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# CodeWarrior Development Studio Common Features Guide

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# Chapter 1

## Introduction

This manual describes the CodeWarrior IDE and debugger features that are common across all the CodeWarrior products. This chapter presents an overview of the manual and the CodeWarrior IDE.

### NOTE

The *CodeWarrior Common Features Guide* (document CWCFUG) may describe features that are not available for your product. Further, the figures show a typical user interface, which may differ slightly from your CodeWarrior product. See your product's *Targeting Manual* for details of its product-specific features.

## 1.1 Release notes

Before using the CodeWarrior IDE, read the release notes. These notes contain important information about the last-minute changes, bug fixes, incompatible elements, or other sections 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.

## 1.2 Documentation structure

CodeWarrior products include an extensive documentation library of user guides, targeting manuals, and reference manuals. Take advantage of this library to learn how to efficiently develop software using the CodeWarrior programming environment.

## 1.2.1 Documentation formats

CodeWarrior documentation presents information in the following formats:

- **PDF** - Portable Document Format of the CodeWarrior manuals, such as the *CodeWarrior Common Features Guide* (document CWCFUG) and the product-specific Targeting manuals.
- **HTML** (Hypertext Markup Language) - HTML versions of the CodeWarrior manuals. To access the HTML version of CodeWarrior manuals, choose **Help > Help Contents** from the CodeWarrior IDE menu bar.

## 1.3 Manual conventions

This topic explains conventions in the *CodeWarrior Common Features Guide* (document CWCFUG).

### 1.3.1 Figure conventions

The CodeWarrior IDE employs a virtually identical user interface across multiple hosts. For this reason, illustrations of common interface elements use images from any host. However, some interface elements are unique to a particular host. In such cases, clearly labeled images identify the specific host.

### 1.3.2 Keyboard conventions

The CodeWarrior IDE accepts keyboard shortcuts, or *key bindings*, for frequently used operations. For each operation, this manual lists corresponding key bindings by platform.

At any time, you can obtain a list of available key bindings using Key Assist ( **Help > Key Assist** or **Ctrl+Shift+L** ).

## 1.4 CodeWarrior IDE overview

The CodeWarrior IDE provides an efficient and flexible software-development tool suite. This topic explains the the software development cycle and the advantages of using the CodeWarrior IDE for development.

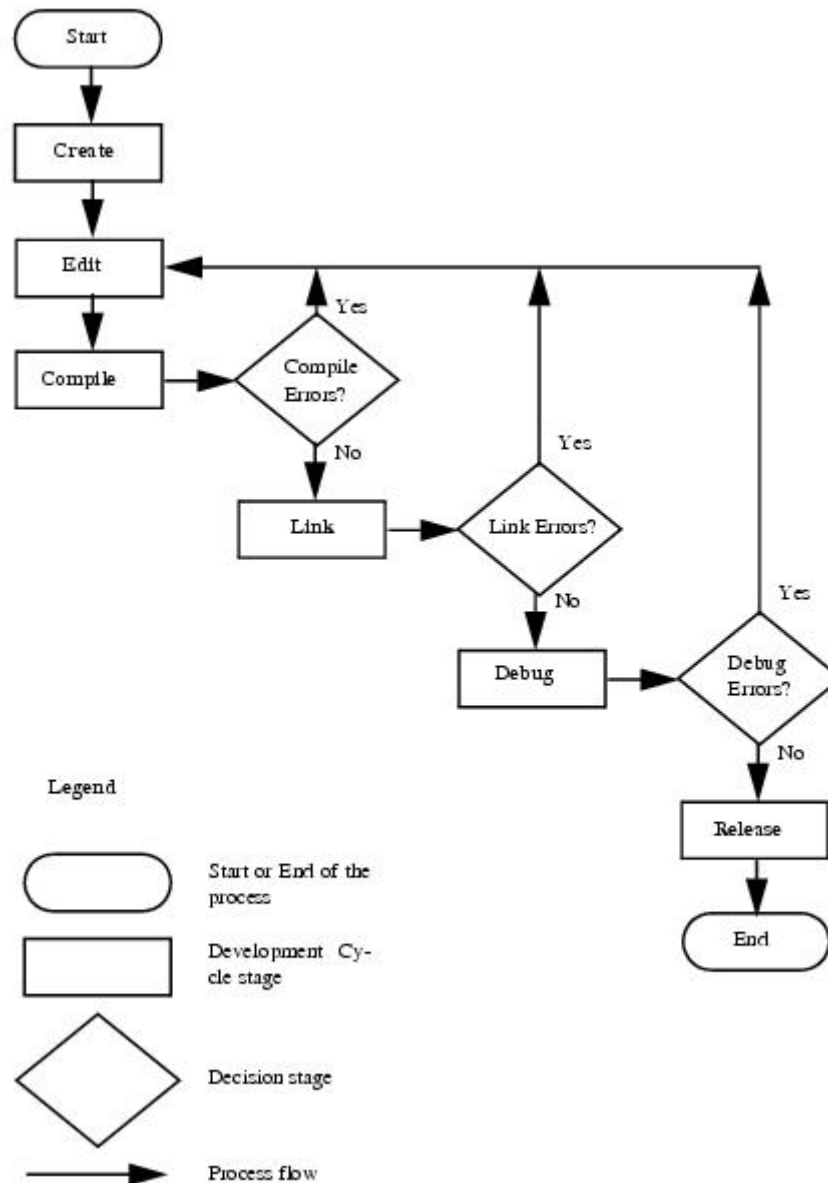
This topic explains:

- [Development cycle](#)
- [CodeWarrior IDE advantages](#)

### 1.4.1 Development cycle

A software developer follows a general process to develop a project:

1. Begin with an idea for a new software.
2. Implement the new idea in source code.
3. Compile the source code into machine code.
4. Link the machine code and create an executable file.
5. Correct errors (debug).
6. Compile, link, and release a final executable file. The following figure shows the development cycle as a flowchart.



**Figure 1-1. CodeWarrior Development Cycle**

## 1.4.2 CodeWarrior IDE advantages

- Cross-platform development

Develop software to run on multiple operating systems, or use multiple hosts to develop the same software project. The CodeWarrior IDE runs on popular operating systems, such as Windows, Solaris, and Linux. It uses virtually the same graphical user interface (GUI) across all Freescale Eclipse-based products.

- Multiple-language support

Choose from multiple programming languages when developing software. The CodeWarrior IDE supports high-level languages, such as C, C++, and Java, as well as in-line assemblers for most processors.

- Consistent development environment

Port software to new processors without having to learn new tools or lose an existing code base. The CodeWarrior IDE supports many common desktop and embedded processor families, such as x86, PowerPC, and MIPS.

- Plug-in tool support

Extend the capabilities of the CodeWarrior IDE by adding a plug-in tool that supports new features. The CodeWarrior IDE currently supports plug-ins for compilers, linkers, pre-linkers, post-linkers, preference panels, version controls, and other tools. Plug-ins make it possible for the CodeWarrior IDE to process different languages and support different processor families.



## Chapter 2

# IDE Extensions

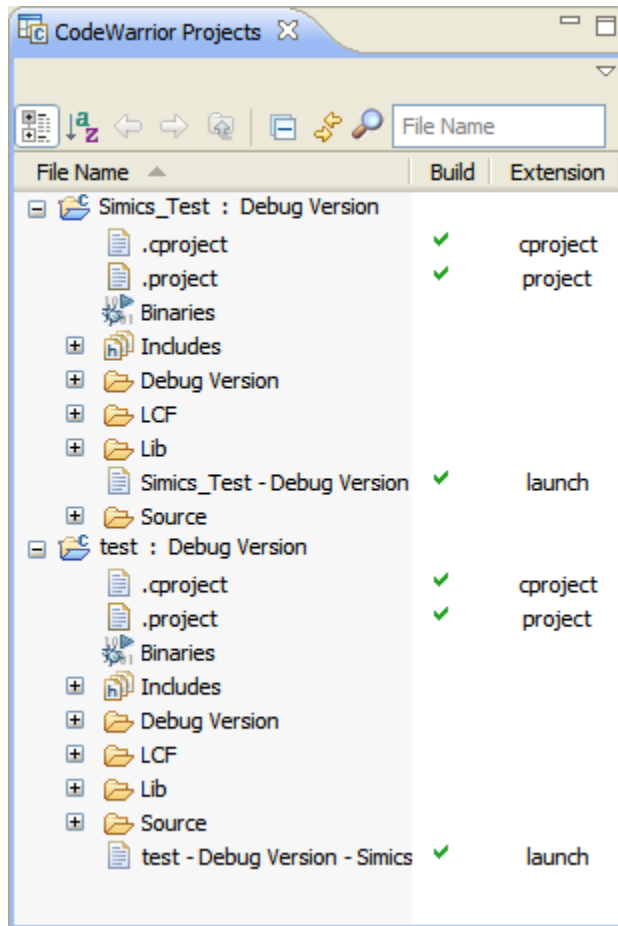
The CodeWarrior IDE is composed of various plug-ins, each of which provide a specific functionality to the IDE. This chapter explains how to work with various extensions (plug-ins) in the Eclipse IDE.

This chapter explains:

- [CodeWarrior Projects view](#)
- [Command line interface](#)
- [Commander view](#)
- [Concurrent compilation](#)
- [Console view](#)
- [Shortcut menus](#)
- [Diagnostic Information export](#)
- [Extracting CodeWarrior configuration details](#)
- [Find and Open File](#)
- [Importing files](#)
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- [Linker Command File navigation](#)
- [Multiple compiler support](#)
- [New External File](#)
- [Problems view](#)
- [Referenced projects](#)
- [Target management via Remote System Explorer](#)
- [Viewing CodeWarrior plug-ins](#)
- [Editing cwide-env file](#)
- [Handling message alerts](#)

## 2.1 CodeWarrior Projects view

The **CodeWarrior Projects** view displays all the resources in a workspace.



**Figure 2-1. CodeWarrior Projects view**

The **CodeWarrior Projects** view is an enhanced version of the **C/C++ Projects** view.

Improvements provided by the **CodeWarrior Projects** view are discussed in the following sections:

- [Active configuration](#)
- [Tree and list view](#)
- [Column headers](#)
- [Quick search](#)
- [Filtering](#)

## 2.1.1 Active configuration



The **CodeWarrior Projects** view displays the name of active configuration associated with a project. Click the configuration name to view the shortcut menu that displays all the configurations available to the project. You can switch to different configurations using this shortcut menu.

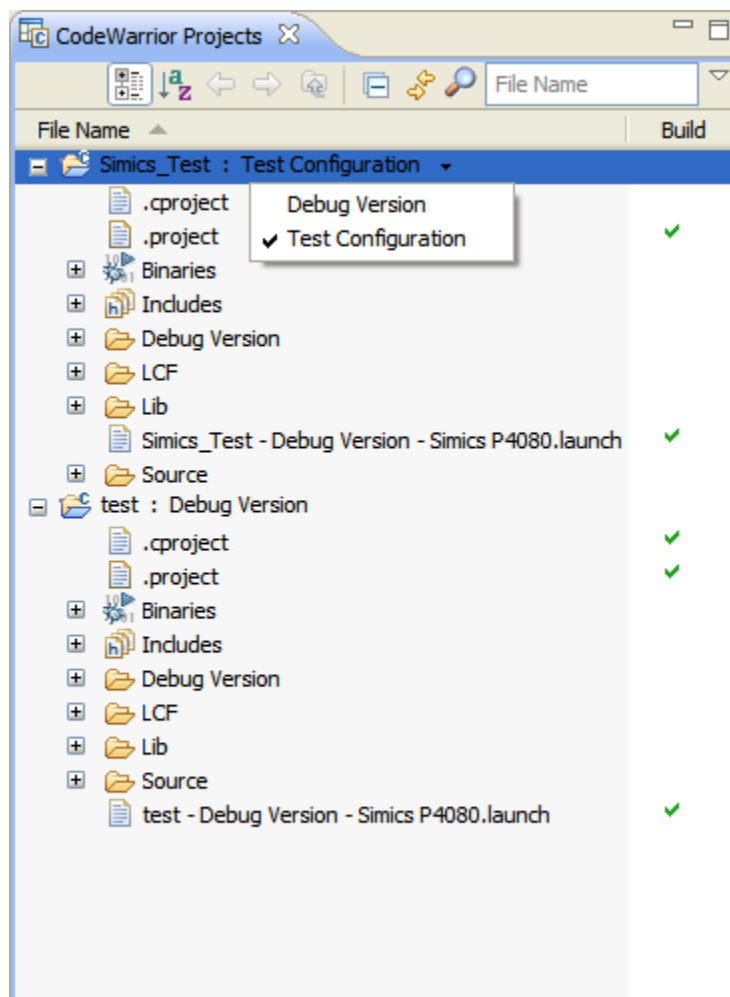




Figure 2-2. CodeWarrior Projects view - Active configuration

## 2.1.2 Tree and list view

The **CodeWarrior Projects** view supports both hierarchal tree and flat list viewing of the resources in a workspace. The table below lists the toolbar icons that can be used to switch the viewing of resources.

**Table 2-1. CodeWarrior Projects view toolbar**

Icon	Description
	Click the <b>Show files in a hierarchal view</b> icon in the <b>CodeWarrior Projects</b> view toolbar to display the resources in hierarchal tree view.
	Click the <b>Show files in a flat view</b> icon in the <b>CodeWarrior Projects</b> view toolbar to display the resources in flat list view.

### 2.1.3 Column headers

You can click on the column header in the **CodeWarrior Projects** view to sort the list of files and folders based on the column. A small triangle in the column header indicates the active column and the sort order. If a column is active, clicking on its header toggles between the descending and ascending order.

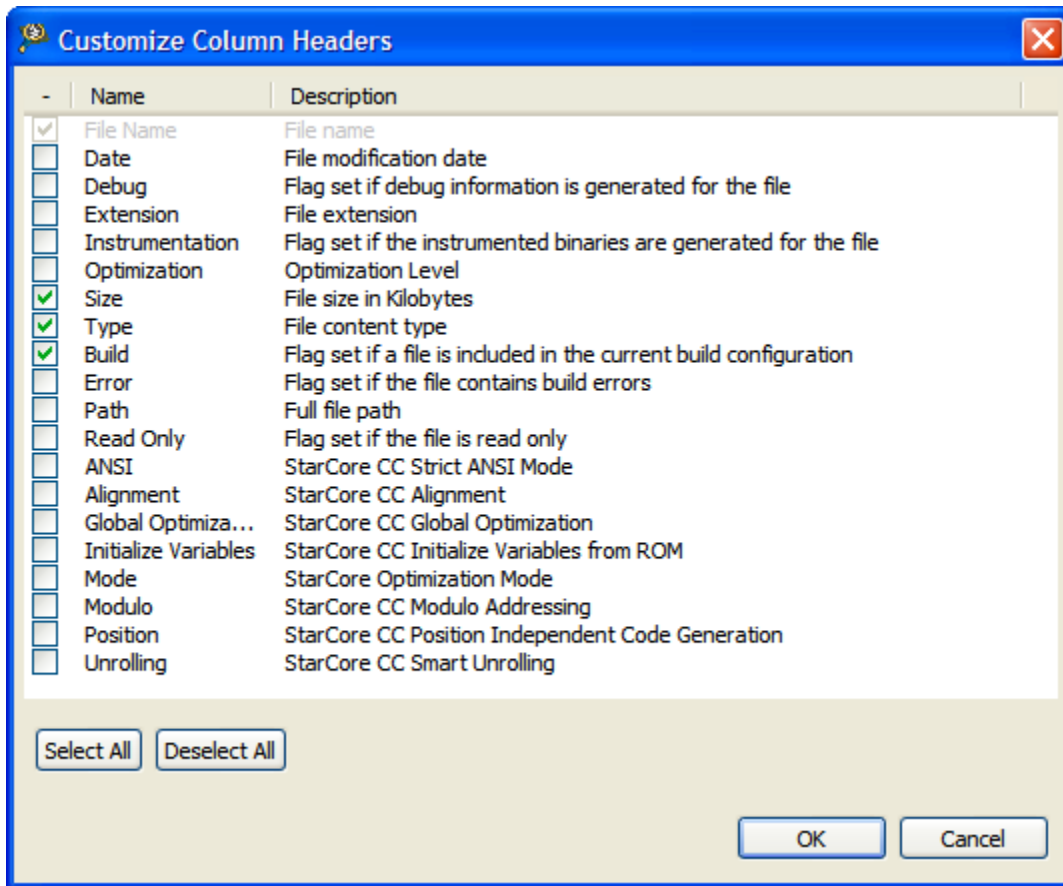
#### NOTE

The files can be sorted in both hierarchal and flat list views.  
Sorting is not case-sensitive for strings.

To add a column header in the **CodeWarrior Projects** view:

1. Choose **Customize Column Headers** from the **CodeWarrior Projects** view pop-up menu.

The **Customize Column Headers** dialog appears.



**Figure 2-3. Customize Column Headers**

2. Select a checkbox to display or hide the corresponding column in the **CodeWarrior Projects** view. Alternatively, you can click **Select All** or **Deselect All** to display or hide all the columns listed in the dialog.
3. Click **OK**.

#### NOTE

You cannot customize the **FileName** column using the **Customize Column Headers** dialog.

The column header is added to the **CodeWarrior Projects** view.

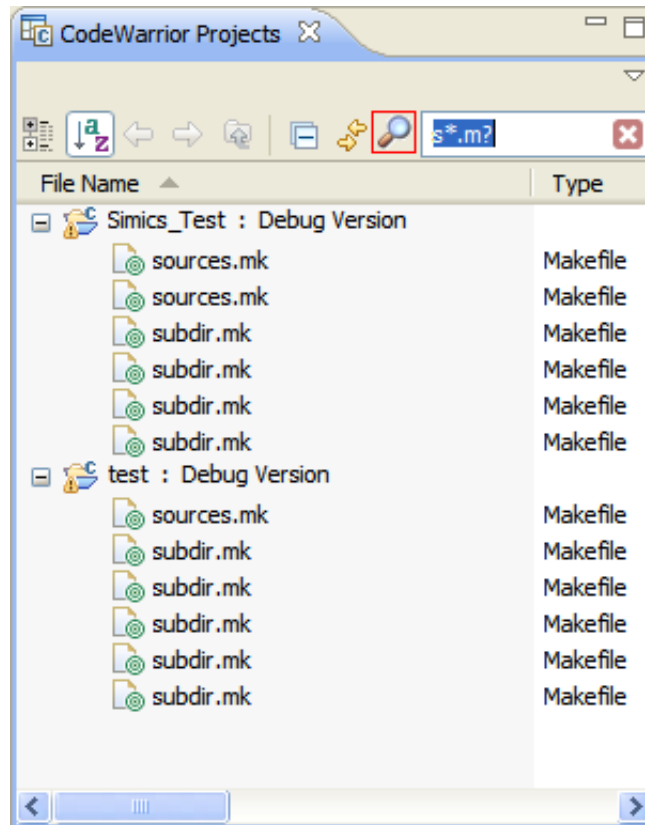
### 2.1.4 Quick search

The **CodeWarrior Projects** view provides Quick Search that lets you filter the files in the current view based on the expression you enter. Quick Search provides the following features:

- Type Ahead - Type the first few letters of the file name and the **CodeWarrior Projects** view automatically selects the appropriate file based on the string typed.
- Wildcard character support - You can also use basic wildcard characters, such as ? and \*, to extend your search.

**NOTE**

The **CodeWarrior Projects** view automatically switches to the flat view when an expression is entered in the Search Text textbox.



**Figure 2-4. CodeWarrior Projects view - Quick search**

Click the **Popup** icon in the **CodeWarrior Projects** view toolbar to specify the fields in which the Eclipse IDE searches for the expression typed in the **Search Text** textbox.

**NOTE**

When you click the **Popup** button, the fields appear depending on the headers enabled in the view.

Click the **Erase Text** icon in the **CodeWarrior Projects** view toolbar to clear the Quick Search query. The **CodeWarrior Projects** view reverts to the normal view displaying all the folders and files in the workspace.

## 2.1.5 Filtering

The **CodeWarrior Projects** view lets you filter the elements being displayed. The following four filters has been added to filter the content in the **CodeWarrior Projects** view.

- **Generated Files** - Filters the output directory associated with each build configuration. This contains all files generated by a build including the executable files, object files, ephemeral makefiles, dependency files, map files, and other such elements. Typically, these files are all contained within a directory named after the build configuration. The entire directory is filtered.
- **Includes** - Filters out the `Includes` element, which shows the include paths the project is using and the included files.
- **Launch Configurations** - Filters `.launch` files, which are the launch configurations stored with the project. Typically, these files are stored in a `Debug_Settings` folder. In such case, the entire folder is filtered.
- **Referenced Projects** - Filters the Referenced Projects element that shows what other projects and build-configurations are referenced by the project.

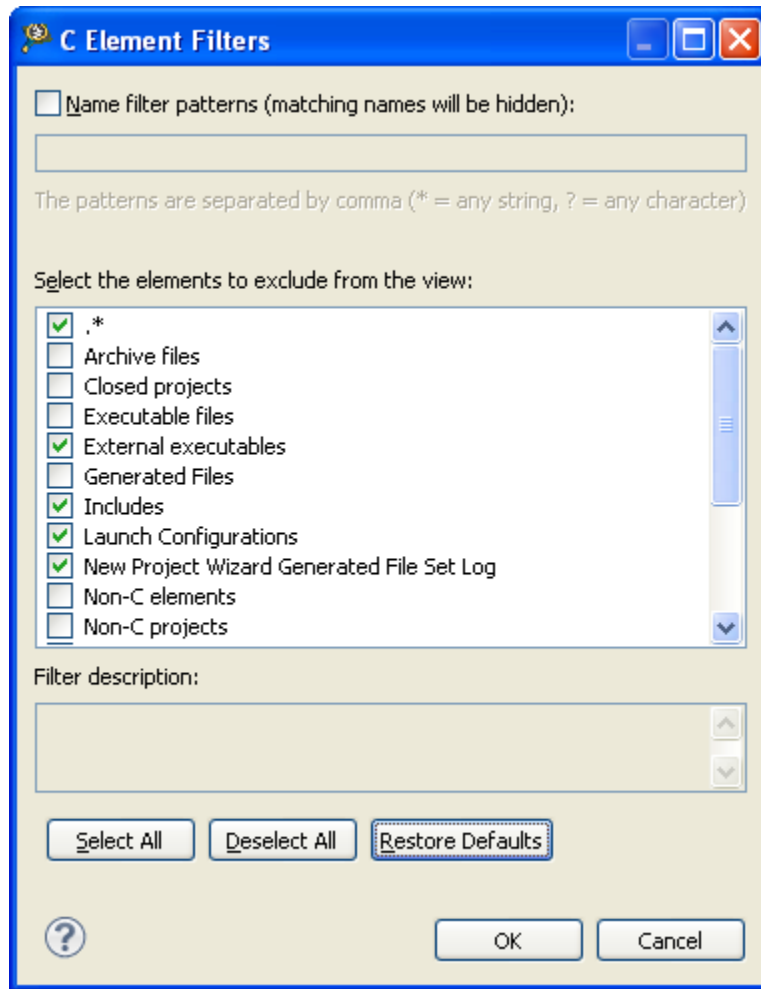
To filter the content of the **CodeWarrior Projects** view:

1. Click the inverted triangle icon in the **CodeWarrior Projects** view.

The shortcut menu appears.

2. Choose **Filters**.

The **C Element Filters** dialog appears.



**Figure 2-5. C Element Filters dialog**

3. Select the filter element you want to exclude from the **CodeWarrior Projects** view.
4. Click **OK**.

## 2.2 Command line interface

A new command- line tool, `ecd.exe` , is installed along with the `cwide.exe` that allows you to run build commands.

To create an Eclipse build from the `ecd` command line:

1. Click **Start** , click **Run** , type `cmd` to open **Command Prompt** .
2. Navigate to the `< CWInstallDir> \eclipse\` folder to invoke the `ecd` command line.
3. At the command prompt, type the following command:

```
ecd -build -data my_workspace_path -project my_project_path
```

**NOTE**

Projects specified by the `-project` flag that are not present in the workspace (either the default one or the one specified by the `-data` flag) are automatically imported in the workspace as existing project in the file system, and recorded in the workspace metadata.

The `ecd` commands are listed below:

- [build](#)
- [getOptions](#)
- [generateMakefiles](#)
- [references](#)
- [setOptions](#)
- [updateWorkspace](#)

**2.2.1 build**

Builds a set of C/C++ projects. Multiple-project flags can be passed on the same command invocation. The build tool output is generated on the command line, and the build result is returned by `ecd.exe` return code, as 0 for success, and -1 for failure.

**Syntax**

```
ecd.exe -build [-verbose] [-cleanAll] [ -project path [ - config name | -allConfigs] -cleanBuild]
```

**Parameters**

`-cleanBuild`

The `-cleanBuild` command applies to the preceding `-project` only.

`-cleanAll`

The `-cleanAll` command applies to all `-project` flags.

`-config`

The build configuration name. If the `-config` flag isn't specified, the default build configuration is used.

## 2.2.2 getOptions

Prints to the standard output C/C++ managed build, launch configuration or RSE system settings.

### Syntax

```
ecd.exe -getOptions -project path [-config name | -allConfigs] [- file path] [-option option-name] [-launchConfig name | - allLaunchConfigs] [-rseSystem name | -allRseSystems]
```

### Parameters

`-config`

The build configuration name. If the `-config` flag isn't specified, the default build configuration is used.

`-allConfigs`

Specifies that all build configurations will be edited or listed

`-file`

The file path of a file included in the project. If the `-file` flag is specified, a file-level setting is retrieved instead of a build configuration level setting(s). The `-file` flag does not apply to the `-launchConfig`, `-allLaunchConfigs` and `-rseSystem` flags.

`-option`

If the option setting isn't specified, all options are printed in a `key=value` format instead of a single option value, which could be used for discovering the list of option ids in a given build configuration, launch configuration or RSE system.

`-option-name`

Specify the option name.

`-launchConfig`

The launch configuration name. Allows retrieving launch configuration settings.

`-allLaunchConfigs`

Allow retrieving all launch configuration settings.

`-rseSystem`

The RSE system name. Allow retrieving RSE system settings.

`-allRseSystems`

Lets you retrieve RSE targets and connections settings.



## 2.2.3 generateMakefiles

Create the makefiles required to build a C/C++ project.

### Syntax

```
ecd.exe -generateMakefiles [-verbose] [ -project path [ - config name ] [-allConfigs] ]
```

### Parameters

`-config`

The build configuration name. If the `-config` flag isn't specified, the default build configuration is used.

`-data workspace-path`

The `-data workspace-path` flag can be used to specify a custom workspace.

## 2.2.4 references

List, add or remove all the referenced project and build configurations in a project.

### Syntax

```
ecd.exe -references -project path [-config name | -allConfigs] ( - list | -add | -remove)
referencedProjectLocation [buildConfigurationName]
```

### Parameters

`-config name`

The name of the build configuration to edit or list referenced project. If the `-config` flag is omitted, the active build configuration will be used

`-allConfigs`

Specifies that all build configurations will be edited or listed.

`-list`

List all the referenced projects and build configurations

`-add referencedProjectLocation [buildConfigurationName]`

Adds a new referenced project, specified by the 'referencedProjectLocation', which can be either an absolute path, or a variable relative path (relative to the path variables defined in the project specified by the -project flag). If the buildConfigurationName is specified, a specific the build configuration rather than the active build configuration will be referenced.

```
-remove referencedProjectLocation [buildConfigurationName]
```

Removes an existing referenced project, specified by the 'referencedProjectLocation', which can be either an absolute path, or a variable relative path (relative to the path variables defined in the project specified by the -project flag). If the buildConfigurationName is specified, only the specific referenced build configuration will be removed, otherwise all references to the specified project will be removed.

## 2.2.5 setOptions

Modify C/C++ managed build, launch configuration or RSE system settings.

### Syntax

```
ecd.exe -setOptions -project path [-config name | -allConfigs | - rseSystem name | -
launchConfig name | -allLaunchConfigs] [-file path] (-set | -prepend | -append | -insert)
option-name option- value
```

### Parameters

-config

The build configuration name. If the '-config' flag isn't specified, the default build configuration will be used.

-file

The path of a file included in the project. If the '-file' flag is specified, a file-level setting is changed instead of a build configuration level setting. The -file flag does not apply to the -launchConfig , -allLaunchConfigs and -rseSystem flags.

-set | -prepend | -append | -insert

A setting can be either changed by replacing its previous value by the new specified one, using the -set flag, or prepended or appended to the existing value using the -prepend and -append flags respectively. The -insert flag can be used for updating exist macros values in macro settings.

option-name

A complete option-name list can be obtained by using the -getOptions command documented above.

`option-value`

The new value of the setting to be changed.

`-launchConfig`

The launch configuration name. Allows modifying launch configuration settings.

`-allLaunchConfigs`

Allow retrieving all launch configuration settings.

`-rseSystem`

The RSE system name. Allow retrieving RSE system settings.

## 2.2.6 updateWorkspace

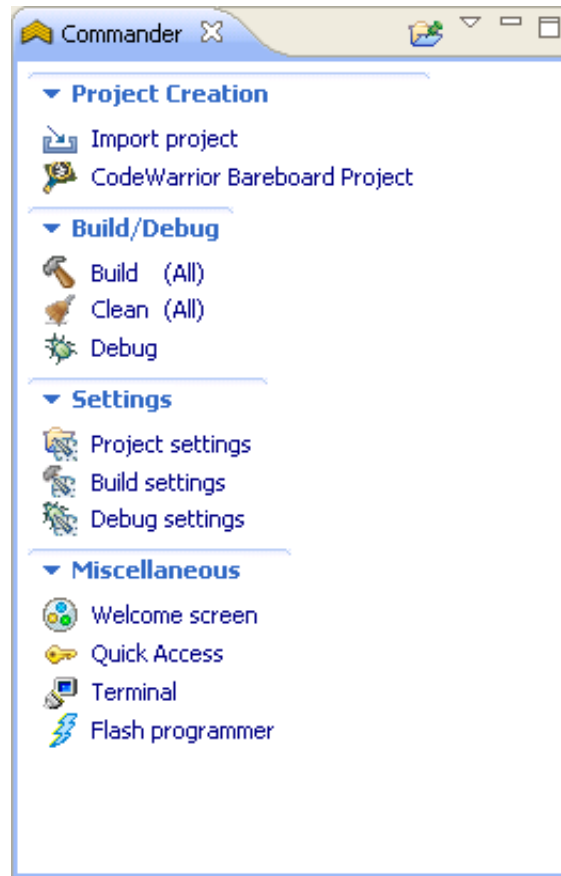
Update a workspace `.metadata` by including any project already located in the workspace file system directory. Optionally, supports redirecting the standard output to a logfile. Also supports leaving the Workbench UI open with the `-noclose` flag.

### Syntax

```
ecd.exe -updateWorkspace -data workspace-path [-logfile path] [-noclose]
```

## 2.3 Commander view

The **Commander** view provides quick access to some of the common and basic CodeWarrior operations. This concept is similar to that of the Quick Launch Bar in Windows. The **Commander** view provides an icon and a descriptive label for each action. The **Commander** view is optional and customizable.



**Figure 2-6. Commander view**

The **Commander** view is not only a new place for existing commands, but also for new commands which optimize common user workflows. Some commands map directly to existing commands in the IDE. For example, the **Welcome screen** command and the **Build All** command. These two commands behave identically to the commands in the IDE menu and toolbar. However, most commands are either improvements on existing commands or commands which reduce the number of steps to get to an existing user interface or functionality.

In the **Commander** view, some commands have variant commands that appear next to the root command. The root command works for a single project; while the All variant works for all projects in the workspace. For example, the **All** command next to the **Build** command. These are two independent commands on a single line. The **All** variant is always available because it does not need a project context, while the **Build** command is available only when there is a selection in the **CodeWarrior Projects** view or the view is pinned to a project ( [Pinning Commander view](#)). A variant action does not have an icon and is visible only if its base command is shown.

Commands in the **Commander** view, are grouped in the following four groups:

- Project Creation

- Build/Debug
- Settings
- Miscellaneous

Each group is a collapsible section and each command has a key binding, which appears in the tooltip of the command. By default, the **Commander** view is docked under the **CodeWarrior Projects** view but like any other view it can be moved to any location within the CodeWarrior IDE.

#### **NOTE**

Commands displayed in the **Commander** view may vary from product to product.

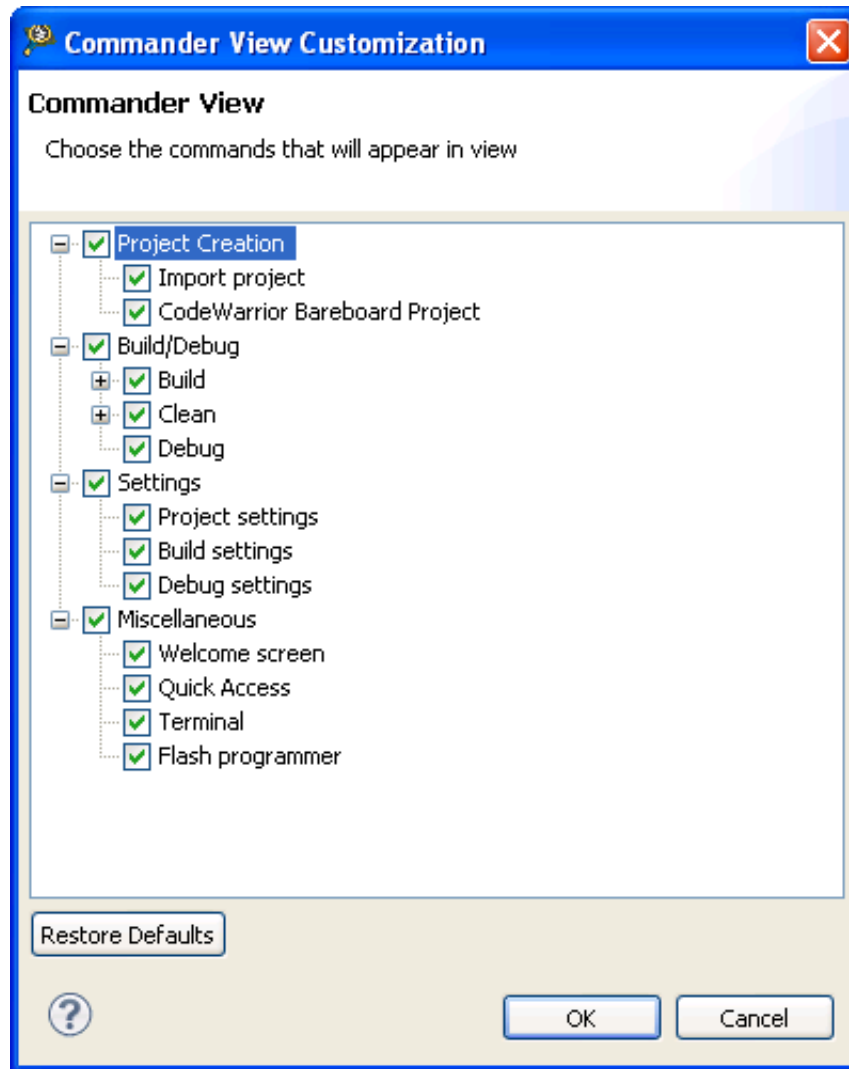
### **2.3.1 Customizing Commander view**

You can customize the content of the **Commander** view by choosing the commands to be displayed in the **Commander** view.

To customize the **Commander** view:

1. Choose **Customize** from the pop-up menu in the **Commander** view.

The **Commander View Customization** dialog appears.



**Figure 2-7. Customizing Commander view**

2. Expand a command group.
3. Select/deselect the command you want to hide/display.
4. Click **OK**.

The selected commands appear in the **Commander** view.

#### **NOTE**

Clicking the **Restore Default** button sets the command set choices to the default combination.

## 2.3.2 Pinning Commander view

If you have multiple projects in your workspace but work mostly on a particular project, then you are allowed to pin the **Commander** view to a specific project. So whenever you perform another task from the **Commander** view, it uses the pinned project for its context regardless of the project selected in the **CodeWarrior Projects** view.

Click the **Pin to Project** button in the **Commander** view to set the context to a particular project. A label also appears in the top-right corner to the Commander view specifying the project the view is pinned to.

The following figure shows the pinned **Commander** view:

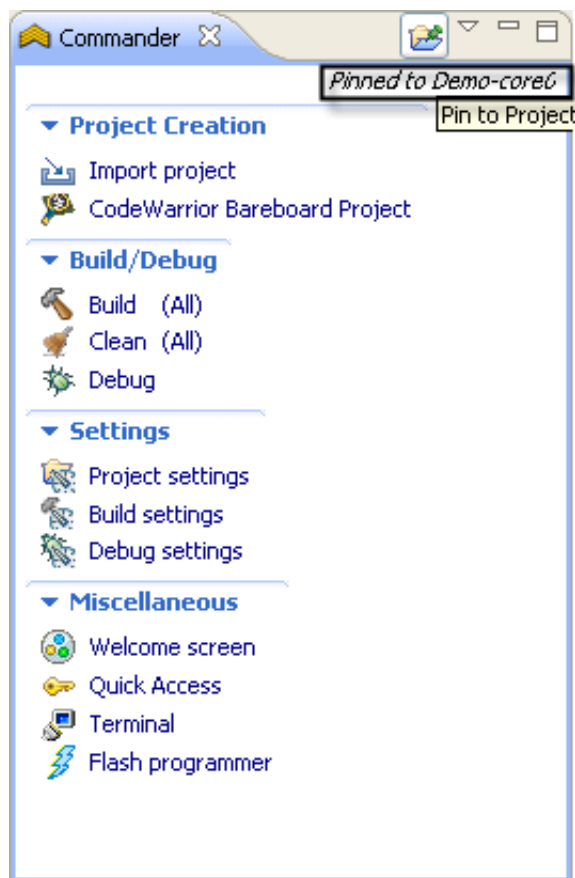


Figure 2-8. Pinning Commander view

## 2.4 Concurrent compilation

The concurrent compilation feature allows you to specify number of processes to compile the project.

To enable the concurrent compilation for a project:

## Concurrent compilation

1. In the **CodeWarrior Projects** view, right-click the project folder.

A shortcut menu appears.

2. Choose **Properties** from the shortcut menu.

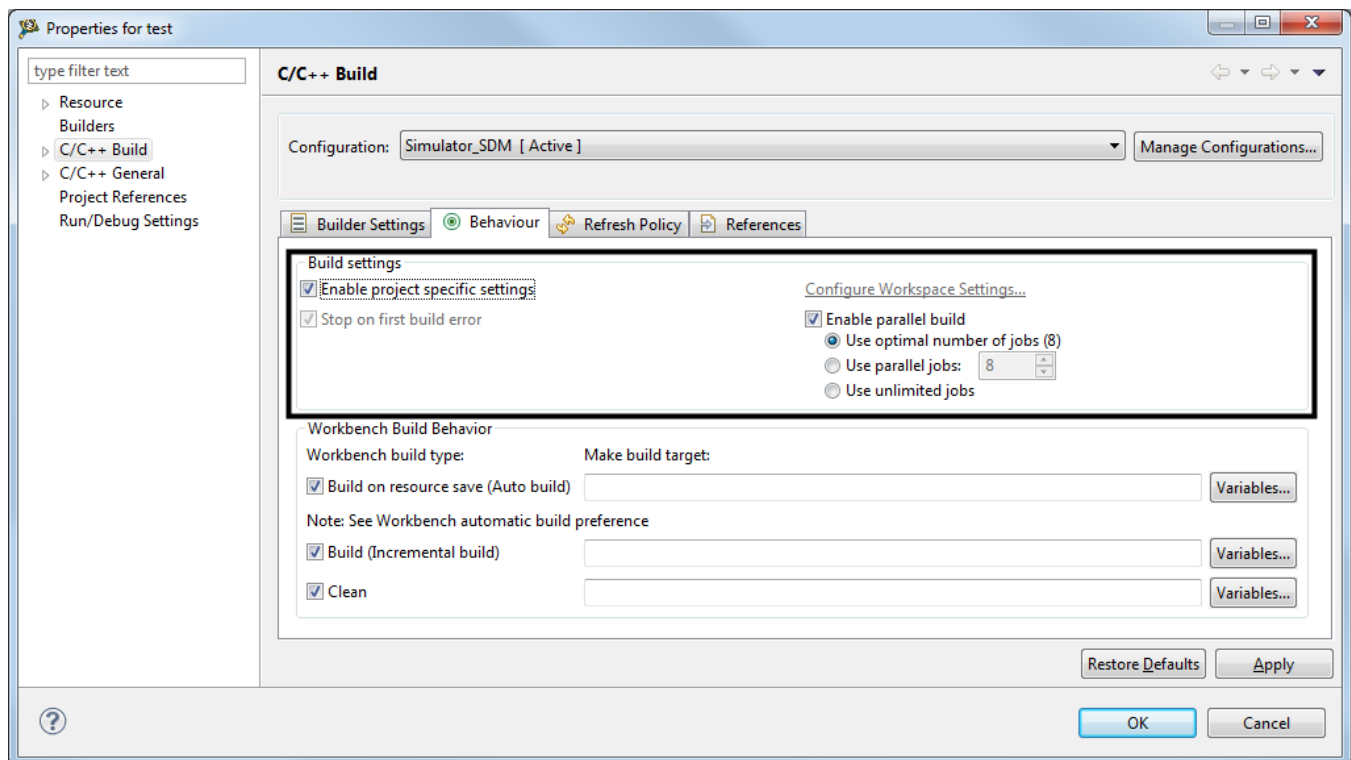
The **Properties for <project>** dialog appears.

3. Select **C/C++ Build** from left pane of the **Properties for <project>** dialog.

The C/C++ build properties appear in the right pane of the **Properties for <project>** dialog.

4. Click the **Behaviour** tab.

The C/C++ build behavior properties appear under the **Behaviour** pane in the **Properties for <project>** dialog.



**Figure 2-9. Properties for <Project> dialog**

5. Select the **Enable project specific settings** checkbox.

The **Enable parallel build** checkbox is available.

6. Select any one of the following options.

- Use optimal number of jobs
- Use parallel jobs
- Use unlimited jobs



**NOTE**

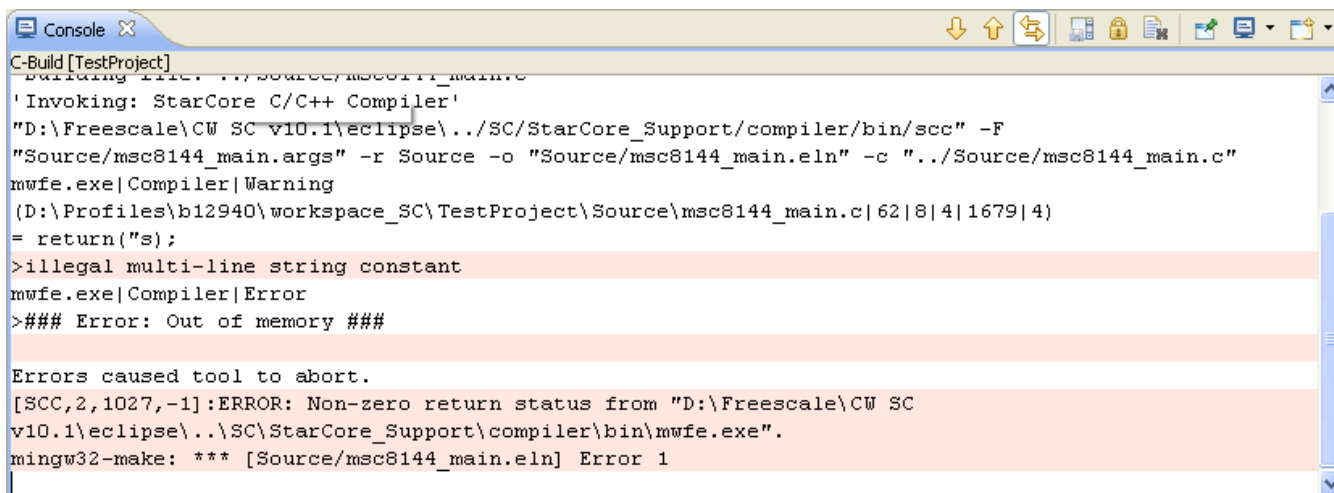
CodeWarrior Power Architecture does not support using parallel jobs. For this reason, the **Use parallel jobs** option is not available in the latest versions of the CodeWarrior Development Studio for Power Architecture Processors.

7. Click **Apply**.
8. Click **OK**.

You have now specified number of processes to compile the project.

## 2.5 Console view

The CodeWarrior **Console** view displays the output from the build (standard out and standard error) as it is generated by the build process. Double-clicking the error or warning message in the **Console** view moves the cursor to the error-source in the Editor window.



```

C-Build [TestProject]
Building file: ../Source/msc8144_main.c
'Invoking: StarCore C/C++ Compiler'
"D:\Freescale\CW SC v10.1\eclipse\..\SC\StarCore_Support\compiler\bin\scc" -F
"Source/msc8144_main.args" -r Source -o "Source/msc8144_main.eln" -c "../Source/msc8144_main.c"
mwfe.exe|Compiler|Warning
(D:\Profiles\b12940\workspace_SC\TestProject\Source\msc8144_main.c|62|8|4|1679|4)
= return("s");
>illegal multi-line string constant
mwfe.exe|Compiler|Error
>### Error: Out of memory ###

Errors caused tool to abort.
[SCC,2,1027,-1]:ERROR: Non-zero return status from "D:\Freescale\CW SC
v10.1\eclipse\..\SC\StarCore_Support\compiler\bin\mwfe.exe".
mingw32-make: *** [Source/msc8144_main.eln] Error 1

```

Figure 2-10. Console view

## 2.6 Shortcut menus

Shortcut menus provide shortcuts to frequently used menu commands. The available menu commands change, based on the context of the selected item.

## Diagnostic Information export

Use shortcut menus to apply context-specific commands to selected items. Right-click an item to open a shortcut menu for that item. The shortcut menu appears, displaying menu commands applicable to the selected item.

Examples of situations in which the debugger displays a shortcut menu are:

- Changing the format of variables displayed in variable panes
- Manipulating breakpoints and the program counter in source code panes
- Viewing memory in separate views

### Tip

To discover additional features, try right-clicking in each IDE view to see what commands are presented in the shortcut menu that appears.

The following figure shows the shortcut menu displayed in the **Variables** view.

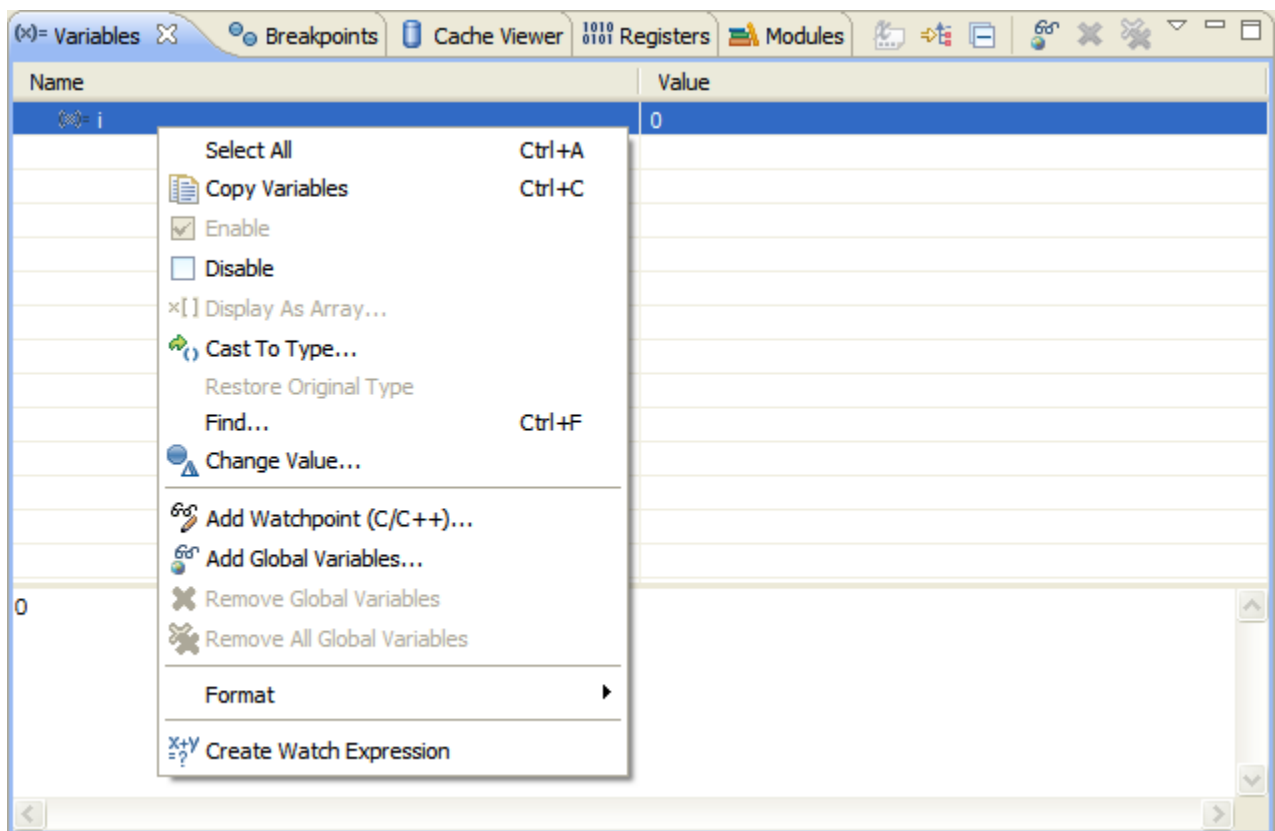


Figure 2-11. Shortcut menu in Variables view

## 2.7 Diagnostic Information export

The Diagnostic Information export feature allows you to export error log information to Freescale support group to diagnose the issue you have encountered while working on the CodeWarrior product. You can export diagnostic information in the following two ways:

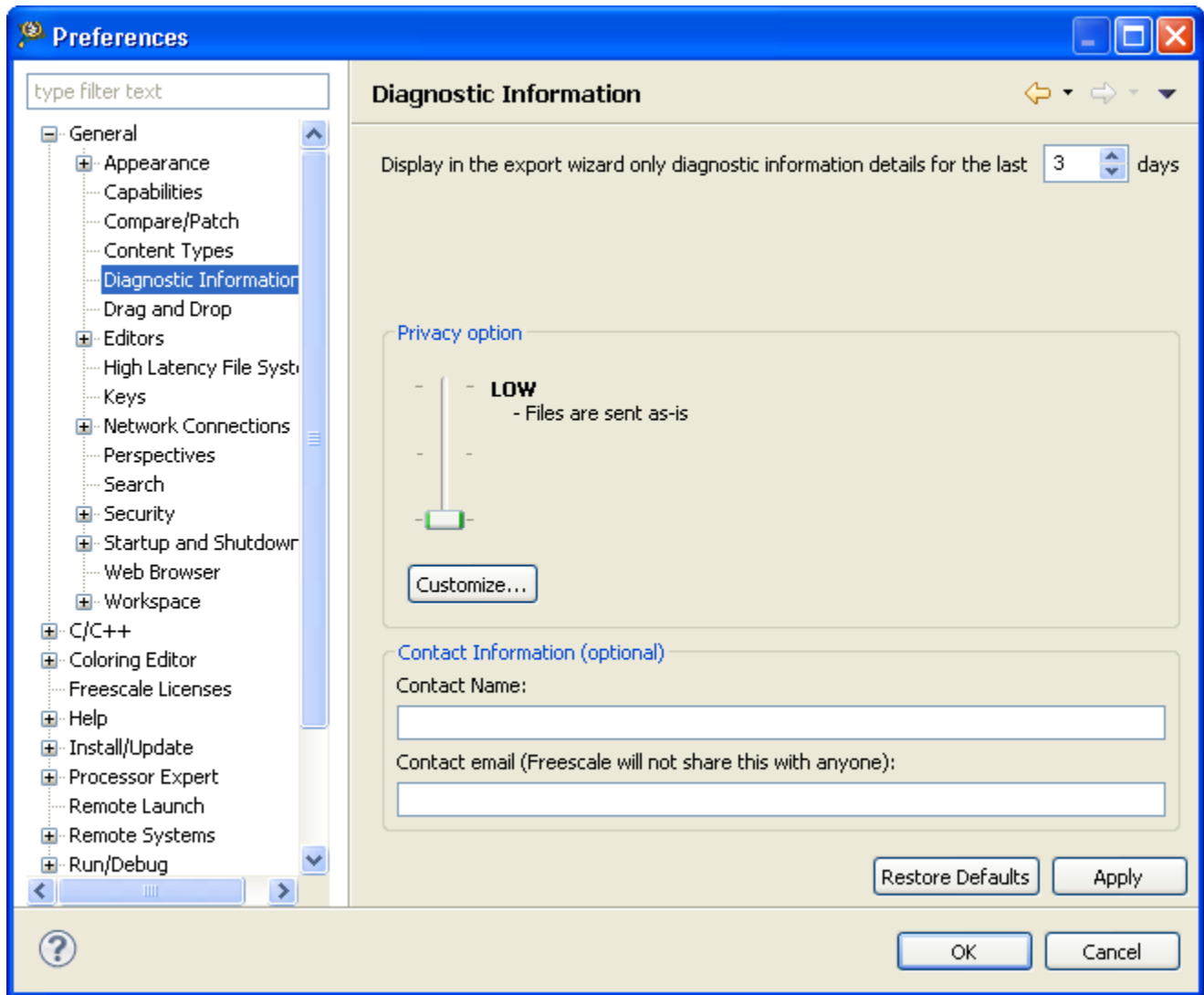
- Whenever an error dialog invokes to inform some exception has occurred, the dialog displays an option to open the Export wizard. You can then choose the files you want to send to Freescale support.
- You can manually open the Export wizard to generate an archive of logs and files to report any issue that you have encountered.

### 2.7.1 General settings for Diagnostic Information

To set general settings for diagnostic information, follow the steps given below:

1. Choose **Windows > Preferences** from the IDE menu bar.

The **Preferences** dialog appears.



**Figure 2-12. Preferences dialog - Diagnostic Information**

- Expand the **General** group and choose **Diagnostic Information**.

The **Diagnostic Information** page appears.

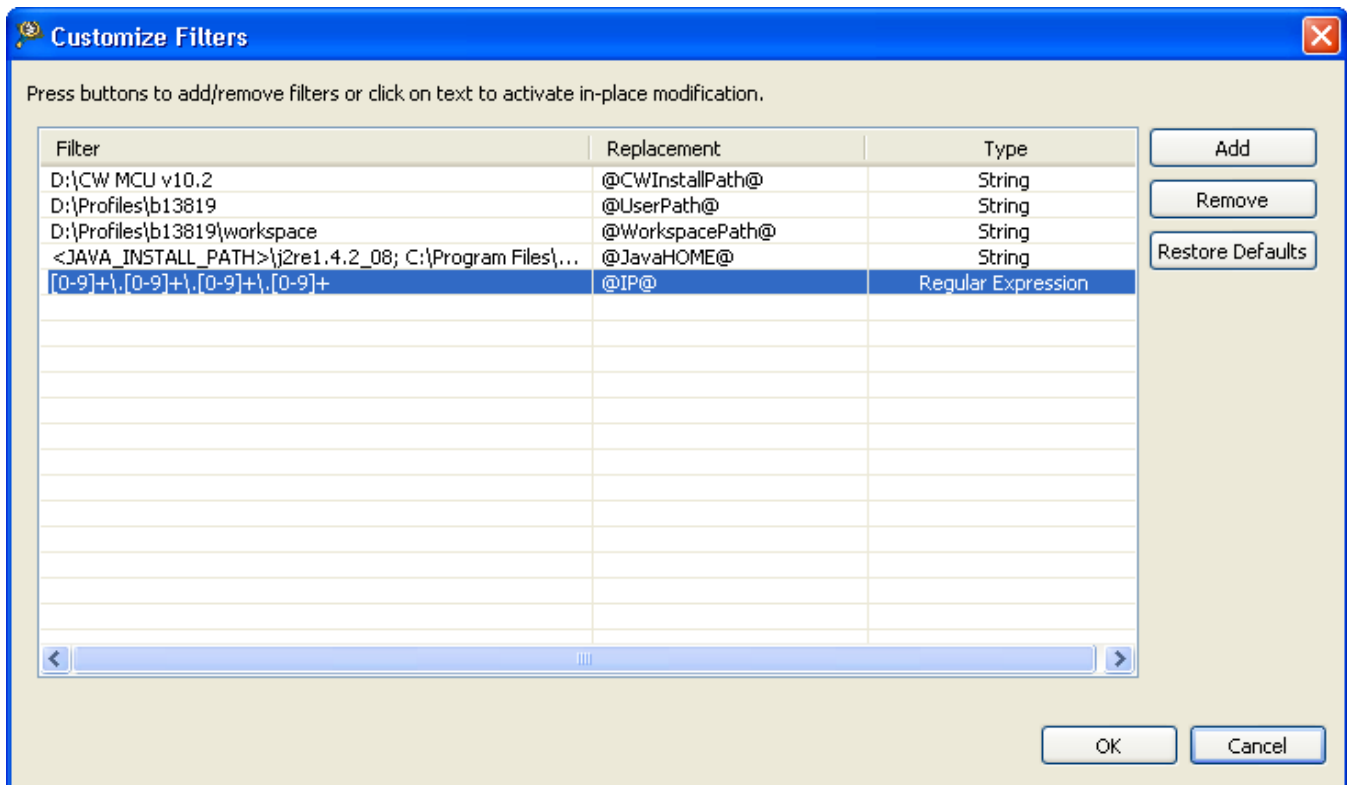
- Enter the number of days for which you want to display the diagnostic information details in the export wizard.
- Select the **Privacy** option by dragging the bar to low, medium and high.

Privacy level setting is used to filter the content of the logs.

- **Low:** The file is sent as is.
- **Medium:** The personal information is obfuscated. You can click on the customize option to view or modify filter.
- **High:** The personal information is removed. Filters are used in the rest of the content.
- Click **Customize** to set privacy filters.

The **Customize Filters** dialog appears. You can add, remove, and modify filters.

- Click **OK** .



**Figure 2-13. Diagnostic Information - Customize Filters**

- Enter **Contact Name** and **Contact Email** in the contact information textbox. This information is optional though Freescale will not share this information with anyone.
- Click **Restore Defaults** to apply default factory settings.
- Click **OK** .

You have set the general settings for diagnostic information.

## 2.7.2 Export Diagnostic Information

To export diagnostic information into an archive file in workspace, follow the steps given below:

1. Choose **File > Export** from the IDE menu bar

The Export dialog appears.

2. Expand the **General** group and choose **Diagnostic Information** option.

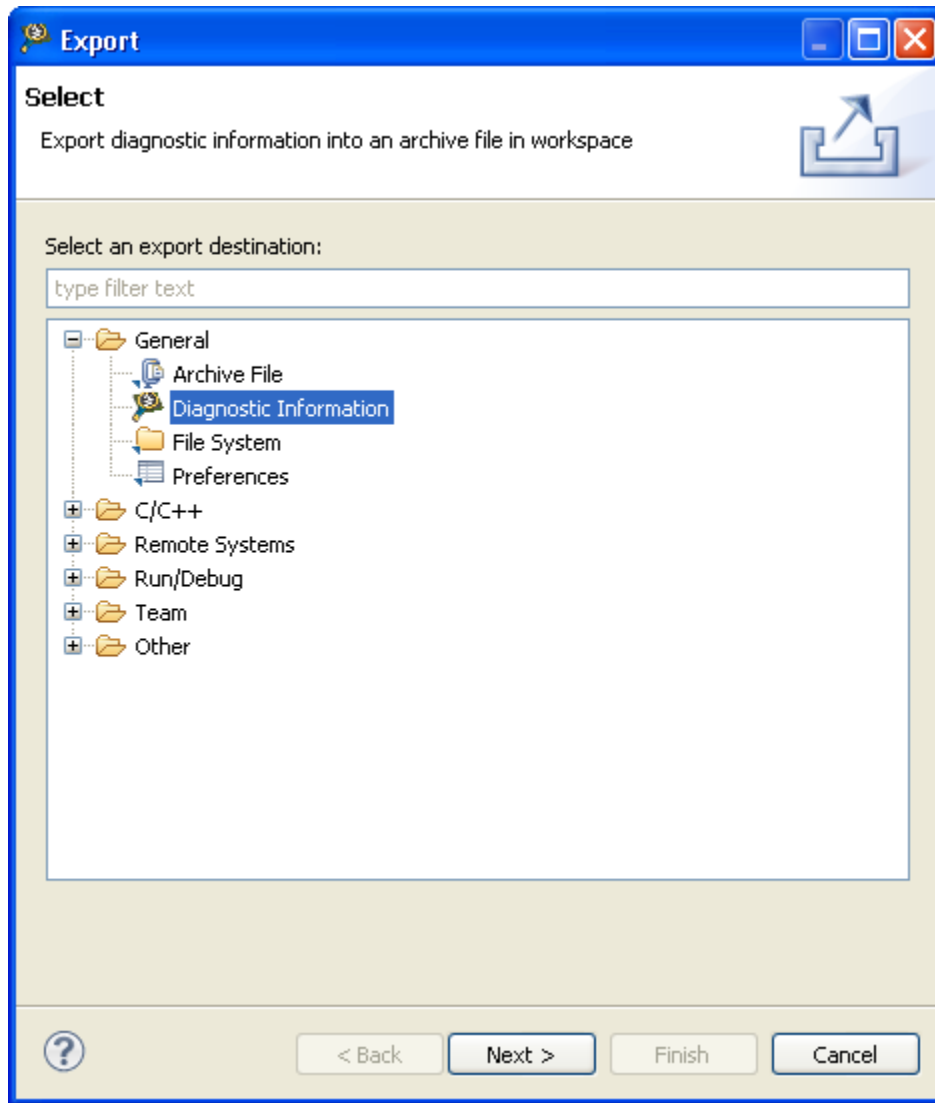
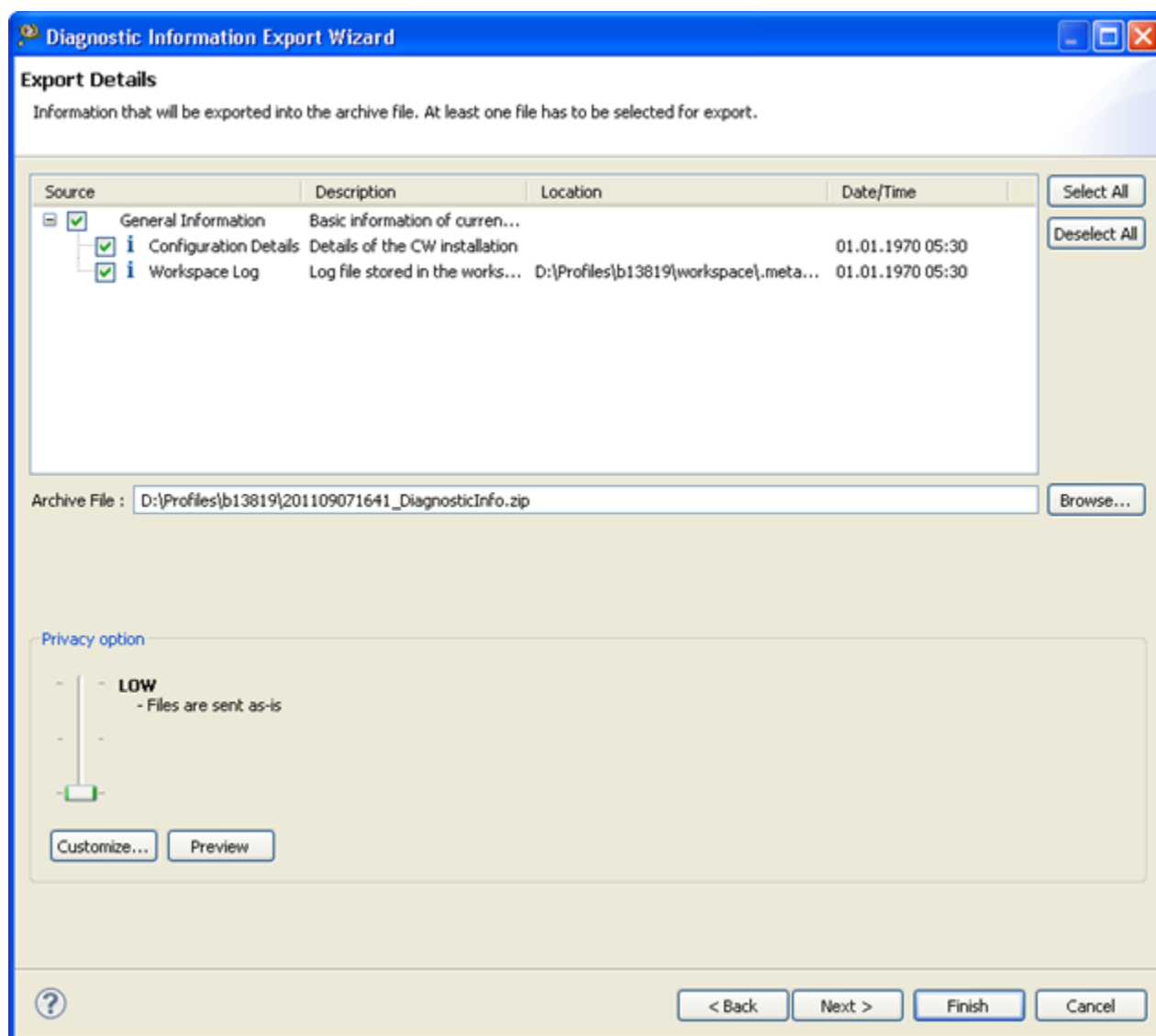


Figure 2-14. Export - Diagnostic Information Dialog

3. Click **Next**.

The **Diagnostic Information Export Wizard** appears.



**Figure 2-15. Diagnostic Information Export Wizard**

4. Select the checkbox under the **Source** column to select the information that will be exported into the archive file.

#### NOTE

You must select at least one file for export.

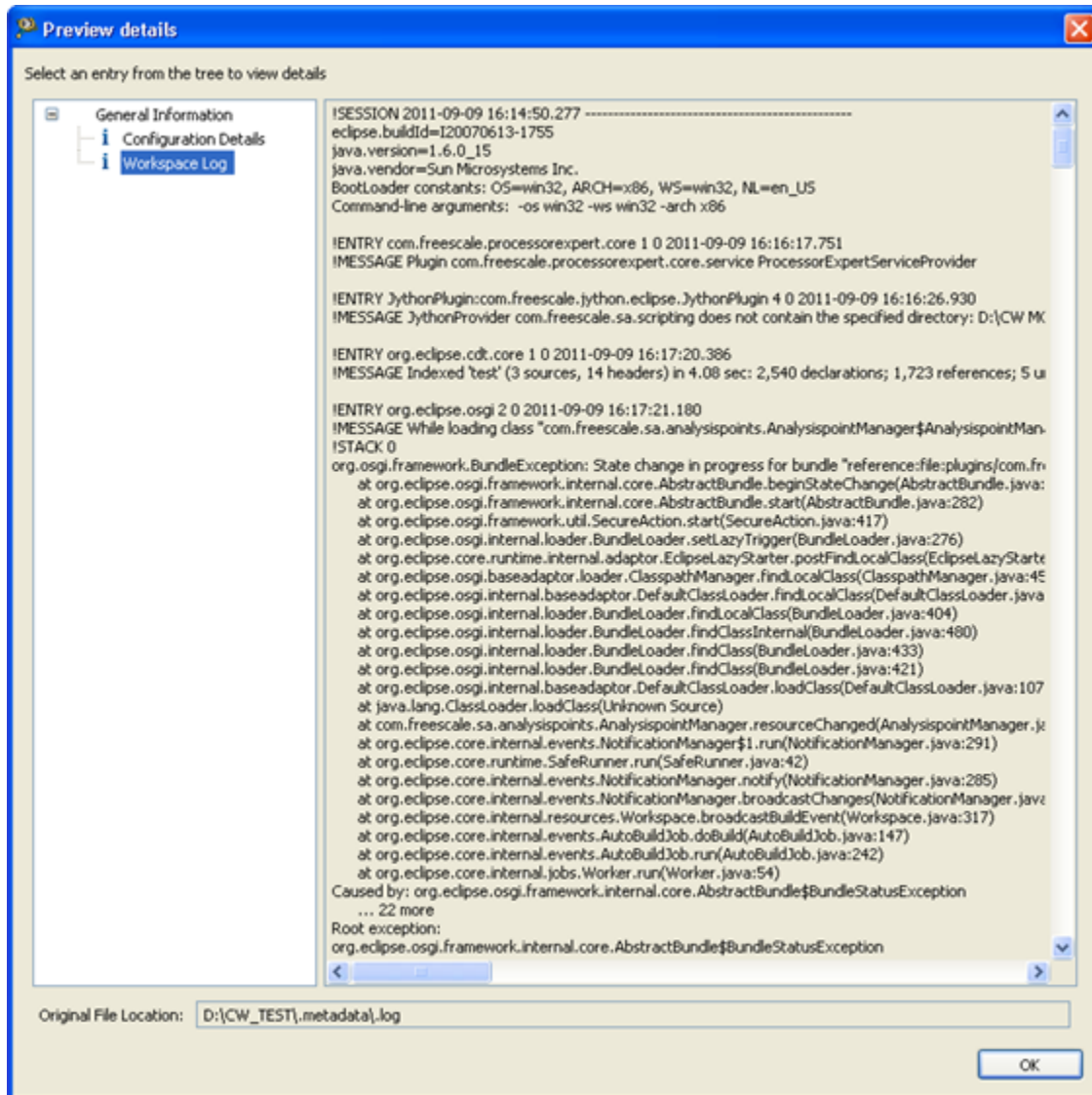
5. Click **Browse** to select a different archive file location.
6. Select the **Privacy option** or click **Customize** to set your privacy level. The **Customize Filters** dialog appears.

#### NOTE

You can open the **Customize Filters** dialog through **Customize** button in the **Diagnostic Information Export**

Wizard ( [Figure 2-15](#)) or in the **Preferences** dialog ( [General settings for Diagnostic Information](#)).

- Click **Preview** to view the text that will be sent to Freescale from the wizard. The **Preview details** dialog appears.



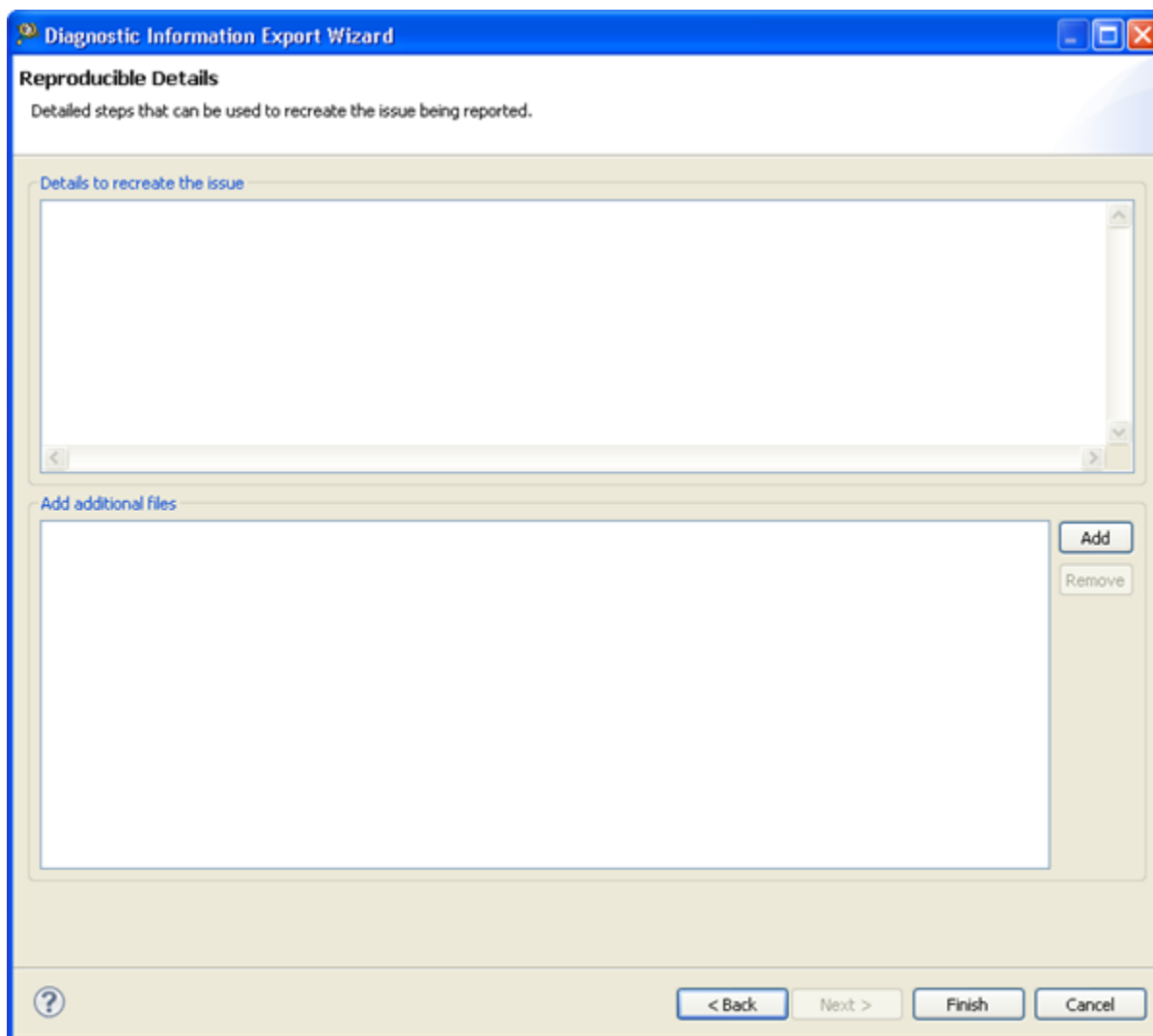
**Figure 2-16. Preview details Dialog**

You can also check if more filters are needed to protect any sensitive information from leakage.

- Click **OK**.
- Click **Next** in the **Diagnostic Information Export Wizard**.

The **Reproducible Details** page appears.





**Figure 2-17. Reproducible Details Dialog**

10. Enter the reproducible steps and any other relevant information in the **Details to recreate the issue** textbox.
11. Click **Add** to add additional files to the archive file for diagnosis.
12. Click **Finish**.

## 2.8 Extracting CodeWarrior configuration details

To extract the configuration details of the currently installed CodeWarrior features and associated plug-ins:

1. Choose **Help > About CodeWarrior Development Studio** from the IDE menu bar.

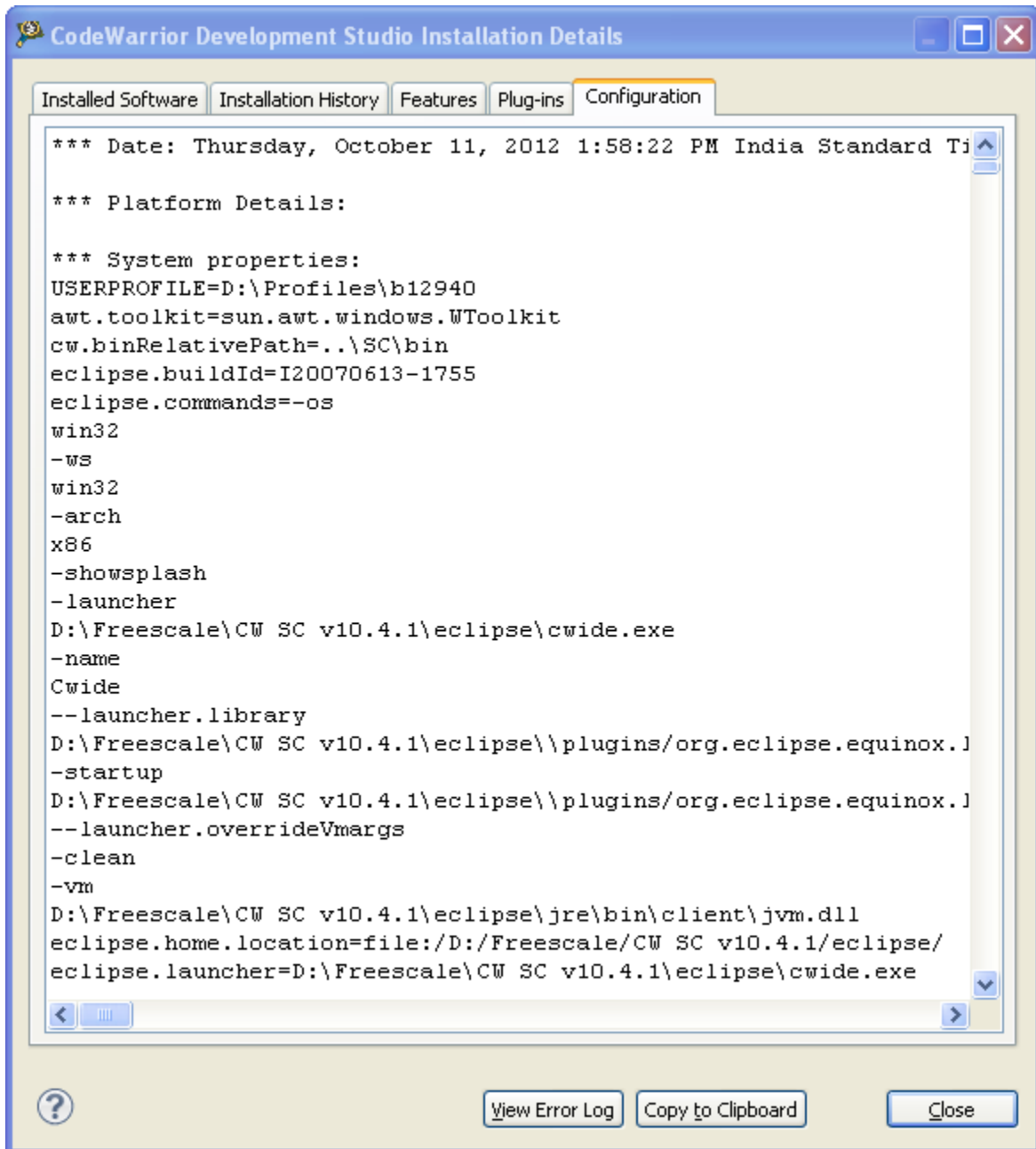
The **About Freescale CodeWarrior** dialog appears.

2. Click **Installation Details**.

The **CodeWarrior Development Studio Installation Details** dialog appears.

3. Click the **Configuration** tab.

The configuration data appears.



**Figure 2-18. Configuration tab**

4. Click the **Copy to Clipboard** button to copy the configuration data.

5. Paste the copied data in any text editor, such as notepad or winword and save the data.

6. Click **Close**.

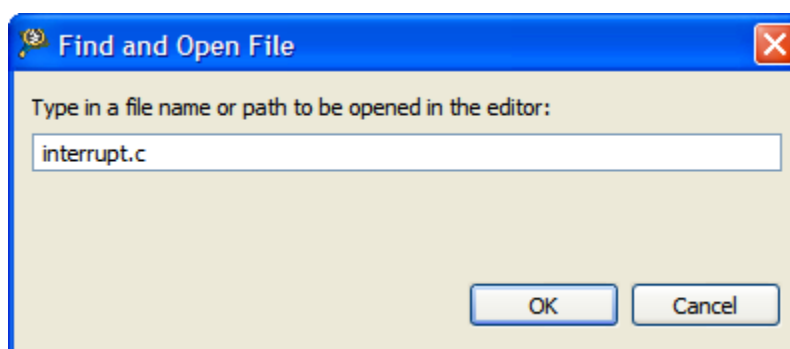
## 2.9 Find and Open File

The **Find and Open File** dialog lets you open a selected path or file in the **Editor** area.

To open particular path or file in the Editor area:

1. Choose **File > Open Path** from the IDE menu bar.

The **Find and Open File** dialog appears.



**Figure 2-19. Find and Open File dialog**

2. Enter a file descriptor. The file descriptor can be a simple file name, a partial path or a full path. The path delimiters can also be different from that of the native platform delimiters. For example, you can use "/" on a Windows host instead of "\".
3. Click **OK**.

Eclipse IDE performs the following actions:

- Scans for a matching file descriptor in all the open editor windows. If a match is found, the IDE activates the open editor window in the **Editor** area.
- If no open editor windows match the specified file descriptor, IDE searches for a matching file in the accessible paths of the current project. If a match is found, IDE opens the file in a new editor window in the **Editor** area. If the file is not found, IDE generate a beep sound.

### NOTE

The **Open Path** feature is also invoked when a file name is selected in an `#include` directive in a source file. In such a case, the IDE opens the file in the **Editor** area without displaying the **Find and Open File** dialog.

## 2.10 Importing files

You can import files into the Workbench by:

- [CodeWarrior drag and drop support](#)
- [Using Import wizard](#)

### 2.10.1 CodeWarrior drag and drop support

The CodeWarrior drag and drop support extends the following features to the CodeWarrior IDE.

- Allows user to drop different files and folders to the Workbench window.
- Allows user to drop multiple files and folders simultaneously and handle them properly in a sequence.
- Supports files and directories created by the earlier versions of CodeWarrior ( .mcp files).

#### NOTE

A classic project file has the .mcp extension.

- Resolves potential handling ownership conflict between different components over the dropped objects.

For example, to create a link to a project existing in a different workspace from the current workspace:

1. Open the workspace using Windows Explorer (In Linux, you can open the workspace using Shell).
2. Drag the project folder over the CodeWarrior IDE.

The CodeWarrior IDE effectively handles the files and folders dropped to the Workbench. A link to the existing project is created in the **CodeWarrior Projects** view.

### 2.10.2 Using Import wizard

The Import wizard helps you import resources into the workbench.

This section explains:

- [Import existing project](#)
- [Import example project](#)

### 2.10.2.1 Import existing project

The Import Existing Project wizard lets you import existing project into the workspace. To import existing project:

1. Choose **File > Import** from the IDE menu bar.

The **Import** wizard appears.

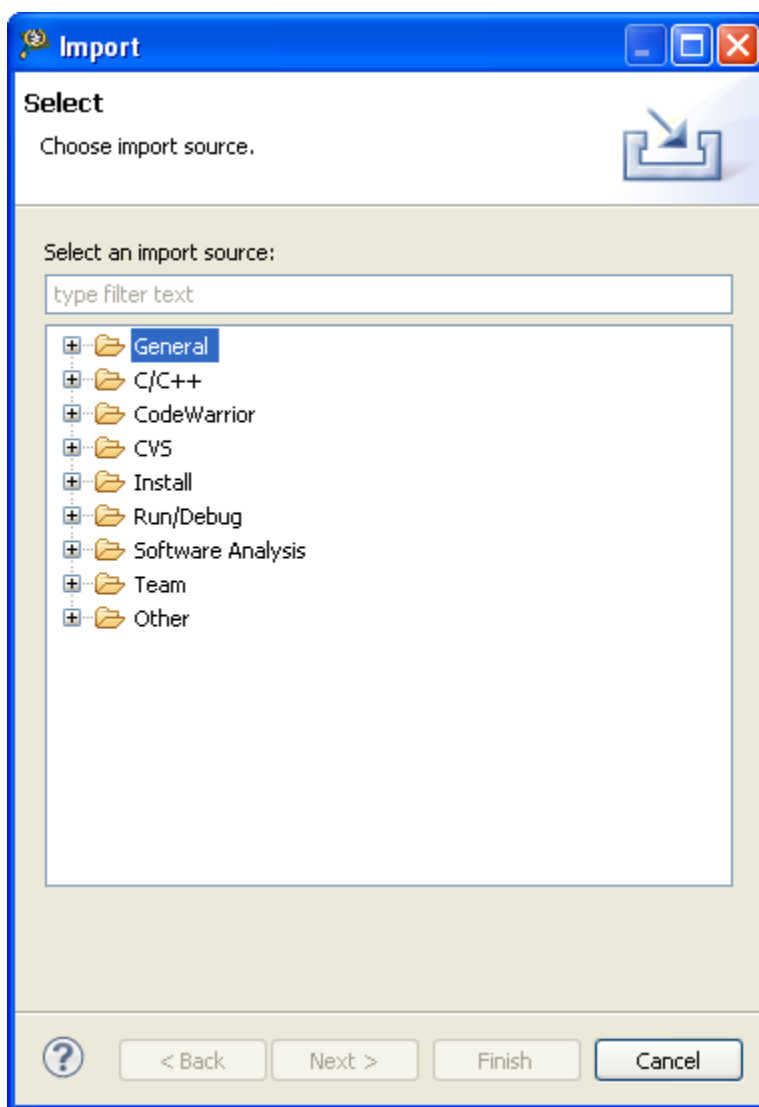
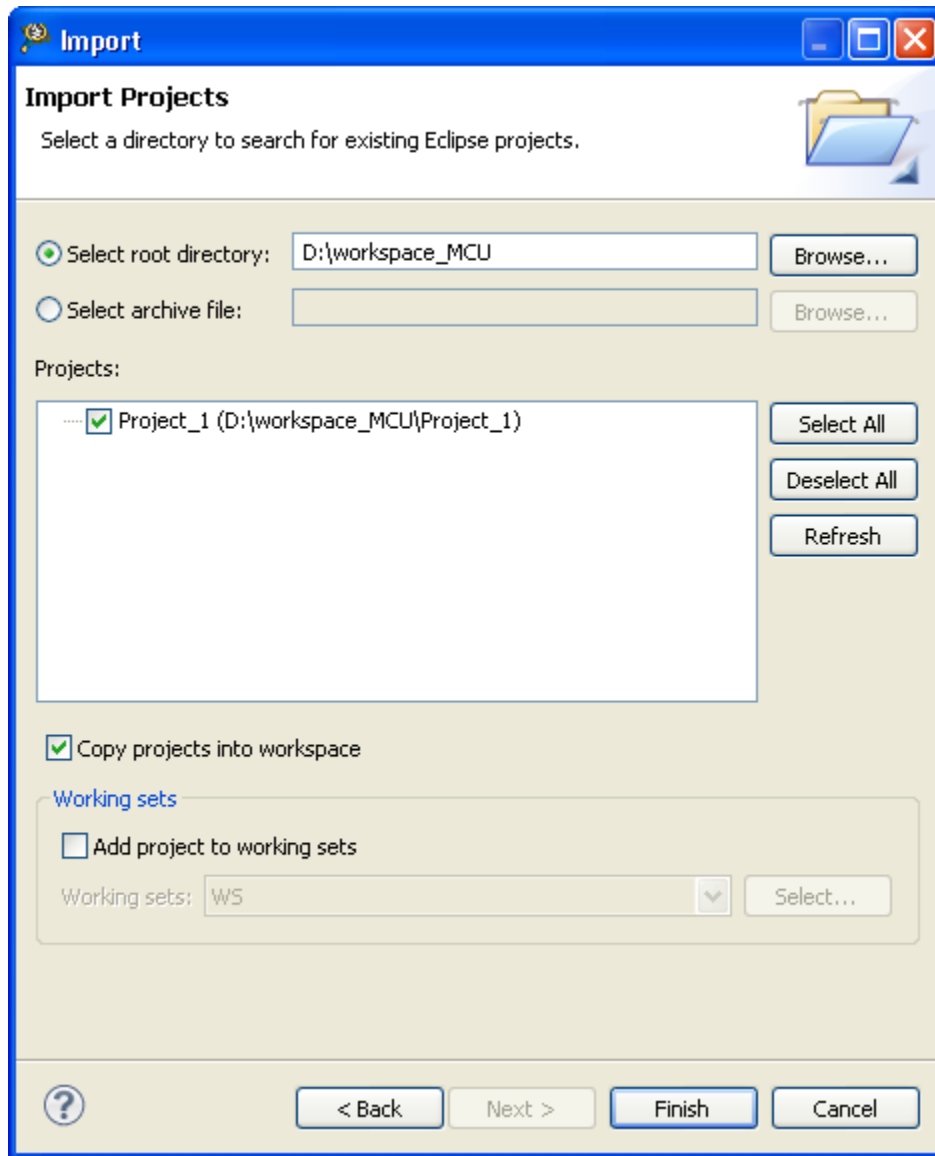


Figure 2-20. Import wizard

2. Choose **General > Existing Project into Workspace**.
3. Click **Next**.

The **Import Project** page appears.



**Figure 2-21. Import Projects page**

4. Select **Select root directory** or **Select archive file** option and click the associated **Browse** to locate the directory or file containing the projects.

The list of existing projects appear under the Project group.

5. Under **Projects** , select the project or projects which you would like to import.

**NOTE**

When there are projects with the same name in the list, only one of them is selected by default and allow you to change

the selections as needed. If any error occurs during the import, the project list is updated and all the projects that were already imported are disabled.

### NOTE

You may select **Copy projects into workspace** checkbox to copy the project into workspace. You may also select **Add Project to working sets** checkbox to include the project in working sets.

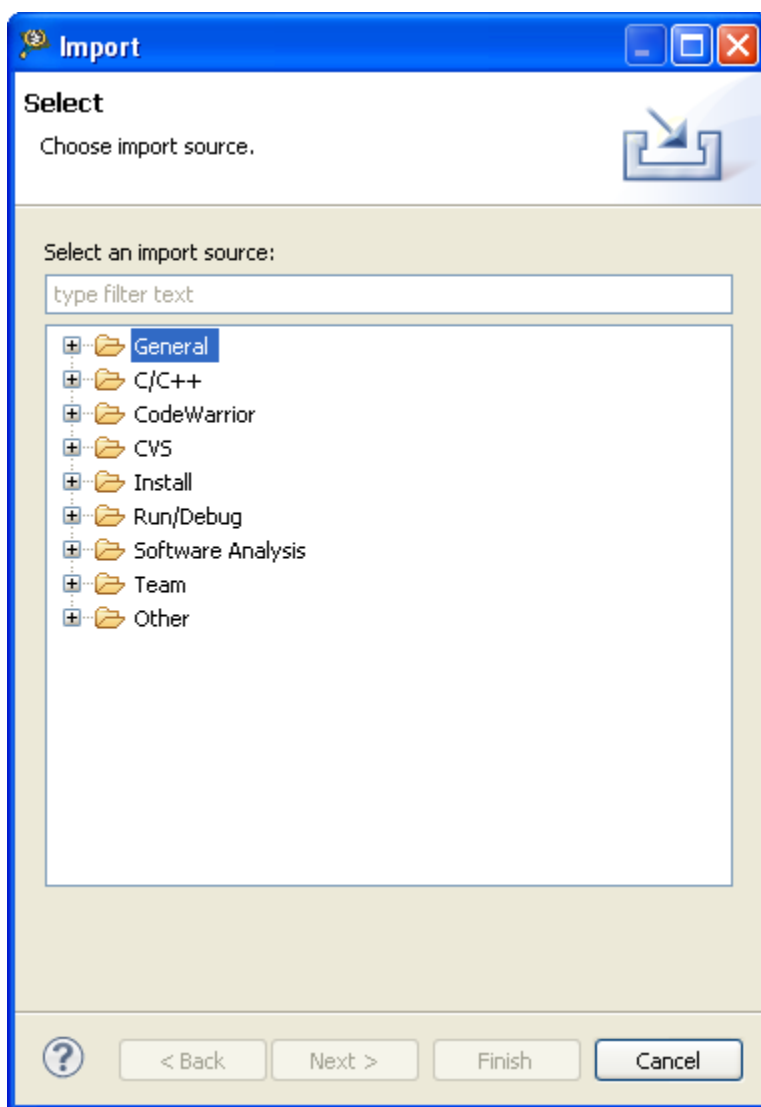
6. Click **Finish**.

## 2.10.2.2 Import example project

The Import Example Project wizard lets you import example project into the workspace. To import an example project:

1. Choose **File > Import** from the IDE menu bar.

The **Import** wizard appears.

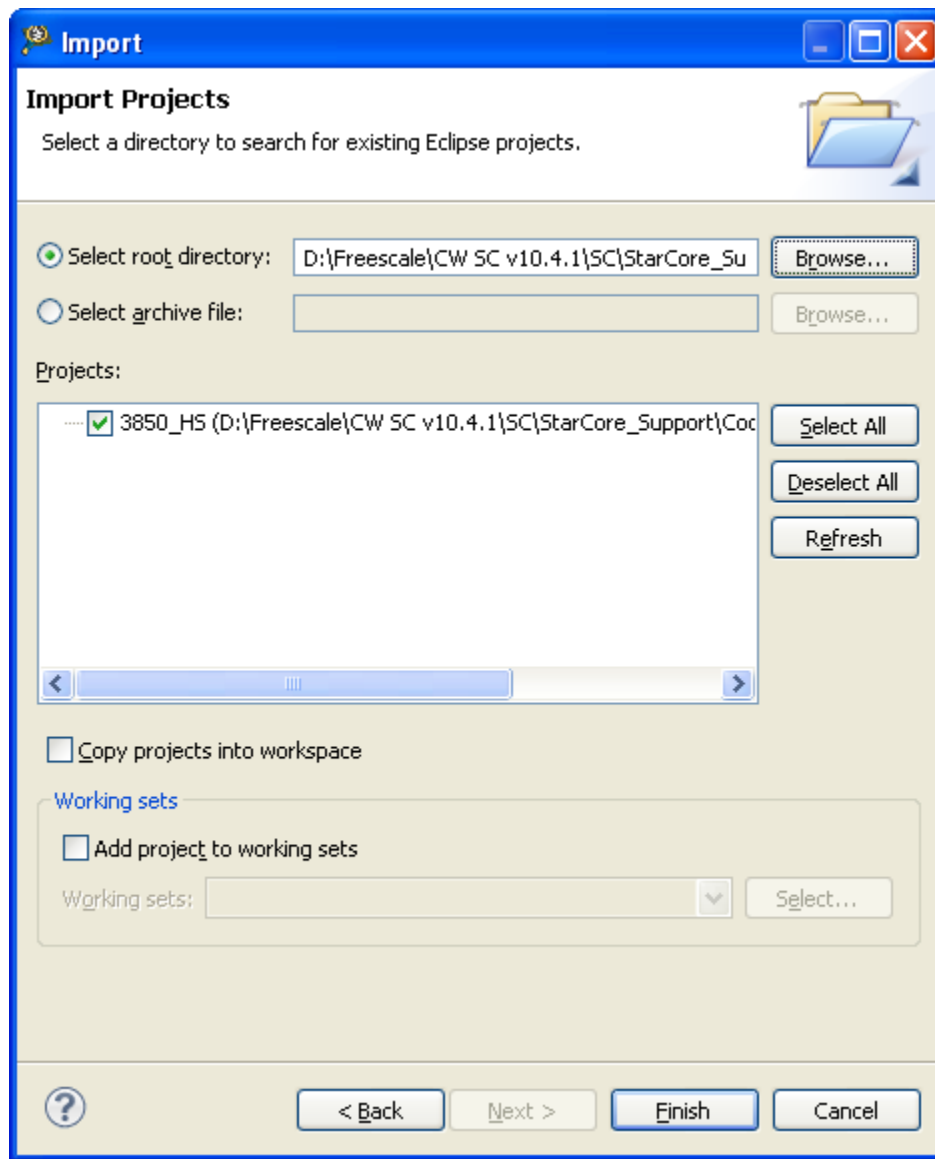


**Figure 2-22. Import wizard**

2. Choose **CodeWarrior > Example Project**.
3. Click **Next**.

The **Import Projects** page appears.





**Figure 2-23. Import Projects page**

4. Select the **Select root directory** or the **Select archive file** option and click the associated **Browse** to locate the directory or file containing the projects.

The list of existing projects appear under the **Projects** group.

5. Under **Projects**, select the project or projects which you would like to import.

#### **NOTE**

When there are projects with the same name in the list, only one of them is selected by default and allow you to change the selections as needed. If any error occurs during the import, the project list is updated and all the projects that were already imported are disabled.

**NOTE**

You may select **Copy projects into workspace** checkbox to copy the project into workspace. You may also select **Add Project to working sets** checkbox to include the project in working sets.

6. Click **Finish**.

## 2.11 Key mappings

CodeWarrior Eclipse IDE accepts keyboard shortcuts, or *key bindings*, for frequently used operations. At any time, you can obtain a list of available key bindings using Key Assist. To open the **Key Assist** view, choose **Help > Key Assist**.

Alternatively, press **Ctrl+Shift+L** keys to display a list of available key bindings in Eclipse.

**NOTE**

Key bindings can vary based on the current context of Eclipse, platform and locale. The current platform and locale is determined when Eclipse starts, and does not vary over the course of an Eclipse instance.

The following table lists and defines the key mappings for Classic IDE and Eclipse IDE.

**Table 2-2. Key Mappings - Classic IDE and Eclipse IDE**

Behaviour	Classic IDE	Eclipse IDE
New	Ctrl + Shift + N	Ctrl + N
Open Open Path (Eclipse IDE)	Ctrl + O	Ctrl + Shift + A
Close	Ctrl + W	Ctrl + F4
Close All	Ctrl + Shift + W	Ctrl + Shift + W Ctrl + Shift + F4
Save	Ctrl + S	Ctrl + S
Save All	Ctrl + Shift + S	Ctrl + Shift + S
Print	Ctrl + P	Ctrl + P
Undo	Ctrl + Z Alt + Backspace	Ctrl + Z
Redo	Ctrl + Shift + Z	Ctrl + Y
Cut	Ctrl + X Shift + Delete	Ctrl + X Shift + Delete
Copy	Ctrl + C Ctrl + Insert	Ctrl + C Ctrl + Insert
Paste	Ctrl + V Shift + Insert	Ctrl + V Shift + Insert
Delete	Del	Del
Select All	Ctrl + A	Ctrl + A

*Table continues on the next page...*

**Table 2-2. Key Mappings - Classic IDE and Eclipse IDE (continued)**

Behaviour	Classic IDE	Eclipse IDE
Find Next	F3	Ctrl + K
Find Previous	Shift + F3	Ctrl + Shift + K
Go to Line	Ctrl + G	Ctrl + L
Debug	F5	F11
Run	Ctrl + F5	Ctrl + F11
Step Over	F10	F6
Step Into	F11	F5
Step Out Step Return (Eclipse IDE)	Shift + F11	F7
Enable/Disable Breakpoint Toggle Breakpoint (Eclipse IDE)	Ctrl + F9	Ctrl + Shift + B
Make Build All (Eclipse IDE)	F7	Ctrl + B
Move Line Up	Up	Alt + Up
Move Line Down	Down	Alt + Down

## 2.12 Linker Command File navigation

The linker command file (LCF) navigation feature allows you to click on strings containing path names in the CodeWarrior Editor and navigate to the specified file.

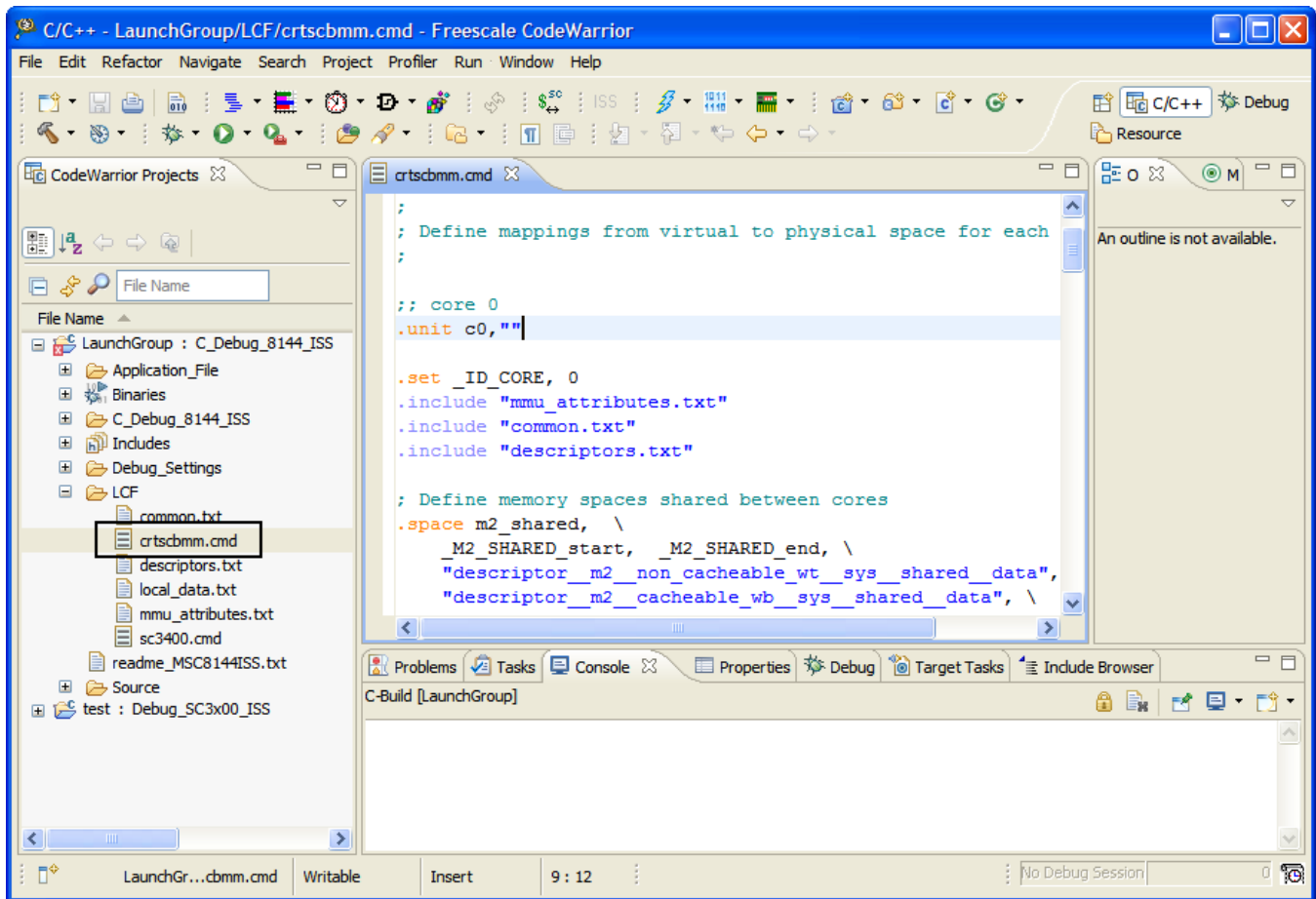
### NOTE

The CodeWarrior Editor recognizes the files with `.lcf` , `.cmd` , and `.l3k` file extensions as LCF files. A file with `.txt` file extension is not recognized as a LCF file.

To navigate to a LCF file:

1. Open the LCF file in the text editor.

## Linker Command File navigation

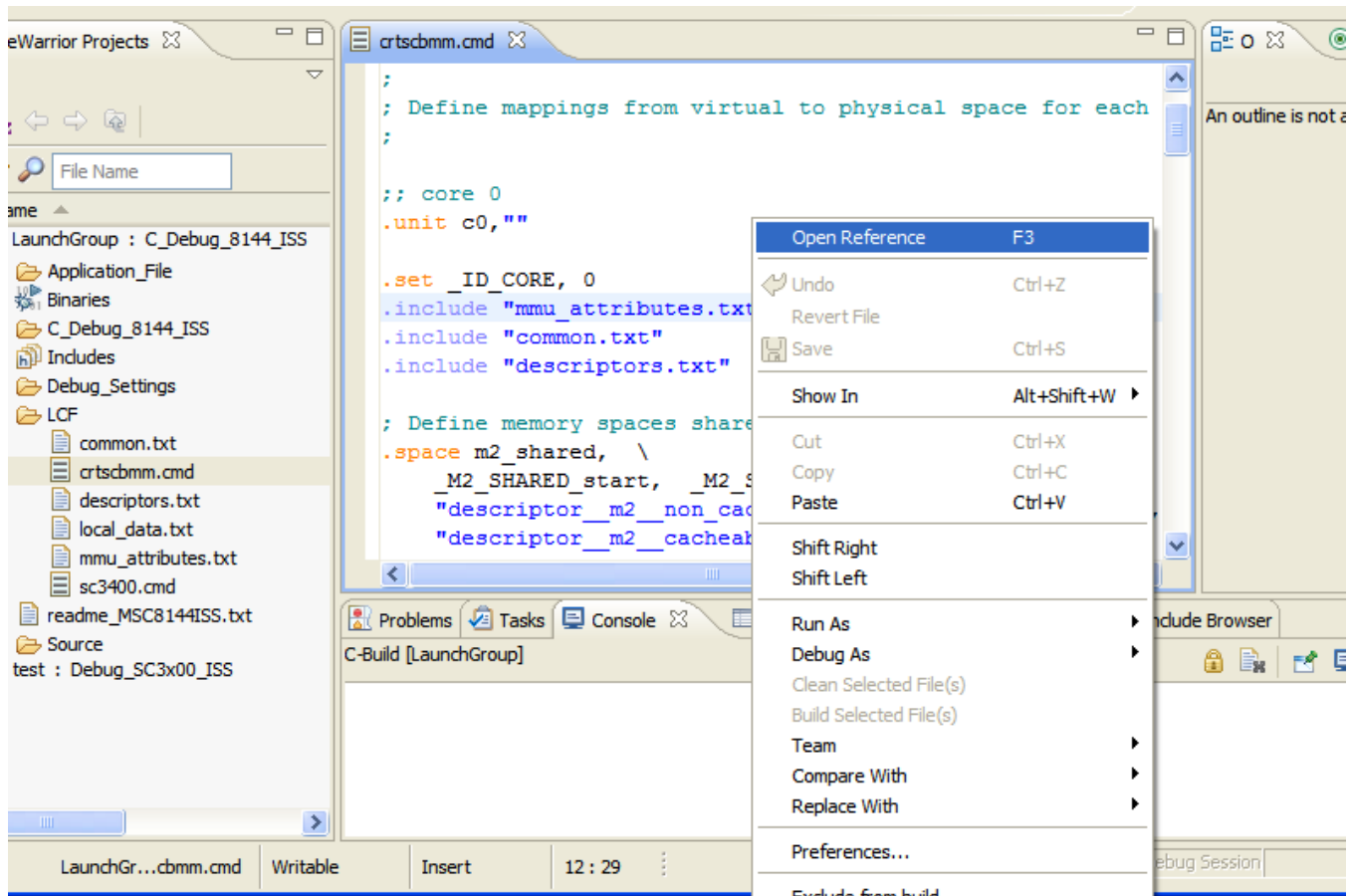


**Figure 2-24. LCF file**

2. In the LCF file, right-click a line that refers to a text file.

The shortcut menu appears.

3. Choose **Open Reference** from the shortcut menu.



**Figure 2-25. Open Reference**

The referenced text file opens in the Editor window.

## 2.13 Multiple compiler support

This feature helps you switch between multiple versions of a toolchain. When you acquire a new version of the command line tools associated with an integration plug-in, multiple compiler feature allows you to add the new version into the list of available toolchain versions.

To switch between multiple versions of a toolchain:

1. In the **CodeWarrior Projects** view, right-click the project, and choose **Properties** from the shortcut menu.

The **Properties for <project>** dialog appears.

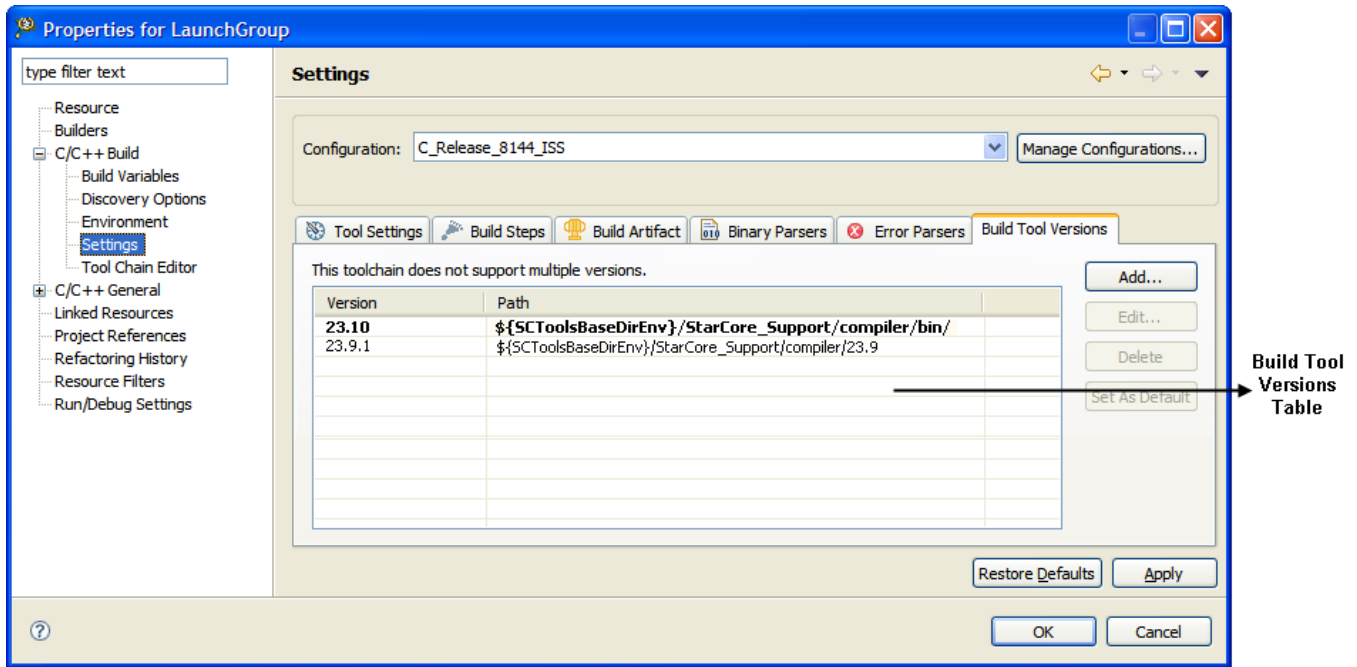
## Multiple compiler support

2. Choose **C/C++ Build > Settings** in the left pane of the **Properties for <project>** dialog.

The C/C++ build settings appear in the right pane of the **Properties for <project>** dialog.

3. Click the **Build Tool Versions** tab.

The build tool version settings appear in the **Build Tool Versions** pane.



**Figure 2-26. Properties for <Project> dialog**

The following table lists and defines the **Build Tool Versions** pane controls.

**Table 2-3. Build Tool Versions pane controls**

Control	Description
Build Tool Versions table	Lists multiple toolchain versions.
Add button	Adds a new toolchain version.
Edit button	Edits the currently selected toolchain version.
Delete button	Deletes a toolchain version.
Set as Default button	Sets the currently selected toolchain versions as default toolchain version for building projects.
Restore Defaults button	Restores the default toolchain version.

**NOTE**

The default toolchain version is highlighted in **bold** letters in the Build Tool Versions table.

4. Click **Apply**.
5. Click **OK**.

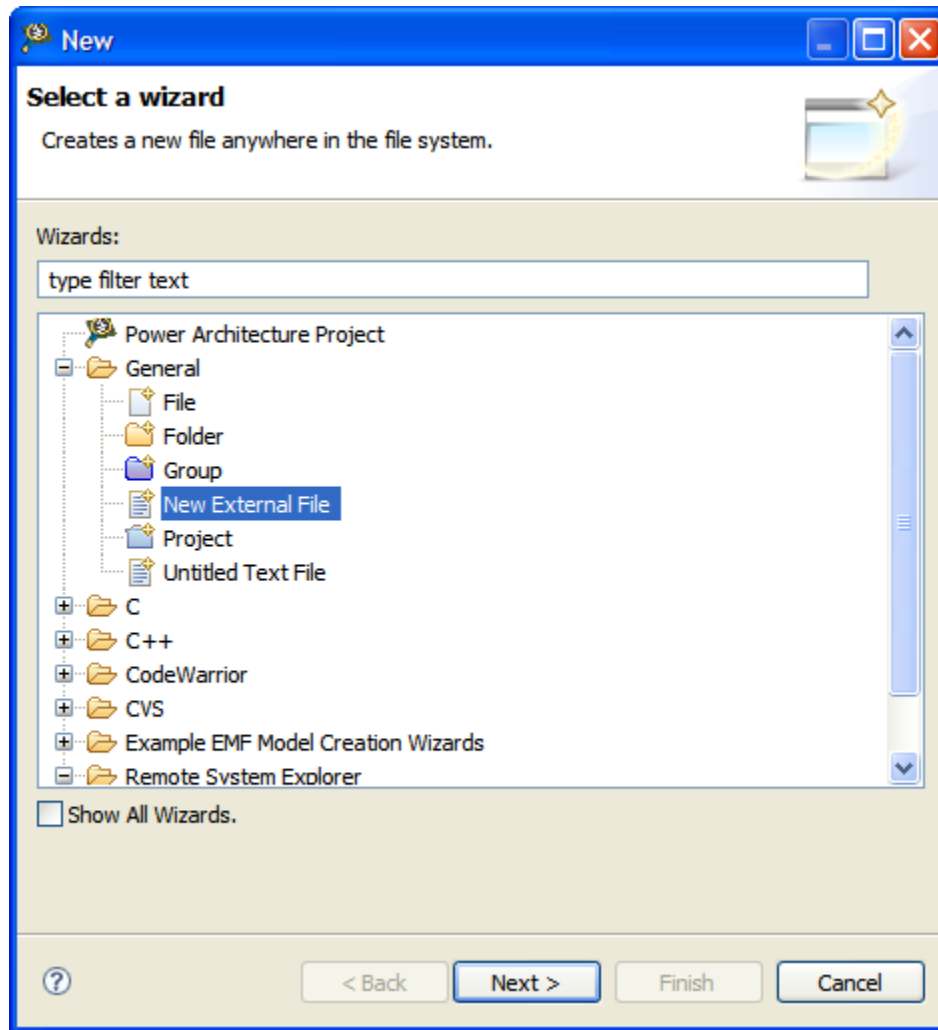
Now, you can switch between multiple versions of a toolchain.

## 2.14 New External File

The CodeWarrior Eclipse IDE now supports creating, opening, and saving files that are located outside the current workspace. To create a non-project file:

1. Click **File > New > Other** .

The **New** wizard appears.



**Figure 2-27. New wizard - Select a wizard page**

2. Choose **General** > **New External File**.
3. Click **Next**.

The **New External File** page appears.

4. Specify the path and filename.
5. Click **Finish**.

IDE opens the file in a new editor window in the **Editor** view.

## 2.15 Problems view



The **Problems** view displays build errors and warnings in a tree table control. The **Problems** view also displays the information, such as description, resource, path, location, and type for build errors and warnings. Double-click an error/warning to go to the location in the source from where the error/warning was generated.

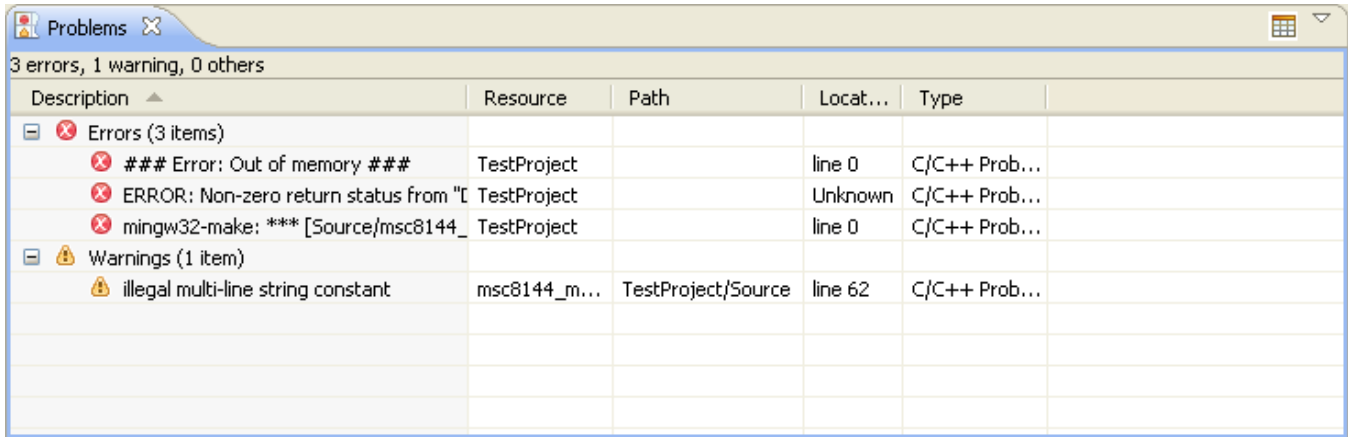


Figure 2-28. Problems view

Clicking the Toggle visibility of the details pane button in the **Problems** view displays the Details pane. The Details pane displays full description of the selected error/warning.

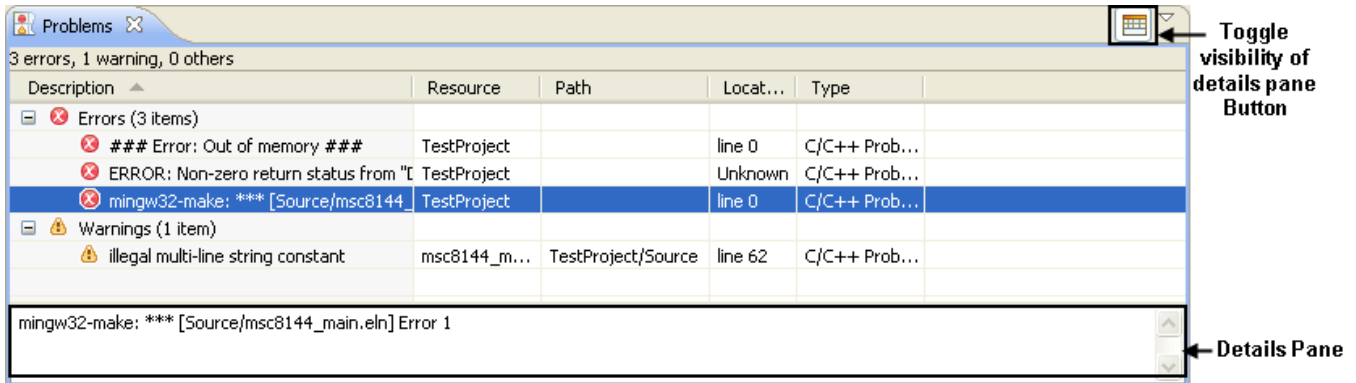


Figure 2-29. Problems view - Details pane

## 2.16 Referenced projects

Referenced projects allow you to create build dependencies between projects. If project A is set up as a referenced project for project B, then project A will be built before each project B build. Referenced projects are automatically imported and opened when a project is imported in the workspace, so referenced projects can be used to automatically populate the workspace with a set of projects.

This topic explains:

- [Create a Referenced project](#)
- [Displaying referenced projects in CodeWarrior Projects view](#)
- [Automatic linking with referenced project build artifact](#)
- [Circular build dependencies](#)

### 2.16.1 Create a Referenced project

To create a referenced project B in project A, follow the steps given below:

1. Select and right-click the project in the **CodeWarrior Projects** view.
2. Choose **Properties** from the shortcut menu that appears.

The **Properties** dialog appears.

3. Select the **C/C++ Build** option on the left and click the **References** tab in the **C/C++ Build properties** page on the right.
4. Select **project B** in the tree.

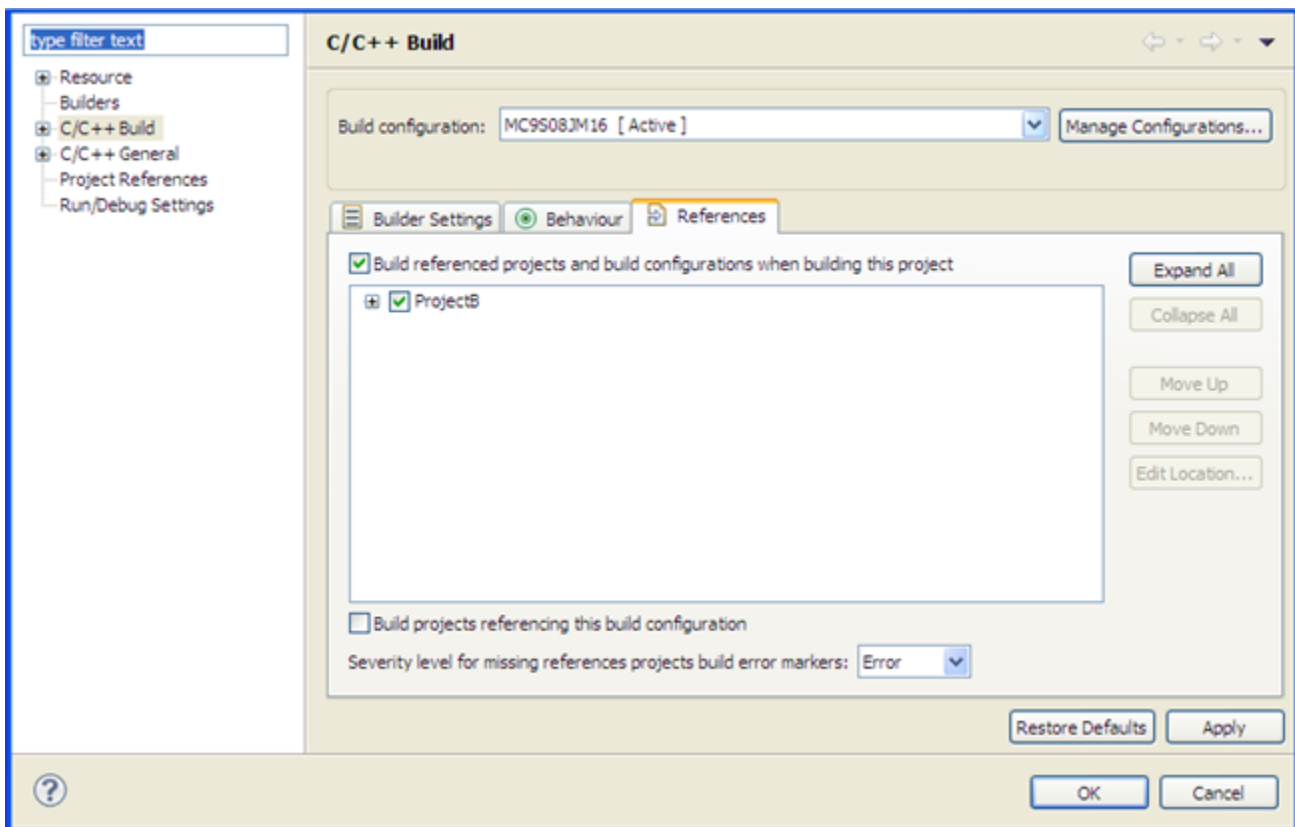


Figure 2-30. C/C++ Build properties > References pane

5. Click **OK** to include Project B in Project A.

### NOTE

You can also create a project reference by dragging 'Project B' onto 'Project A' in the CodeWarrior Projects view.

The following table lists various options available in **C/C++ Build > References** page.

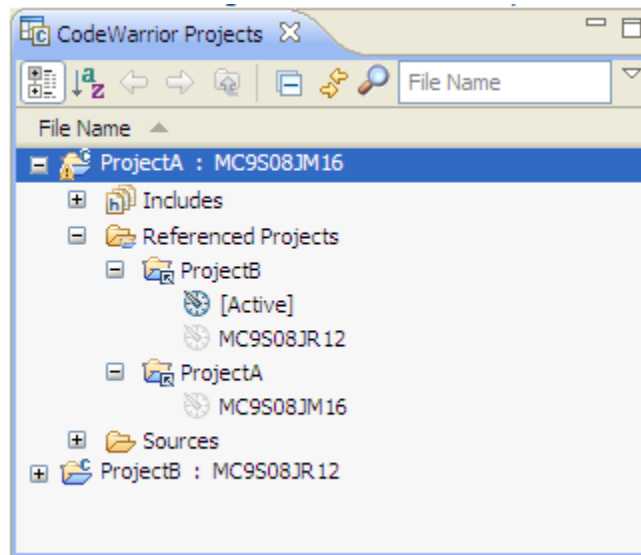
**Table 2-4. C/C++ Build > References options**

Option	Description
Build referenced projects and build configurations when building this project	If selected, enable building referenced projects and build configurations while building project. This option is also available from the CodeWarrior Projects view, by right-clicking on the 'Referenced Projects' element.
Expand All	Click to expand all referenced projects in the tree.
Collapse All	Click to collapse all the referenced projects in the tree.
Move Up/Move Down	Changes the referenced project build order. The first project shown will be built first.
Edit Location	Allows you to change the location of referenced project. The project location is recorded automatically as a project-relative path, and can make use of the project path variables to be portable across machines
Build Projects referencing this build configuration	Causes projects that include the current project as a referenced project to be included in the current build dependency, and be built when the current project is built.
Severity level for missing references projects build error makers	Allows you to select Error or Warning to display severity level for missing references.
Restore Defaults	Restores default factory settings
Apply	Saves your changes without closing the dialog.
OK	Saves your changes and close the dialog.
Cancel	Closes the dialog without saving.

## 2.16.2 Displaying referenced projects in CodeWarrior Projects view

The **CodeWarrior Projects** view displays the referenced projects and highlights which build configuration is referenced.

The following figure shows the Referenced Project in the **CodeWarrior Projects** view.



**Figure 2-31. CodeWarrior Projects view > Referenced project**

**NOTE**

All the project references appear under a **Referenced Projects** folder, which only shows if the project contains at least one referenced project.

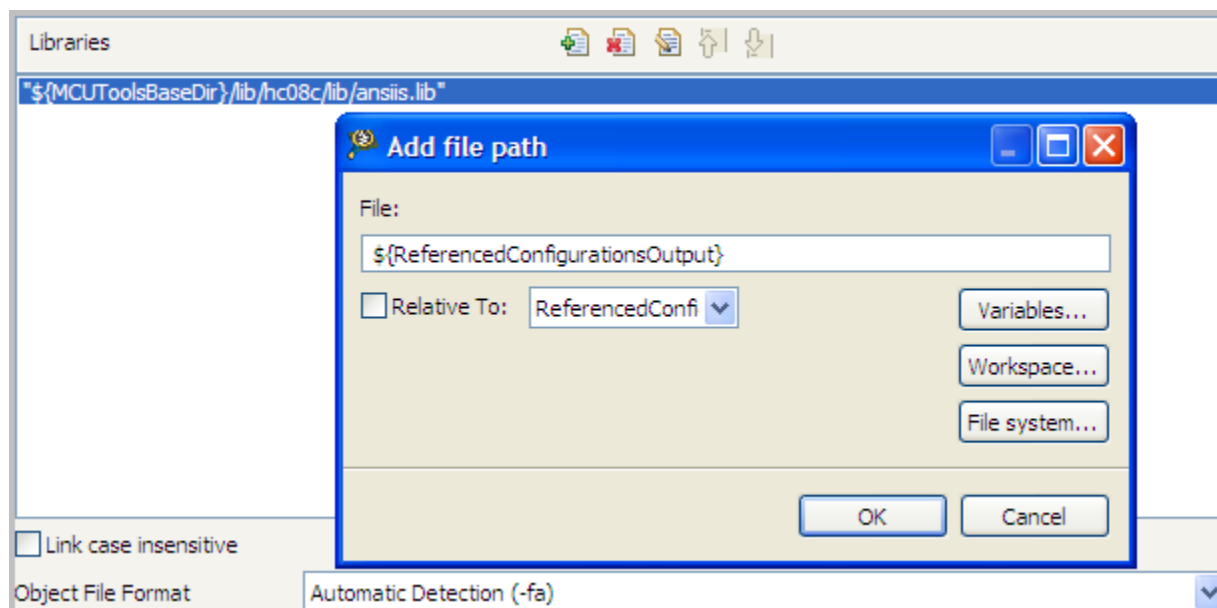
The following table shows the shortcut menu commands available through the **CodeWarrior Projects** view:

**Table 2-5. Referenced projects - Shortcut menu commands**

Command	Description
Include in Build	It allows you to quickly toggle whether all referenced projects and build configurations will be included in the build or not.
Open/Import Project	It is available when the referenced project element is selected and is either closed or does not exist in the workspace. The action imports and/or opens the referenced project in the workspace.
Close Project	It is available when the referenced project element is selected and is opened in the workspace. It allows you to close the referenced project in the workspace.
Edit Location	Allows you to edit the location of the referenced project.
Remove Referenced Project	Allows you to delete the referenced project.

### 2.16.3 Automatic linking with referenced project build artifact

A project can automatically include the build artifact of its referenced project in its linker input settings by using the `'${ReferencedConfigurationsOutput}'` build variable as shown in figure below. The `'${ReferencedConfigurationsOutput}'` build variable contains automatically the list of the referenced projects build artifacts paths.



**Figure 2-32. Referenced project - Add file path dialog**

## 2.16.4 Circular build dependencies

If two projects depend on each other through referenced projects, a build error will be generated, since circular build references is not permissible by design.

If multiple projects needs to be built at the same time, a single referenced project can be used for the first dependency, and the second project can set the 'Projects referencing this build configuration' flag, so that building the first or second project will cause the other one to be built automatically. This also applies to referenced build configuration for single or multiple projects.

For example, if two different build configurations (Debug and Release) of a single project need to be built no matter which one of the two build configuration is active, the 'Debug' build configuration can reference the 'Release' build configuration in the 'References' tab, and the 'Release' build configuration can have its Projects referencing this build configuration' flag set to 'true', so that both the 'Debug' and 'Release' build configurations will be built together, no matter which one is active.

## 2.17 Target management via Remote System Explorer

Remote System Explorer operates with remote system entities. The CodeWarrior uses two types of remote systems for describing Freescale hardware with respect to debug process:

1. Target Configuration
2. Connection Configuration

A target configuration defines initialization, and target parameters. The Remote System Explorer provides data models and frameworks to configure and manage both target and connection configurations.

The configuration model for bareboard debug uses a target and a connection configuration that allows you to define a single target configuration that can be referred by multiple connection configurations. Each such configuration is implemented as Remote System host.

### 2.17.1 Creating remote system

To create a remote system:

1. Click **File > New > Other**.

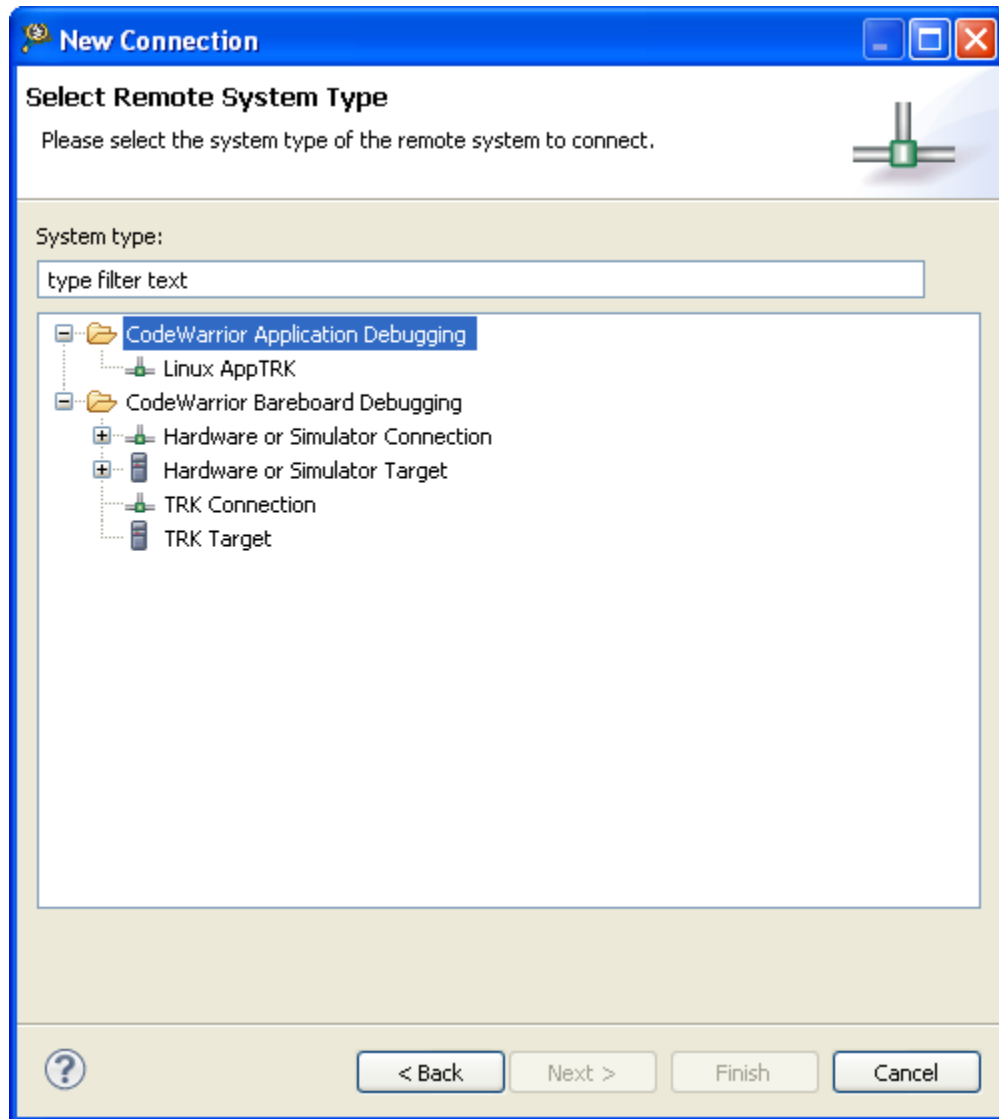
The **New** wizard appears.



**Figure 2-33. New wizard - Select a wizard page**

2. Choose **Remote System Explorer > Connection**.
3. Click **Next** .

The **New Connection** page appears.



**Figure 2-34. New Connection page**

4. Expand **CodeWarrior Bareboard Debugging** and choose a remote target type.

A remote target type represents a particular type of remote system. The supported remote target types are:

- **Hardware or Simulator Connection** - Connection configuration for a hardware-based or simulated system. For more information, see [Creating hardware or simulator connection configuration](#).
- **Hardware or Simulator Target** - Target configuration for a hardware-based or simulated target. For more information, see [Creating hardware or simulator target configuration](#).
- **TRK Target** - System configuration for a system running the TRK debug agent. For more information, see [Creating TRK target configuration](#).

5. Click **Next** .



The new configuration settings appear. You need to specify configuration settings depending upon the remote target type chosen in the **New Connection** page.

6. Click **Finish**.

## 2.17.2 Creating hardware or simulator connection configuration

A hardware or simulator connection configuration helps you create a connection configuration for a hardware-based or simulated target. To create a hardware or simulator connection configuration:

1. Click **File > New > Other**.

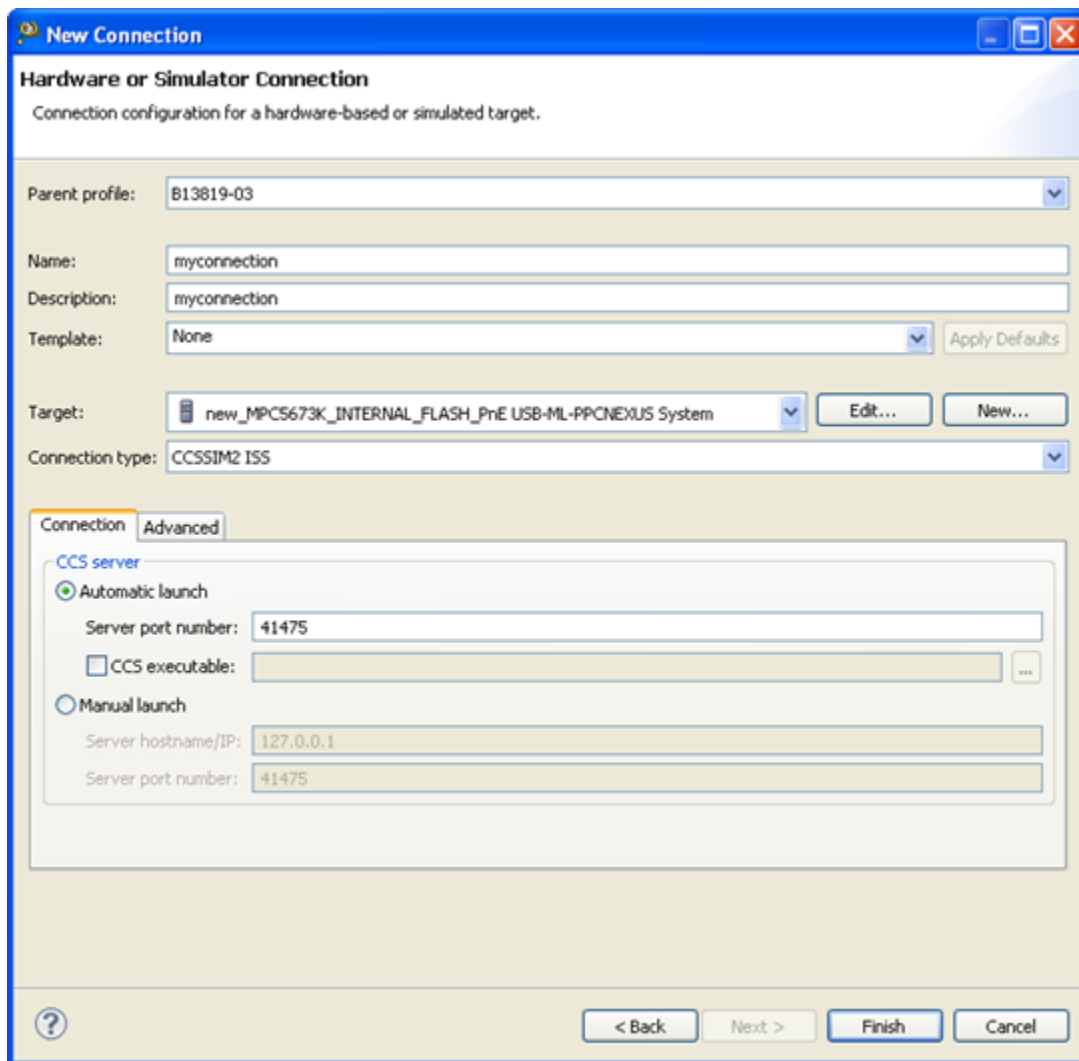
The **New** wizard appears.

2. Choose **Remote System Explorer > Connection**.
3. Click **Next**.

The **New Connection** page appears.

4. Choose **CodeWarrior Bareboard Debugging > Hardware or Simulator Connection**.

The **New Connection - Hardware or Simulator Connection** page appears.



**Figure 2-35. New Connection - Hardware or Simulator Connection page**

5. Choose a parent profile from the **Parent Profile** pop-up menu.
6. Type a configuration name in the **Name** textbox.
7. Type connection description in the **Description** textbox.
8. Choose a remote system template from the **Template** pop-up menu. The remote system template is a predefined configuration fully supported by CodeWarrior debugger.
9. Choose **None** from the **Template** pop-up menu when the current remote system configuration does not use any reference template.
10. Click **Apply Defaults** to load settings from reference template in the current configuration.
11. Choose a target from the **Target** pop-up menu.

A target type is a CodeWarrior abstraction that represents the users target processor layout. This can be a simple processor or a set of processors as defined by a JTAG configuration file or a Power Architecture® device tree blob file.

12. Click **Edit** to add or remove target types.
13. Click **New** to create a new target configuration.
14. Choose a connection type from the **Connection type** pop-up menu.
  - Choose **CCSSIM2 ISS** to specify setting for CodeWarrior Connection Server (CCS).
  - Choose **Ethernet TAP** to specify settings for ethernet TAP connection.
  - Choose **USB TAP** to specify settings for USB TAP connection.
15. Click **Finish**.

The hardware or simulator connection configuration appears in the [Remote Systems view](#).

### 2.17.3 Creating hardware or simulator target configuration

A hardware or simulator target configuration enables you to connect to your target via a direct hardware connection or simulate your target. To create a bareboard or simulator remote system:

1. Click **File > New > Other**.

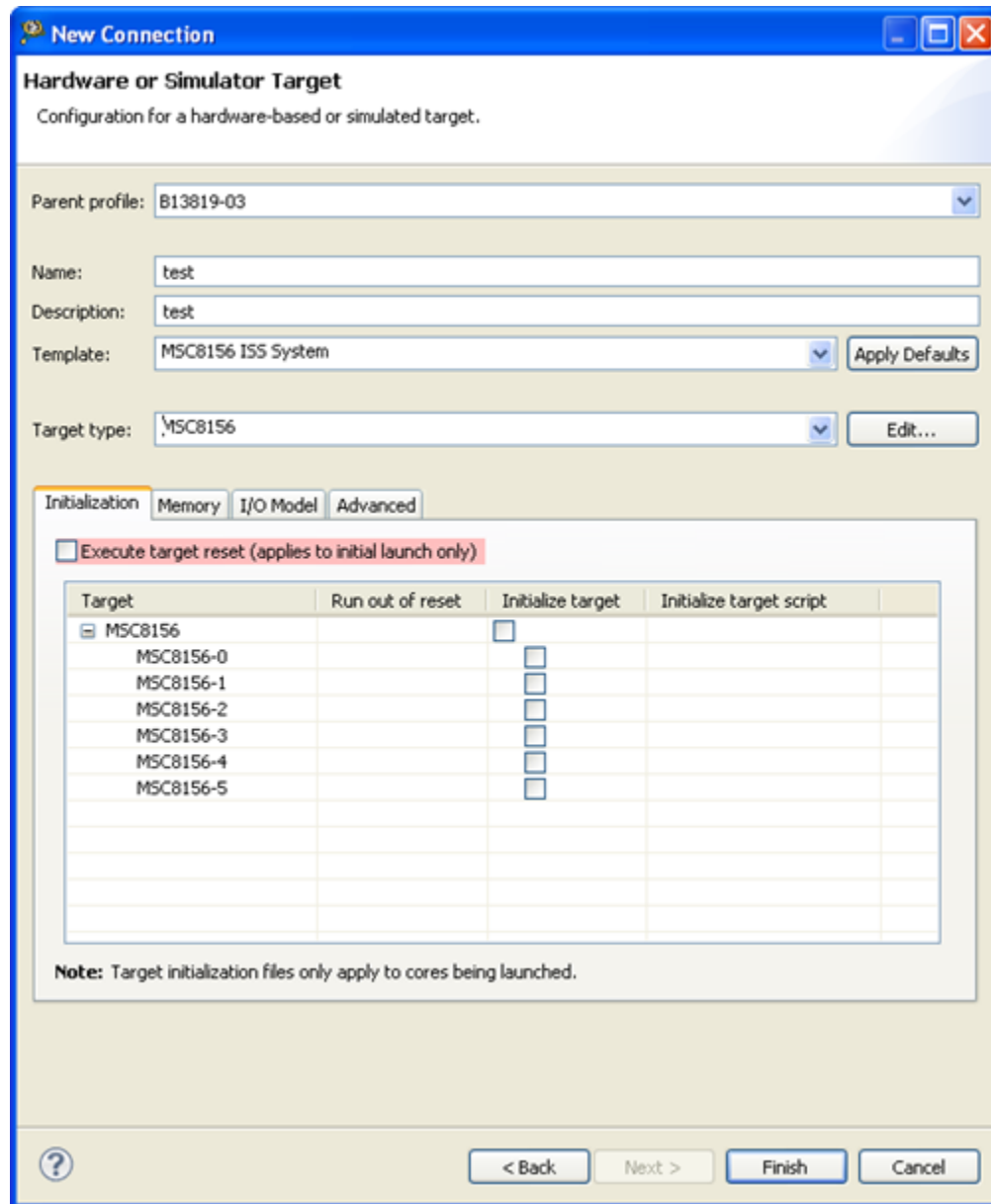
The **New** wizard appears.

2. Choose **Remote System Explorer > Connection**.
3. Click **Next**.

The **New Connection** page appears.

4. Choose **CodeWarrior Bareboard Debugging > Hardware or Simulator Target**.

The **New Connection - Hardware or Simulator Target** page appears.



**Figure 2-36. New Connection - Hardware or Simulator Target page**

5. Choose a parent profile from the **Parent Profile** pop-up menu.
6. Type a configuration name in the **Name** textbox.
7. Type target description in the **Description** textbox.
8. Choose remote system template from the **Template** pop-up menu. The remote system template is a predefined configuration fully supported by CodeWarrior debugger.
9. Choose **None** from the **Template** pop-up menu when the current remote system configuration does not use any reference template.
10. Click **Apply Defaults** to load settings from reference template in the current configuration.

**NOTE**

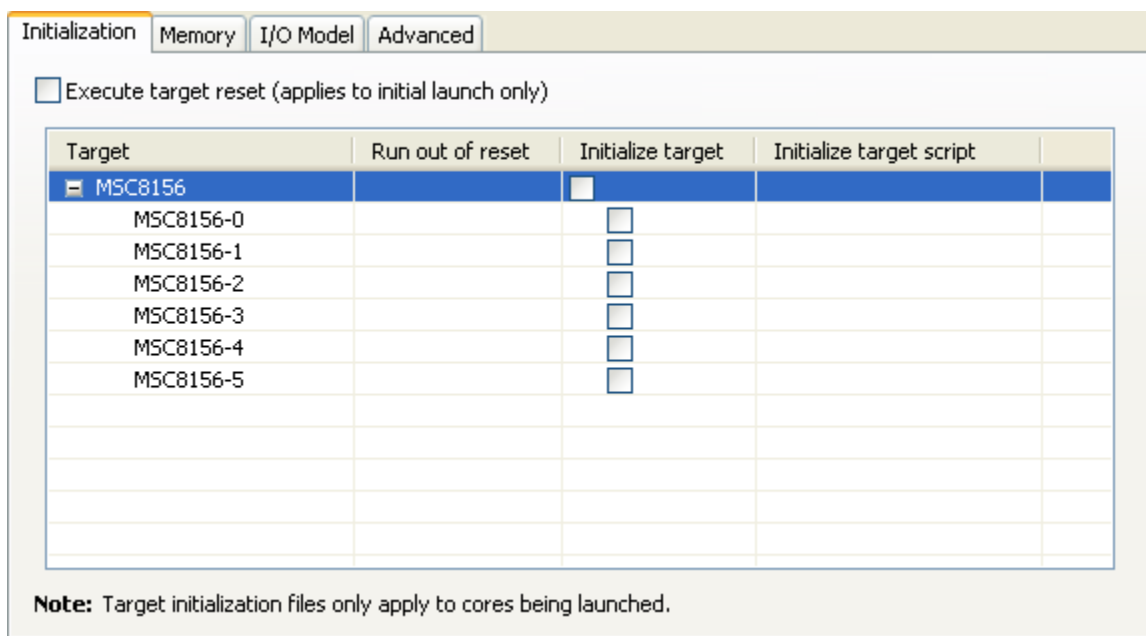
The differences between reference template and current configuration is highlighted. You can disable highlighting from Remote Systems view's pop-up menu. The color used for highlighting can be changed from global preferences.

- Choose a target configuration from the **Target type** pop-up menu.

A target type is a CodeWarrior abstraction that represents the user's target processor layout. This can be a simple processor or a set of processors as defined by a JTAG configuration file or a Power Architecture® device tree blob file.

- Click **Edit** to edit the current target configuration.
- Click **New** to create a new target configuration.
- Click the **Initialization** tab.

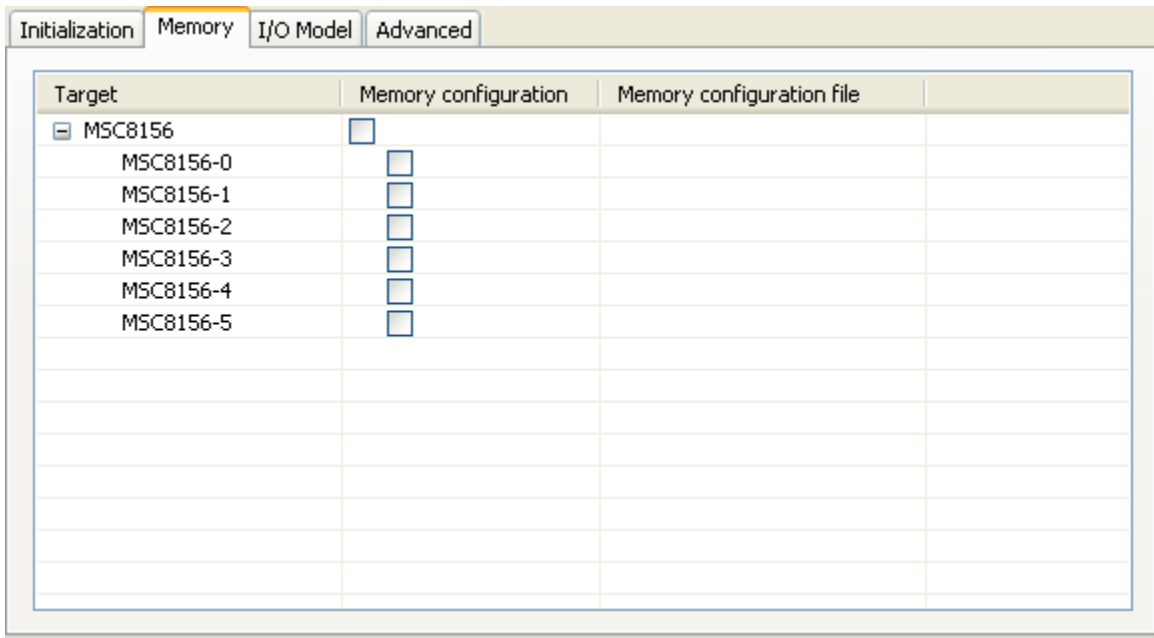
The initialization settings page appears.



**Figure 2-37. Hardware or Simulator Target page - Initialization pane**

- Specify the initialization settings to suit your needs.
- Click the **Memory** tab.

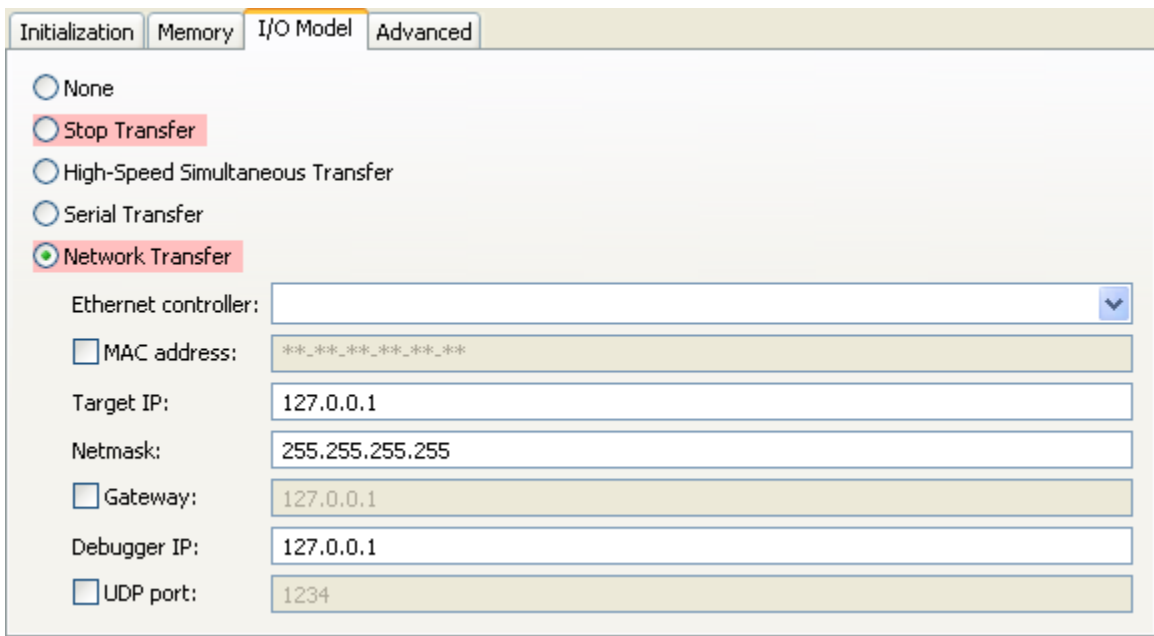
The memory settings page appears.



**Figure 2-38. Hardware or Simulator Target page - Memory pane**

17. Specify the target settings to suit your needs.
18. Click the **I/O Model** tab.

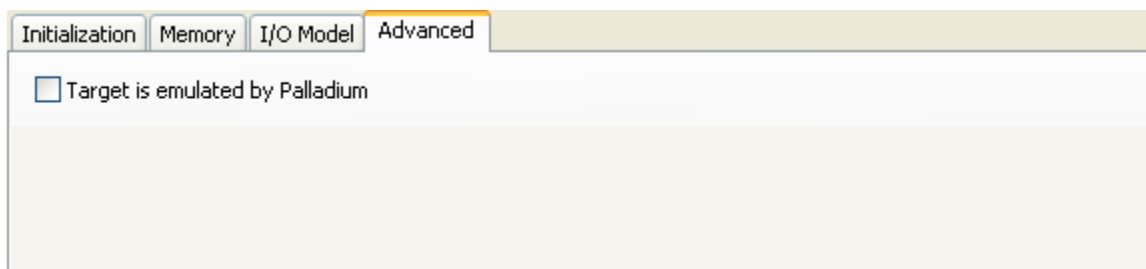
The **I/O Model** page appears.



**Figure 2-39. Hardware or Simulator Target page - I/O Model pane**

19. Specify the I/O model settings to suit your needs.
20. Click the **Advanced** tab.

The **Advanced** page appears.



**Figure 2-40. Hardware or Simulator Target page - Advanced pane**

21. Select the **Target is emulated by Palladium** checkbox if required.
22. Click **Finish**.

The hardware or simulator target appears in the [Remote Systems view](#).

## 2.17.4 Creating TRK target configuration

You can create a target configuration for a target running the TRK debug agent.

### NOTE

This feature is not available in StarCore.

To create a TRK target configuration:

1. Click **File > New > Other**.

The **New** wizard appears.

2. Choose **Connection** under the **Remote System Explorer** category.
3. Click **Next**.

The **Select Remote System Type** page appears.

4. Choose **CodeWarrior Bareboard Debugging > TRK Target**.

The **TRK Target** page appears.

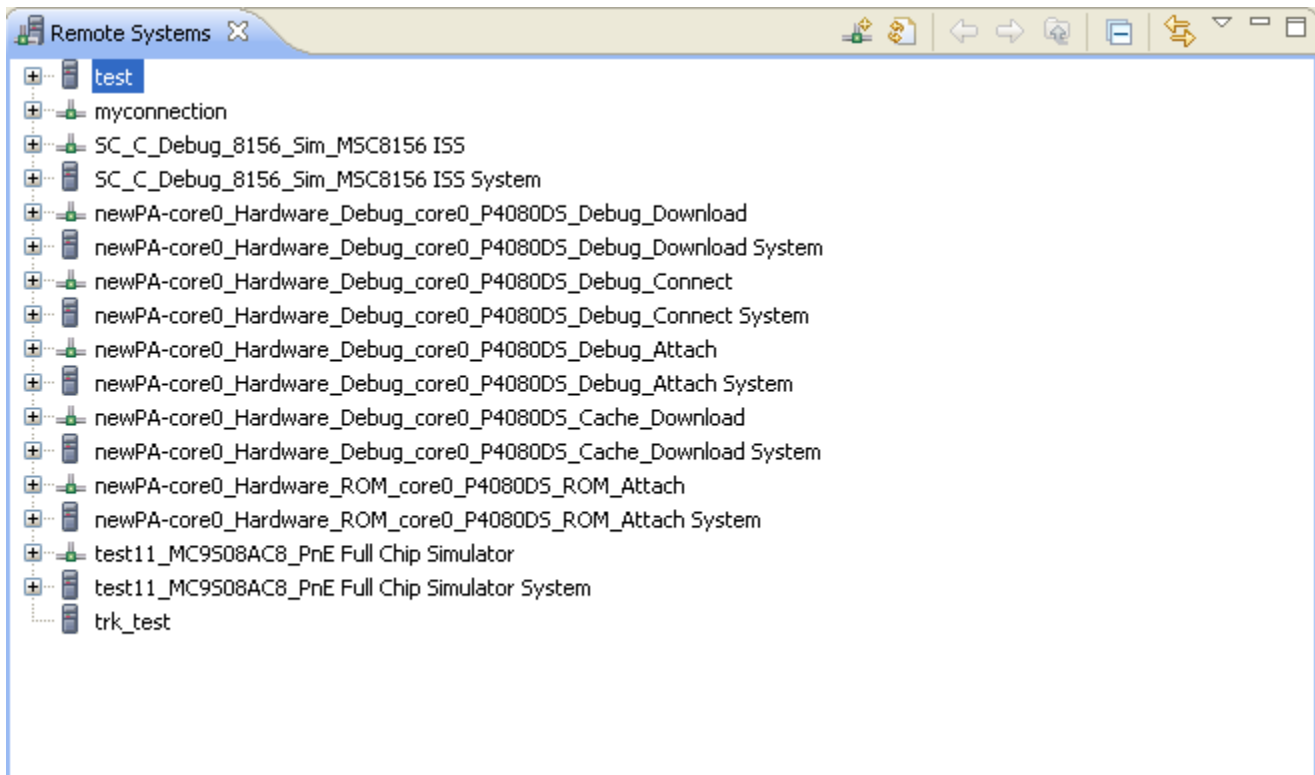
5. Choose a parent profile from the **Parent profile** pop-up menu.
6. Type a configuration name in the **Name** textbox.
7. Type connection description in the **Description** textbox.
8. Choose a remote system template from the **Template** pop-up menu. The remote system template is a pre-defined configuration fully supported by CodeWarrior debugger.
9. Choose **None** from the **Template** pop-up menu when the current remote system configuration does not use any reference template.

10. Click **Apply Defaults** to load settings from reference template in the current configuration.
11. Choose a target type from the **Target type** pop-up menu or click **Edit** to import the target type.
12. Click the **Initialization** tab and specify the initialization settings to suit your needs.
13. Click the **Memory** tab and specify the memory configuration settings to suit your needs.
14. Click **Finish**.

The TRK target configuration appears in the [Remote Systems view](#).

## 2.17.5 Remote Systems view

**Remote Systems** view helps you view and modify remote system settings. It displays various target and connection configurations. To open the **Remote Systems** view, choose **Window > Show View > Remote Systems** from the IDE menu bar.



**Figure 2-41. Remote Systems view**

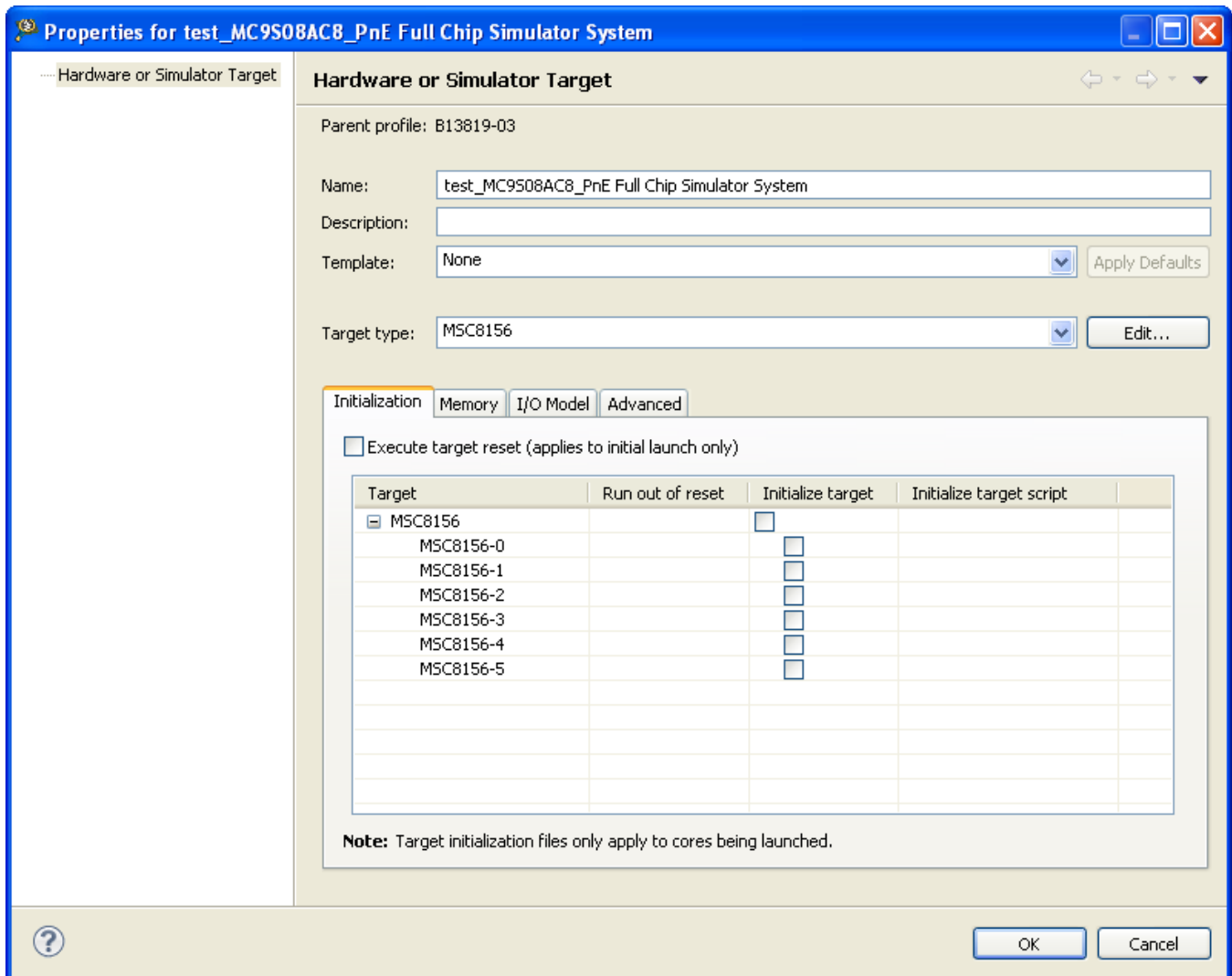


## 2.17.5.1 Modifying target or connection configuration

The **Remote System** view allows you to modify settings for a target or connection. To change target or connection settings:

1. Switch to the **Remote Systems** view.
2. Right-click a remote system name and choose **Properties** from the shortcut menu.

The **Properties for <Remote System>** dialog appears.



**Figure 2-42. Properties for <target or connection> dialog**

3. Change the settings in this page to suit your needs.
4. Click **OK**.

The changes are applied to the target.

### 2.17.5.2 Exporting target or connection configuration

You can export a target or connection to an external file. To export a target or connection:

1. Switch to the **Remote Systems** view.
2. Right-click a remote system name and choose **Export** from the shortcut menu.

The **Save As** dialog appears.

3. Enter a file name in the **File name** textbox.
4. Click **Save**.

### 2.17.5.3 Importing target or connection configuration

You can import a target or connection from an external file. To import a target or connection:

1. Switch to the **Remote Systems** view.
2. Right-click in the view and choose **Import** from the shortcut menu.

The **Open** dialog appears.

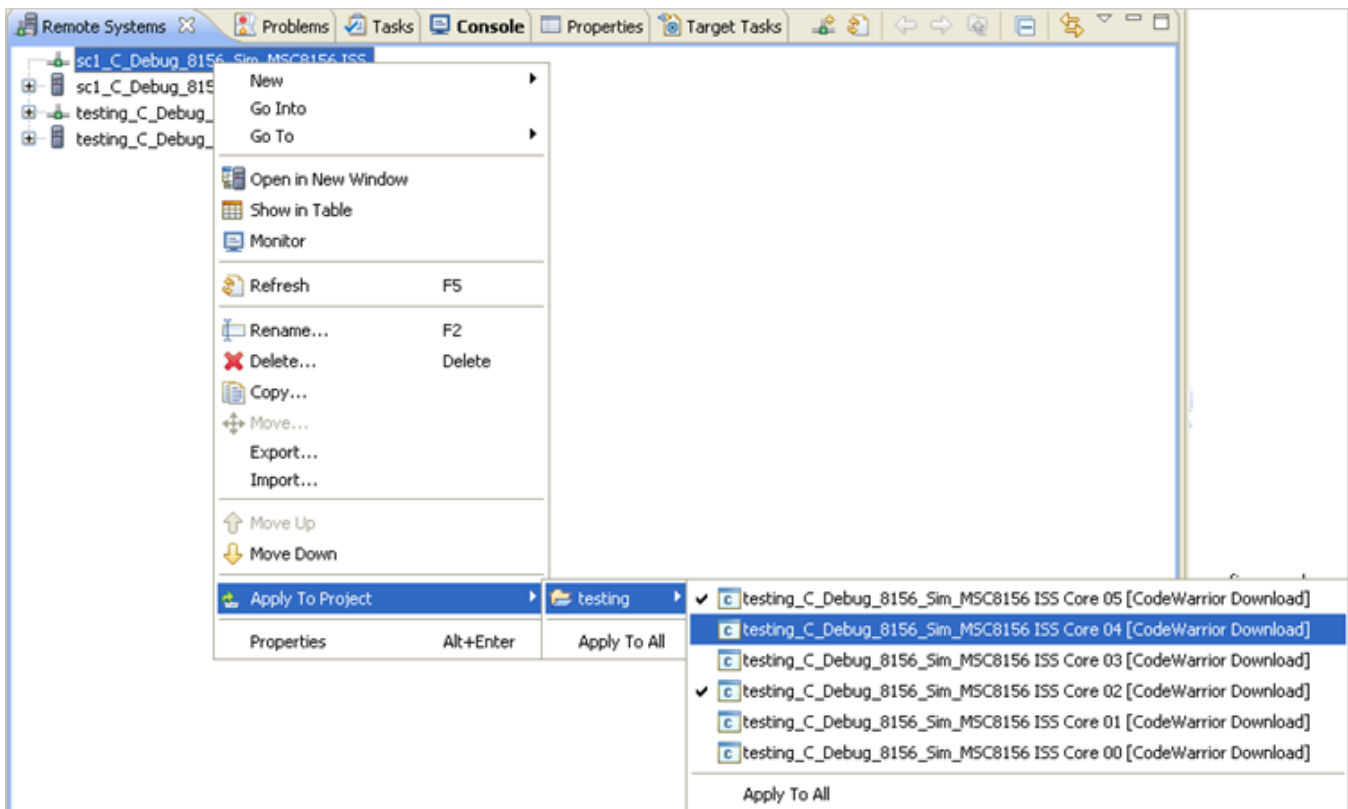
3. Select a remote system file.
4. Click **Open**.

### 2.17.5.4 Apply to Project

This feature allows you to set the active target and component of a launch configuration. To set the active target and component:

1. Switch to the **Remote Systems** view.
2. Right-click the host and choose **Apply to Project** from the shortcut menu.

A submenu with different projects and launch configurations appears.



**Figure 2-43. Remote Systems - Apply to Project**

3. Choose the item to apply the target selection in a project.

The projects items appear with a check mark to show if the item has the target selected.

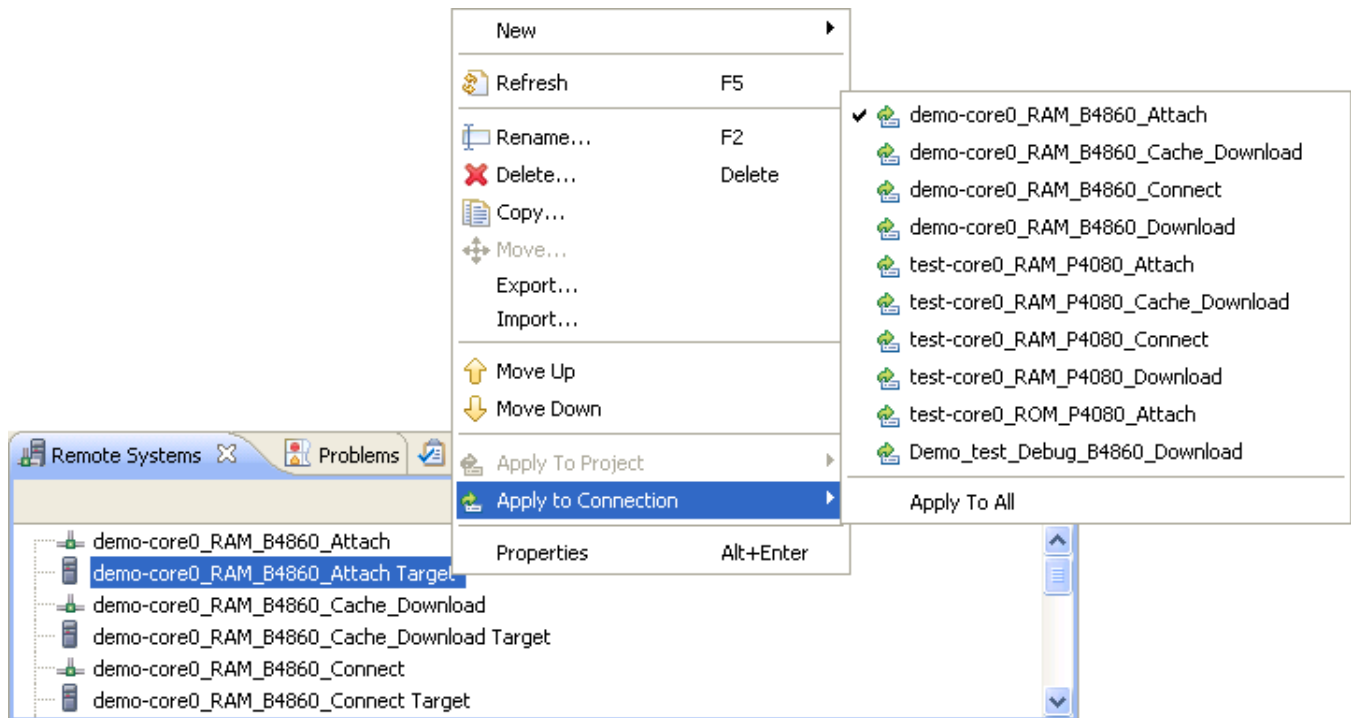
4. Choose **Apply To All** to apply the target selection for all projects.

### 2.17.5.5 Apply to Connection

This feature allows you to set a target configuration to a connection, without having to open the **Debug Configurations** dialog. To set a target configuration:

1. Switch to the **Remote Systems** view.
2. Right-click the host and choose **Apply to Connection** from the shortcut menu.

A submenu with different target configurations appears.



**Figure 2-44. Remote Systems - Apply to Connection**

3. Choose the item to apply the target configuration to the connection configuration.

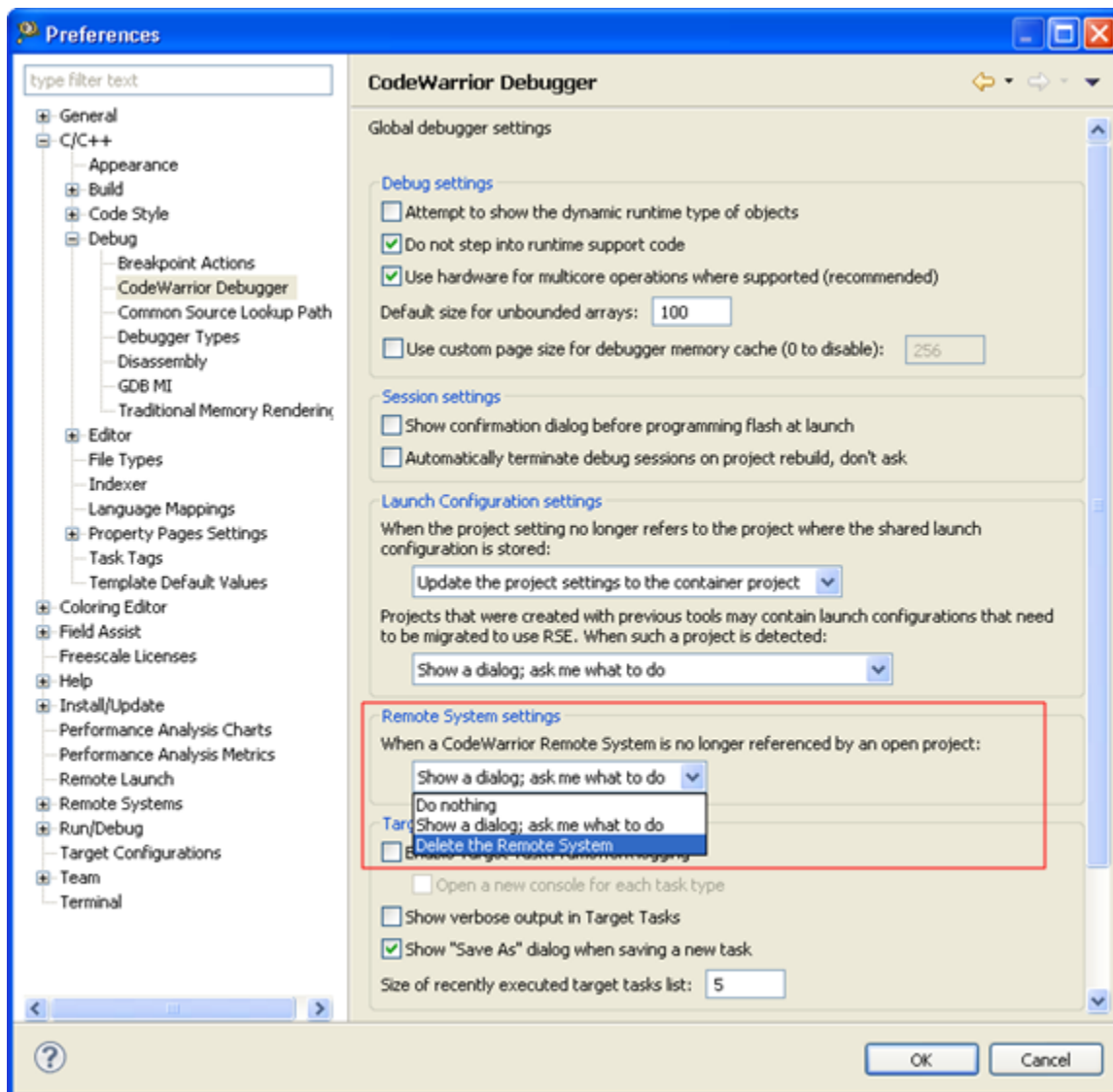
The connection is selected with a check mark displayed.

### 2.17.5.6 Automatic removal of unreferenced remote system

When a CodeWarrior Remote System is no longer referenced by an open project, you may delete it automatically. To remove unreferenced remote systems:

1. Choose **Window > Preferences > C/C++->Debug > CodeWarrior Debugger**.

The **CodeWarrior Debugger** dialog appears.



**Figure 2-45. Preferences dialog - Remote System settings**

2. Choose any one of the options available in the **Remote System Settings** pop-up menu.
  - Do nothing
  - Show a dialog; ask me what to do
  - Delete the Remote System
3. Click **OK**.

The unreferenced remote systems are removed.

## 2.17.6 Automatic project remote system setting cache

The APSC feature automatically stores the settings of the Remote Systems referenced by a project's launch configurations. When the project is opened on a different machine or in a different workspace, the APSC feature automatically re-creates the missing Remote Systems for the project. This feature will also update and merge any Remote System setting that has changed between its project and workspace version.

APSC feature allows you to update the Remote System tree when a project is open in the workspace and its APSC cache doesn't match the current Remote System settings. APSC provides following two operations:

- [Remote System Missing](#)
- [Remote System Changed dialog](#)

### 2.17.6.1 Remote System Missing

The **Remote System Missing** dialog appears when a project is open in the workspace and its APSC cache contains Remote Systems that do not exist. In such case, you will be asked to create missing objects.

The following figure shows the **Remote System Missing** dialog.

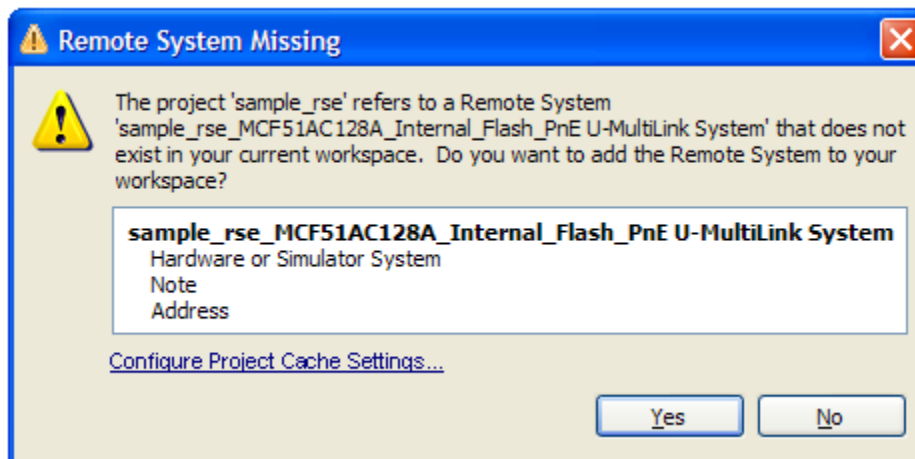


Figure 2-46. Remote System Missing dialog

#### NOTE

By default, the **Remote System Missing** dialog does not appear unless the Remote System Project Cache workspace preferences are changed. Any missing host will be automatically re-created.

If you click **Yes** to create the missing Remote System, a new remote system will be created and initialized with the cached settings.

If you click **No**, the **Remote System Missing** dialog will be closed.

You can click the **Configure Project Cache Settings** link to directly change the Remote System Project Cache preferences to avoid automatically displaying this dialog in future.

### 2.17.6.1.1 Remote system project cache preferences

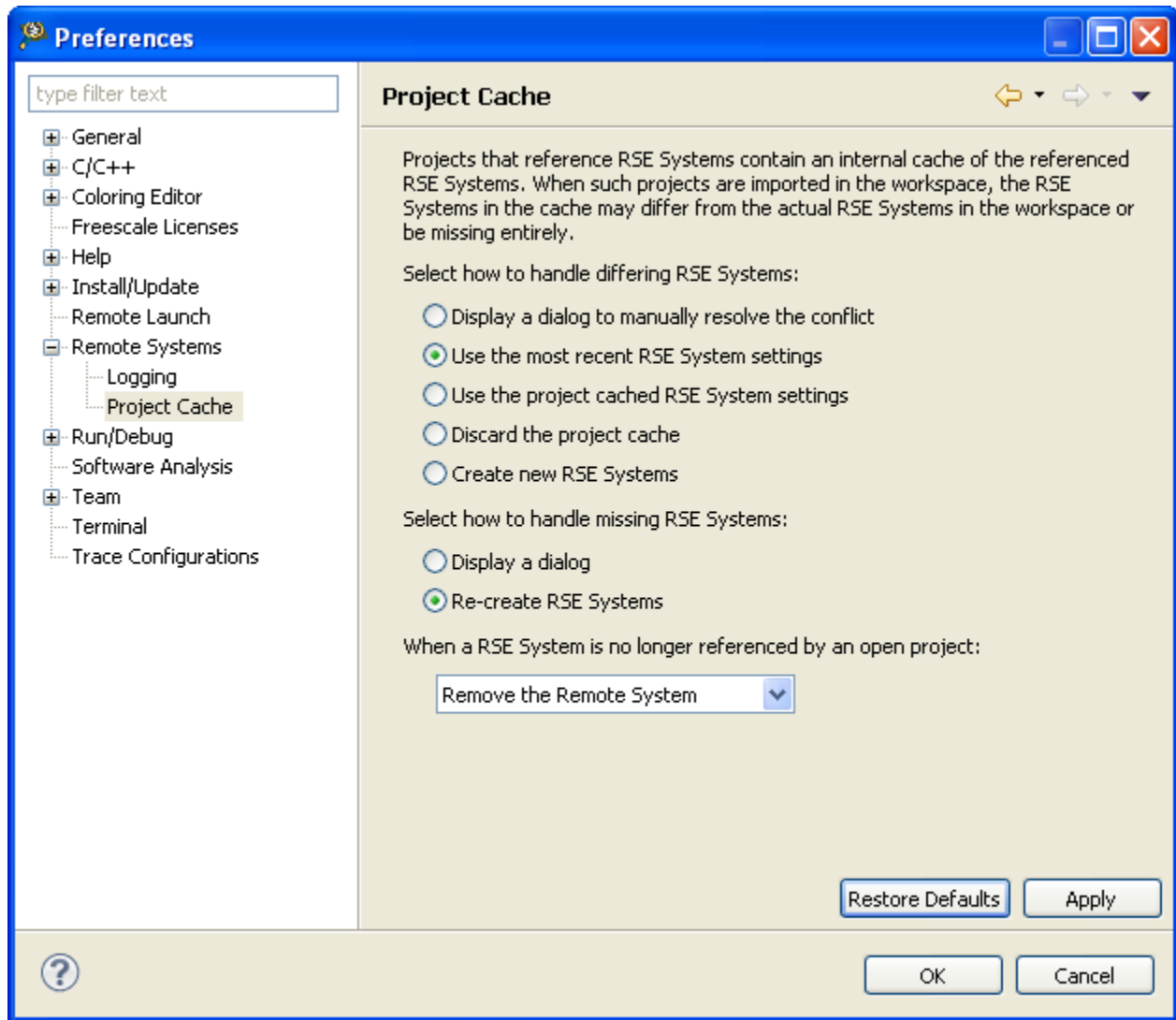
You can set preferences for Remote System to handle differing Remote Systems and missing Remote System.

Projects that reference Remote Systems contain an internal cache of the referenced Remote Systems. When such projects are imported in the workspace, the Remote Systems in the cache may differ from the actual Remote Systems in the workspace or be missing entirely.

To configure merge settings:

1. Choose **Window > Preferences**.

The **Preferences** dialog appears.



**Figure 2-47. Preferences dialog - Remote Systems Project Cache settings**

2. Expand the **Remote System** tree control from the left-pane of the **Preferences** dialog.

You can configure the way the dialog appears by changing the **Remote System Project Cache** page as shown in the above figure.

3. Select an option from **how to handle differing RSE System**.
4. Select an option from **how to handle missing RSE Systems**.
5. Choose an action from the **When a RSE System is no longer referenced by an open project** pop-up menu.
6. Click **OK** to apply changes.

You have set the preferences for Remote System to handle differing Remote Systems and missing Remote Systems.



## 2.17.6.2 Remote System Changed dialog

The **Remote System Changed** dialog appears when a project is open in the workspace and its APSC cache contains Remote Systems that have different settings to the ones in the existing Remote System tree. In such case, you will be asked to update, discard or create a new set of objects for the cached Remote System settings.

The **Remote System Changed** dialog provides following three options to resolve the version differences:

1. Replace the current version with the project version.
2. Discard the project version and update the project to use the current version.
3. Create a new Remote System for the project version.
4. Choose an appropriate option and click **OK**.

You can click the **Configure Project Cache Settings** link to directly change the Remote System Project Cache preferences, to avoid automatically displaying this dialog in future. For details, see [Remote system project cache preferences](#).

### NOTE

You may keep the file containing the referenced remote systems available in the `<Project_name>/Referenced Systems` folder in a version control system for future use.

## 2.17.7 Compatibility with older products

The CodeWarrior connection configuration and target configuration have moved from the Launching framework to the Remote System Explorer. This allows you to share the same connection and target configuration among many launch configurations and you can see all configuration for a Multicore system at a glance.

The following sections will show the facilities for migrating older projects to use RSE.

### 2.17.7.1 Display of launch configurations needing migration

CodeWarrior allows you to display migration candidates as information, warnings, or errors in the **Problems** view. You can also set preference to ignore or automatically migrate the migration candidates.

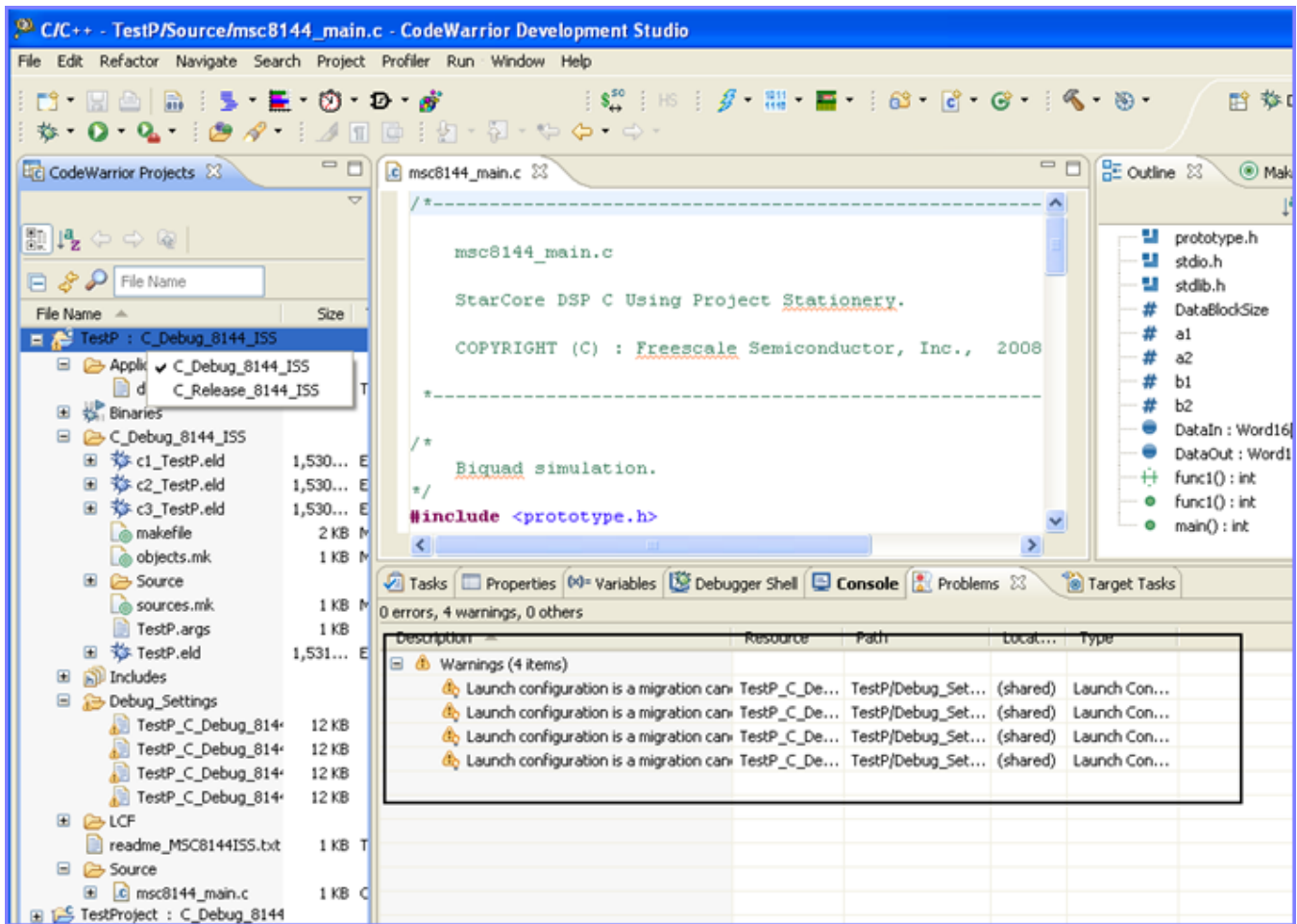


Figure 2-48. Migration candidates in Problems view

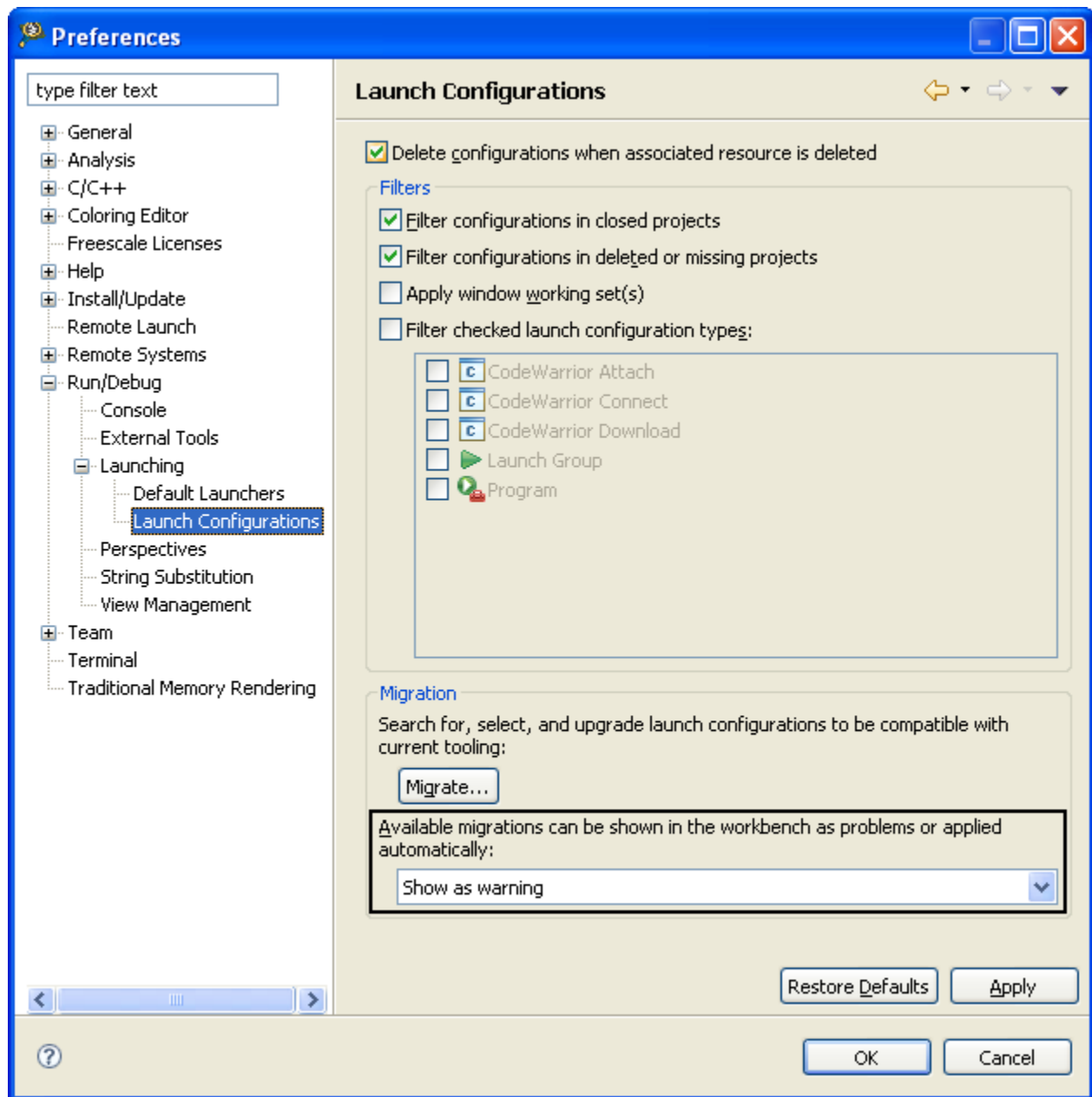
To configure migration preference:

1. Choose **Window > Preferences** .

The **Preferences** dialog appears.

2. Choose **Run/Debug > Launching > Launch Configurations** in the left pane of the **Preferences** dialog.

The launch configuration preferences appear in the right pane of the **Preferences** dialog.



**Figure 2-49. Preferences dialog**

3. Choose a value from the **Available migrations can be shown in the workbench as problems or applied automatically** pop-up menu.
  - Ignore - Ignores the migration candidates.
  - Show as information - Displays migration candidates as information in the **Problems** view.
  - Show as warning - Displays migration candidates as warnings in the **Problems** view.
  - Show as error - Displays migration candidates as errors in the **Problems** view.
  - Apply automatically - Automatically migrates all migration candidates.
4. Click **Apply**.

5. Click **OK**.

For projects created using Launching framework, a migration facility is provided.

## 2.17.7.2 Migrating launch configurations

For projects created using Launching framework, a migration facility is provided. CodeWarrior allows you to migrate launch configurations using these methods:

- [Migration using Smart Migration](#)
- [Migration using Quick Fix](#)

### 2.17.7.2.1 Migration using Smart Migration

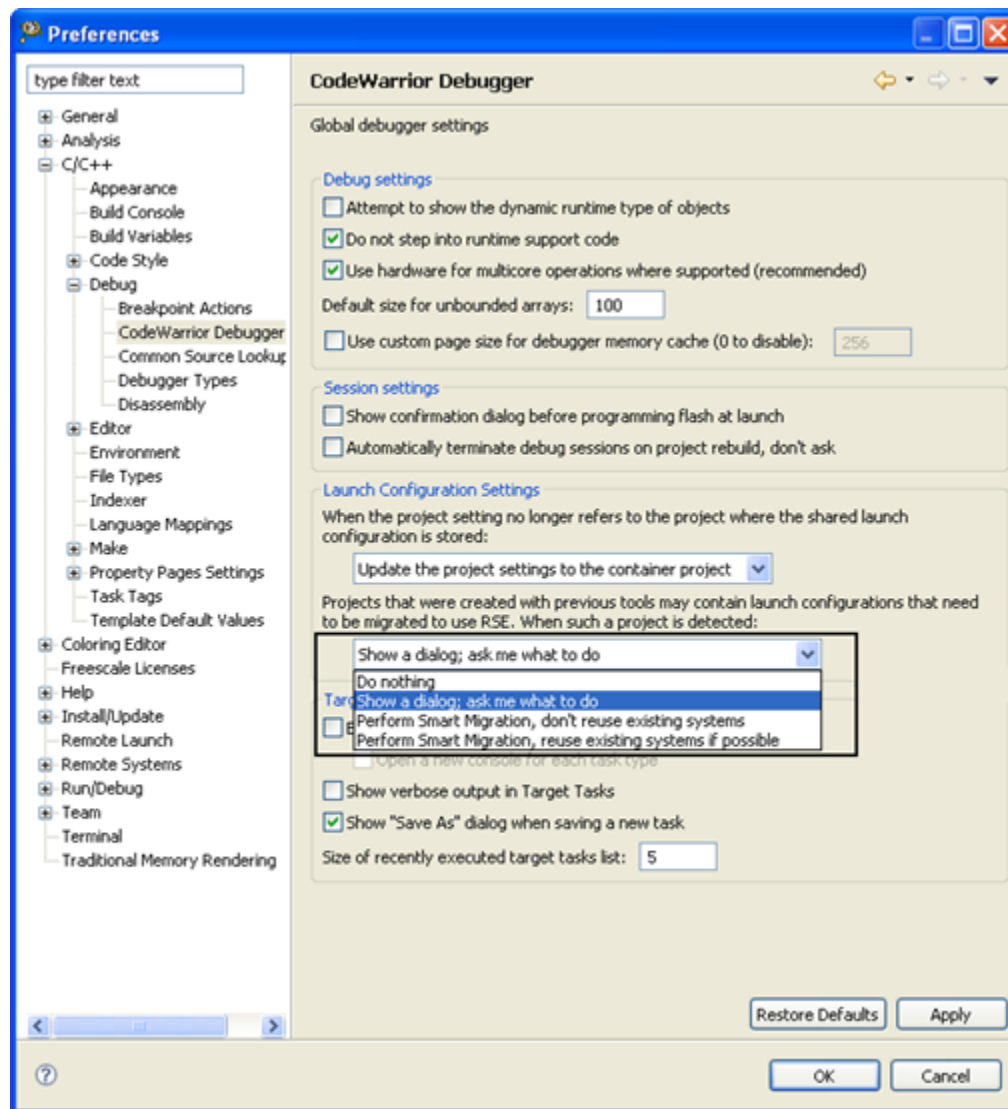
You need to configure CodeWarrior to migrate launch configurations using Smart Migration method. To configure CodeWarrior for Smart Migration:

1. Choose **Window > Preferences**.

The **Preferences** dialog appears.

2. Choose **C/C++ > Debug > CodeWarrior Debugger** in the left pane of the **Preferences** dialog.

The CodeWarrior debugger preferences appear in the right pane of the **Preferences** dialog.



**Figure 2-50. Configuring Smart Migration**

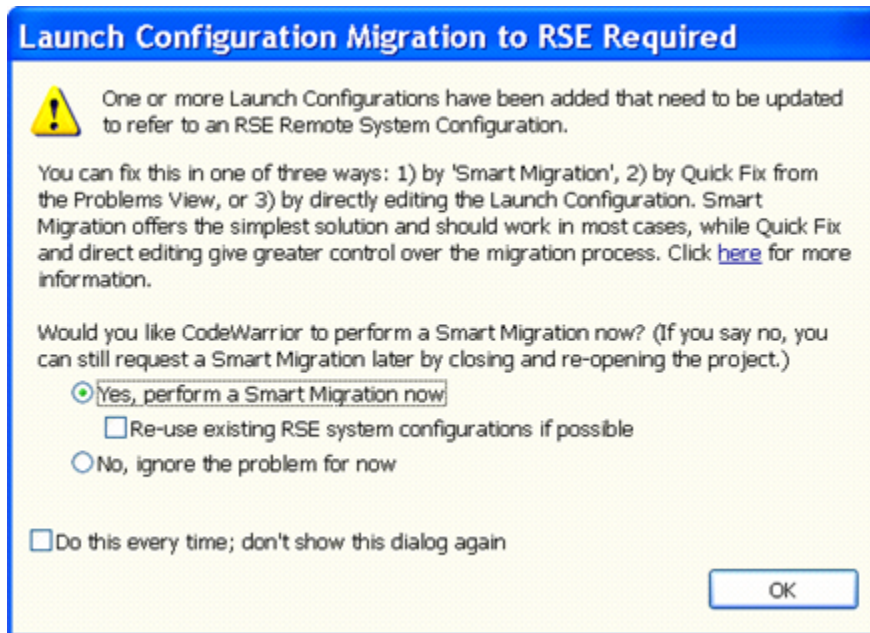
3. Choose a migration option from the available pop-up menu.
  - Do nothing - Launches configuration not migrated, and no warning is displayed.
  - Show a dialog; ask me what to do - Displays a dialog to select a migration option.
  - Perform Smart Migration, don't reuse existing systems - Automatically migrates launch configurations without using existing Remote System.
  - Perform Smart Migration, reuse existing system if possible - Automatically migrates launch configurations using existing remote systems (if possible).
4. Click **Apply**.
5. Click **OK**.

Now, when you open a project that was created using Launching framework, the CodeWarrior launches the Smart Migration utility ( [Figure 2-51](#)) to migrate all migration candidates.

To migrate using Smart Migration

1. Open the project in CodeWarrior.

The **Launch Configuration Migration to RSE Required** dialog appears.



**Figure 2-51. Launch Configuration Migration using Smart Migration**

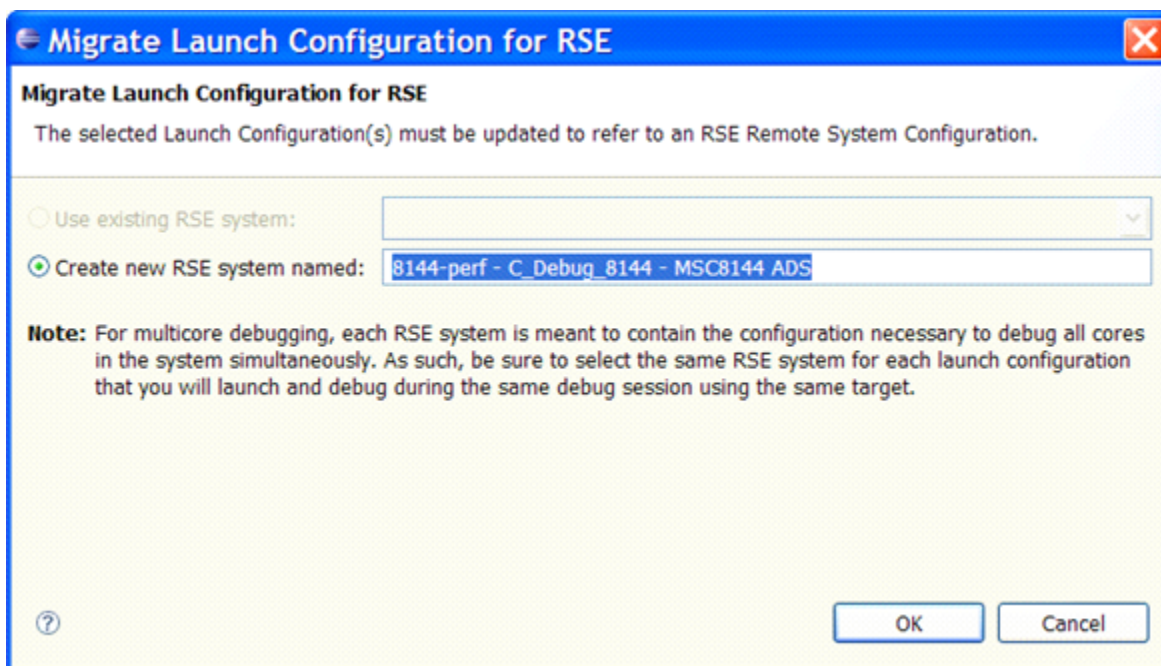
2. Select the **Yes, Perform a Smart Migration now** option.
3. Select the **Re-use existing RSE system configuration if possible** checkbox to reuse existing Remote System configurations. Otherwise, Smart Migration migrates launch configurations without re-using existing Remote System configurations.

#### **NOTE**

Selecting the **No, ignore the problem for now** option stops the migration process. You can still migrate launch configuration using Quick Fix or by directly editing the launch configurations.

4. Select the **Do this every time; don't show this dialog again** checkbox to save your selection as general preference.
5. Click **OK**.

The **Migrate Launch Configuration for RSE** dialog appears.



**Figure 2-52. Migrate Launch Configuration for RSE dialog**

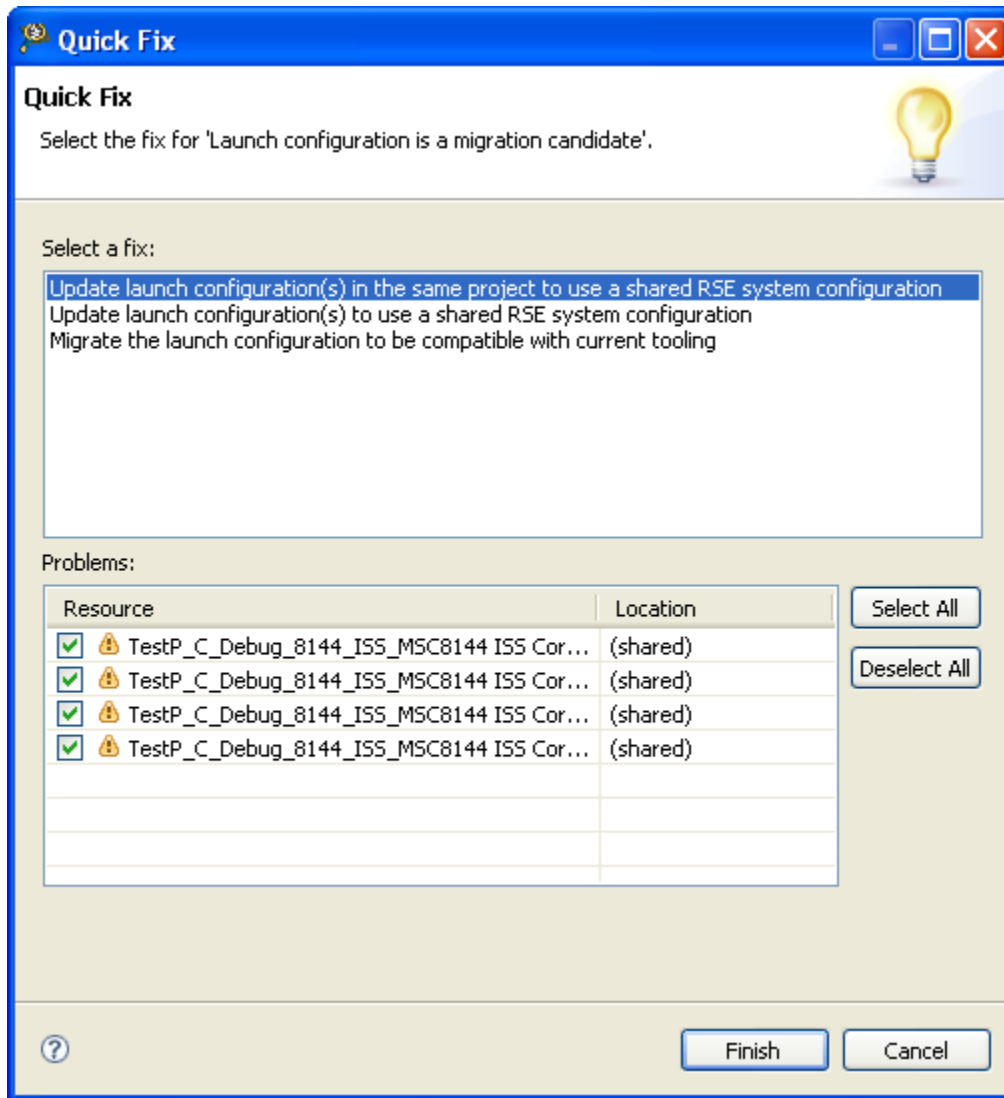
6. Specify a name for the launch configuration in the **Create new RSE system named:** textbox.
7. Click **OK**.

### 2.17.7.2.2 Migration using Quick Fix

To migrate a launch configuration using Quick Fix:

1. Select a migration candidate in the **Problems** view.
2. Right-click and choose **Quick Fix** from the shortcut menu.

The **Quick Fix** dialog appears.

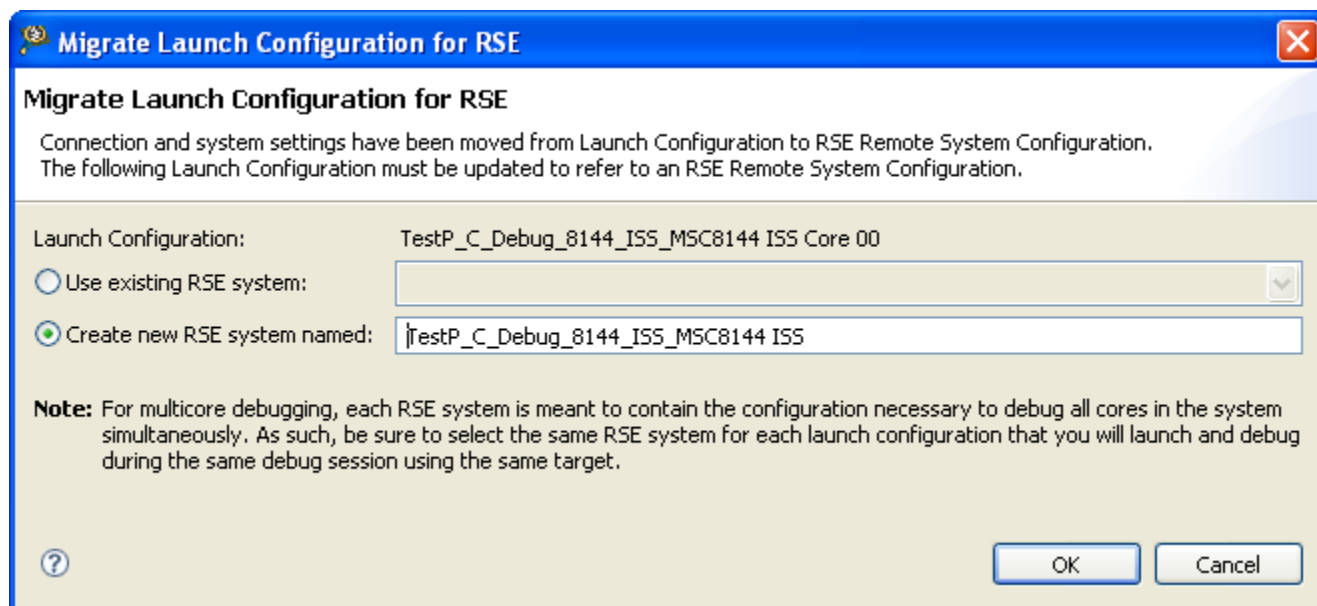


**Figure 2-53. Quick Fix dialog**

3. Select a fix from the **Select a Fix** list box.
  - Update launch configuration(s) in the same project to use a shared Remote System configuration - Assigns the selected remote system to all launch configurations from a single project.
  - Update launch configuration(s) to use a shared Remote System configuration - Assigns the selected remote system to all launch configurations from workspace.
  - Migrate the launch configuration to be compatible with current tooling - Lets you to choose remote system for each selected launch configuration.
4. Select launch configurations to be migrated from the **Problems** table.
5. Click **Finish**.

The **Migrate Launch Configuration for RSE** dialog appears.





**Figure 2-54. Migrate Launch Configuration for RSE dialog**

6. Select a remote system setting.
  - Select the **Use existing RSE system** option and choose an existing remote system from the pop-up menu.

#### NOTE

Remote systems compatible with the chosen launch configuration are only listed in the pop-up menu.

- Select **Create new RSE system named** to create a new remote system by the specified name in the textbox.
7. Click **OK**.

Alternatively, You can invoke the launch configuration migration dialog using the **Preferences** dialog:

1. Choose **Window > Preferences** .

The **Preferences** dialog appears.

2. Choose **Run/Debug > Launching > Launch Configurations** in the left pane of the **Preferences** dialog.

The launch configuration preferences appear in the right pane of the **Preferences** dialog.

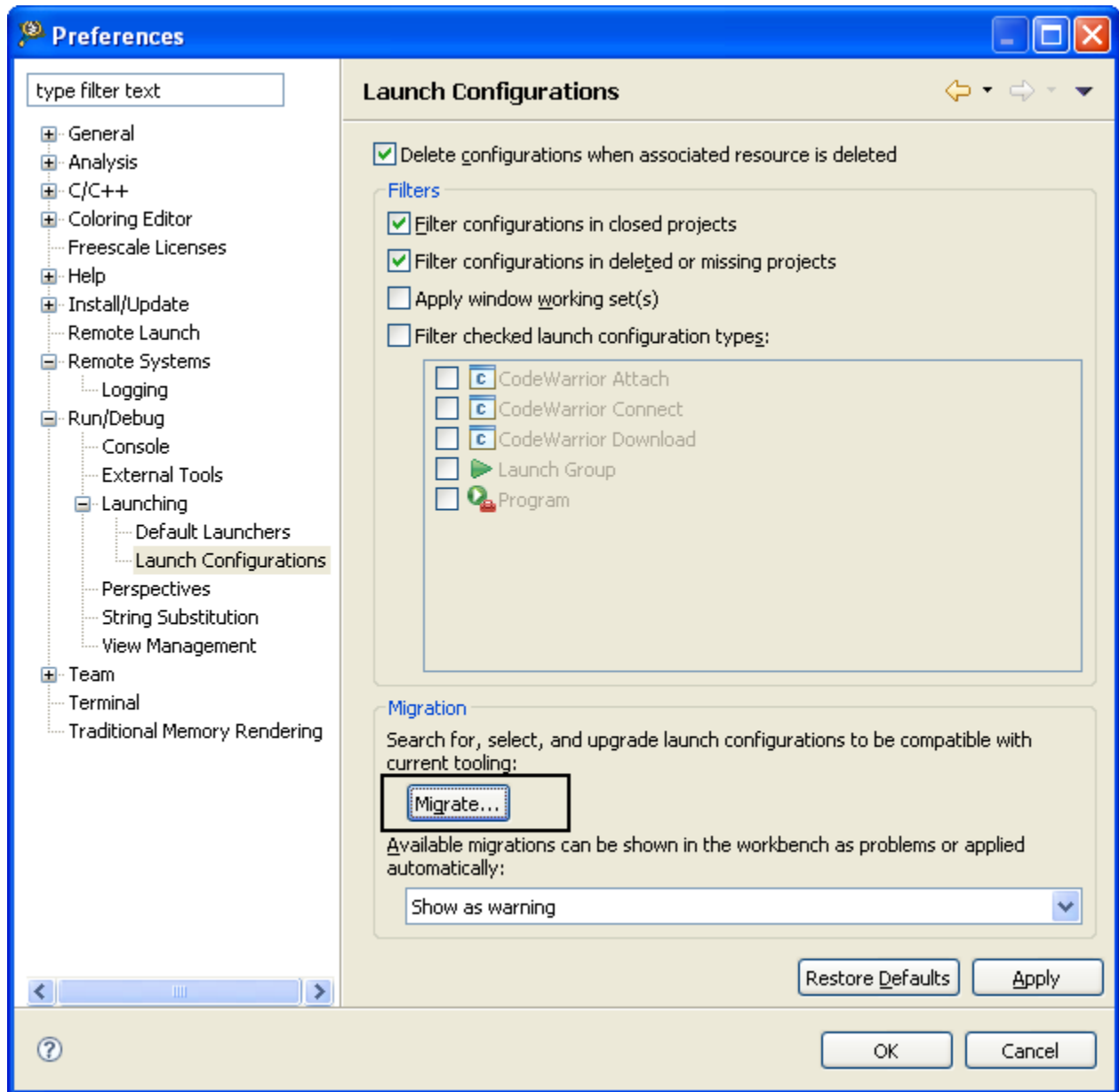
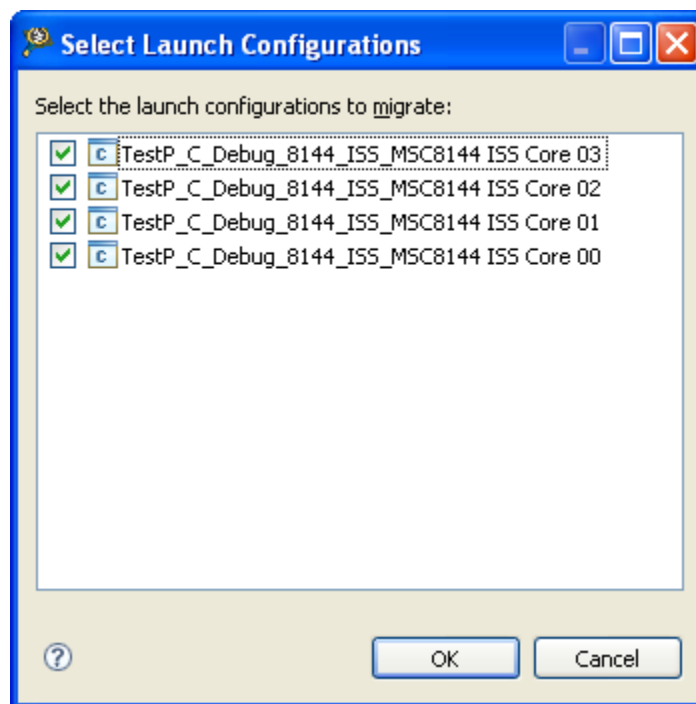


Figure 2-55. Preferences dialog

3. Click **Migrate**.

The **Select Launch Configurations** dialog appears.



**Figure 2-56. Select Launch Configurations dialog**

4. Select the launch configurations to migrate.
5. Click **OK**.

The **Migrate Launch Configuration for RSE** dialog ( [Figure 2-54](#)) appears.

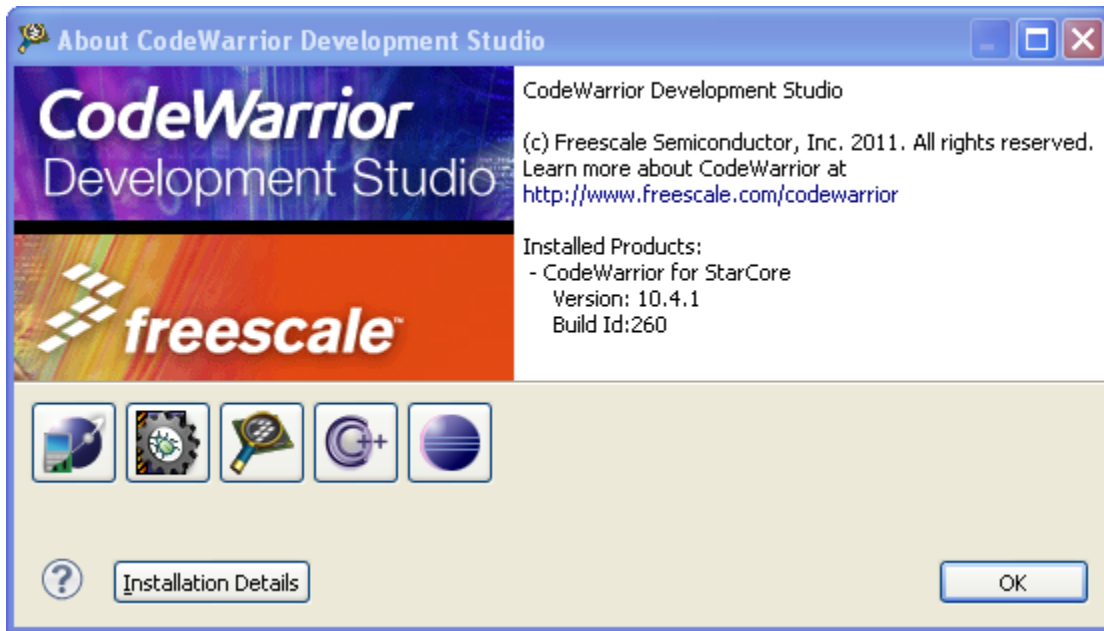
6. Select a remote system setting.
  - Select the **Use existing RSE system** option to choose an existing remote system from the pop-up menu.
  - Select **Create new RSE system named** to create a new remote system by the specified name in the textbox.
7. Click **OK**.

## 2.18 Viewing CodeWarrior plug-ins

To view the currently installed CodeWarrior features and the associated plug-ins:

1. Choose **Help > About Freescale CodeWarrior** from the IDE menu bar.

The **About CodeWarrior Development Studio** dialog appears.

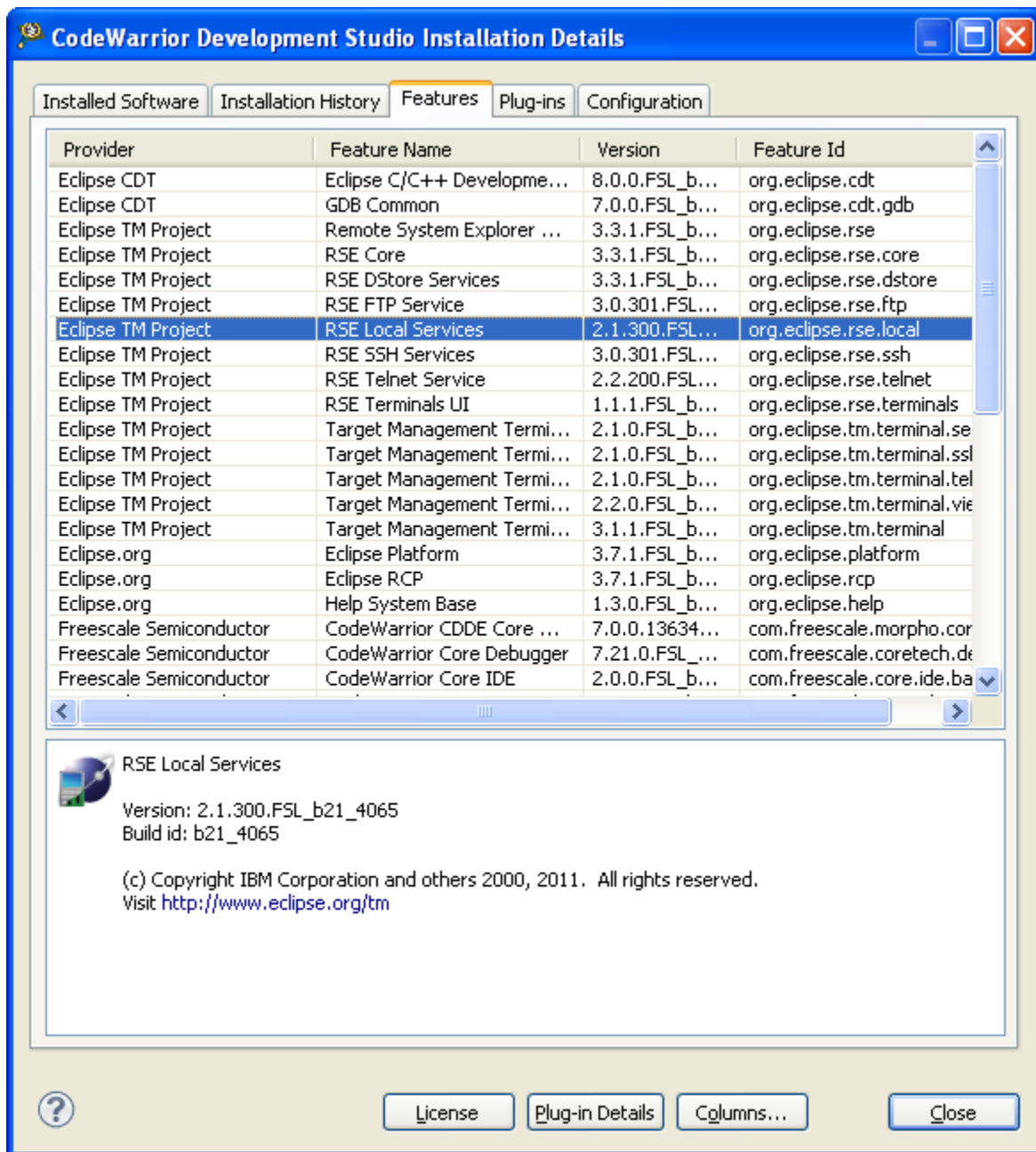


**Figure 2-57. About CodeWarrior Development Studio dialog**

2. Click the **Installation Details** button.

The **CodeWarrior Development Studio Installation Details** dialog appears.

3. Click the **Features** tab.



**Figure 2-58. Features tab**

- Select a feature and click the **Plug-in Details** button to view the list of plug-ins associated with the selected feature.

For example, if you select the Eclipse TM Project feature and click the **Plug-in Details** button, the **Feature Plug-ins** dialog containing the list of plug-ins associated with the Eclipse TM Project feature appears.

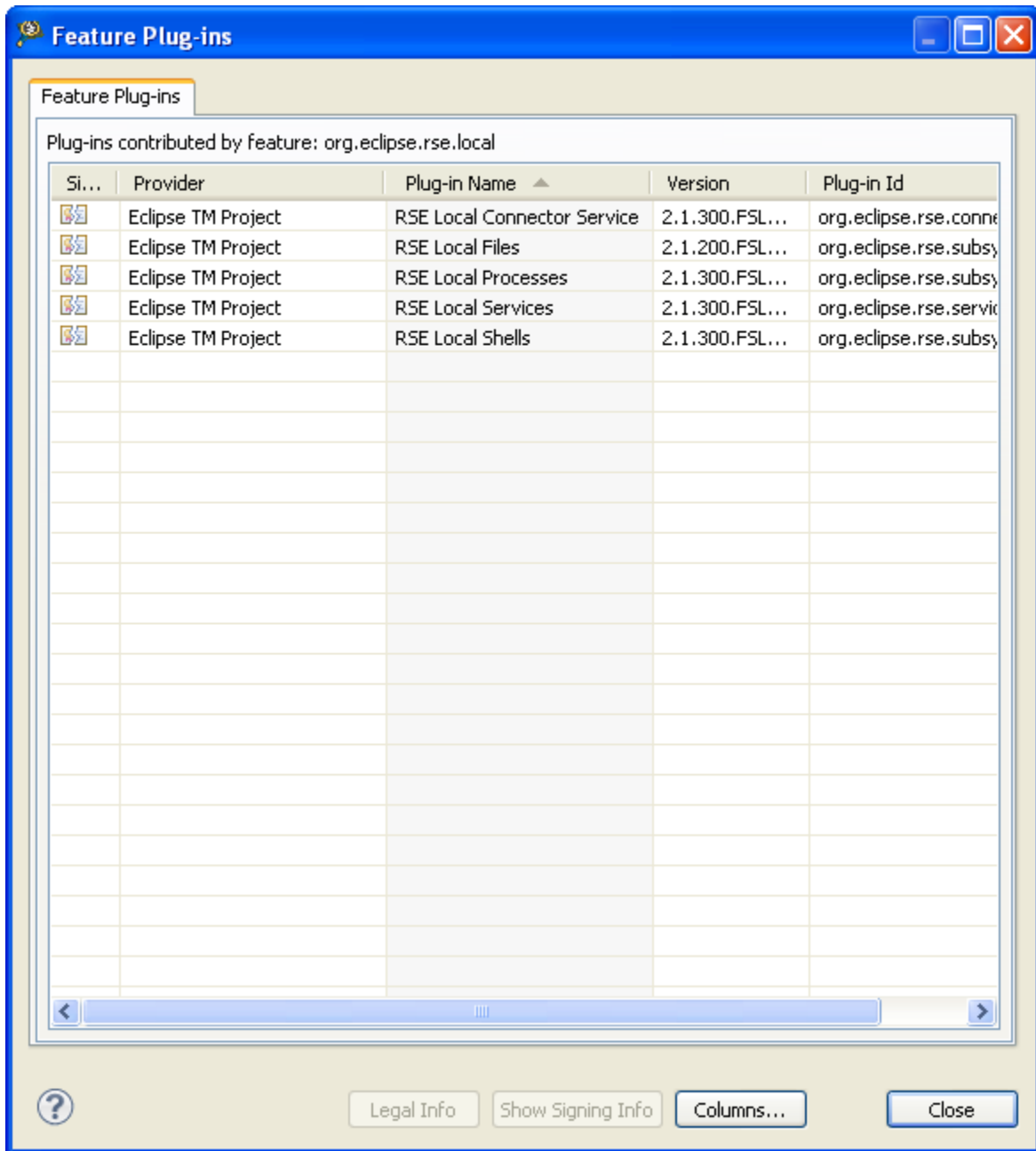


Figure 2-59. Feature Plug-ins dialog

## 2.19 Editing cwide-env file

The `cwide-env` file is a file that is read by the `cwide.exe`, `cwidec.exe`, and `ecd.exe` tools. The `cwide-env` file allows you to customize the list of environment variables of the java process that is created by these tools to run the Eclipse IDE.

The format of the `cwide-env` file follows the syntax as shown below.

```
<environment variable name>= <command> <value> ;
```

where

- `<environment variable name>` represents the name of the environment variable that you want to customize.
- `<command>` represents the command that you can use on the environment variable. Following options are available:
  - `-add` - Adds the environment variable to the list, or erases the value of an existing variable.
  - `-remove` - Removes the environment variable from the list.
  - `-append` - Appends the value to the existing environment variable content.
  - `-prepend` - Prepends the value to the existing environment variable content.
- `<value>` represents the value of the environment variable.

The expression can contain macros of the syntax `%VAR%`, which will be expanded before the environment variable is set.

The `cwide-env` file can also include other files to be passed as `cwide-env` files by adding a line with the following syntax.

```
-include <file name>
```

## NOTE

The changes to the environment variable list only affect the java process created by the `cwide.exe`, `cwidec.exe`, and `ecd.exe` tools.

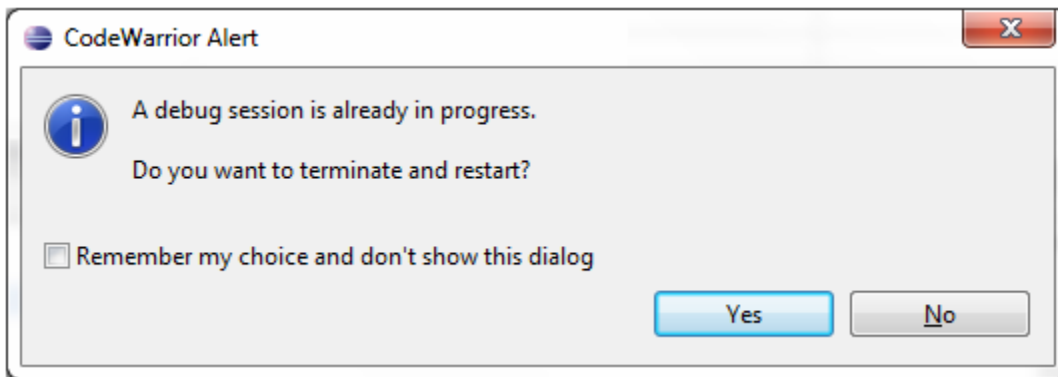
The content of a sample `cwide-env` file is shown below.

```
PATH= -prepend %CD%../MCU/bin;
LM_LICENSE_FILE= -prepend %CD%../MCU/license.dat;
CW_DE_SWITCHES= -prepend -ORBthreadPerConnectionPolicy 0 -ORBconnectionWatchImmediate 1 -
ORBthreadPoolWatchConnection 5
MCU_ProductDir= -add %CD%../MCU
MCU_TOOLS_HOME= -add %CD%../MCU
PA_TOOLS_HOME= -add %CD%../MCU
CW_SA_HOME= -add %CD%../MCU/morpho_sa/sasdk/data/fsl.configs.sa.searchpath
FLEXLM_BATCH= -add 1
CROSS_TOOLS_HOME= -add %CD%../Cross_Tools
ARM_GNU_TOOLS_HOME= -add %CD%../Cross_Tools/arm-none-eabi-gcc-4_7_3
```

## 2.20 Handling message alerts

The message boxes with **Yes/No** or **OK/Cancel** buttons display the **Do not Show this dialog again** checkbox. This checkbox if selected lets CodeWarrior automatically execute your saved choice, without displaying the message box next time. If you do not select the checkbox, the message box appears again next time.

For example, if the processor is in the Secure Debug mode and if the unlock key is not provided, then a pop-up message appears requesting the unlock key. If you enter the unlock key correctly, and select the **Do not Show this dialog again** checkbox, the next time when unlock is needed, the key will be automatically provided without displaying the pop-up message. This is also applicable for the message boxes which do not require user input. For example, in the **CodeWarrior Alert** message box, if you select the **Remember my choice and don't show this dialog** checkbox and click **Yes**, next time CodeWarrior will automatically take input as **Yes**, without displaying the message box. And if you select the checkbox and click **No**, CodeWarrior will take input as **No** next time.

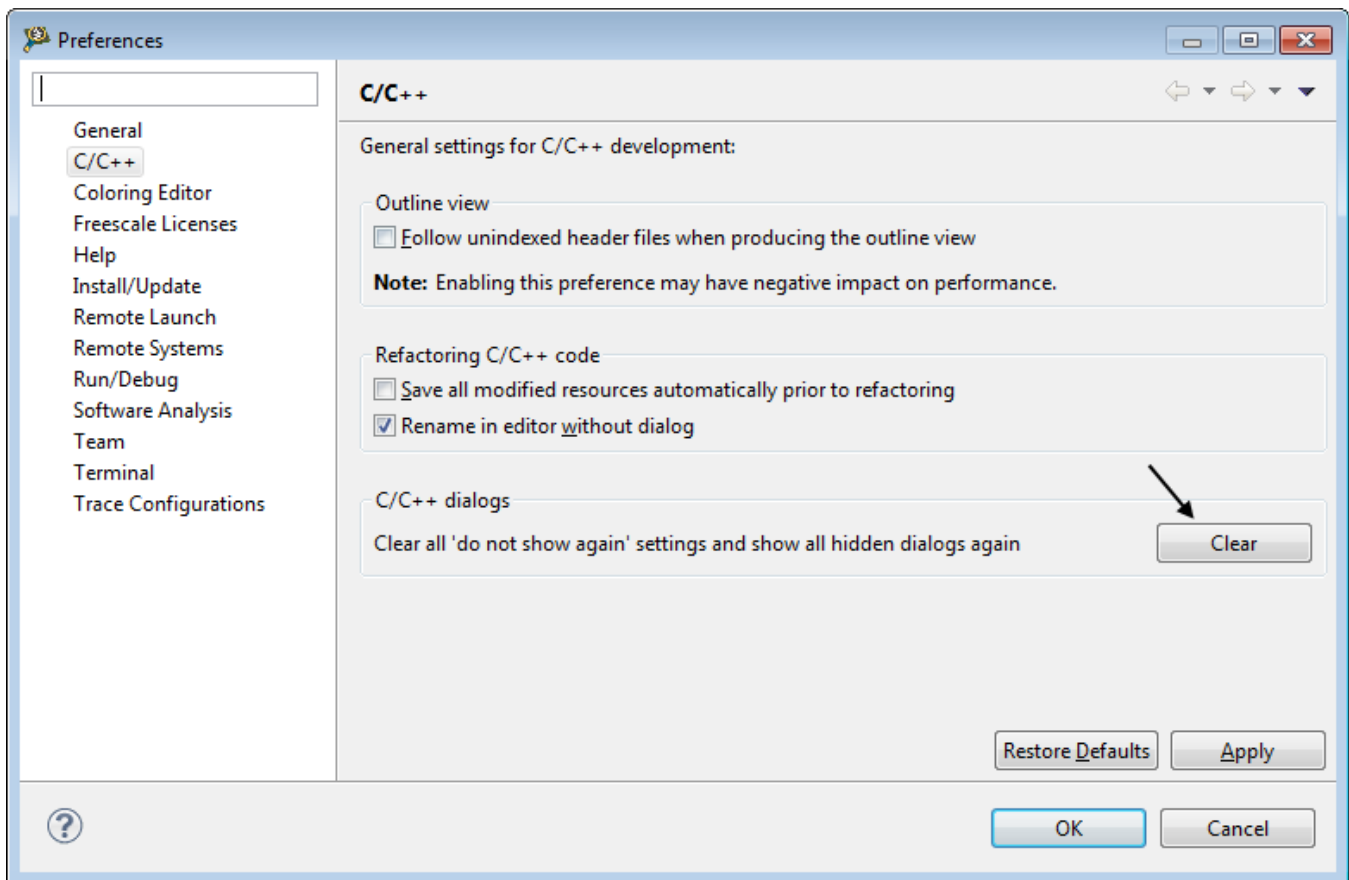


**Figure 2-60. CodeWarrior Alert message box**

To reset the settings of such message boxes, that is to display the previously hidden message boxes when needed, perform the following steps.

1. Choose **Window > Preferences** to open the **Preferences** dialog.
2. Select **C/C++** in the left pane.
3. Click the **Clear** button in the **C/C++ dialogs** group.





**Figure 2-61. Preferences dialog**

4. Click **Apply** to save the settings.
5. Click **OK** to close the **Preferences** dialog.

This will clear all 'do not show again' settings and display all hidden message or dialogs again.



## Chapter 3

# Debugger

This chapter explains how to work with the debugger to control program execution.

This chapter explains:

- [About debugger](#)
- [Breakpoints](#)
- [Build while debugging](#)
- [Cache view](#)
- [CodeWarrior debugger settings](#)
- [Core index indicators in homogeneous multicore environment](#)
- [Debug perspective](#)
- [Debug view](#)
- [Disassembly view](#)
- [Environment variables in launch configuration](#)
- [Flash programmer](#)
- [Flash File to Target](#)
- [Hardware diagnostics](#)
- [Import/Export/Fill memory](#)
- [Launch group](#)
- [Load multiple binaries](#)
- [Memory view](#)
- [Memory Browser view](#)
- [Memory Management Unit configurator](#)
- [Multicore debugging](#)
- [Multicore Groups](#)
- [Multicore reset](#)
- [Path mappings](#)
- [Redirecting standard output streams to socket](#)
- [Refreshing data during runtime](#)
- [Registers view](#)
- [Register Details view](#)

- [Remote launch](#)
- [Stack crawls](#)
- [Symbolics](#)
- [System Browser view](#)
- [Target connection lost](#)
- [Target initialization files](#)
- [Target Tasks view](#)
- [Variables](#)
- [Watchpoints](#)

## 3.1 About debugger

A *debugger* controls program execution and shows the internal operation of a computer program. You can use the debugger to find problems while the program executes and observe how a program uses memory to complete tasks.

These tasks can be performed using the CodeWarrior debugger:

- attach to a running process,
- manipulate the contents of cache, registers, and memory,
- change the program-counter (PC) value,
- execute debugger commands from a command line interface,
- connect to target hardware or simulators,
- render the same data in different formats or byte ordering,
- perform hardware diagnostics,
- program the flash memory,
- manipulate target memory, and
- configure target-hardware subsystems.

## 3.2 Breakpoints



You use a breakpoint to halt program execution on a particular line of source code. Once execution halts, you can examine your program's current state and check register and variable values. You can also change these values and alter the flow of normal program execution. Setting breakpoints helps you debug your program and verify its efficiency.

The types of breakpoints are:

- Regular - Halts the program execution.
- Conditional - Halts the program execution when a specified condition is met.
- Special - Halts the program execution and then removes the breakpoint that caused the halt.

Breakpoints have *enabled* and *disabled* states. The following table defines these states.

**Table 3-1. Breakpoint states**

State	Icon	Description
Enabled		Indicates that the breakpoint is currently enabled. The debugger halts the program execution at an enabled breakpoint. Click the icon to disable the breakpoint.
Disabled		Indicates that the breakpoint is currently disabled. The debugger does not halt program execution at a disabled breakpoint. Click the icon to enable the breakpoint.

### 3.2.1 Breakpoints view

The **Breakpoints** view lists all the breakpoints set in the workbench projects. This view also allows breakpoints to be grouped by type, project, file, or working sets, and supports nested groupings. If you double-click a breakpoint displayed by this view, the source code editor displays the source code statement on which this breakpoint is set.

Choose **Window > Show View > Breakpoints** from the IDE menu bar to open the **Breakpoints** view.

#### Tip

Alternatively, press the **Alt+Shift+Q, B** key combination to open the **Breakpoints** view.

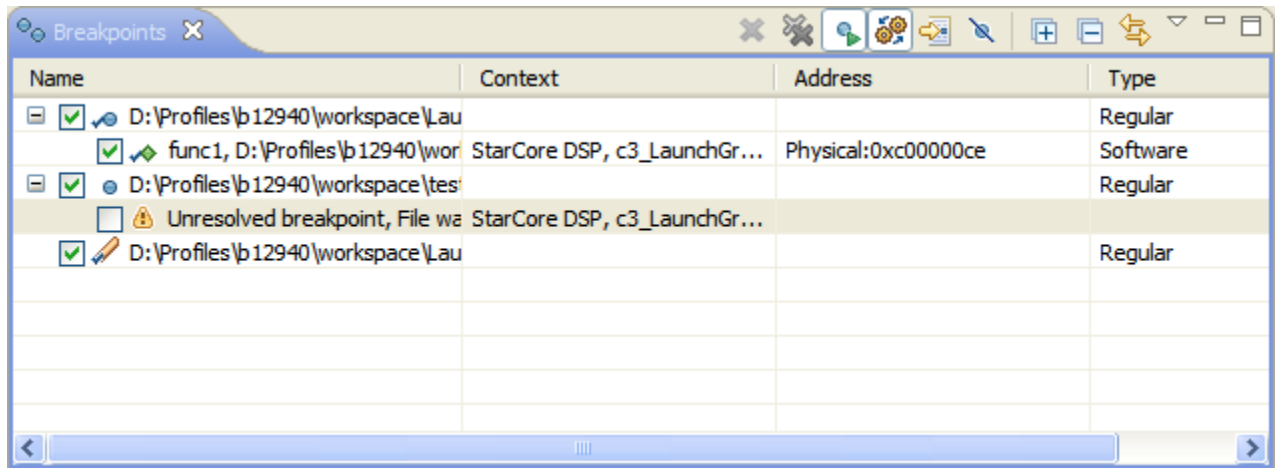


Figure 3-1. Breakpoints view

### 3.2.2 Breakpoint annotations

This CodeWarrior feature allows you to change editor breakpoint annotations.

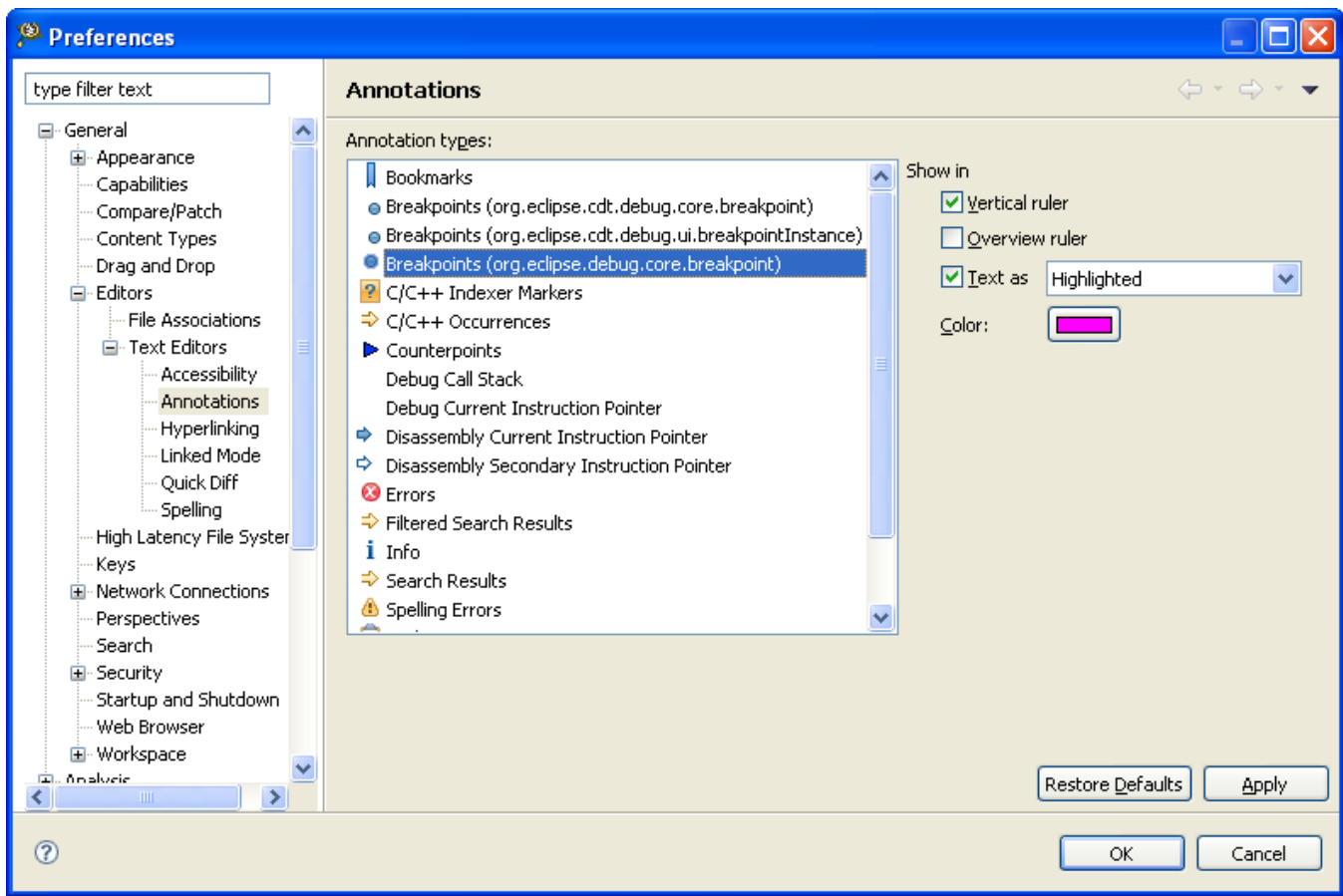
To change breakpoint annotations:

1. Choose **Window > Preferences** .

The **Preferences** dialog appears.

2. Choose **General > Editors > Text Editors > Annotations** .

The annotations appear in the right pane of the **Preferences** dialog.



**Figure 3-2. Breakpoint annotations**

3. Select **Breakpoints (org.eclipse.debug.core.breakpoint)** from the **Annotation types** list box.
4. Specify settings for the selected annotation.
5. Click **Apply**.
6. Click **OK**.

You have changed editor breakpoint annotations.

### 3.2.3 Regular breakpoints

Regular breakpoints suspend the execution of a thread before a line of code or method is executed. Regular breakpoints include:

- **Line** - Suspends the thread execution when the line of code it applies to is executed.
- **Method** - Suspends the thread execution when the method that it applies to, is entered or exited (or both).

The following figure shows an editor window and the marker bar to the left of the source code. Breakpoint icons appear in this marker bar.

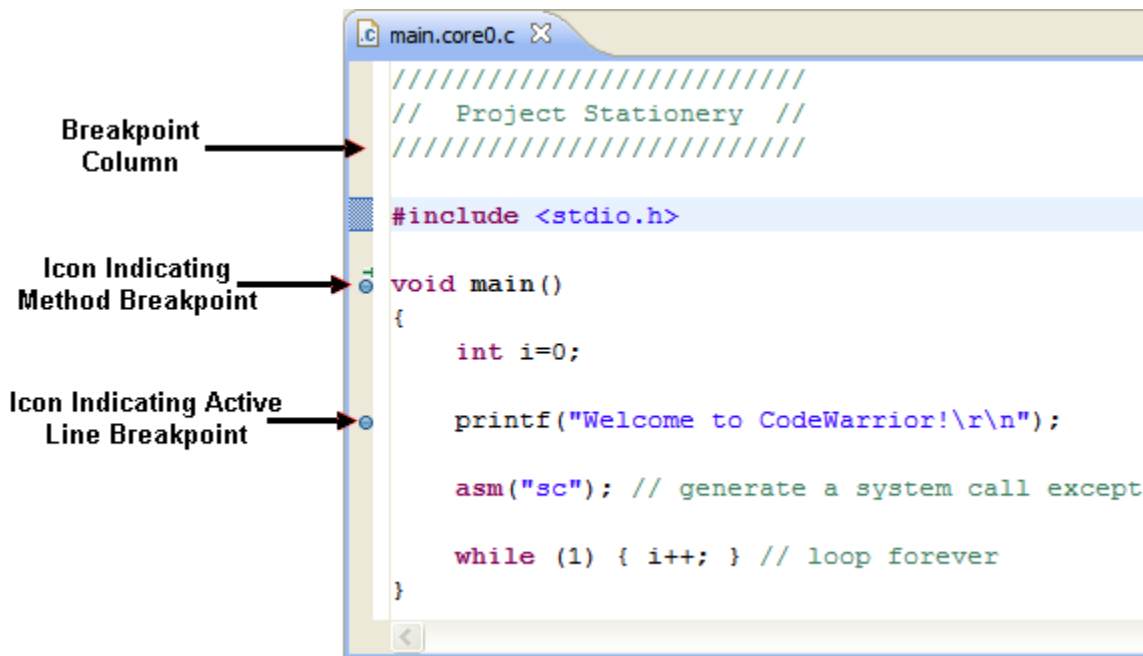


Figure 3-3. Setting regular breakpoints

**NOTE**

You can add a breakpoint while debugging your project. Double-click the marker bar to the left of a source code line to set a breakpoint at that line.

**3.2.3.1 Setting line breakpoint**

Line breakpoints are set on an executable line of a program. To set a line breakpoint at a line of source code:

1. Open the source code file in the editor and place the cursor on the line where you want to set the breakpoint.
2. Choose **Run > Toggle Line Breakpoint** from the IDE menu bar. You can also double-click the marker bar next to the source code line.

A breakpoint appears in the **Breakpoints** view. A breakpoint icon appears on the marker bar, directly to the left of the line where you added the breakpoint. The line where the breakpoint is set is highlighted in the editor area. The line appears highlighted in the **C/C++** perspective also.



When the breakpoint is enabled, the thread execution suspends before that line of code executes. The debugger selects the suspended thread and displays its stack frames.

### 3.2.3.2 Setting method breakpoint

Method breakpoints are set on methods that do not have source code. To set a method breakpoint on a line of source code:

1. Open the source code file in the editor.
2. Choose **Window > Show View > Outline** from the IDE menu bar.

The **Outline** view appears displaying an outline of the structured elements of the C/C++ file that is currently open in the editor area.

3. Select the method where you want to add a breakpoint.
4. Choose **Run > Toggle Breakpoint** from the IDE menu bar. You can also choose **Toggle Breakpoint** from the shortcut menu.

A breakpoint appears in the **Breakpoints** view. A breakpoint appears on the marker bar in the file's editor for the method that was selected, if source code exists for the class.

When the breakpoint is enabled, thread execution suspends before the method enters or exits.





### 3.2.4 Special breakpoints

A special breakpoint is different from a regular breakpoint. A special breakpoint can be one of these types:

- **Hardware** - Hardware breakpoints are implemented by the processor hardware. The number of hardware breakpoints available varies by processor type.
- **Software** - Software breakpoints are implemented by replacing some code in the target with special opcodes. These opcodes stop the core as soon as they are executed. Software breakpoints only work if the code is running out of RAM. There is no restriction on the number of software breakpoints in a project.

Special breakpoints have *enabled* and *disabled* states. The following table describes these states.

**Table 3-2. Special breakpoint states**

State	Hardware Icon	Software Icon	Description
Enabled			Indicates that the breakpoint is currently enabled. The debugger halts program execution at an enabled breakpoint. Click the icon to disable the breakpoint.
Disabled			Indicates that the breakpoint is currently disabled. The debugger does not halt program execution at a disabled breakpoint. Click the icon to enable the breakpoint.

### 3.2.4.1 Setting special breakpoint using IDE

A special breakpoint is not a regular breakpoint and therefore, cannot be set by double-clicking.

To set a special breakpoint:

1. Choose **Breakpoint Types > C/C++ Software Breakpoint** or **C/C++ Hardware Breakpoint** from any of the following views:
  - Editor - From the shortcut menu that appears on right-clicking the marker bar.
  - Disassembly - From the shortcut menu that appears on right-clicking the marker bar of the **Disassembly** view.
  - Outline - From the shortcut menu of the selected C++ class method.
  - In the editor area, directly to the left of the line where you want to add the breakpoint, choose **Toggle Breakpoint** from the shortcut menu. You can also double-click the marker bar next to the source code line.

A new special breakpoint marker appears on the marker bar, directly to the left of the line, where you added the breakpoint.

#### Tip

To add a special breakpoint while debugging your project, right-click the marker bar to the left of a source code line and choose **Breakpoint Types > C/C++**

## Software Breakpoint or C/C++ Hardware Breakpoint from the shortcut menu.

### 3.2.5 Breakpoint persistence

This CodeWarrior debugger feature preserves the enable/disable state of a breakpoint instance. If you change the enabled/disable state of the breakpoint instances, the debugger now serializes the breakpoint state for all breakpoint instances. As a result, next time the user starts a new debug session, the breakpoint instances are created as enabled/disabled according to the serialized state.

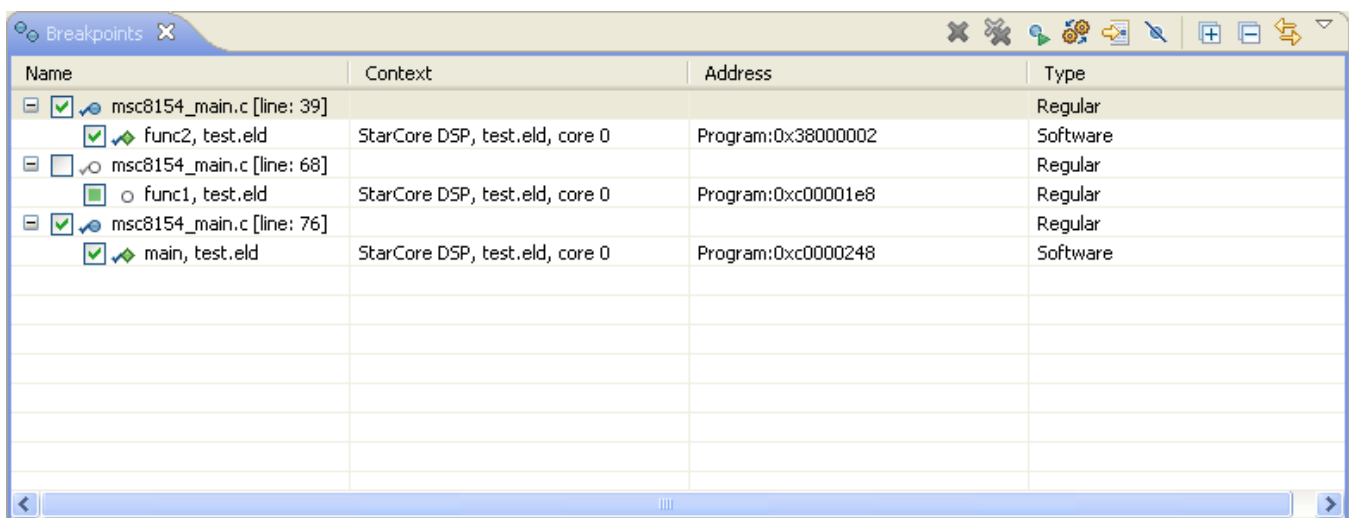


Figure 3-4. Breakpoints persistence

### 3.2.6 Breakpoint preferences

When a breakpoint is hit, CodeWarrior shifts the focus to the workbench and the **Debug** view. This can be annoying while working with long automated scripts. CodeWarrior can be configured to remain in background, when a breakpoint is hit, by changing the breakpoint preferences.

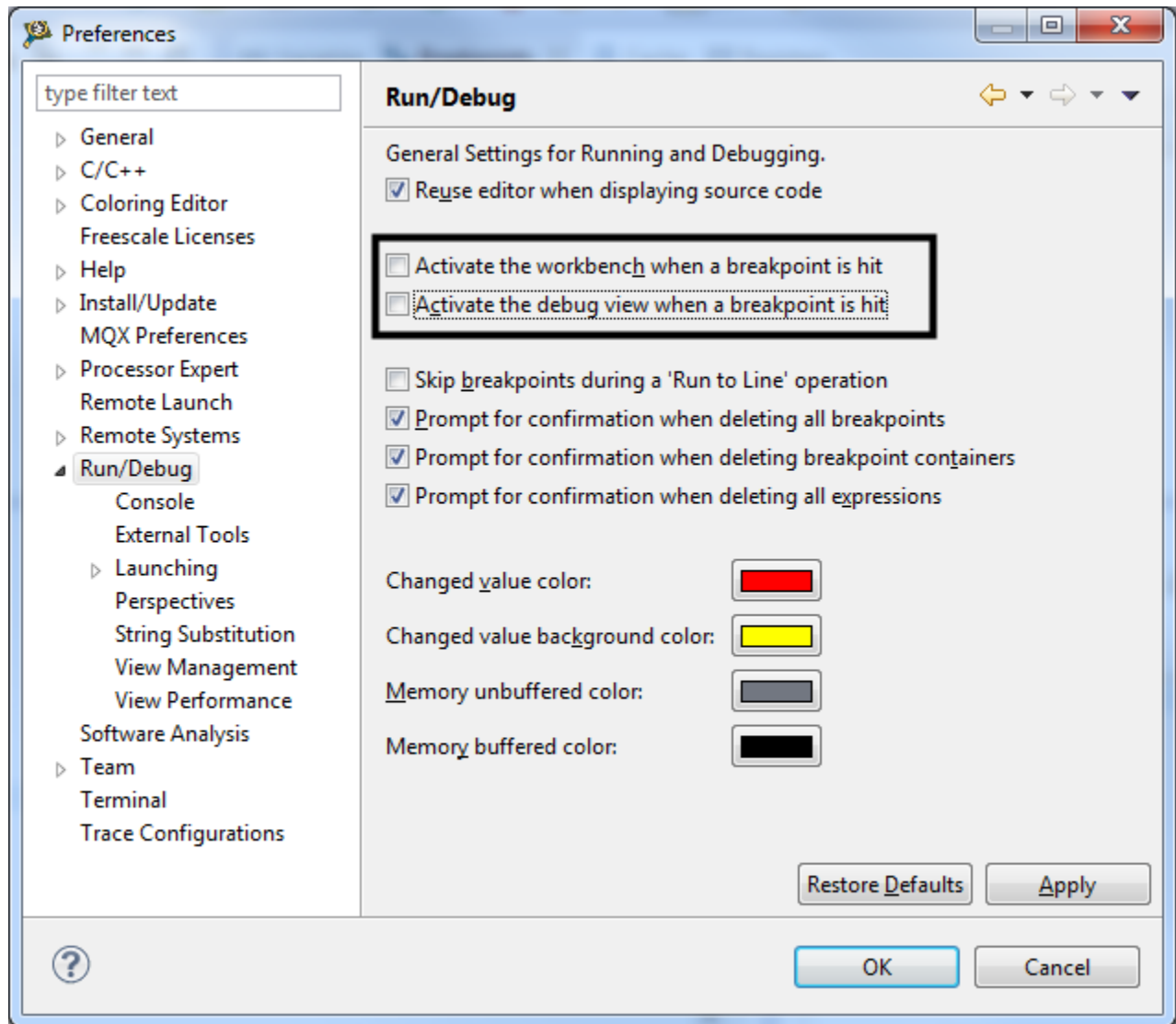
To change the breakpoint preferences for a debug session:

1. Choose **Window > Preferences**.

The **Preferences** dialog appears.

2. Select **Run/Debug**.

The **Run/Debug** preference pane appears.



**Figure 3-5. Breakpoint preferences**

3. Deselect the **Activate the workbench when a breakpoint is hit** checkbox and the **Activate the debug view when a breakpoint is hit** checkbox.
4. Click **Apply**.
5. Click **OK**.

### NOTE

The breakpoint preferences are set to default after completion of the debug session.

Alternatively, to ensure that CodeWarrior remains in the background, every time a breakpoint is hit, add the following lines of code at the end of the `<CWInstall>\eclipse\cwide.properties` file, where `<CWInstall>` is the CodeWarrior installation path:

```
org.eclipse.debug.ui/org.eclipse.debug.ui.activate_debug_view=false
org.eclipse.debug.ui/org.eclipse.debug.ui.activate_workbench=false
```

## 3.2.7 Working with breakpoints

This topic describes the following:

- [Modify breakpoint properties](#)
- [Restricting breakpoints to selected targets and threads](#)
- [Limiting new breakpoints to active debug context](#)
- [Grouping breakpoints](#)
- [Disabling breakpoints](#)
- [Enabling breakpoints](#)
- [Removing breakpoints](#)
- [Removing All Breakpoints](#)
- [Undo delete breakpoint](#)
- [Redo delete breakpoint](#)
- [Skipping all breakpoints](#)

### 3.2.7.1 Modify breakpoint properties

To view or modify breakpoint properties for a breakpoint using the **Properties for C/C++ breakpoint** dialog. You can open the **Properties for C/C++ breakpoint** dialog using one of the following methods:

- From the **Breakpoint** view - right-click and choose **Breakpoint Properties** from the shortcut menu.
- From the editor area - right-click on breakpoint and choose **Breakpoint Properties** from the shortcut menu.

The following figure shows the **Properties for C/C++ breakpoint** dialog. The following table describes each breakpoint property.

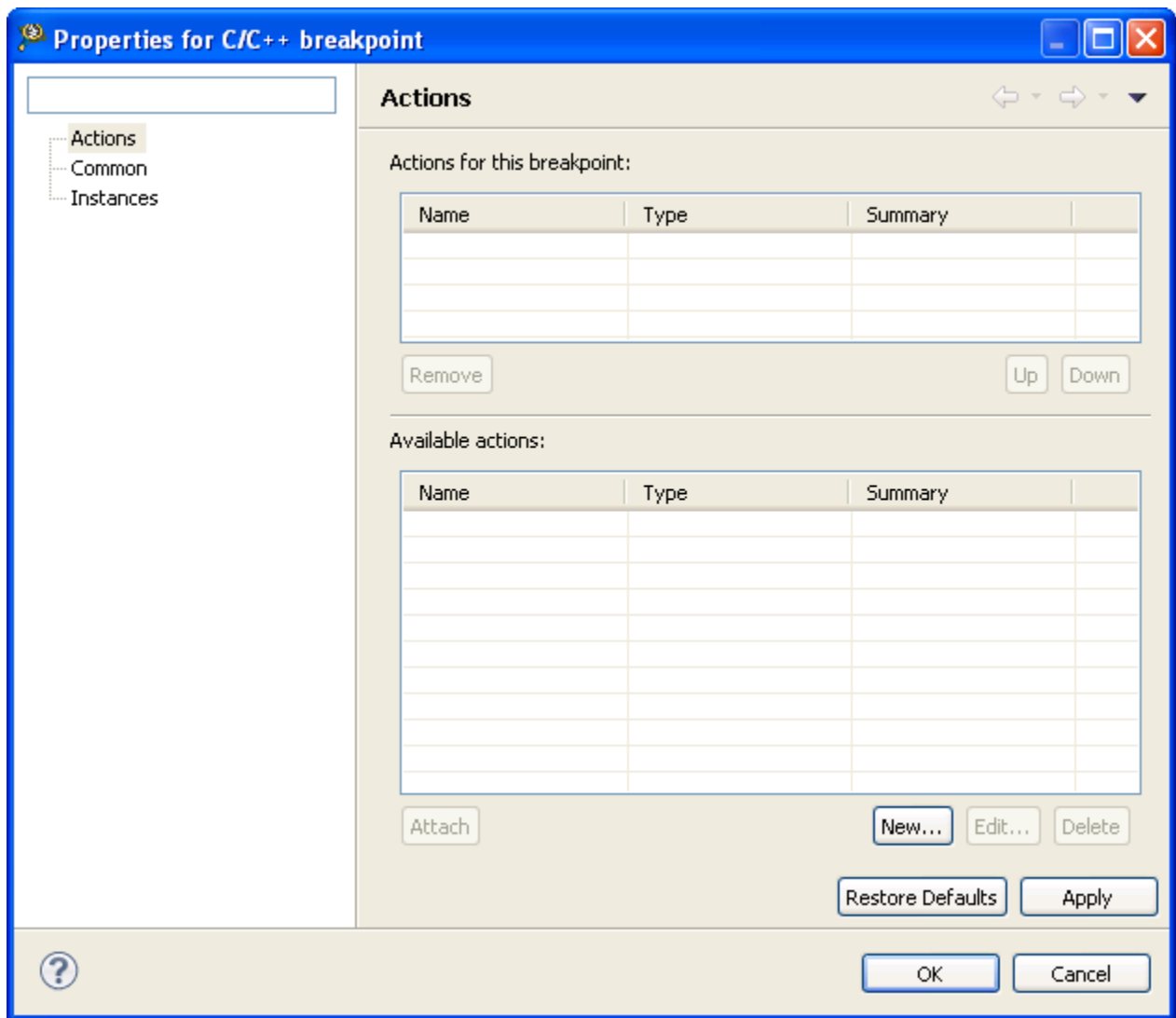


Figure 3-6. Properties for C/C++ breakpoint dialog

Table 3-3. Breakpoint properties

Option	Description
Actions	Allows you to attach one or more breakpoint actions to a single breakpoint. For example, when a breakpoint is encountered you could both log a message and play a sound. Actions are executed in the order they appear in the <b>Actions for this breakpoint</b> table.
Common	Displays common properties of a breakpoint. Additionally, you can define a condition that determines when the breakpoint will be encountered. A condition for a breakpoint can be any logical expression that returns true or false value.
Filtering	Allows you to restrict the breakpoint to the selected targets and threads. The <b>Filtering</b> option is available during a debug session.
Instances	Displays real-time breakpoint information that helps identify the address and the way a breakpoint is installed on a target.

### 3.2.7.2 Restricting breakpoints to selected targets and threads

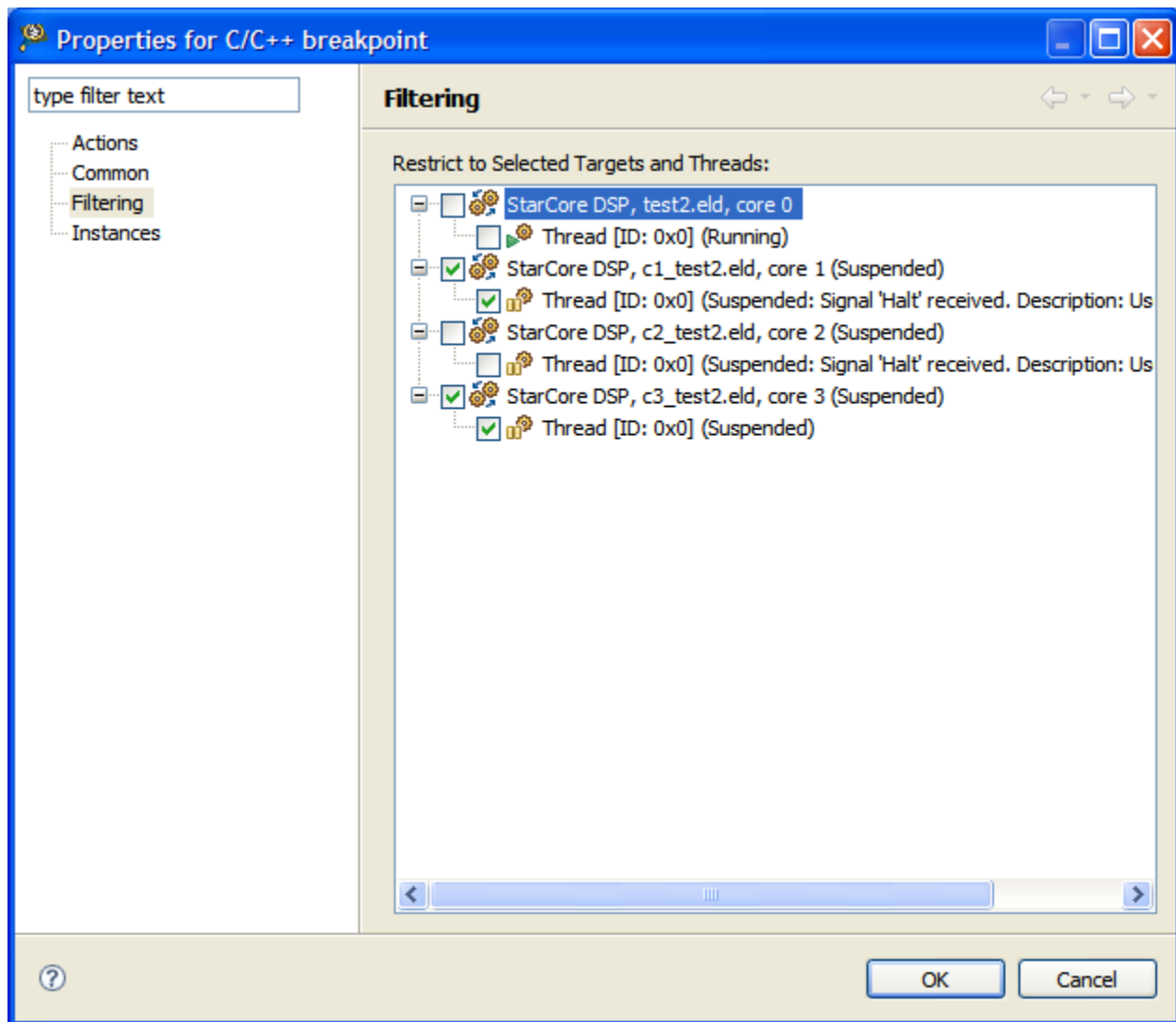
You can restrict a breakpoint to one or more threads of a target. This process allows you to work on selected threads of a target.

To restrict a breakpoint to one or more process threads:

1. Select the **Breakpoints** view.
2. Right-click on the breakpoint you want to restrict, and choose **Breakpoint Properties** from the shortcut menu.

The **Properties for C/C++ Breakpoint** dialog appears.

3. In the left pane, select **Filtering**. The **Filtering** option is available during a debug session.



**Figure 3-7. Restrict breakpoint to selected targets and threads**

4. From the **Restrict to Selected Targets and Threads** list, select the checkboxes adjacent to threads you want to restrict the breakpoint.
5. Click **OK**.

The breakpoint is applied to the selected targets and threads.

### 3.2.7.3 Limiting new breakpoints to active debug context

If a breakpoint is set in a file shared by multiple cores; the breakpoint is set for all cores by default. To enable limiting new breakpoints on an active debug context:

1. Debug your project.
2. Select the **Breakpoints** view.



- Click the **Limit New Breakpoints to Active Debug Context** icon in the **Breakpoints** view.
- Double-click the marker bar to the left of a source code line to set a breakpoint at that line.

### NOTE

If no debug context exists, the breakpoint is installed in all contexts as normal.

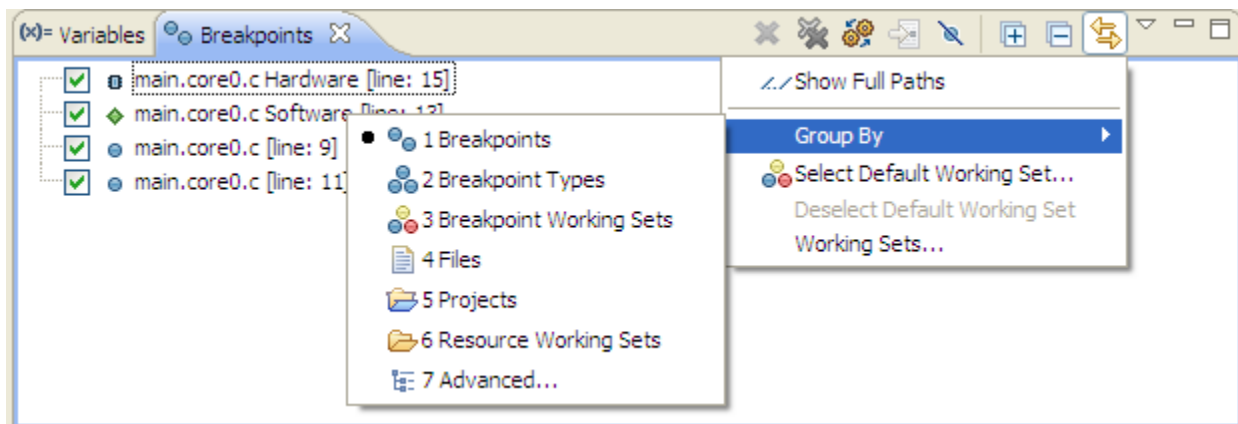
Once set, the breakpoint filtering is maintained for the individual context during a Restart but is lost after a Terminate. After a Terminate, the breakpoint is installed in all debug contexts.

### 3.2.7.4 Grouping breakpoints

Grouping breakpoints helps you view a list of breakpoints that match specified criteria.

To group breakpoints:

- Click the pop-up menu in the **Breakpoints** view.



**Figure 3-8. Grouping breakpoints**

- Choose **Group By**.
  - Breakpoints - Displays a standard list of breakpoints.
  - Breakpoint types - Groups all breakpoints by their types.
  - Breakpoint Working Sets - Groups all breakpoints as user defined problem-specific sets that can be quickly enabled and disabled.
  - Files - Groups all breakpoints by the files they are set in.
  - Projects - Groups all breakpoints by the project in which they are set.

- Resource Working Sets - Groups all breakpoints into resource-specific working sets that can be quickly enabled and disabled.
- Advanced - Displays the **Group Breakpoints** dialog that helps you specify nested grouping for the **Breakpoints** view. For example, you group breakpoints by Breakpoint Types and then group them by Projects and Working Sets.

### 3.2.7.5 Disabling breakpoints


Disabling a breakpoint prevents it from affecting program execution and is easier than clearing or creating new breakpoints.

#### NOTE

Disabled breakpoints can be enabled without losing any information. To know how to enable breakpoints, see [Enabling breakpoints](#).

To disable a breakpoint:

1. Right-click on an enabled breakpoint in the marker bar.
2. Choose **Disable Breakpoint** from the shortcut menu.

The breakpoint icon changes to . The disabled breakpoint icon indicates that the breakpoint does not halt program execution.

### 3.2.7.6 Enabling breakpoints


The program execution suspends whenever an enabled breakpoint is encountered in the source code. Enabling a breakpoint is easier than clearing or creating a new breakpoint.

#### NOTE

Enabled breakpoints can be disabled without losing any information. To know how to disable breakpoints, see [Disabling breakpoints](#).

To enable a breakpoint:

1. Right-click on a disabled breakpoint in the marker bar.
2. Choose **Enable Breakpoint** from the shortcut menu.

The breakpoint icon changes to . The enabled breakpoint icon indicates that it suspends the program execution whenever encountered in the source code.

### 3.2.7.7 Removing breakpoints

To remove a breakpoint:

1. Right-click on a breakpoint in the **Breakpoint** view.
2. Choose **Remove Selected Breakpoints** from the shortcut menu.

The selected breakpoint is removed.

#### NOTE

Alternatively, click the **Remove Selected Breakpoints** icon in the **Breakpoints** view.

### 3.2.7.8 Removing All Breakpoints

To remove all breakpoints:

1. Right-click in the **Breakpoints** view.
2. Choose **Remove All Breakpoints** from the shortcut menu.

#### NOTE

Alternatively, click the **Remove All Breakpoints** icon in the **Breakpoints** view.

### 3.2.7.9 Undo delete breakpoint

This feature allows you to undo delete breakpoints from breakpoints view. It is useful when by mistake you have deleted a breakpoint with some elaborated conditions. To undo delete breakpoint:

1. Choose **Edit > Undo Delete Breakpoint** from the IDE menu bar.

### 3.2.7.10 Redo delete breakpoint

To redo delete breakpoint:

1. Choose **Edit > Redo Delete Breakpoint** from the IDE menu bar.

### 3.2.7.11 Skipping all breakpoints

To ignore all active breakpoints, click the **Skip All Breakpoints** icon. All active breakpoints are skipped by the debugger during program/source code execution.

#### NOTE

Skipped breakpoints do not suspend execution until they are turned on.

Click the **Skip All Breakpoints** icon again to turn on all breakpoints.

## 3.2.8 Breakpoint actions

This topic explains CodeWarrior enhancements to standard breakpoint behavior. While the standard behavior of breakpoints of a debugger is to stop execution at a specific spot, you can use breakpoint actions to extend the breakpoint behavior and define other actions that occur when program execution reaches the breakpoint.

Breakpoint actions let you:

- specify specific tasks to perform,
- manage a list of actions, where each action has specific properties,
- attach specific actions to individual breakpoints,
- control the order in which the breakpoint actions occur, and
- execute the **Debugger Shell** commands.

You can associate more than one action with a breakpoint. The debugger executes the associated breakpoint actions when the program execution encounters the breakpoint. The following table lists and describes breakpoint actions.

**Table 3-4. Breakpoint actions**

Action	Description
Debugger Shell Action	Executes Debugger Shell commands or a Debugger Shell script.
Sound Action	Plays the specified sound.
Log Action	Logs messages to a console. The messages can be literal strings or the result of an expression that the debugger evaluates.
Resume Action	Halt the program execution for a specified time and then resumes the program execution.
External Tool Action	Invokes a program, which is external to the debugger.

### 3.2.8.1 Breakpoint Actions preferences page

You use the **Breakpoint Actions** preferences page to manage a global list of breakpoint actions available in a workspace. Each action is an instance of a specific action type.

The **Breakpoint Actions** preferences page:

- shows a list of available actions,
- lets you create new actions for a selected action type, and
- lets you add, edit, and delete existing actions.

To open the **Breakpoint Actions** preferences page:

1. Choose **Window > Preferences** from the IDE menu bar.

The **Preferences** dialog appears.

2. Choose **C/C++ > Debug > Breakpoint Actions**.

The **Breakpoint Actions** preferences page appears.

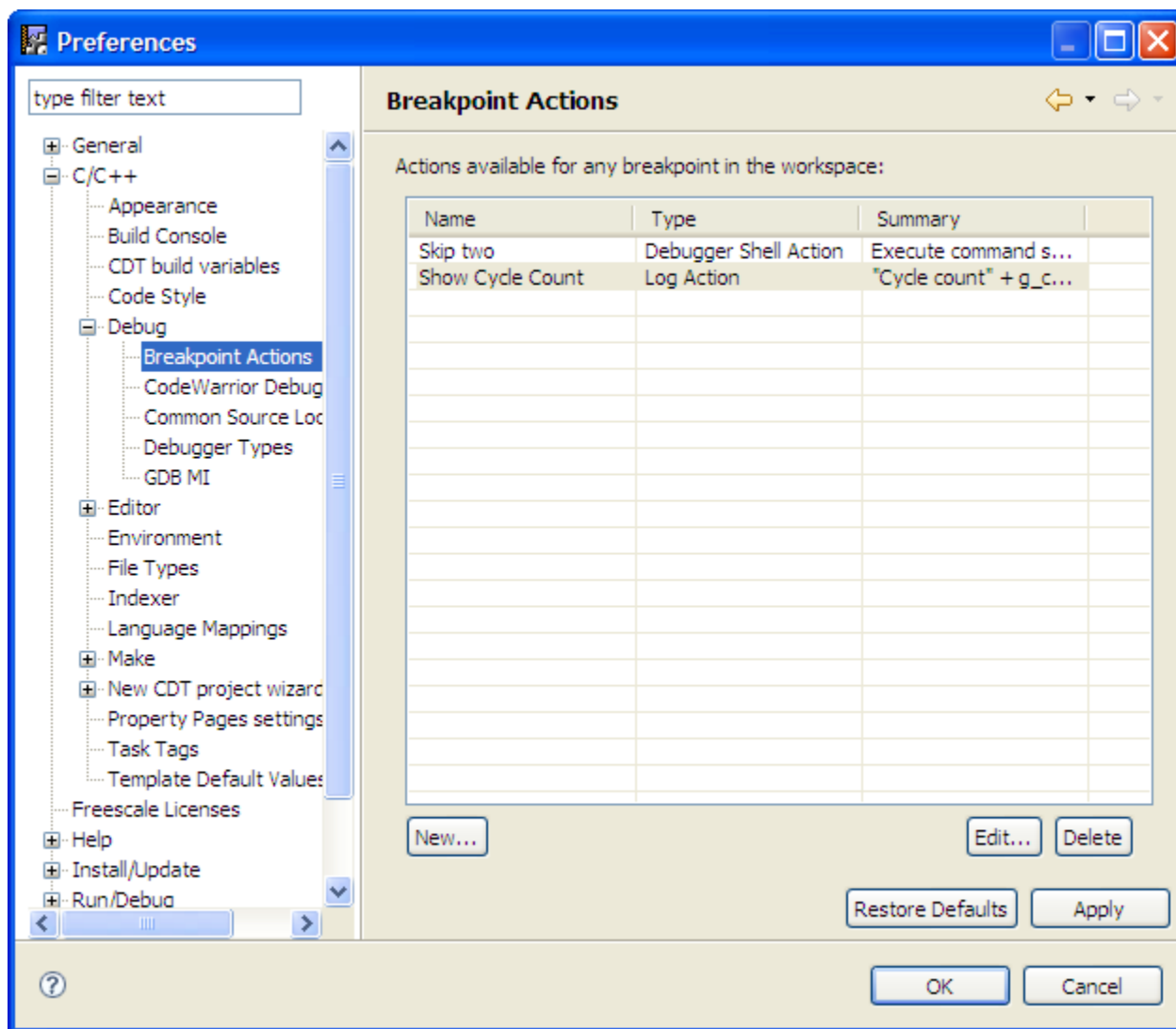


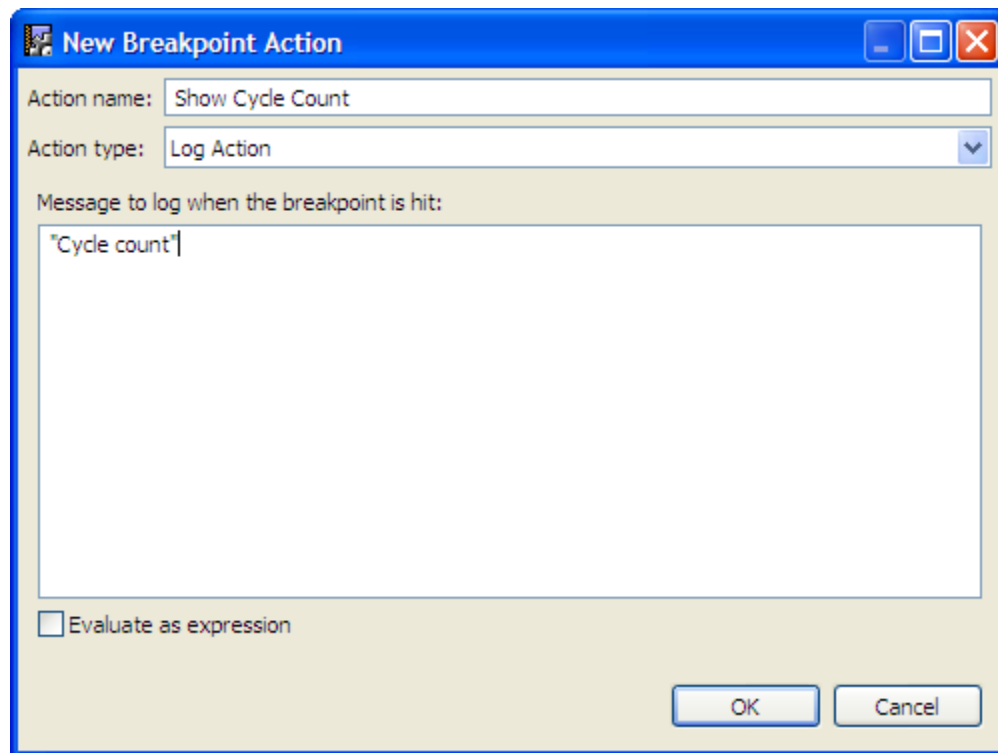
Figure 3-9. Preferences dialog - Breakpoint Actions page

### 3.2.8.2 Adding breakpoint action

To add a breakpoint action:

1. Open the **Breakpoint Actions** preferences page.
2. Click **New**.

The **New Breakpoint Action** dialog appears.



**Figure 3-10. New Breakpoint Action dialog**

3. In the **Action name** textbox, enter a name for the new action.
4. Use the **Action type** pop-up menu to choose the type of action you want to create.
5. Specify additional breakpoint-action properties, according to the action type that you specified.

For example, to display a specified log message when the debugger encounters a breakpoint, specify the log message in the **Log Action** breakpoint action.

6. Click **OK**.

The **New Breakpoint Action** dialog closes. The new breakpoint action appears in the **Breakpoint Actions** preferences page table.

### 3.2.8.3 Attaching breakpoint actions to breakpoints

To use a breakpoint action, you must attach it to an existing breakpoint.

#### **NOTE**

To attach breakpoint actions to a breakpoint, add the associated breakpoint actions in the **Breakpoint Actions** preference page.

To attach breakpoint actions to a breakpoint:

1. Initiate a debugging session.
2. In the editor area of the **Debug** perspective, set a breakpoint.
3. Open the **Breakpoints** view.
  - a. From the IDE menu bar, choose **Window > Show View**.

The **Show View** dialog appears.

- b. Choose **Debug > Breakpoints**.
  - c. Click **OK**.
4. In the **Breakpoints** view, right-click a breakpoint.
  5. Choose **Properties** from the shortcut menu.

The **Properties for** dialog appears.

6. Select **Actions** in the left pane of the **Properties for** dialog.

The **Actions** page appears.

7. Follow these sub-steps for each breakpoint action that you want to attach to the breakpoint:
  - a. Select the breakpoint action from the **Available actions** table.
  - b. Click **Attach**.

The selected breakpoint action moves from the **Available actions** table to the **Actions for this breakpoint** table.

### NOTE

The debugger executes the breakpoint actions in the order shown in the **Actions for this breakpoint** table.

8. To reorder the breakpoint actions in the **Actions for this breakpoint** table:
  - a. Select the action in the table.
  - b. Click **Up** to move the selected action up in the table.
  - c. Click **Down** to move the selected action down in the table.

During a debugging session, the debugger executes the breakpoint actions when the breakpoint is encountered.

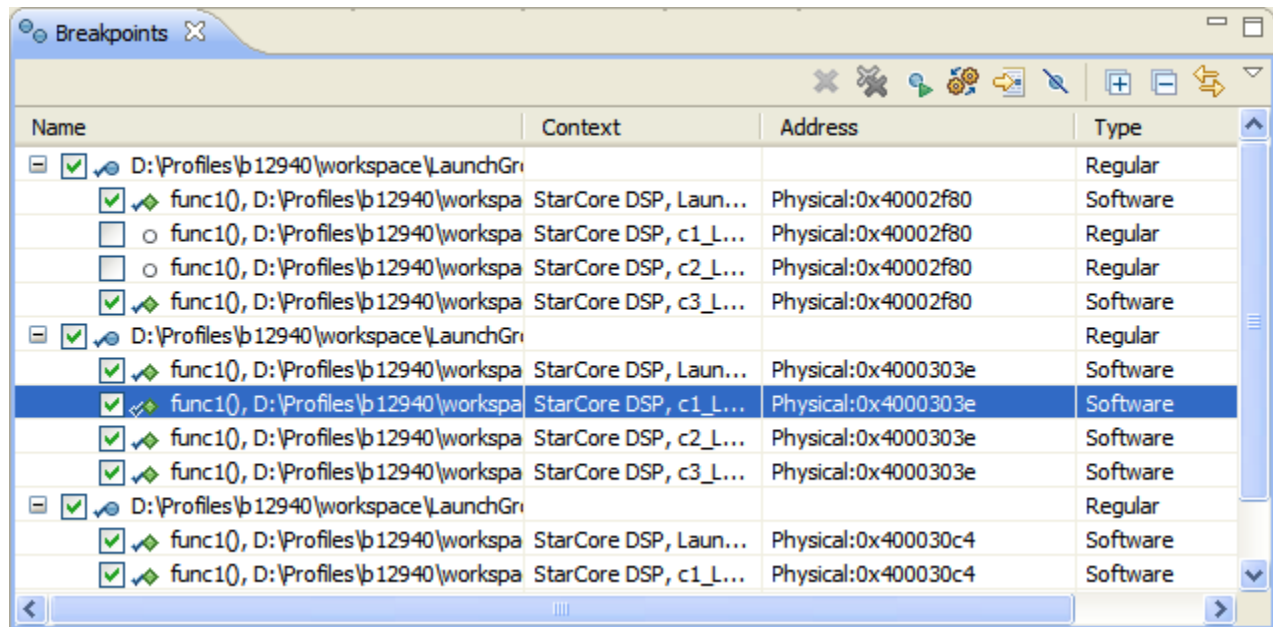
## 3.2.9 Selecting breakpoint template

When you set a line or function breakpoint in the template code from the IDE, the breakpoint is set on all template instances. This feature allows you to enable or disable a breakpoint for a particular core.



To disable breakpoint for a particular core:

1. Initiate a debugging session.
2. Open the **Breakpoints** view.
3. Click on the + sign to expand a breakpoint.



**Figure 3-11. Selecting breakpoint template**

4. Deselect the checkbox for the core for which you do not want the breakpoint applied.

### 3.3 Build while debugging

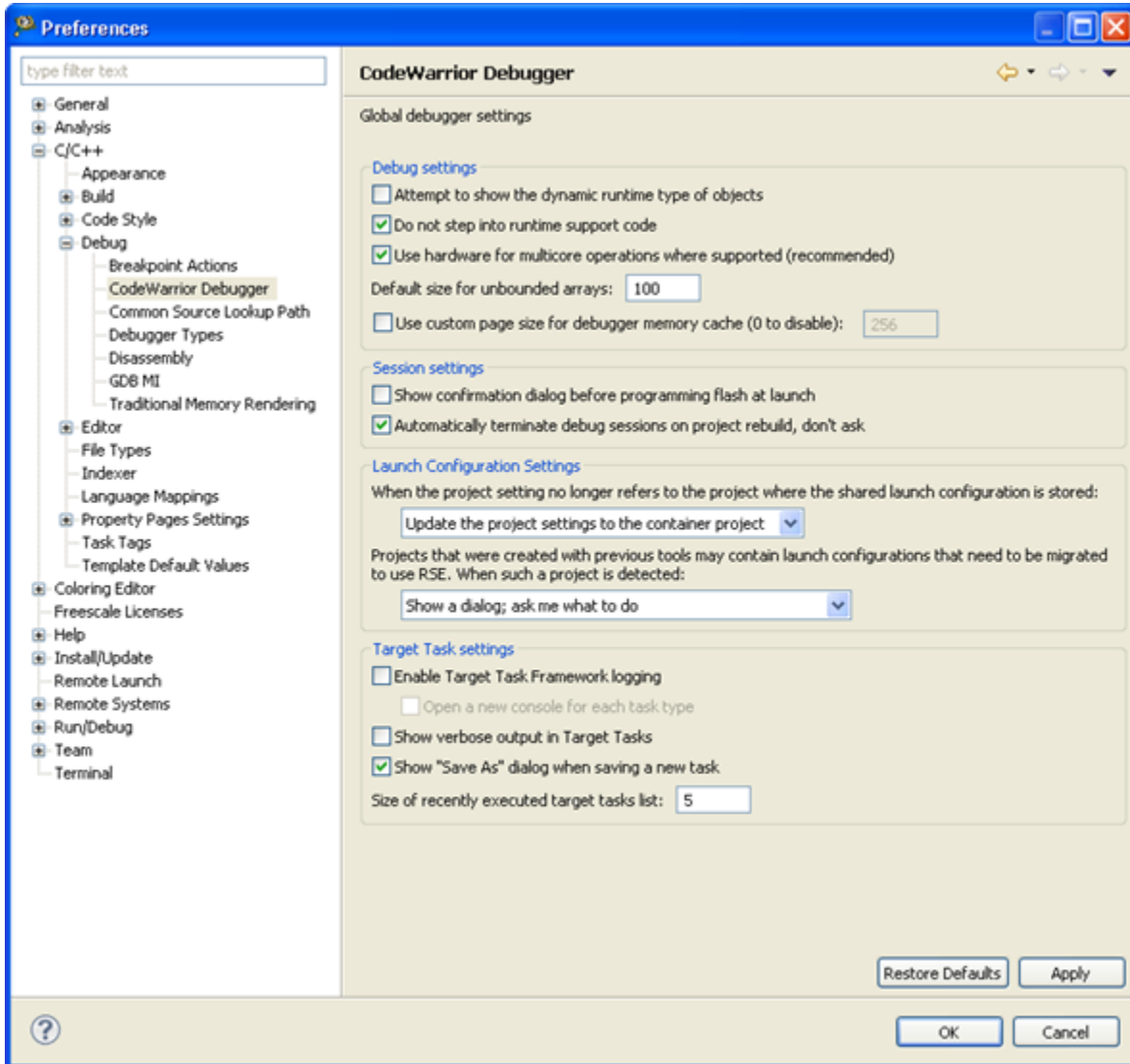
The debug session locks the debugged elf when **Create and Use Copy of Executable** checkbox is not selected, see [Symbolics](#). If you make changes to the source files and rebuild the project while a debug session is on, the build commands are invoked but the locked files are not overwritten and a link-time error is generated.

This feature allows automatic termination of the debug sessions when initiating a build that produces executables locked by those debug sessions.

To enable build while debugging:

1. Choose **Window > Preferences** from the IDE menu bar.  
The **Preferences** dialog appears.
2. Choose **C/C++ > Debug > CodeWarrior Debugger**.

The CodeWarrior debugger preferences appears in the right pane of the **Preferences** dialog.



**Figure 3-12. Preferences dialog**

3. Select the **Automatically terminate debug session on project rebuild, don't ask** checkbox.
4. Click **Apply**.
5. Click **OK**.

**NOTE**

Applying this setting immediately effects the project.

Now the debug session will automatically terminate while initiating a build that produces executables locked by those debug sessions

## 3.4 Cache view

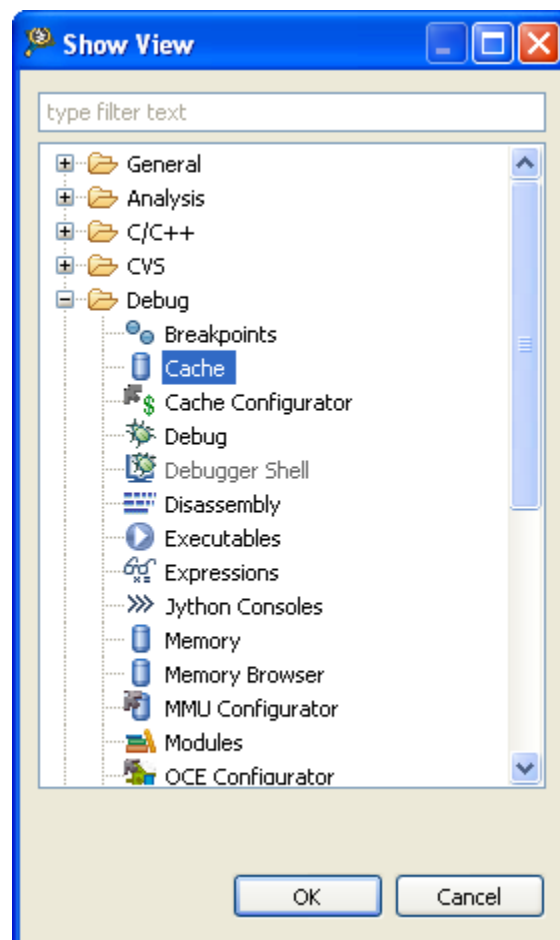
**Cache** view helps you view, modify, and control a hardware cache. Use the **Cache** view to examine instruction and data cache for L1 and L2 cache for the supported targets.

### 3.4.1 Opening Cache view

To open the **Cache** view:

1. Start a debugging session.
2. From the CodeWarrior menu bar, choose **Window > Show View > Other**.

The **Show View** dialog appears.



**Figure 3-13. Show View dialog**

## Cache view

3. Expand the **Debug** group and select **Cache**.
4. Click **OK**.

The **Cache** view appears.

### Tip

Alternatively, start typing **Cache** in the **type filter text** textbox. The **Show View** dialog filters the list of the views and displays only the views matching the characters typed in the textbox. Select **Cache** from the filtered list and click **OK**.

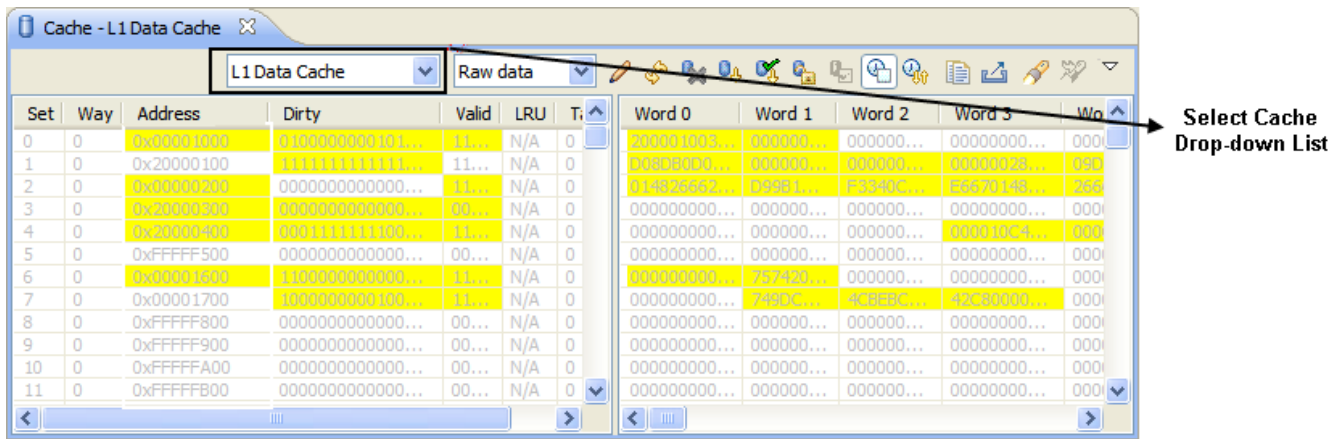


Figure 3-14. Cache view

### NOTE

If the **Select Cache** pop-up menu is dimmed in the **Cache** view then the current target does not support viewing cache.

## 3.4.2 Preserving sorting

To preserve sorting of the cache when you update and refresh the cache:

1. Start a debugging session.
2. Open the **Cache** view. For more information about how to open the **Cache** view, see [Opening Cache view](#).
3. Choose the Preserve Sorting command from the pop-up menu of the **Cache** view.

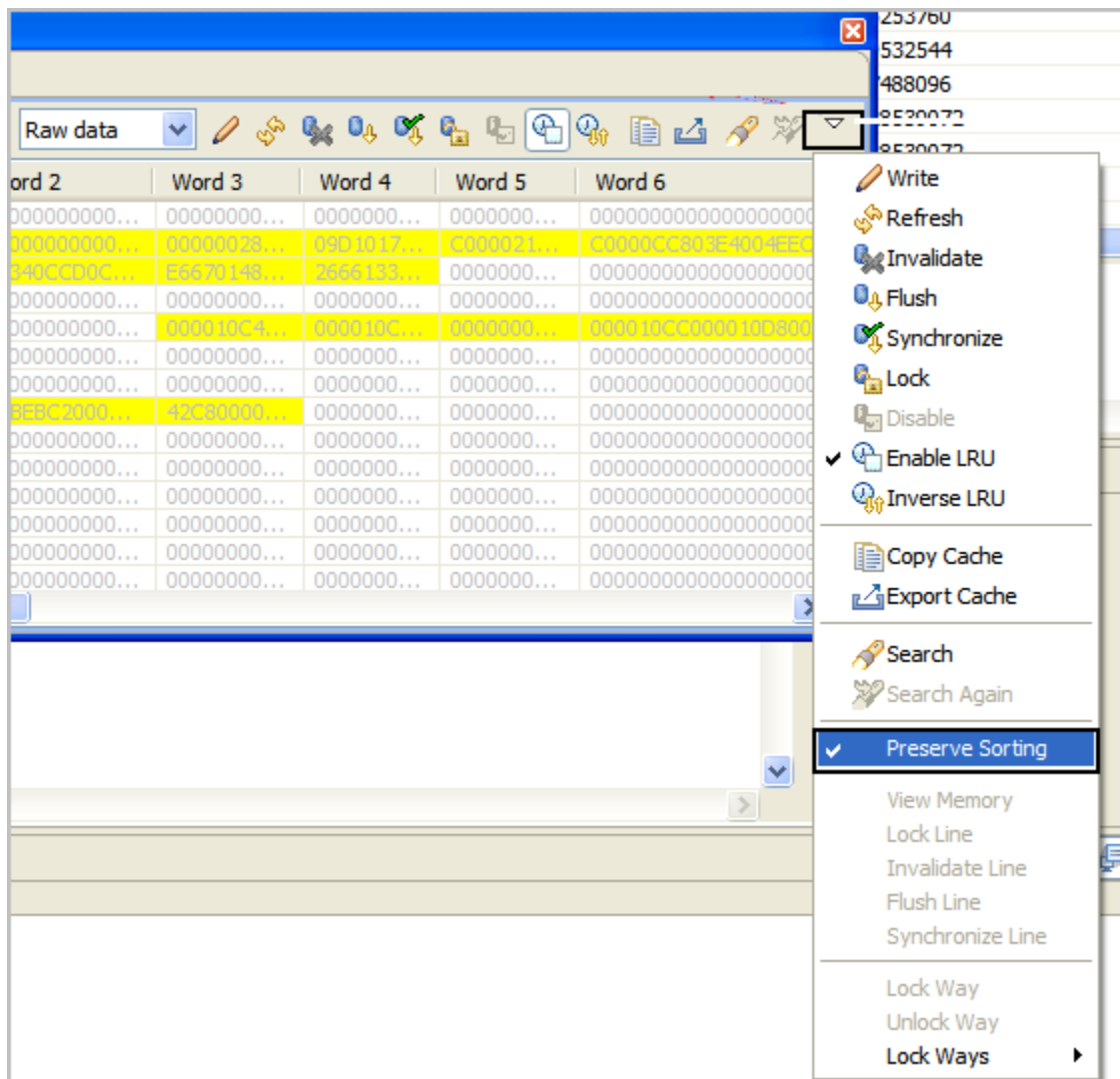


Figure 3-15. Cache view - Preserve sorting

### NOTE

The **Preserve Sorting** command is not available by default. If available, every operation that triggers cache refresh, such as step, and run to breakpoint will have to wait for the cache data loading and sorting.

### 3.4.3 Cache view pop-up menu

## Cache view

You can perform various actions on the cache using the pop-up menu in the **Cache** view. Alternatively, you can use the **Cache** view toolbar that includes the same commands as the **Cache** view pop-up menu. The following table lists the **Cache** view pop-up menu commands and their description.

**Table 3-5. Cache view pop-up menu commands**

Command	Description
Write	Commits changes in the Cache view to the cache register of the target hardware, if supported by the target hardware.
Refresh	Reads data from the target hardware and updates the cache display.
Invalidate	Invalidates the entire content of the cache.
Flush	Flushes the entire content of the cache. Flushing the cache involves committing uncommitted data to the next level of the memory hierarchy, and then invalidating the data within the cache.
Lock	Locks the cache. Locking cache prevents the cache from fetching the new lines or discarding the current valid lines.
Synchronize	Synchronize cache data with memory data.
Enable	Turns on the cache.
Disable LRU	Removes the Least Recently Used attribute from the existing display for each cache line.
Inverse LRU	Displays the inverse of the Least Recently Used attribute for each cache line.
Copy Cache	Copies the cache contents to the system clipboard.
Export Cache	Exports the cache contents to a file.
Search	Finds an occurrence of a string in the cache lines.
Search Again	Finds the next occurrence of a string in the cache lines.
Preserves sorting	Preserves sorting of the cache when the cache data is updated and the cache is refreshing. This option is not available by default. If available, every operation that triggers cache refresh (like step, run to breakpoint) will have to wait for cache data loading and sorting.
View Memory	Views the corresponding memory for the selected cache lines.
Lock Line	Locks the selected cache lines.
Invalidate Line	Invalidates the selected cache lines.
Flush Line	Flushes the entire contents of the selected cache lines.
Synchronize Line	Synchronize selected cache data with memory data.
Lock Way	Locks the cache ways specified with the Lock Ways menu command. Locking a cache way means that the data contained in that way must not change. If the cache needs to discard a line, it will not discard the locked lines, such as the lines explicitly locked, or the lines belonging to locked ways.
Unlock Way	Unlocks the cache ways specified with the Lock Ways command.
Lock Ways	Specifies the cache ways on which the Lock Way and Unlock Way commands operate.

## 3.5 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. For example, the project you created in the tutorial chapter had two associated launch configurations.

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 lets you specify settings such as:

- Files that belong to the launch configuration
- behavior of the debugger and related debugging tools

If you use the CodeWarrior wizard to create a new project, the IDE creates two debugger related launch configurations:

- Debug configuration that produces unoptimized code for development purposes.
- Release configuration that produces code intended for production purposes.

### 3.5.1 Modifying debugger settings

If you use the CodeWarrior wizard to create a new project, the IDE sets the debugger settings to default values. You can modify these settings as per the requirement.

To change debugger settings:

1. In the **CodeWarrior Projects** view, right-click the project folder.

A shortcut menu appears.

2. Choose **Debug As > Debug Configurations**.

The **Debug Configurations** dialog appears.

The left pane of the **Debug Configurations** dialog lists the debug configurations that apply to the current project.

3. Expand the **CodeWarrior** configuration.
4. From the expanded list, select the name of the debug configuration you want to modify.

The **Debug Configurations** dialog shows the settings for the selected configuration.

5. Click the **Debugger** tab.

The **Debugger** page appears.

6. Change the settings in this page to suit your needs.
7. Click the **Apply** button.

The IDE saves your new settings.

### NOTE

You can select other pages and modify their settings. When you finish, you can click the **Debug** button to start a new debugging session, or click the **Close** button to save your changes and close the **Debug Configuration** dialog.

## 3.5.2 Reverting debugger settings

You can revert pending changes and restore last saved settings. To undo pending changes, click the **Revert** button at the bottom of the **Debug Configurations** dialog.

The IDE restores the last set of saved settings to all pages of the **Debug Configurations** dialog. Also, the IDE disables the **Revert** button until you make new changes.

## 3.5.3 Stopping debugger at program entry point

This feature helps you specify debugger settings for the CodeWarrior Debugger to remain stopped at program entry point.

To specify debugger settings to stop debugger at program entry point:

1. In the **CodeWarrior Projects** view, right-click the project folder.



A shortcut menu appears.

2. Choose **Debug As > Debug Configurations**.

The **Debug Configurations** dialog appears. The left pane of the **Debug Configurations** dialog lists the debug configurations that apply to the current project.

3. Expand the **CodeWarrior** configuration.

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

The **Debug Configurations** dialog shows the settings for the selected configuration.

5. Click the **Debugger** tab.

The **Debugger** pane appears.

6. Select the **Stop on startup at** checkbox.

The **Program entry point** and the **User Specified** options become available.

7. Select the **Program entry point** option.

#### NOTE

To stop the debugger at a user-specified function, select the **User specified** option and type the function name in the textbox.

8. Click **Apply**.

The IDE saves the settings for the debugger to remain stopped at program entry point.

## 3.6 Core index indicators in homogeneous multicore environment

This feature helps you identify the core(s) being debugged, when you debug a target with two or more cores of the same architecture.

The core index is displayed in these three views:

- Debug view

For information on how the core index is displayed in the **Debug** view, see the product's *Targeting Manual*.

- [System Browser view](#)
- [Console view](#)

### 3.6.1 System Browser view

The **System Browser** serves these two types of debug sessions:

- [Kernel Awareness](#)
- [OS application](#)

#### 3.6.1.1 Kernel Awareness

In a Kernel Awareness debug session, the core index is displayed under these scenarios:

- Multiple homogeneous cores, each running a single core Operating System (OS)
- Multicore OS

The **System Browser** view displays content for the active debug context. For Kernel Awareness, the label of the process object, as shown in the **Debug** view, is displayed at the top of the **System Browser** view's client area. This label contains the index of the core the OS is running on, and is referred to as the *context label*.

For example, if the user is performing Kernel Awareness on a **P4080** target, and the user is looking at Linux running on the 5th e500 core, then the top of the **System Browser** client area shows a label that contains core 4.

In a multicore OS scenario, the system browser shows kernel threads for all cores being managed by the OS. The **System Browser** view that displays kernel threads indicates the core index for each thread.

The following figure shows the core index information for kernel threads in a multicore environment.

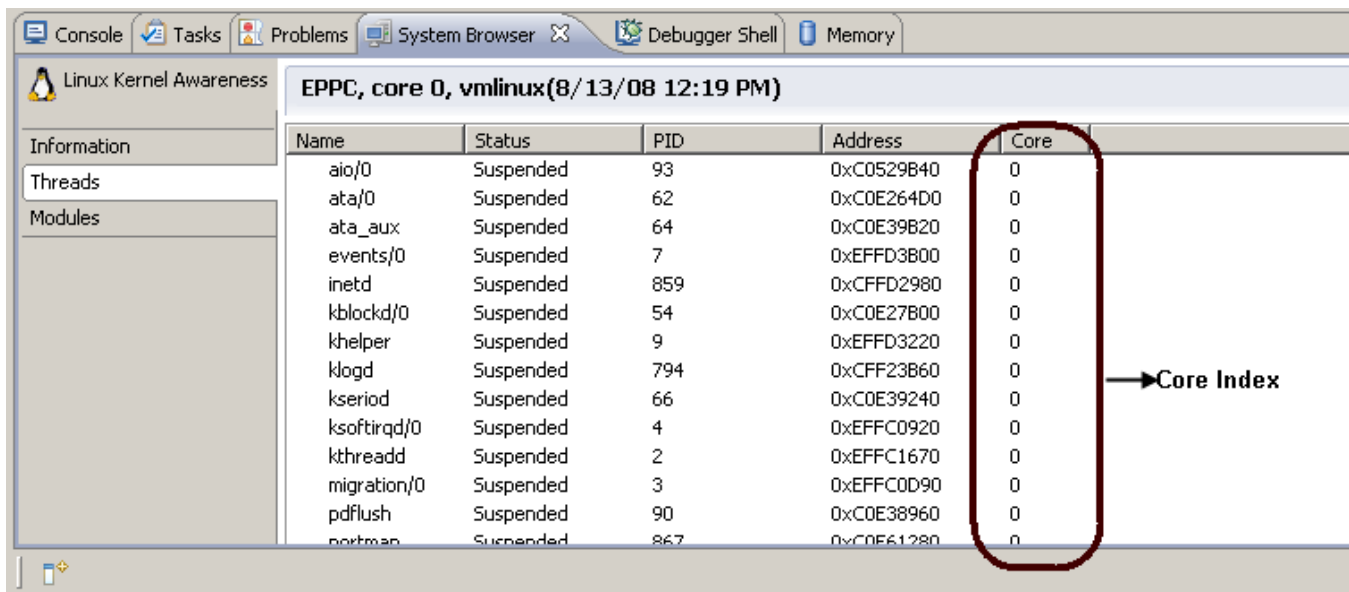


Figure 3-16. System Browser View - Kernel Awareness

### 3.6.1.2 OS application

OS Application debugging happens through a connection with an agent running on the OS. The connection to the agent is through TCP/IP or COM port. In this scenario, the agent does not have information about the core it is running on, nor does the user specify it when configuring the launch. The user simply specifies the IP address or COM port where the agent is running.

The **System Browser** view shows the IP address or COM port in the context label.

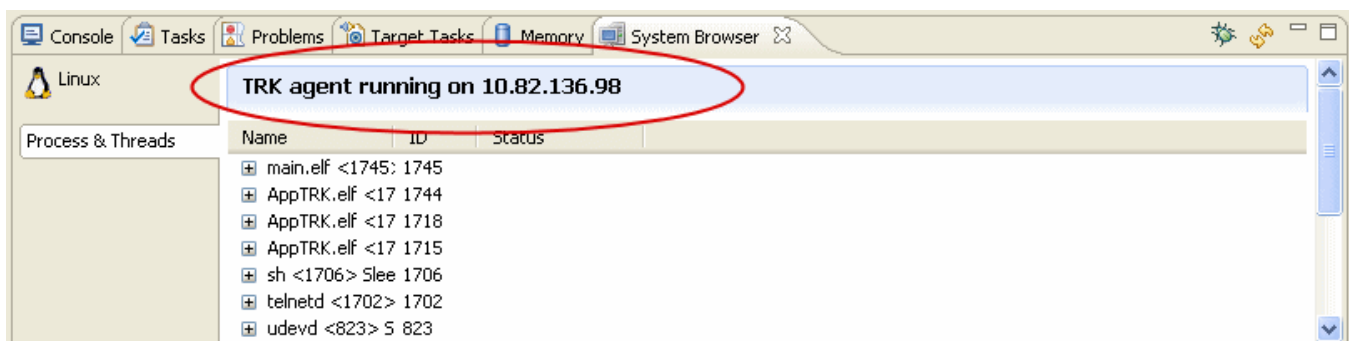


Figure 3-17. System Browser view - OS application

## 3.6.2 Console view

## Debug perspective

The console associated with a process object displays the label of that process, as it appears in the **Debug** view. When debugging a homogeneous multicore target, this label contains the core index.

The following figure shows the core index in the **Console** view.

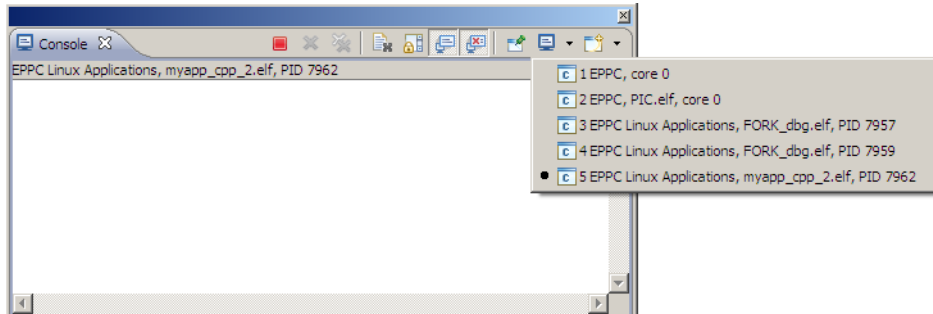


Figure 3-18. Console view

## 3.7 Debug perspective

A perspective defines the initial set and layout of views in the Workbench window. Within the window, each perspective shares the same set of editors. Each perspective provides a set of functionality aimed at accomplishing a specific type of task or works with specific types of resources.

The **Debug** perspective lets you manage how the Workbench debugs and runs a program. You can control your program's execution by setting breakpoints, suspending launched programs, stepping through your code, and examining the values of variables.

The Debug perspective displays this information:

- The stack frame of the suspended threads of each target that you are debugging
- Each thread in your program represented as a node in the tree
- The process of each program that you are running

The **Debug** perspective also drives the **Source** view. As you step through your program, the **Source** view highlights the location of the execution pointer.

The following figure shows a **Debug** perspective.

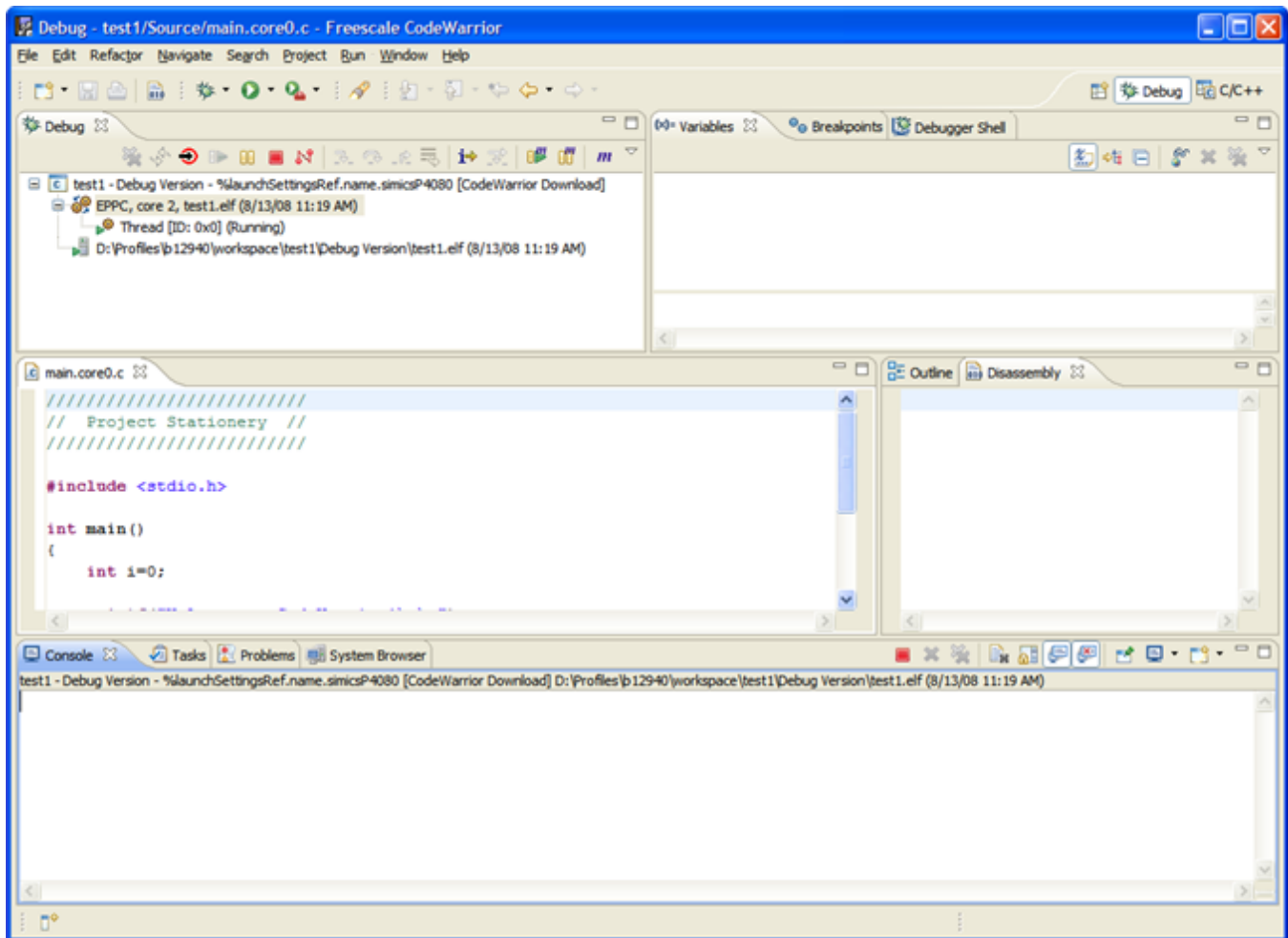
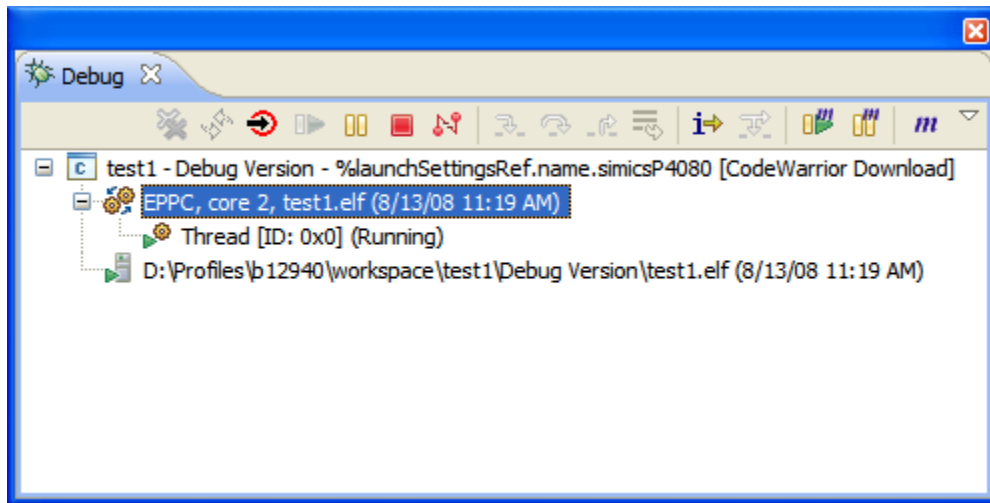


Figure 3-19. Debug perspective

## 3.8 Debug view

Views support editors and provide alternate presentations as well as ways to navigate the information in your Workbench. The **Debug** view shows the target debugging information in a tree hierarchy. For more information on the tree hierarchy and target debugging information, see the *C/C++ Development User Guide*.



**Figure 3-20. Debug view**

Use the **Debug** view to perform these tasks:

- Clear all terminated processes.
- Start a new debug session for the selected process.
- Resume execution of the currently suspended debug target.
- Halt execution of the currently selected thread in a debug target.
- Terminate the selected debug session and/or process.
- Detach the debugger from the selected process.
- Execute the current line, including any routines, and proceed to the next statement.
- Execute the current line, following execution inside a routine.
- Re-enter the selected stack frame.
- Examine a program as it steps into disassembled code.

For more information on debugging actions, see [Common debugging actions](#).

### 3.8.1 Common debugging actions

This topic explains how to perform common debugging actions that correct source-code errors, control program execution, and observe memory behavior. The common debugging actions are:

- [Starting debugger](#)
- [Stepping into routine call](#)
- [Stepping Out of Routine Call](#)
- [Stepping over routine call](#)
- [Stopping program execution](#)
- [Resuming program execution](#)
- [Running program](#)

- [Disconnecting core](#)
- [Restarting debugger](#)
- [Debugging in Instruction Stepping mode](#)
- [Changing program counter value](#)

### 3.8.1.1 Starting debugger

Use the `debug` command in the **Command-Line Debugger Shell** to begin a debugging session. The debugger then takes control of program execution, starting at the main entry point of the program.

Alternatively, choose **Run > Debug** or click the **Debug** button in the [Debug view](#) toolbar to start the debugger and launch a new **Debug** view.

#### NOTE

Some projects require additional configuration before a debugging session can begin. For more information, see the product's *Targeting Manual*.

### 3.8.1.2 Stepping into routine call

Use the `step` command in the **Command-Line Debugger Shell** to execute one source-code statement at a time and follow execution in a routine call.

Alternatively, choose **Run > Step Into** or click the **Step Into** button in the [Debug view](#) toolbar to step into a routine.

After the debugger executes the source code statement, the current statement arrow moves to the next statement. The debugger uses these rules to find the next statement:

- If the executed statement did not call a routine, the current statement arrow moves to the next statement in the source code.
- If the executed statement called a routine, the current statement arrow moves to the first statement in the called routine.
- If the executed statement is the last statement in a called routine, the current statement arrow moves to the statement in the calling routine.

### 3.8.1.3 Stepping Out of Routine Call

Use the `step_return` command in the **Command-Line Debugger Shell** to execute the rest of the current routine and stop program execution after the routine returns to its caller. This command causes execution to return up the call chain.

Alternatively, choose **Run > Step Return** or click the **Step Return** button in the [Debug view](#) toolbar to step out of a routine.

The current routine executes and returns to its caller; then program execution stops.

### 3.8.1.4 Stepping over routine call

Use the `next` command in the **Command-Line Debugger Shell** to execute the current statement and advance to the next statement in the source code. If the current statement is a routine call, program execution continues until it reaches:

- end of the called routine,
- breakpoint,
- watchpoint,
- or an eventpoint that stops execution.

Alternatively, choose **Run > Step Over** or click the **Step Over** button (shown at left) in the [Debug view](#) toolbar to step over a routine. The current statement or routine executes; then program execution stops.

### 3.8.1.5 Stopping program execution

Use the `kill` command in the **Command-Line Debugger Shell** to stop program execution during a debugging session.

Alternatively, choose **Run > Terminate** or click the **Terminate** button in the [Debug view](#) toolbar to stop program execution.

The operating system surrenders control to the debugger, which stops the program execution.



## NOTE

When working with a processor that has multiple cores, you can choose **Run > Multicore Terminate** to stop selected group of cores.

### 3.8.1.6 Resuming program execution

Use the `go` command in the **Command-Line Debugger Shell** to resume execution of a suspended debugging session.

Alternatively, choose **Run > Resume** or click the **Debug** button (shown at left) in the [Debug view](#) toolbar to resume program execution.

The suspended session resumes.

### 3.8.1.7 Running program

Use the `run` command in the **Command-Line Debugger Shell** to execute a program outside of the debugger control.

Alternatively, choose **Run > Run** or click the **Run** button (shown at left) in the [Debug view](#) toolbar to begin program execution.

The program runs outside of debugger control. Further, any watchpoints and breakpoints (special, hardware, and software) are not hit.

## NOTE

The `run` command is shortcut for `debug`, `go`, and `disconnect` actions. The **run** command downloads the code to the target, puts the core in running mode, and then disconnects from the target.

### 3.8.1.8 Disconnecting core

Click the **Disconnect** button in the [Debug view](#) toolbar to disconnect a core from the target.

The effect of the `disconnect` command is same as of the `terminate` command. The only difference between the two commands is that the `disconnect` command turns on when a debug session is running.

### 3.8.1.9 Restarting debugger

You can restart debug session in following ways:

- Use the `restart` command in the **Command-Line Debugger Shell**, after stopping program execution. The debugger goes back to the beginning of the program and begins execution again.
- Right-click **Thread** in the **Debug** view and choose **Restart** from the shortcut menu.
- Click the **Restart** button in the **Debug** view toolbar to restart debug session.

#### NOTE

Restart action is considerable faster to relaunch a debug session as it skips over loading executable debug information and target register descriptors.

### 3.8.1.10 Debugging in Instruction Stepping mode

Use the `stepi` command in the **Command-Line Debugger Shell** to debug a program in instruction stepping mode. In this mode, you can debug the program in [Disassembly view](#) instead of the source view.

You can also switch to instruction stepping mode by clicking the **Instruction Stepping Mode** button in the [Debug view](#) toolbar.

### 3.8.1.11 Changing program counter value

To change the program-counter value:

1. Initiate a debugging session.
2. In the editor view, place the cursor on the line you want the debugger to execute.
3. Right-click on the line and choose **Move To Line** from the shortcut menu.

The debugger moves the program counter to the location you specified. The editor view shows the new location.

### CAUTION

Changing the program-counter value because doing so can cause your program to malfunction. For example, if you set the program counter outside the address range of the current function, the processor will skip the instructions that clean up the stack and return execution to the correct place in the calling function. Your program will then behave in an unpredictable way.

## 3.9 Disassembly view

The **Disassembly** view shows the loaded program as assembly language instructions mixed with source code for comparison. The next instruction to be executed is indicated by an arrow marker and highlighted in the view.

You can perform these tasks in the **Disassembly** view:

- Set breakpoints at the start of any assembly language instruction
- Enable and disable breakpoints and set their properties
- Step through the disassembled instructions of your program
- Jump to specific instructions in the program

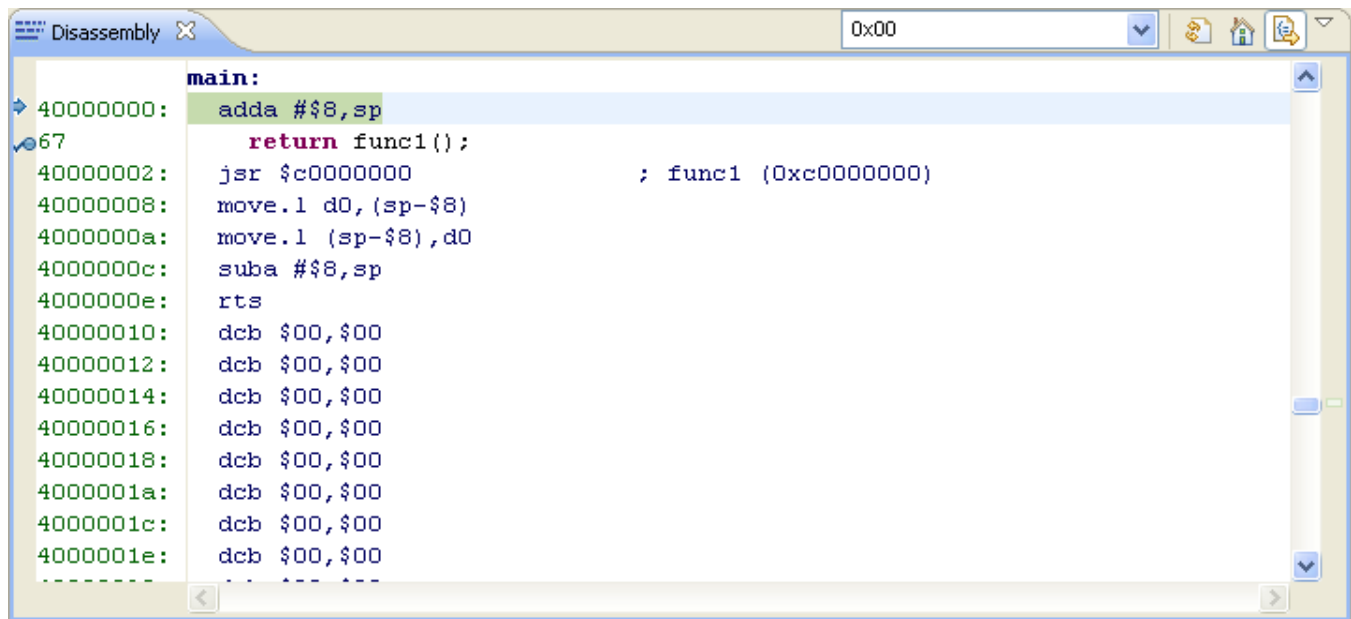


Figure 3-21. Disassembly view

## 3.10 Environment variables in launch configuration

CodeWarrior allows you to use environment or eclipse variables to specify the path of the launch executable.

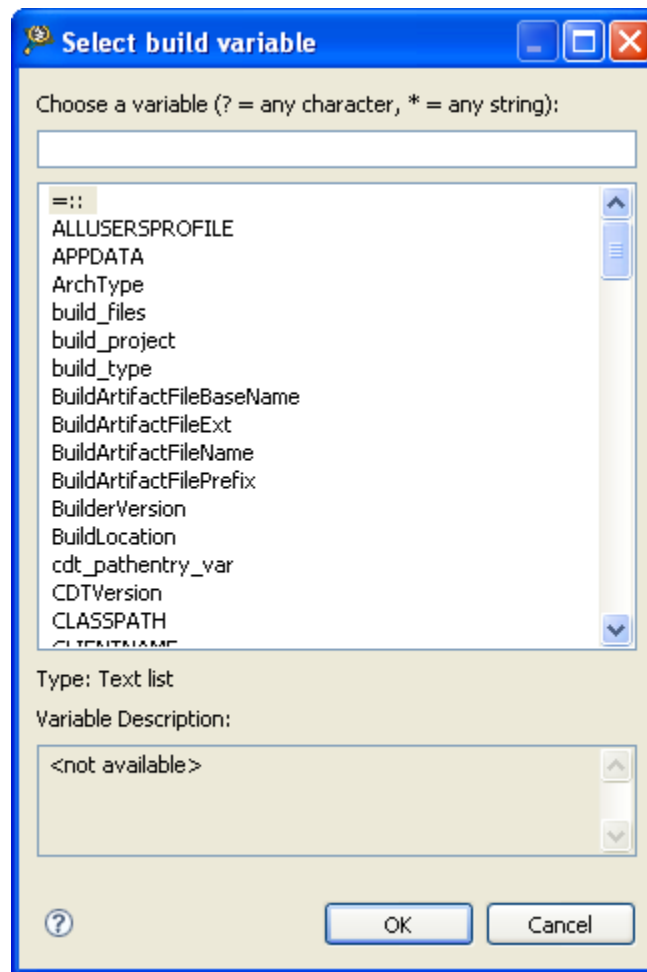
To specify an environment or eclipse variable:

1. Choose **Run > Debug Configurations**.

The **Debug Configurations** dialog appears.

2. Select a launch configuration in the left pane of the **Debug Configurations** dialog.
3. Click **Variables**.

The **Select build variable** dialog appears.



**Figure 3-22. Select Build Variable dialog**

4. Select a variable from the available list.
5. Click **OK**.

Now you can use environment or eclipse variables to specify the path of the launch executable.

## 3.11 Flash programmer

Flash programmer is a CodeWarrior plug-in that lets you program the flash memory of the supported target boards from within the IDE. The flash programmer can program the flash memory of the target board with code from a CodeWarrior IDE project or a file. You can perform the following actions on a flash device using the flash programmer:

- [Erase/Blank check actions](#)
- [Program/Verify actions](#)
- [Checksum actions](#)

## Flash programmer

- [Diagnostics actions](#)
- [Dump Flash actions](#)
- [Protect/Unprotect actions](#)
- [Secure/Unsecure actions](#)

The flash programmer runs as a target task in the Eclipse IDE. To program the flash memory on a target board, you need to perform the following tasks:

- [Create flash programmer target task](#)
- [Configure flash programmer target task](#)
- [Execute flash programmer target task](#)

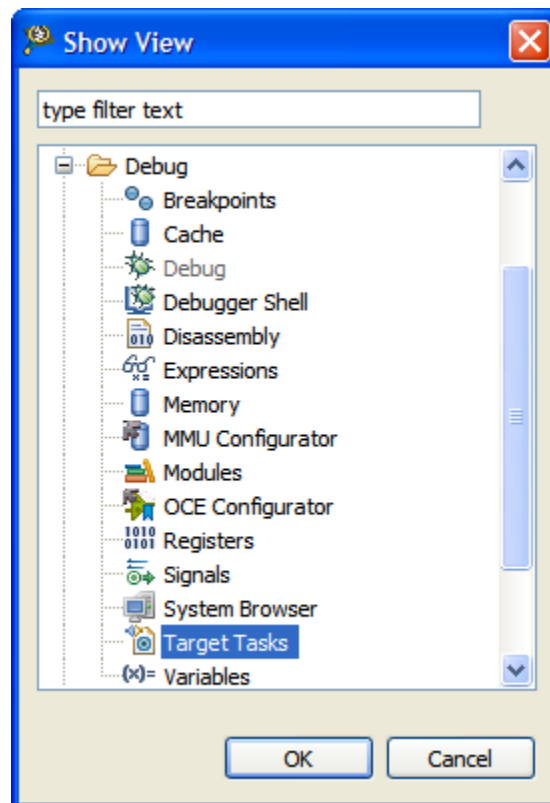
### NOTE

Click the **Save** button or press **Ctrl+S** to save task settings.

## 3.11.1 Create flash programmer target task

1. Choose **Windows > Show Views > Others** from the IDE menu bar.

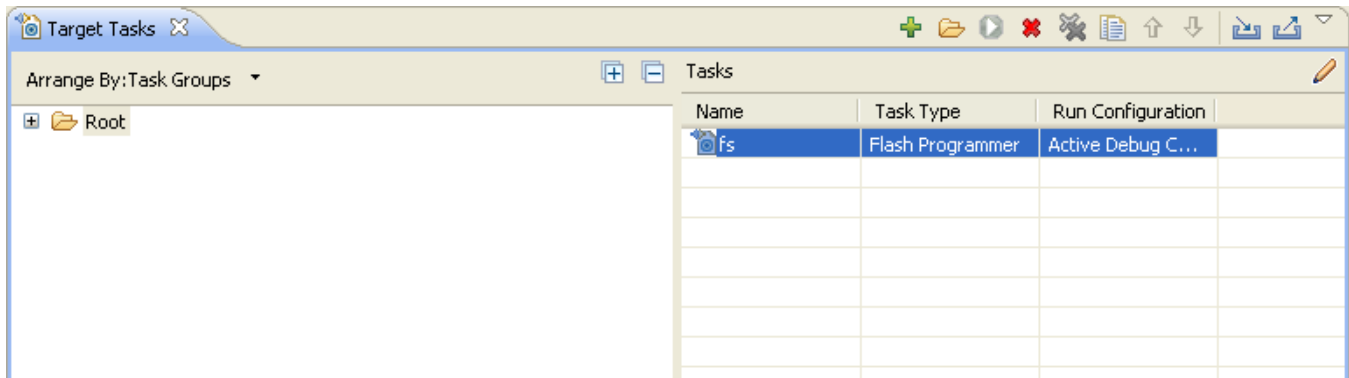
The **Show View** dialog appears.



**Figure 3-23. Show View dialog**

2. Expand the **Debug** group and select **Target Tasks**.
3. Click **OK**.

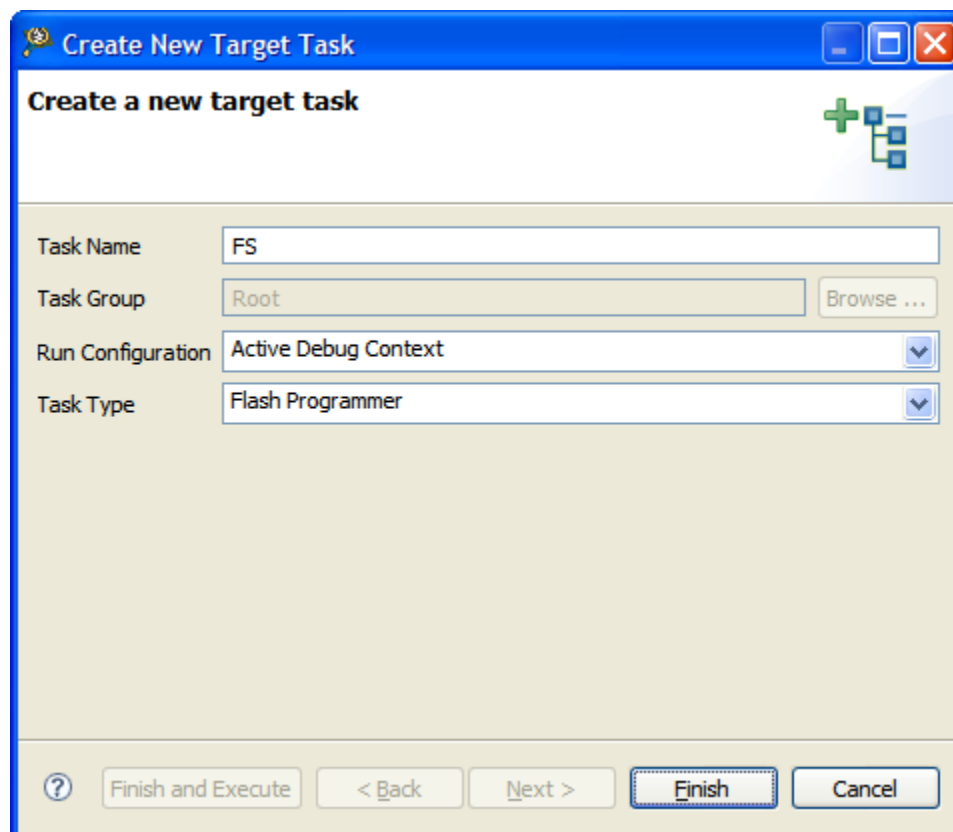
The **Target Tasks** view appears.



**Figure 3-24. Target Tasks view**

4. Click the **Create a new Target Task** button in the **Target Tasks** view toolbar.

The **Create New Target Task** wizard appears.



**Figure 3-25. Create New Target Task window**

5. In the **Task Name** textbox, enter a name for the new flash programming target task.
6. Choose a launch configuration from the **Run Configuration** pop-up menu.

- Choose **Active Debug Context** when flash programmer is used over an active debug session.
  - Choose a project-specific debug context when flash programmer is used without an active debug session.
7. Choose **Flash Programmer** from the **Task Type** pop-up menu.
  8. Click **Finish**.

The target task is created and the **Flash Programmer Task** editor window appears. You use this window to configure the flash programmer target task.

- Flash Devices - Lists the devices added in the current task.
- Target RAM - Lets you specify the settings for Target RAM.
- Flash Program Actions - Displays the programmer actions to be performed on the flash devices.

### 3.11.2 Configure flash programmer target task

To configure a flash programmer target task, you need to perform the following actions:

- [Add flash device](#)
- [Specify target RAM settings](#)
- [Add flash programmer actions](#)

#### 3.11.2.1 Add flash device

To add a flash device to the **Flash Devices** table:

1. Click the **Add Device** button.

The **Add Device** dialog appears.

2. Select a flash device from the device list.
3. Click the **Add Device** button.

The flash device is added to the **Flash Devices** table in the **Flash Programmer Task** editor window.



**NOTE**

You can select multiple flash devices to add to the **Flash Devices** table. To select multiple devices, hold down the Control key while selecting the devices.

4. Click **Done**.

The **Add Device** dialog closes and the flash device appears in the **Flash Devices** table in the **Flash Programmer Task** editor window.

**NOTE**

For NOR flashes, the base address indicates the location where the flash is mapped in the memory. For SPI and NAND flashes, the base address is usually  $0x0$ .

**3.11.2.2 Specify target RAM settings**

The Target RAM is used by Flash Programmer to download its algorithms.

**NOTE**

The Target RAM memory area is not restored by flash programmer. If you are using flash programmer with Active Debug Context, it will impact your debug session.

The **Target RAM** ( [Add flash device](#)) group contains fields to specify settings for the Target RAM.

- **Address** textbox: Use it to specify the address from the target memory. The **Address** textbox should contain the first address from target memory used by the flash algorithm running on a target board.
- **Size** textbox: Use it to specify the size of the target memory. The flash programmer does not modify any memory location other than the target memory buffer and the flash memory.
- **Verify Target Memory Writes** checkbox: Select this checkbox to verify all write operations to the hardware RAM during flash programming.

**3.11.2.3 Add flash programmer actions**

In the **Flash Programmer Actions** group in the Flash Programmer Task editor window ( [Create flash programmer target task](#)), you can add following actions on the flash device.

- [Erase/Blank check actions](#)
- [Program/Verify actions](#)
- [Checksum actions](#)
- [Diagnostics actions](#)
- [Dump Flash actions](#)
- [Protect/Unprotect actions](#)
- [Secure/Unsecure actions](#)

The **Flash Programmer Actions** group contains the following UI controls to work with flash programmer actions.

- **Add Action** pop-up menu
  - **Erase/Blank Check Action:** Allows you to add erase or blank check actions for a flash device.
  - **Program/Verify Action:** Allows you to add program or verify flash actions for a flash device.
  - **Checksum Action:** Allows you to add checksum actions for a flash device.
  - **Diagnostics Action:** Lets you add a diagnostics action.
  - **Dump Flash Action:** Lets you add a dump flash action.
  - **Protect/Unprotect Action:** Lets you add protect or unprotect action.
  - **Secure/Unsecure Action:** Lets you add secure or unsecure action.
- **Duplicate Action** button: Allows you to duplicate a flash program action in the **Flash Programmer Actions** table.
- **Remove Action** button: Allows you to remove a flash program action from the **Flash Programmer Actions** table.
- **Move Up** button: Allows you to move up the selected flash action in the **Flash Programmer Actions** table.
- **Move Down** button: Allows you to move down the selected flash action in the **Flash Programmer Actions** table.

### NOTE

Actions can also be enabled or disabled using the **Enabled** column. The **Description** column contains the default description for the flash programmer actions. You can also edit the default description.

#### 3.11.2.3.1 Erase/Blank check actions

The Erase action erases sectors from the flash device. You can also use the erase action to erase the entire flash memory without selecting sectors. The blank check action verifies if the specified areas have been erased from the flash device.

**NOTE**

Flash Programmer will not erase a bad sector in the NAND flash. After the erase action a list of bad sectors is reported (if any).

To add an erase/blank check action:

1. Choose **Erase/Blank Check Action** from the **Add Action** pop-up menu.

The **Add Erase/Blank Check Action** dialog appears.

2. Select a sector from the **Sectors** table and click the **Add Erase Action** button to add an erase operation on the selected sector.

**NOTE**

Press the Control or the Shift key for selecting multiple sectors from the **Sectors** table.

3. Click the **Add Blank Check** button to add a blank check operation on the selected sector.
4. Select the **Erase All Sectors Using Chip Erase Command** checkbox to erase the entire flash memory.

**NOTE**

After selecting the **Erase All Sectors Using Chip Erase Command** checkbox, you need to add either erase or blank check action to erase all sectors.

5. Click **Done**.

The **Add Erase/Blank Check Action** dialog closes and the added erase/blank check actions appear in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window.

**3.11.2.3.2 Program/Verify actions**

The Program action allows you to program the flash device and the verify action verifies the programmed flash device.

**NOTE**

The program action will abort and fail if it is performed in a bad block for NAND flashes.

To add a program/verify action:

1. Choose **Program/Verify Action** from the **Add Action** pop-up menu.

The **Add Program/Verify Action** dialog appears.

2. Select the file to be written to the flash device.
3. Select the **Use File from Launch Configuration** checkbox to use the file from the launch (run) configuration associated with the task.
4. Specify the file name in the **File** textbox. You can use **Workspace**, **File System**, or **Variables** buttons to select the desired file.
5. Choose a file type from the **File Type** pop-up menu. You can select any one of the following file types:
  - Auto - Detects the file type automatically.
  - Elf - Specifies executable in ELF format.
  - Srec - Specifies files in Motorola S-record format.
  - Binary - Specifies binary files.
6. Select the **Erase sectors before program** checkbox to erase sectors before program.
7. [Optional] Select the **Verify after program** checkbox to verify after the program.

#### NOTE

The **Verify after program** checkbox is available only with the processors supporting it.

8. Select the **Restricted To Address in this Range** checkbox to specify a memory range. The write action is permitted only in the specified address range. In the **Start** textbox, specify the start address of the memory range sector and in the **End** textbox, specify the end address of the memory range.
9. Select the **Apply Address Offset** checkbox and set the memory address in the **Address** textbox. Value is added to the start address of the file to be programmed or verified.
10. Click the **Add Program Action** button to add a program action on the flash device.
11. Click the **Add Verify Action** button to add a verify action on the flash device.
12. Click **Done**.

The **Add Program/Verify Action** dialog closes and the added program/verify actions appear in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window.

### 3.11.2.3.3 Checksum actions

The checksum can be computed over host file, target file, memory range or entire flash memory. To add a checksum action:

1. Choose **Checksum Action** from the **Add Action** pop-up menu.

The **Add Checksum Action** dialog appears.

2. Select the file for checksum action.
3. Select the **Use File from Launch Configuration** checkbox to use the file from the launch (run) configuration associated with the task.
4. Specify the filename in the **File** textbox. You can use the **Workspace**, **File System**, or **Variables** buttons to select the desired file.
5. Choose the file type from the **File Type** pop-up menu.
6. Select an option from the **Compute Checksum Over** options. The checksum can be computed over the host file, the target file, the memory range, or the entire flash memory.
7. Specify the memory range in the **Restricted To Addresses in this Range** group. The checksum action is permitted only in the specified address range. In the **Start** textbox, specify the start address of the memory range sector and in the **End** textbox, specify the end address of the memory range.
8. Select the **Apply Address Offset** checkbox and set the memory address in the **Address** textbox. Value is added to the start address of the file to be programmed or verified.
9. Click the **Add Checksum Action** button.
10. Click **Done**.

The **Add Checksum Action** dialog closes and the added checksum actions appear in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window.

### 3.11.2.3.4 Diagnostics actions

The diagnostics action generates the diagnostic information for a selected flash device.

#### NOTE

Flash Programmer will report bad blocks, if they are present in the NAND flash.

To add a diagnostics action:

1. Choose **Diagnostics** from the **Add Action** pop-up menu.

The **Add Diagnostics Action** dialog appears.

2. Select a device to perform the diagnostics action.
3. Click the **Add Diagnostics Action** button to add diagnostic action on the selected flash device.

**NOTE**

Select the **Perform Full Diagnostics** checkbox to perform full diagnostics on a flash device.

**4. Click Done.**

The **Add Diagnostics Action** dialog closes and the added diagnostics action appears in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window.

**3.11.2.3.5 Dump Flash actions**

The dump flash action allows you to dump selected sectors of a flash device or the entire flash device.

To add a dump flash action:

1. Choose **Dump Flash Action** from the **Add Action** pop-up menu.

The **Add Dump Flash Action** dialog appears.

2. Specify the file name in the **File** textbox. The flash is dumped in this selected file.
3. Choose the file type from the **File Type** pop-up menu. You can choose 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.
  - Enter the start address of the range in the **Start** textbox.
  - Enter the end address of the range in the **End** textbox.
5. Click the **Add Dump Flash Action** button to add a dump flash action.
6. Click **Done**.

The **Add Dump Flash Action** dialog closes and the added dump flash action appear in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window.

**3.11.2.3.6 Protect/Unprotect actions**

The protect/unprotect actions allow you to change the protection of a sector in the flash device.

To add a protect/unprotect action:

1. Choose the **Protect/Unprotect Action** from the **Add Action** pop-up menu.

The **Add Protect/Unprotect Action** dialog appears.

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 the Control or Shift key for selecting multiple sectors from the **Sectors** table.

3. Click the **Add Unprotect Action** button to add an unprotect action on the selected sector.
4. Select the **All Device** checkbox to add action on full device.
5. Click **Done**.

The **Add Protect/Unprotect Action** dialog closes and the added protect or unprotect actions appear in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window.

### **3.11.2.3.7 Secure/Unsecure actions**

The secure/unsecure actions help you change the security of a flash device.

#### **NOTE**

The Secure/Unsecure flash actions are not supported for StarCore devices.

To add a secure/unsecure action:

1. Choose the **Secure/Unsecure Action** from the **Add Action** pop-up menu.

The **Add Secure/UnSecure Action** dialog appears.

2. Select a device from the **Flash Devices** table.
3. Click the **Add Secure Action** button to add Secure action on the selected flash device.
  - a. Enter password in the **Password** textbox.
  - b. Choose the password format from the **Format** pop-up menu.
4. Click the **Add Unsecure Action** button to add an unprotect action on the selected sector.
5. Click **Done**.

The **Add Secure/UnSecure Action** dialog closes and the added secure or unsecure action appears in the **Flash Programmer Actions** table in the **Flash Programmer Task** editor window.

### 3.11.2.3.8 Duplicate action

To duplicate a flash programmer action from the **Flash Programmer Actions** table:

1. Select the action in the **Flash Programmer Actions** table.
2. Click the **Duplicate Action** button.

The selected action is copied in the **Flash Programmer Action** table.

### 3.11.2.3.9 Remove action

To remove a flash programmer action from the **Flash Programmer Actions** table:

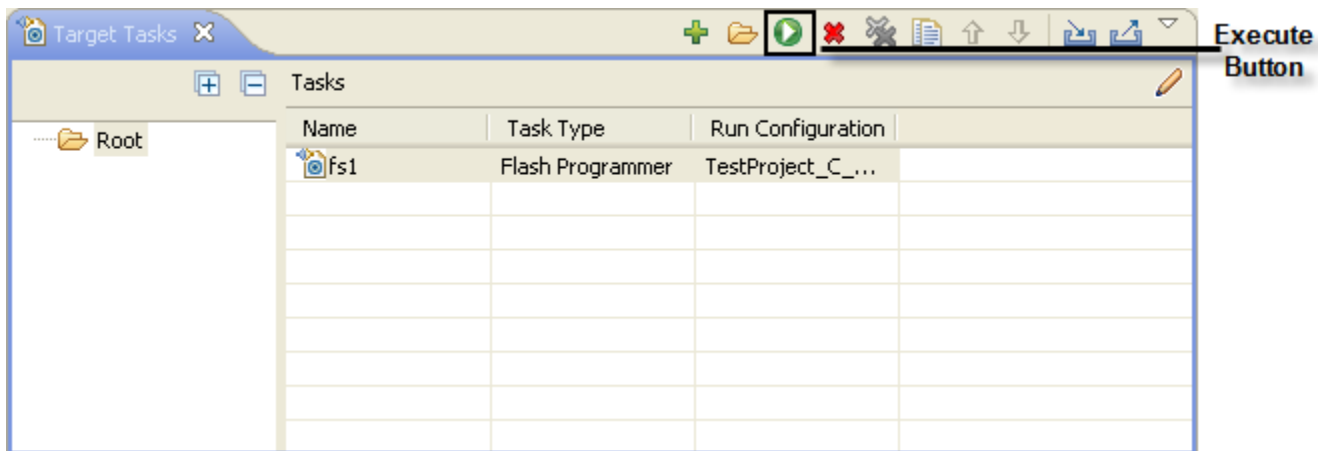
1. Select the action in the **Flash Programmer Actions** table.
2. Click the **Remove Action** button.

The selected action is removed from the **Flash Programmer Action** table.

## 3.11.3 Execute flash programmer target task

To execute the configured flash programmer target task, select a target task and click the **Execute** button in the **Target Tasks** view toolbar. Alternatively, right-click on a target task and choose **Execute** from the shortcut menu.



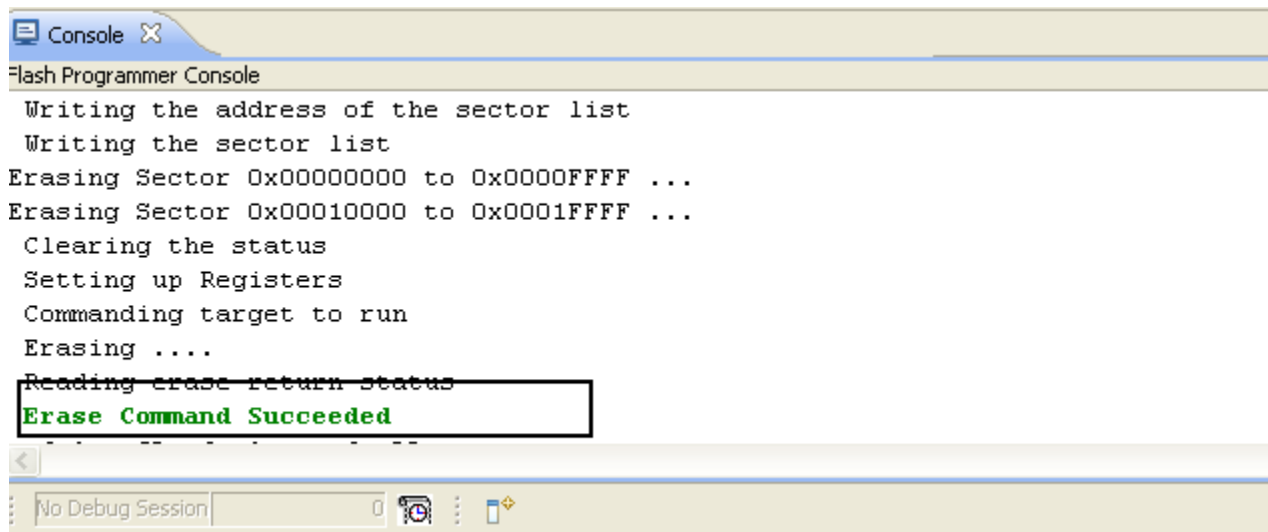


**Figure 3-26. Execute target task**

### NOTE

You can use predefined target tasks for supported boards. To load a predefined target task, right-click in the **Target Tasks** view and choose **Import Target Task** from the shortcut menu. To save your custom tasks, right-click in the **Target Tasks** view and then choose **Export Target Task** from the shortcut menu.

You can check the results of flash batch actions in the **Console** view. The green color indicates the success and the red color indicates the failure of the task.



**Figure 3-27. Console view**

## 3.12 Flash File to Target

You can use the **Flash File to Target** feature to perform flash operation. You do not need any project for using **Flash File to Target** feature, only a valid **Remote System** is required.

To open the **Flash File to Target** dialog, click the **Flash Programmer** button on the IDE toolbar.

- **Connection** pop-up menu- 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 File** pop-up menu - Lists predefined target tasks for the processor selected in the Launch Configuration and tasks added by user with the **Browse** button. The items in this pop-up menu are updated based on the processor selected in the launch configuration. For more information on launch configurations, see product's *Targeting Manual*.
  - **Unprotect flash memory before erase** checkbox - Select to unprotect flash memory before erasing the flash device. This feature allows you to unprotect the flash memory from **Flash File To Target** dialog.
- **File to Flash** group - Allows selecting the file to be programmed on the flash device and the location.
  - **File** textbox - Used for specifying the filename. You can use the **Workspace**, **File System**, or **Variables** buttons to select the desired file.
  - **Offset:0x** textbox - Used for specifying 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 does not contain address information then zero is considered as start address.
- **Save as Target Task** - Select to enable **Task Name** textbox.
  - **Task Name** textbox - Lets you to save the specified settings as a Flash target task. Use the testbox to specify the name of the target task.
- **Erase Whole 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.
- **Erase and Program** 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.

This feature helps you perform these basic flash operations:

- [Erasing flash device](#)
- [Programming a file](#)

### 3.12.1 Erasing flash device

To erase a flash device, follow these steps:

1. Click the **Flash Programmer** button on the IDE toolbar.

The **Flash File to Target** dialog appears.

2. Choose a connection from the **Connection** pop-up menu.

#### NOTE

If a connection is already established with the target, this control is disabled.

The **Flash Configuration File** pop-up menu is updated with the supported configurations for the processor from the launch configuration.

3. Choose a flash configuration from the **Flash Configuration File** pop-up menu.
4. Select the **Unprotect flash memory before erase** checkbox to unprotect flash memory before erasing the flash device.
5. Click the **Erase Whole Device** button.

### 3.12.2 Programming a file

1. Click the **Flash Programmer** button on the IDE toolbar.

The **Flash File to Target** dialog appears.

2. Choose a connection from the **Connection** pop-up menu.

#### NOTE

If a connection is already established with the target, this control is disabled.

The **Flash Configuration File** pop-up menu is updated with the supported configurations for the processor from the launch configuration.

3. Choose a flash configuration from the **Flash Configuration File** pop-up menu.
4. Select the **Unprotect flash memory before erase** checkbox to unprotect flash memory before erasing the flash device.
5. Type the file name in the **File** textbox. You can use the **Workspace**, **File System**, or **Variables** buttons to select the desired file.

6. Type the offset location in the **Offset** textbox.
7. Click the **Erase and Program** button.

## 3.13 Hardware diagnostics

The **Hardware Diagnostics** utility lets you run a series of diagnostic tests that determine if the basic hardware is functional. These tests include:

- **Memory read/write** - This test only makes a read or write access to the memory in order to read or write a byte, word (2 bytes) and long word (4 bytes) to or from the memory. For this task, the user needs to set the options in the **Memory Access** group.
- **Scope loop** - This test makes read and write accesses to memory in a loop at the target address. The time between accesses is given by the loop speed settings. The loop can only be stopped by the user, which cancels the test. For this type of test, the user needs to set the memory access settings and the loop speed.
- **Memory tests** - This test requires the user to set the access size and target address from the access settings group and the settings present in the **Memory Tests** group.

The Hardware Diagnostics has following topics:

- [Creating hardware diagnostics task](#)
- [Working with Hardware Diagnostic Action editor](#)
- [Memory test use cases](#)

### 3.13.1 Creating hardware diagnostics task

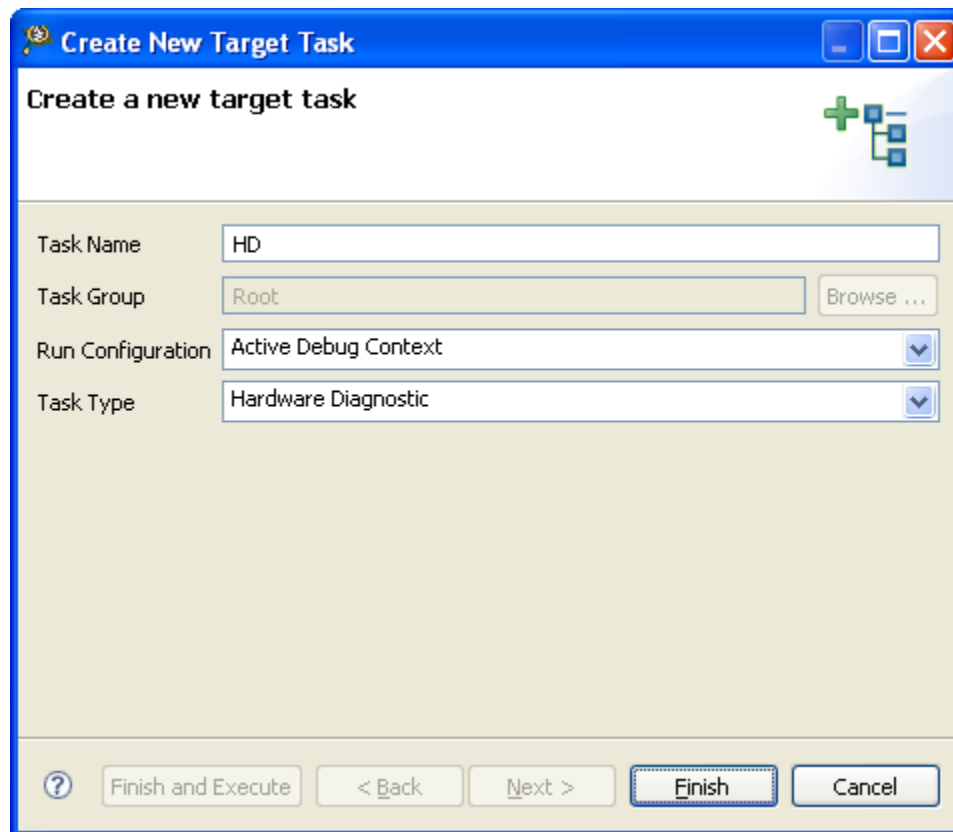
To create a task for hardware diagnostics:

1. Choose **Window > Show View > Other** from the IDE menu bar.

The **Show View** dialog appears.

2. Expand the **Debug** group and select **Target Tasks**.
3. Click **OK**.
4. Click the **Create a new Target Task** button on the **Target Tasks** view toolbar. Alternatively, right-click in the **Target Tasks** view and choose **New Task** from the shortcut menu.

The **Create a New Target Task** wizard appears.



**Figure 3-28. Create New Target Task wizard**

5. Type name for the new task in the **Task Name** textbox.
6. Choose a launch configuration from the **Run Configuration** pop-up menu.

#### **NOTE**

If the task does not successfully launch the configuration that you specify, the **Execute** button on the **Target Tasks** view toolbar stays unavailable.

7. Choose **Hardware Diagnostic** from the **Task Type** pop-up menu.
8. Click **Finish**.

A new hardware diagnostic task is created in the **Target Tasks** view.

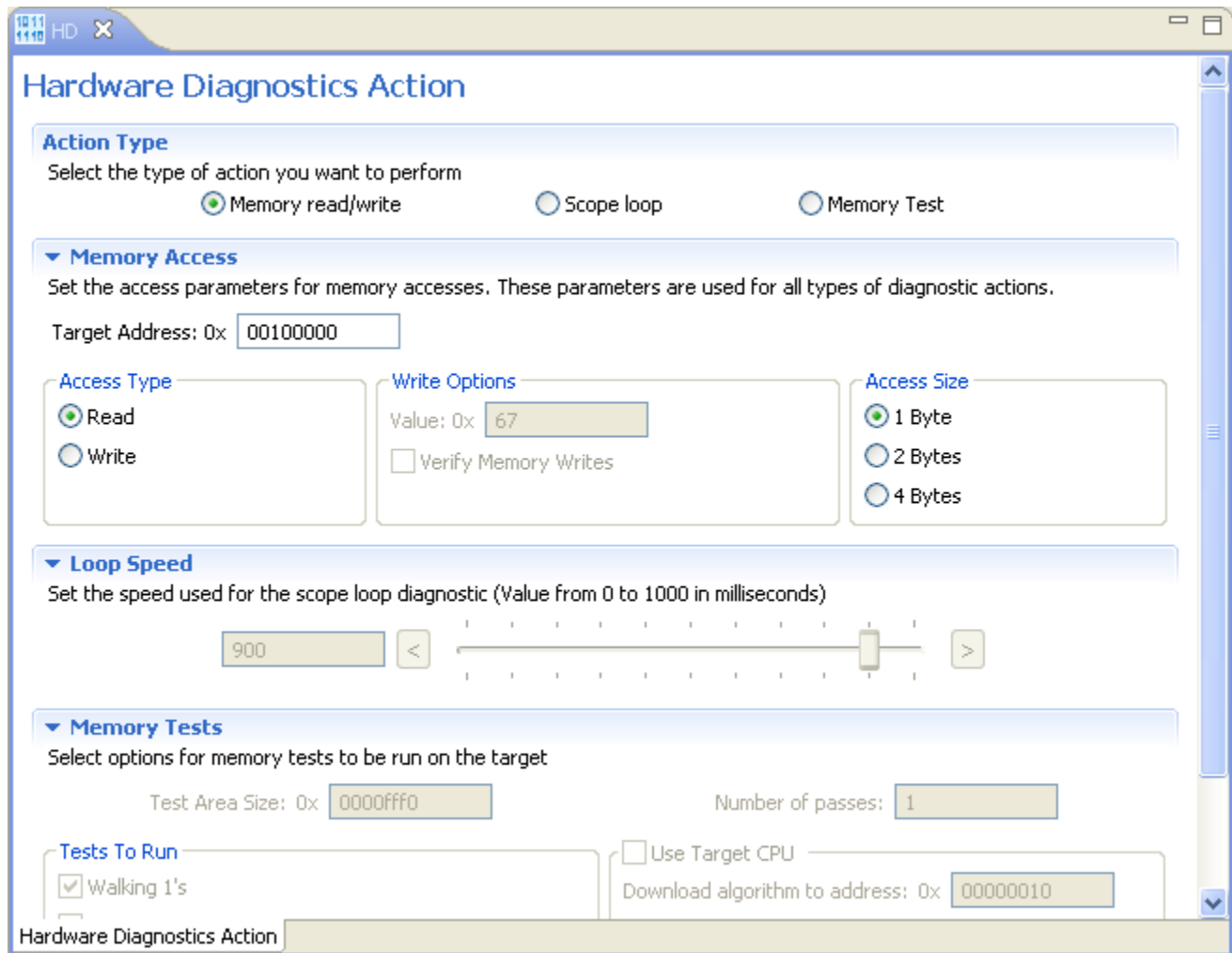
#### **NOTE**

You can perform various actions on a hardware diagnostic task, such as renaming, deleting, or executing the task, using the shortcut menu that appears on right-clicking the task in the **Target tasks** view.

### 3.13.2 Working with Hardware Diagnostic Action editor

The **Hardware Diagnostic Action** editor is used to configure a hardware diagnostic task. To open the **Hardware Diagnostic Action** editor for a particular task, double-click the task in the **Target Tasks** view.

The following figure shows the **Hardware Diagnostics Action** editor.



**Figure 3-29. Hardware Diagnostics Action editor**

The **Hardware Diagnostics Action** editor window includes the following groups:

- [Action Type](#)
- [Memory Access](#)
- [Loop Speed](#)
- [Memory Tests](#)

### 3.13.2.1 Action Type

The **Action Type** group in the **Hardware Diagnostics Action** editor window is used for selecting the action type. You can choose any one of the following actions:

- Memory read/write - Enables the options in the **Memory Access** group.
- Scope loop - Enables the options in the **Memory Access** and the **Loop Speed** groups.
- Memory test - Enables the access size and target address from the access settings group and the settings present in the **Memory Tests** group.

### 3.13.2.2 Memory Access

The **Memory Access** pane ( [Working with Hardware Diagnostic Action editor](#)) configures diagnostic tests for performing memory reads and writes over the remote connection interface. The table below lists and describes the items in the pane.

**Table 3-6. Memory Access Pane Items**

Item	Description
Read	Select to have the hardware diagnostic tools perform read tests.
Write	Select to have the hardware diagnostic tools perform write tests.
1 Byte	Select to have the hardware diagnostic tools perform byte-size operations.
2 Bytes	Select to have the hardware diagnostic tools perform word-size operations.
4 Bytes	Select to have the hardware diagnostic tools perform long-word-size operations.
Target Address	Specify the address of an area in RAM that the hardware diagnostic tools should analyze. The tools must be able to access this starting address through the remote connection (after the hardware initializes).
Value	Specify the value that the hardware diagnostic tools write during testing. Select the <b>Write</b> option to enable this textbox.
Verify Memory Writes	Select the checkbox to verify success of each data write to the memory.

### 3.13.2.3 Loop Speed

The **Loop Speed** pane ( [Working with Hardware Diagnostic Action editor](#)) configures diagnostic tests for performing repeated memory reads and writes over the remote connection interface. The tests repeat until you stop them. By performing repeated read and write operations, you can use a scope analyzer or logic analyzer to debug the hardware device. After the first 1000 operations, the **Status** shows the estimated time between operations.

#### NOTE

For all values of **Speed**, the time between operations depends heavily on the processing speed of the host computer.

For **Read** operations, the Scope Loop test has an additional feature. During the first read operation, the hardware diagnostic tools store the value read from the hardware. For all successive read operations, the hardware diagnostic tools compare the read value to the stored value from the first read operation. If the Scope Loop test determines that the value read from the hardware is not stable, the diagnostic tools report the number of times that the read value differs from the first read value. Following table lists and describes the items in Loop Speed pane.

**Table 3-7. Loop Speed Pane Items**

Item	Description
Set Loop Speed	Enter a numeric value between 0 to 1000 in the textbox to adjust the speed. You can also move the slider to adjust the speed at which the hardware diagnostic tools repeat successive read and write operations. Lower speeds increase the delay between successive operations. Higher speeds decrease the delay between successive operations.

### 3.13.2.4 Memory Tests

The **Memory Tests** pane ( [Working with Hardware Diagnostic Action editor](#)) lets you perform three hardware tests:

- [Walking Ones](#)
- [Address](#)
- [Bus noise](#)



You can specify any combination of tests and number of passes to perform. For each pass, the hardware diagnostic tools performs the tests in turn, until all passes are complete. The tools compare memory test failures and display them in a log window after all passes are complete. Errors resulting from memory test failures do not stop the testing process; however, fatal errors immediately stop the testing process.

The following table explains the items in the **Memory Tests** pane.

**Table 3-8. Memory Tests pane items**

Item	Explanation
Walking 1's	Select the checkbox to have the hardware diagnostic tools perform the <a href="#">Walking Ones</a> test. Deselect to have the diagnostic tools skip the <a href="#">Walking Ones</a> test.
Address	Select to have the hardware diagnostic tools perform the <a href="#">Address</a> test. Deselect to have the diagnostic tools skip the <a href="#">Address</a> test.
Bus Noise	Select to have the hardware diagnostic tools perform the <a href="#">Bus noise</a> test. Deselect to have the diagnostic tools skip the <a href="#">Bus noise</a> test.
Test Area Size	Specify the size of memory to be tested. This setting along with Target Address defines the memory range being tested.
Number of Passes	Enter the number of times that you want to repeat the specified tests.
Use Target CPU	Select to have the hardware diagnostic tools download the test code to the hardware device. Deselect to have the hardware diagnostic tools execute the test code through the remote connection interface. Execution performance improves greatly if you execute the test code on the hardware CPU, but requires that the hardware has enough stability and robustness to execute the test code.
Download Algorithm to Address	Specify the address where the test driver is downloaded in case the Use target CPU is selected.

### 3.13.2.4.1 Walking Ones

This test detects these memory faults:

- **Address Line:** The board or chip address lines are shorting or stuck at 0 or 1. Either condition could result in errors when the hardware reads and writes to the memory location. Because this error occurs on an address line, the data may end up in the wrong location on a write operation, or the hardware may access the wrong data on a read operation.

- **Data Line:** The board or chip data lines are shorting or stuck at 0 or 1. Either condition could result in corrupted values as the hardware transfers data to or from memory.
- **Retention:** The contents of a memory location change over time. The effect is that the memory fails to retain its contents over time.

The Walking Ones test includes four sub-tests:

- **Walking Ones:** This subtest first initializes memory to all zeros. Then the subtest writes, reads, and verifies bits, with each bit successively set from the least significant bit (LSB) to the most significant bit (MSB). The subtest configures bits such that by the time it sets the MSB, all bits are set to a value of 1. This pattern repeats for each location within the memory range that you specify. For example, the values for a byte-based Walking Ones subtest occur in this order:

`0x01, 0x03, 0x07, 0x0F, 0x1F, 0x3F, 0x7F, 0xFF`

- **Ones Retention:** This subtest immediately follows the Walking Ones subtest. The Walking Ones subtest should leave each memory location with all bits set to 1. The Ones Retention subtest verifies that each location has all bits set to 1.
- **Walking Zeros:** This subtest first initializes memory to all ones. Then the subtest writes, reads, and verifies bits, with each bit successively set from the LSB to the MSB. The subtest configures bits such that by the time it sets the MSB, all bits are set to a value of 0. This pattern repeats for each location within the memory range that you specify. For example, the values for a byte-based Walking Zeros subtest occur in this order:

`0xFE, 0xFC, 0xF8, 0xF0, 0xE0, 0xC0, 0x80, 0x00`

- **Zeros Retention:** This subtest immediately follows the Walking Zeros subtest. The Walking Zeros subtest should leave each memory location with all bits set to 0. The Zeros Retention subtest verifies that each location has all bits set to 0.

### 3.13.2.4.2 Address

This test detects memory aliasing. *Memory aliasing* exists when a physical memory block repeats one or more times in a logical memory space. Without knowing about this condition, you might conclude that there is much more physical memory than what actually exists.

The address test uses a simplistic technique to detect memory aliasing. The test writes sequentially increasing data values (starting at one and increasing by one) to each successive memory location. The maximum data value is a prime number and its specific value depends on the addressing mode so as to not overflow the memory location.

The test uses a prime number of elements to avoid coinciding with binary math boundaries:

- For byte mode, the maximum prime number is 28-5 or 251.
- For word mode, the maximum prime number is 216-15 or 65521.
- For long word mode, the maximum prime number is 232-5 or 4294967291.

If the test reaches the maximum value, the value rolls over to 1 and starts incrementing again. This sequential pattern repeats throughout the memory under test. Then the test reads back the resulting memory and verifies it against the written patterns. Any deviation from the written order could indicate a memory aliasing condition.

### 3.13.2.4.3 Bus noise

This test stresses the memory system by causing many bits to flip from one memory access to the next (both addresses and data values). *Bus noise* occurs when many bits change consecutively from one memory access to another. This condition can occur on both address and data lines.

### 3.13.2.4.4 Address lines

To force bit flips in address lines, the test uses three approaches:

- Sequential- This approach works sequentially through all of the memory under test, from lowest address to highest address. This sequential approach results in an average number of bit flips from one access to the next.
- Full Range Converging- This approach works from the fringes of the memory range toward the middle of the memory range. Memory access proceeds in this pattern, where + *number* and - *number* refer to the next item location (the specific increment or decrement depends on byte, word, or long word address mode):
  - the lowest address
  - the highest address
  - (the lowest address) + 1
  - (the highest address) - 1
  - (the lowest address) + 2
  - (the highest address) - 2
- Maximum Invert Convergence- This approach uses calculated end point addresses to maximize the number of bits flipping from one access to the next. This approach involves identifying address end points such that the values have the maximum inverted bits relative to one another. Specifically, the test identifies the lowest address with all 0x5 values in the least significant nibbles and the highest address

with all 0xA values in the least significant nibbles. After the test identifies these end points, memory access alternates between low address and high address, working towards the center of the memory under test. Accessing memory in this manner, the test achieves the maximum number of bits flips from one access to the next.

### 3.13.2.4.5 Data lines

To force bit flips in data lines, the test uses two sets of static data, a pseudo-random set and a fixed-pattern set. Each set contains 31 elements—a prime number. The test uses a prime number of elements to avoid coinciding with binary math boundaries. The sets are unique to each addressing mode so as to occupy the full range of bits.

- The test uses the pseudo-random data set to stress the data lines in a repeatable but pattern-less fashion.
- The test uses the fixed-pattern set to force significant numbers of data bits to flip from one access to the next.

The sub-tests execute similarly in that each subtest iterates through static data, writing values to memory. The test combines the three address line approaches with the two data sets to produce six unique sub-tests:

- Sequential with Random Data
- Sequential with Fixed Pattern Data
- Full Range Converging with Random Data
- Full Range Converging with Fixed Pattern Data
- Maximum Invert Convergence with Random Data
- Maximum Invert Convergence with Fixed Pattern Data

## 3.13.3 Memory test use cases

The memory read/write and scope loop tests are host based tests. The host machine issues read and write action to the memory through the connection protocol. For example CCS.

Memory tests are the complex tests that can be executed in two modes: Host based and Target based depending upon the selection made for **Use Target CPU** checkbox.

- **Selected:** Target Based
- **Deselected:** Host Based

The **Host Based** tests are slower than the **Target Based** tests.

### 3.13.3.1 Use Case 1: Execute host-based Scope Loop on target

You need to perform the following action to execute the host based scope loop on the target:

1. Select **Scope loop** in the **Action Type**.
2. Set **Memory Access** settings from the **Memory Access** section.
3. Set the speed used for the scope loop diagnostic from the **Loop Speed** section.
4. Save the settings.
5. Press **Execute** to execute the action.

### 3.13.3.2 Use Case 2: Execute target-based Memory Tests on target

You need to perform the following action to execute the target based memory test on the target:

1. Select **Memory Test** in the **Action Type**.
2. Specify **Target Address** and **Access Size** settings from the **Memory Access** section.
3. Specify the following settings for **Memory Tests** section:
  - **Test Area Size**: The tested memory region is computed from **Target Address** until **Target Address + Test Area Size**.
  - **Tests to Run**: Select tests to run on the target.
  - **Number of passes**: Specify number of times a test will be executed.
  - **Use Target CPU**: set the Address to which the test driver (algorithm) is to be downloaded.
4. Save the settings.
5. Press **Execute** to execute the action.

## 3.14 Import/Export/Fill memory

The **Import/Export/Fill Memory** utility lets you export memory contents to a file and import data from a file into memory. The utility also supports filling memory with a user provided data pattern.

### 3.14.1 Creating task for import/export/fill memory

Use the **Import/Export/Fill Memory** utility to perform various tasks on memory. The utility can be accessed from the **Target Tasks** view.

To open the **Target Tasks** view:

1. Choose **Window > Show View > Other** from the **IDE** menu bar.

The **Show View** dialog appears.

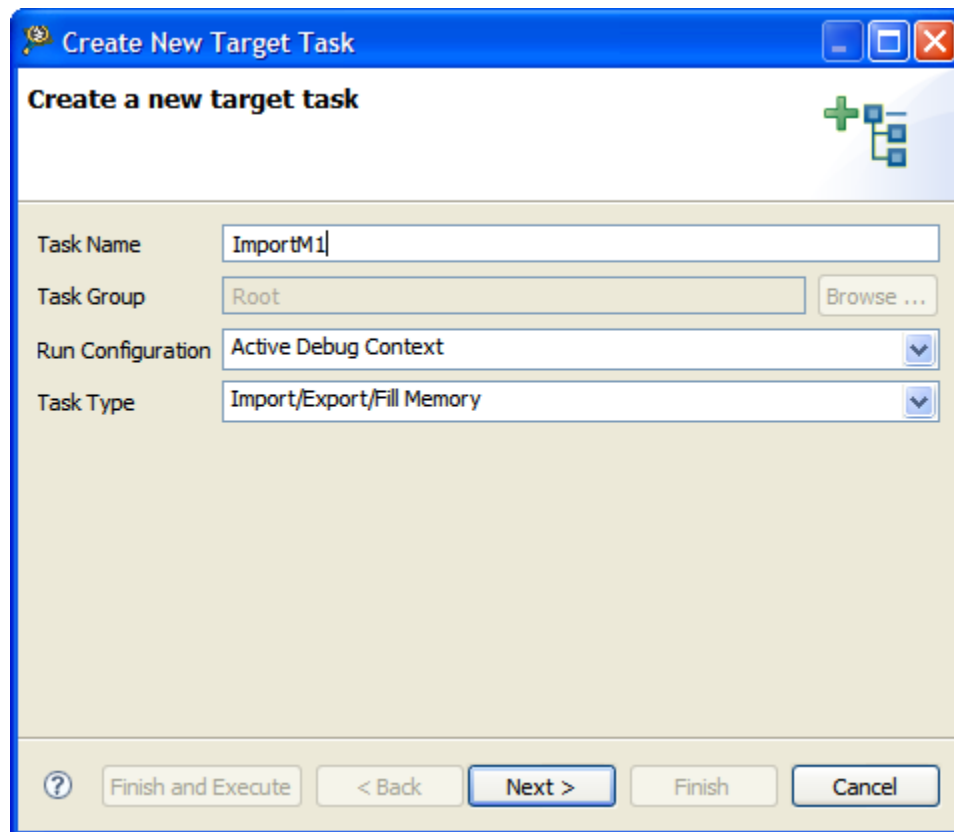
2. Expand the **Debug** group.
3. Select **Target Tasks**.
4. Click **OK**.

The first time it opens, the **Target Tasks** view contains no tasks. You must create a task to use the **Import/Export/Fill Memory** utility.

To create a task:

1. Click the **Create a new Target Task** button on the toolbar of the **Target Tasks** view. Alternatively, right-click the left-hand list of tasks and choose **New Task** from the shortcut menu that appears.

The **Create a New Target Task** page appears.



**Figure 3-30. Create New Target Task Window**

2. In the **Task Name** textbox, enter a name for the new task.
3. Use the **Run Configuration** pop-up menu to specify the configuration that the task launches and uses to connect to the target.

#### **NOTE**

If the task does not successfully launch the configuration that you specify, the **Execute** button of the **Target Tasks** view toolbar stays unavailable.

4. Use the **Task Type** pop-up menu to specify **Import/Export/Fill Memory**.
5. Click **Finish**.

The **Import/Export/Fill Memory** target task is created and it appears in the **Import/Export/Fill Memory Action** editor.

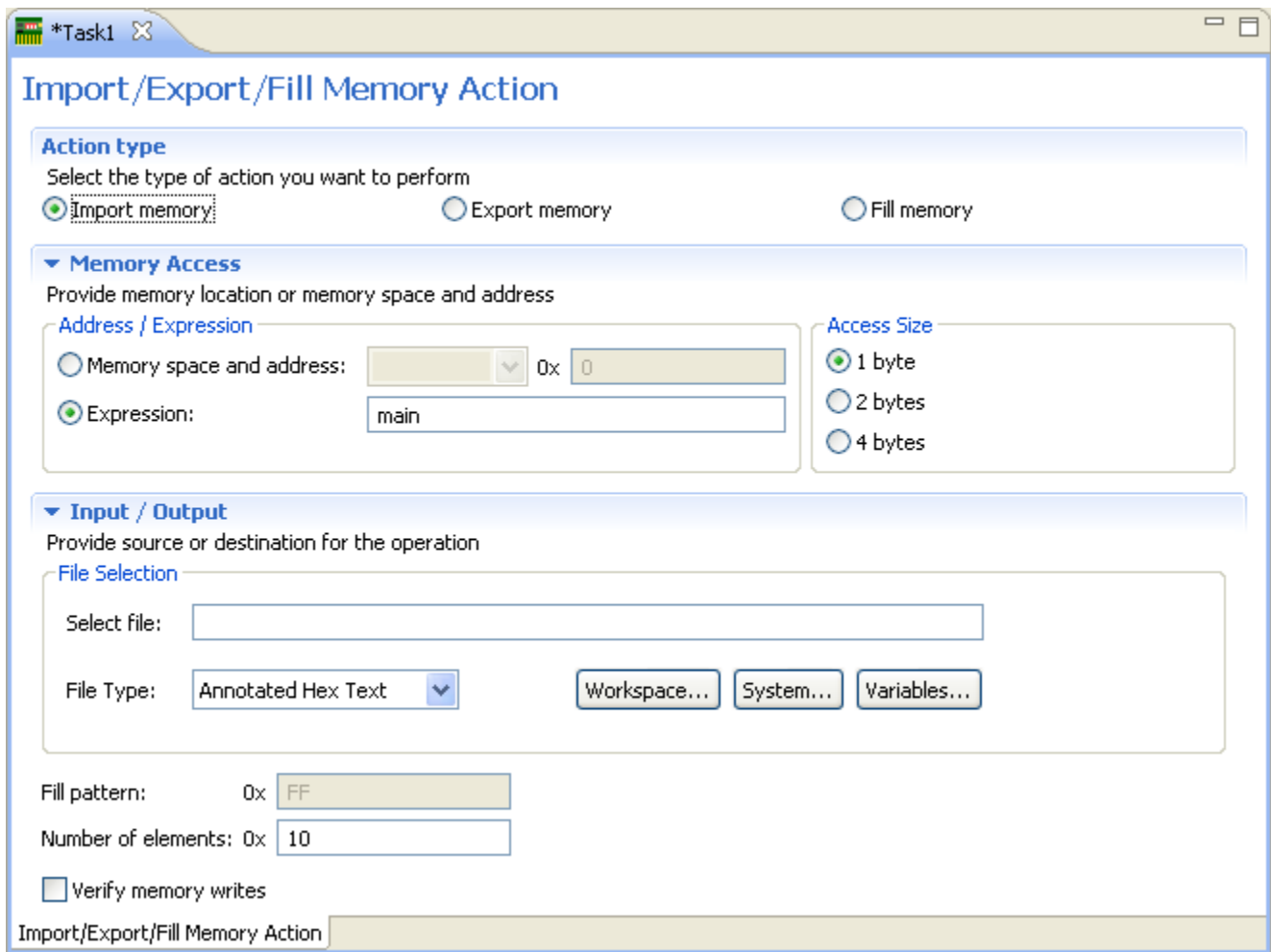
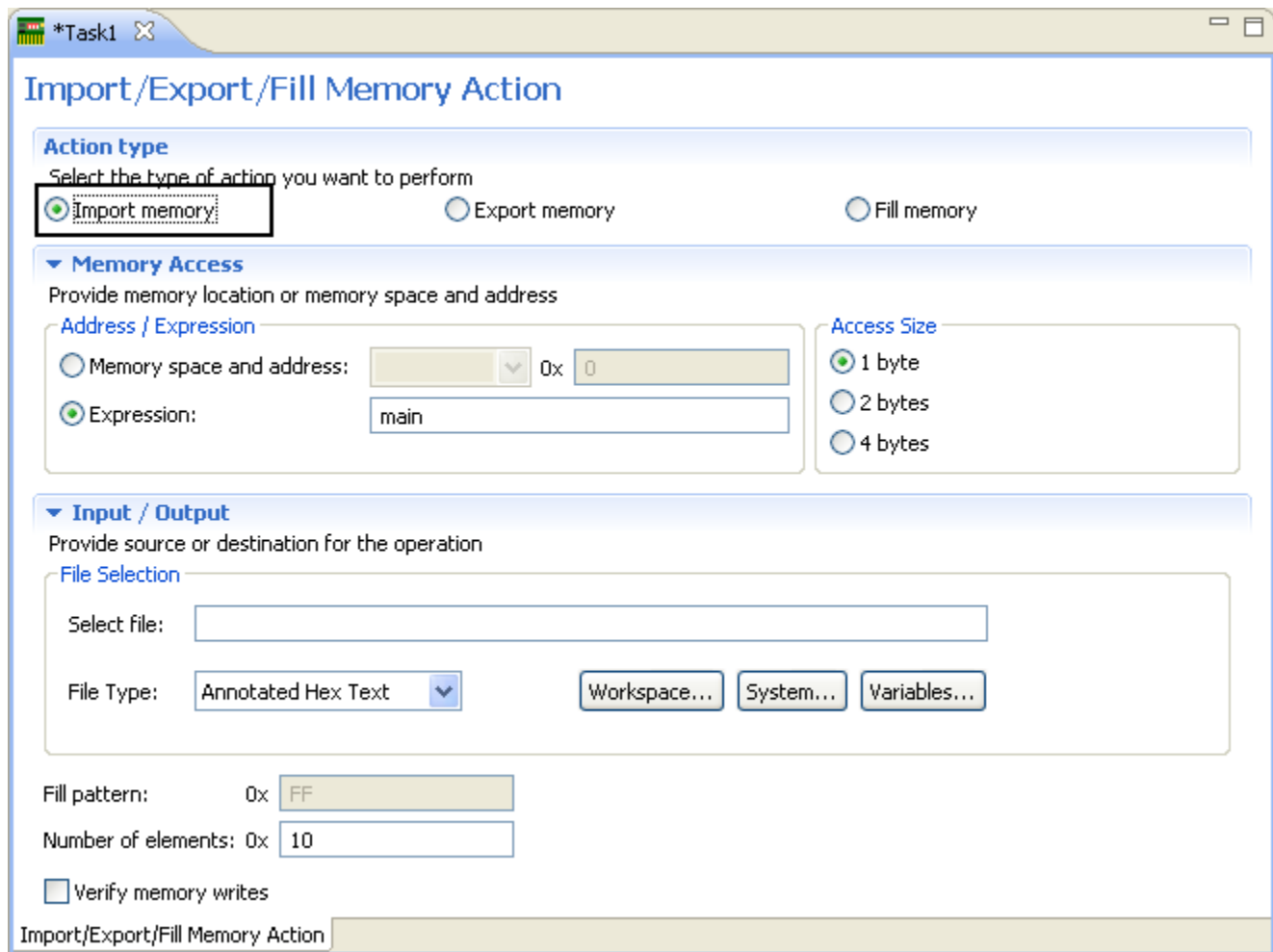


Figure 3-31. Import/Export Memory Action editor

### 3.14.2 Importing data into memory

Select the **Import memory** option from the **Import/Export/Fill Memory Action** editor to import the encoded data from a user specified file, decode it, and copy it into a user specified memory range.





**Figure 3-32. Import/Export Memory Action editor - Importing data into memory**

The following table explains the import memory options.

**Table 3-9. Controls used for importing data into memory**

Item	Explanation
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.
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, and 4 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 imported data is encoded. By default, the following file types are supported: <ul style="list-style-type: none"> <li>• Signed decimal Text</li> <li>• Unsigned decimal Text</li> <li>• Motorola S-Record format</li> <li>• Hex Text</li> <li>• Annotated Hex Text</li> <li>• Raw Binary</li> </ul>

*Table continues on the next page...*

**Table 3-9. Controls used for importing data into memory (continued)**

Item	Explanation
Select file	Enter the path to the file that contains the data to be imported. Click the <b>Workspace</b> button to select a file from the current project workspace. Click the <b>System</b> button to select a file from the file system the standard File Open dialog. Click the <b>Variables</b> button to select a build variable.
Number of Elements	Enter the total number of elements to be transferred.
Verify Memory Writes	Select the checkbox to verify success of each data write to the memory.

### 3.14.3 Exporting memory to file

Select the **Export memory** option from the **Import/Export/Fill Memory Action** editor to 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.

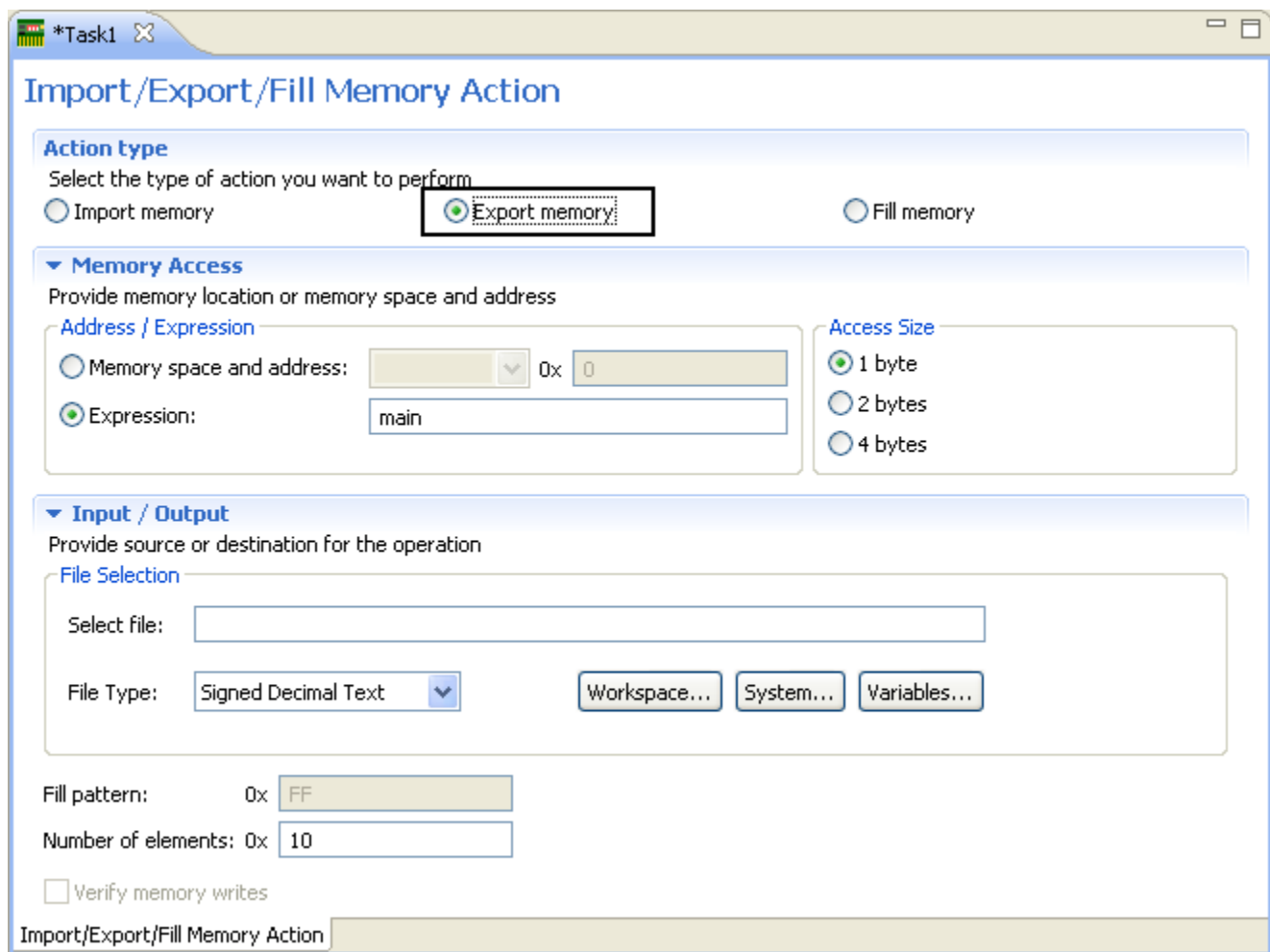


Figure 3-33. Exporting memory

The following table explains the export memory options.

Table 3-10. Controls used for exporting data from memory into file

Item	Explanation
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.
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, and 4 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 encoded data is exported. By default, the following file types are supported: <ul style="list-style-type: none"> <li>• Signed decimal Text</li> <li>• Unsigned decimal Text</li> <li>• Motorola S-Record format</li> <li>• Hex Text</li> <li>• Annotated Hex Text</li> <li>• Raw Binary</li> </ul>

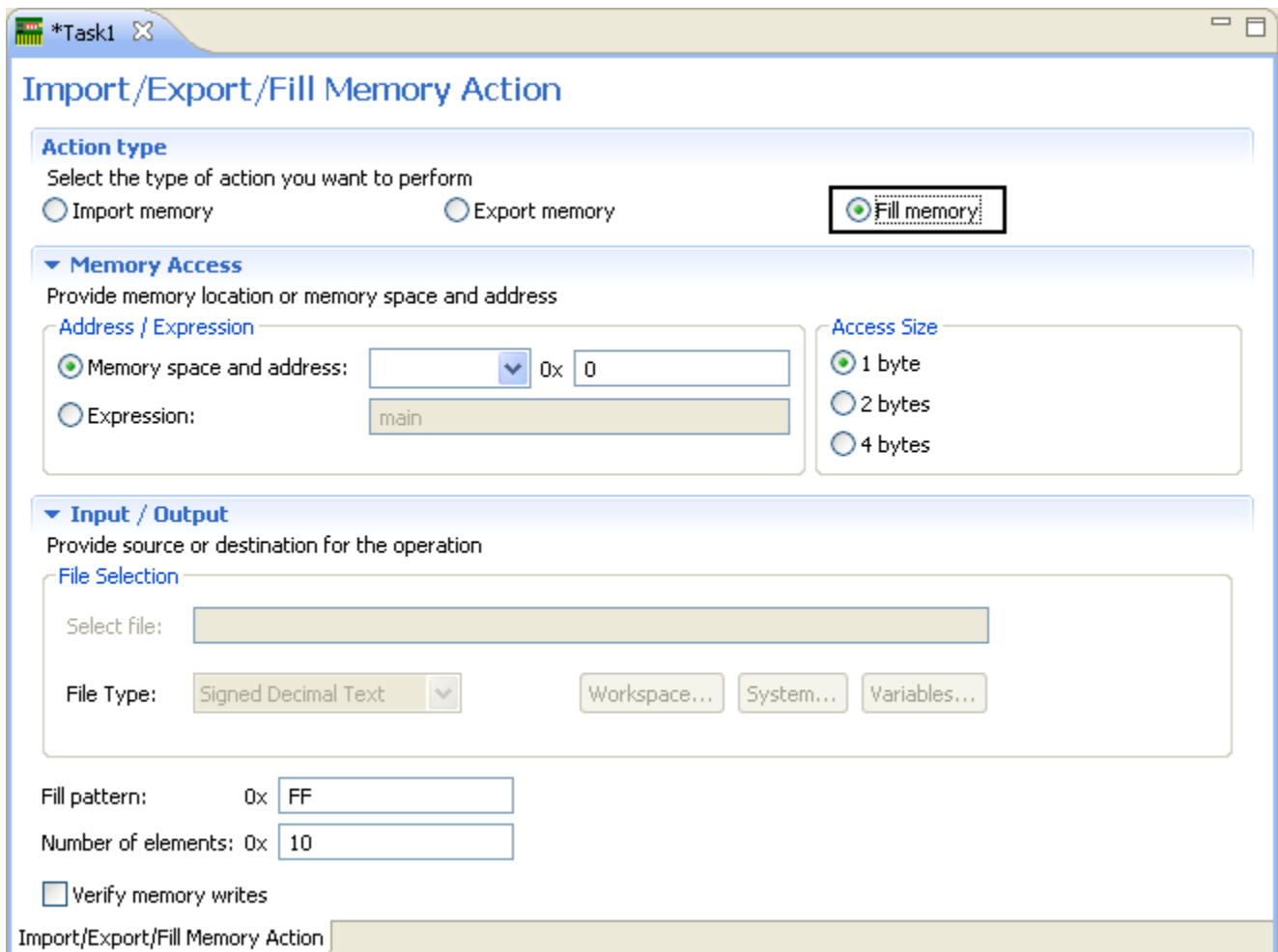
Table continues on the next page...

**Table 3-10. Controls used for exporting data from memory into file (continued)**

Item	Explanation
Select file	Enter the path of the file to write data. Click the <b>Workspace</b> button to select a file from the current project workspace. Click the <b>System</b> button to select a file from the file system the standard <b>File Open</b> dialog. Click the <b>Variables</b> button to select a build variable.
Number of Elements	Enter the total number of elements to be transferred.

### 3.14.4 Fill memory

Select the **Fill memory** option from the **Import/Export/Fill Memory Action** editor window to fill a user specified memory range with a user specified data pattern.



**Figure 3-34. Fill memory**

The following table explains the fill memory options.

**Table 3-11. Controls used for filling memory with data pattern**

Item	Explanation
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.
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, and 4 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 mirrored in the target. The field accept only hexadecimal values. If the width of the pattern exceeds the access size, an error message.
Number of Elements	Enter the total number of elements to be modified.
Verify Memory Writes	Select the checkbox to verify success of each data write to the memory.

## 3.15 Launch group

A launch group is a launch configuration that contains other launch configurations. You can add any number of existing launch configurations to the launch group and order them. In addition, you can attach an action to each launch configuration.

You can also specify the mode in which the launch configuration should be launched. For example, run mode or debug mode.

### 3.15.1 Creating launch group

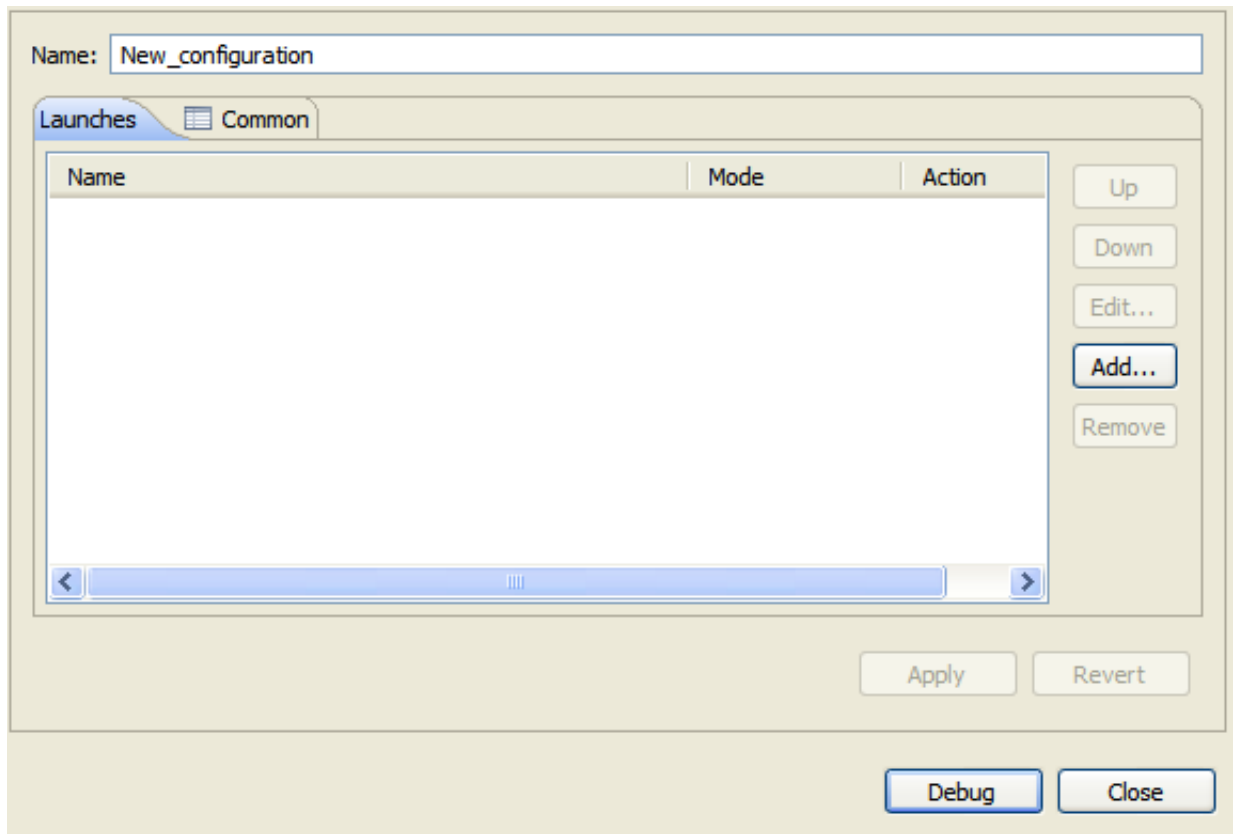
To create a launch group:

1. Choose **Run > Debug Configurations**.

The **Debug Configurations** dialog appears.

2. Select **Launch Group** in the left pane.
3. Click the **New launch configuration** button available on the toolbar of the dialog.

A new launch configuration of launch group type is created and shown on the left pane of the **Debug Configurations** dialog.



**Figure 3-35. Launch Group Configuration pane controls**

**Table 3-12. Launch Group Configuration Pane Controls**

Control	Description
Name	Specify a name for the launch group
Up button	Click to move up the selected launch configuration
Down button	Click to move down the selected launch configuration
Edit button	Click to edit the selected entry in the launch group
Add button	Click to add a launch configuration to the launch group
Remove button	Click to remove a launch configuration from the launch group

4. Specify a name for the launch group configuration in the **Name** textbox.
5. Click **Add**.

The **Add Launch Configuration** dialog appears.

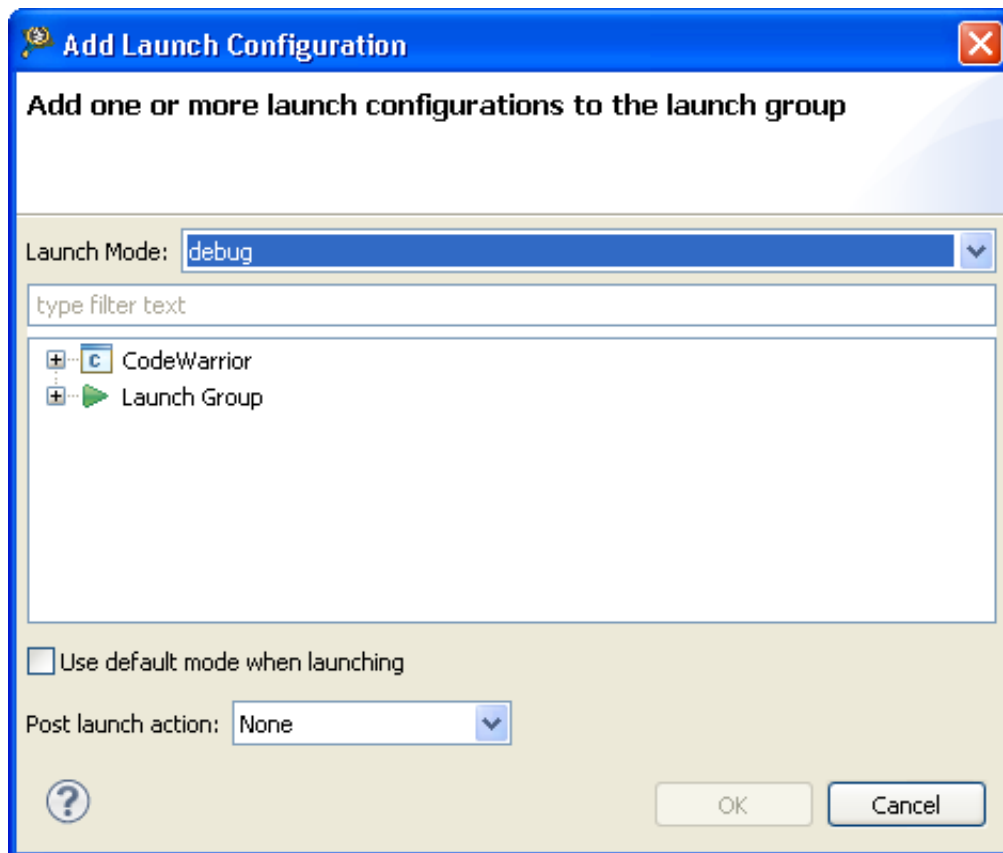


Figure 3-36. Add Launch Configuration dialog

Table 3-13. Add Launch Configuration dialog options

Option	Description
Launch Mode	Allows you to specify launch mode for the selected launch configuration. This can also be used to filter launch configurations. <ul style="list-style-type: none"> <li>• debug - specifies that the launch configuration will be launched in debug mode.</li> <li>• run - specifies that the launch configuration will be launched in run mode.</li> <li>• profile - specifies that the launch configuration will be launched in profile mode.</li> </ul>
Use default mode when launching	Selecting this checkbox indicates that the child launch configuration should be launched in the mode used to initiate the launch group launch.
Post launch action	Allows you to specify a post launch action for the selected launch configuration. <ul style="list-style-type: none"> <li>• None - the debugger immediately moves on to launch the next launch configuration.</li> </ul>

**Table 3-13. Add Launch Configuration dialog options**

Option	Description
	<ul style="list-style-type: none"> <li>• Wait until terminated - the debugger waits indefinitely until the debug session spawned by the last launch terminates and then it moves on to the next launch configuration.</li> <li>• Delay - the debugger waits for specified number of seconds before moving on to the next launch configuration.</li> </ul>

6. To add a launch configuration to the launch group:
  - a. Select one or more launch configurations from the tree control.
  - b. Select an action from the Post launch action list.
  - c. Click **OK**.

The launch configuration is added to the launch group and the **Add Launch Configuration** dialog closes.

7. Click **Apply**.

The launch configurations are added to the launch group.

### 3.15.2 Launching launch group

When launched, the debugger iterates through the launch configurations contained in the launch group and launches each enabled configuration sequentially, in the same order as they are configured in the launch group.

The following figure shows the result of a launch group launch in the **Debug** view.



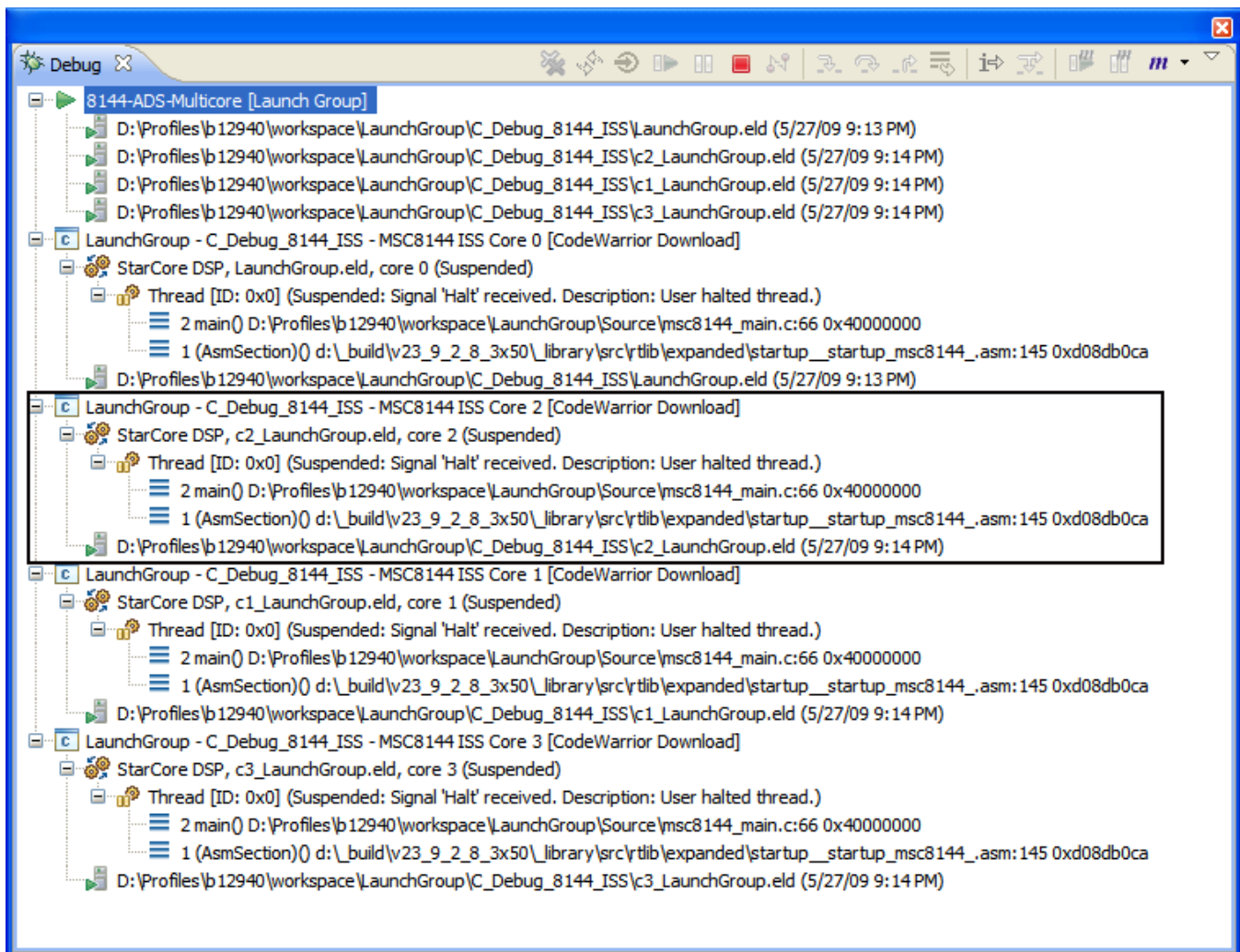


Figure 3-37. Launch group in Debug view

## 3.16 Load multiple binaries

The CodeWarrior debugger supports loading multiple binaries(.elf), to make the symbols and source code of other executable available within a debugging session.

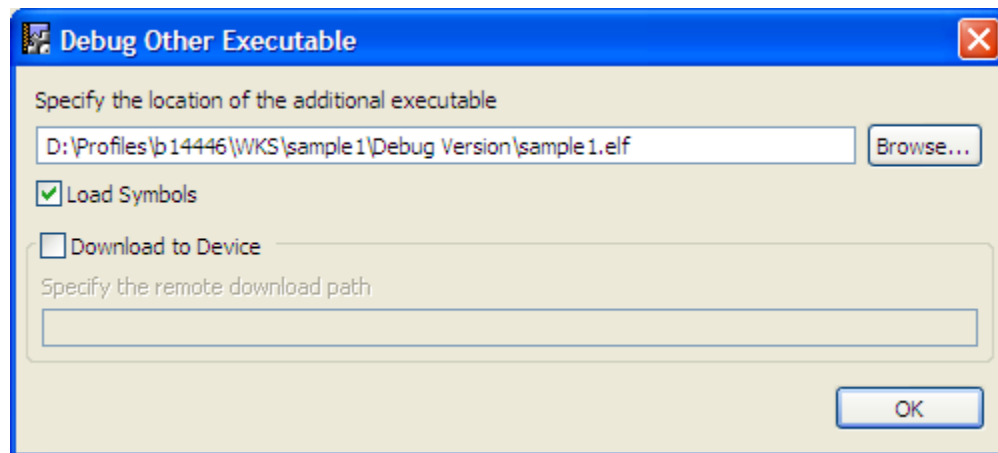
To load multiple binary files within a debugging session:

1. Click **Run > Debug Configurations**.

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

2. Expand the **CodeWarrior** configuration and select the debug configuration that you want to modify.





**Figure 3-39. Debug Other Executable**

6. Enter the path to the additional executable file that the debugger controls in addition to the current project's executable file. Alternatively, click the **Browse** button to specify the file path.
7. Select the **Load Symbols** checkbox to have the debugger load symbols for the specified file. Deselect to prevent the debugger from loading the symbols. The **Debug** column of the **File** list corresponds to this setting.
8. Select the **Download to Device** checkbox to have the debugger download the specified file to the target device. Deselect this checkbox to prevent the debugger from downloading the file to the device. The **Download** column of the **File** list corresponds to this setting.
9. Click **OK** to add the additional executable to the **Other Executables** file list.
10. Click **Debug** to launch a debug session with multiple binaries.

Multiple binary files within a debugging session are now available.

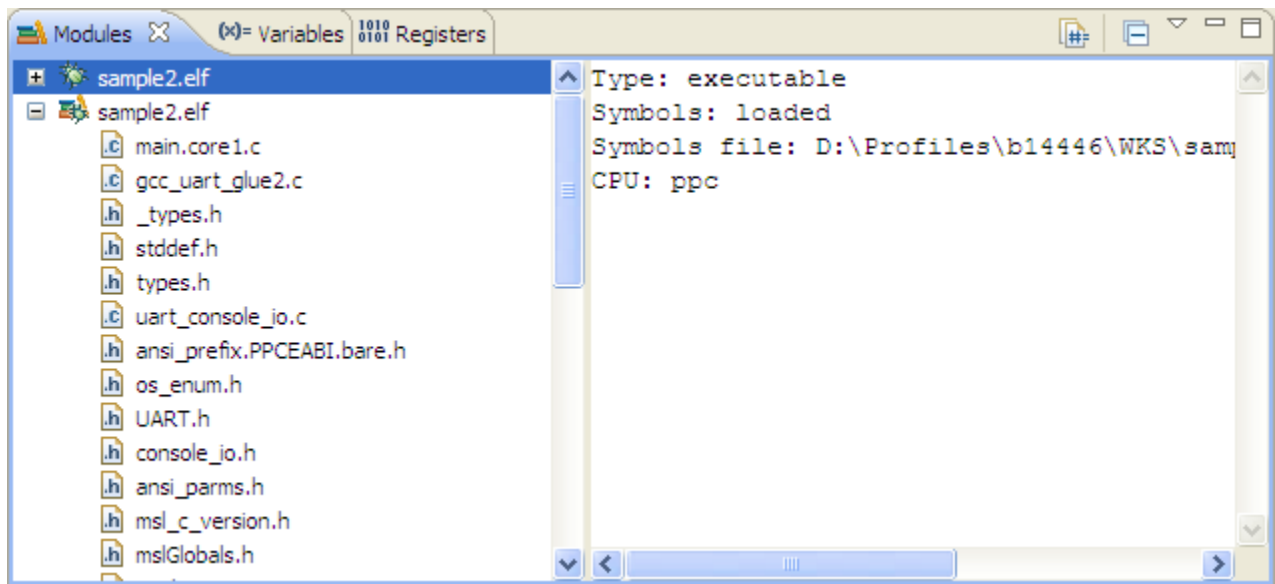
### 3.16.1 Viewing binaries

The **Modules** view shows the application executable and all shared libraries loaded by the application during a debug session. In addition to the current project's executable file, the **Modules** view shows the other executables listed in the **Other Executables** pane (see [Load multiple binaries](#)).

To view the executables loaded during a debug session:

1. Choose **Window > Show View > Modules** from the IDE menu bar.

The **Modules** view appears.



**Figure 3-40. Modules view**

2. Click on the application executable to view its details.

An executable can also be expanded in the **Modules** view (to show its symbols) regardless of whether the executable has been targeted or not in the **Debug Other Executable** dialog.

3. An executable that is not marked to be targeted at launch time can be forced to be targeted at any time during the debug session by choosing **Load Symbols** from the shortcut menu that appears on right-clicking the executable. The menu command will not be available if the executable is already targeted.

#### **NOTE**

All executables listed in the **Other Executables** pane are added to the **Modules** view whether or not they are marked to be targeted or downloaded.

## 3.17 Memory view

The **Memory** view lets you monitor and modify your process memory. The process memory is presented as a list called memory monitors. Each monitor represents a section of memory specified by its location called base address. Each memory monitor can be displayed in different predefined data formats known as memory renderings.

The debugger supports the following rendering types:

- Hex Integer

- Hexadecimal (default)
- ASCII
- Signed integer
- Unsigned integer
- Traditional
- Disassembly
- Floating Point
- Fixed Point

The default rendering is displayed automatically when a monitor is created.

### NOTE

CodeWarrior debugger will retain the formats and layouts, defined in the **Memory** view, between debug sessions.

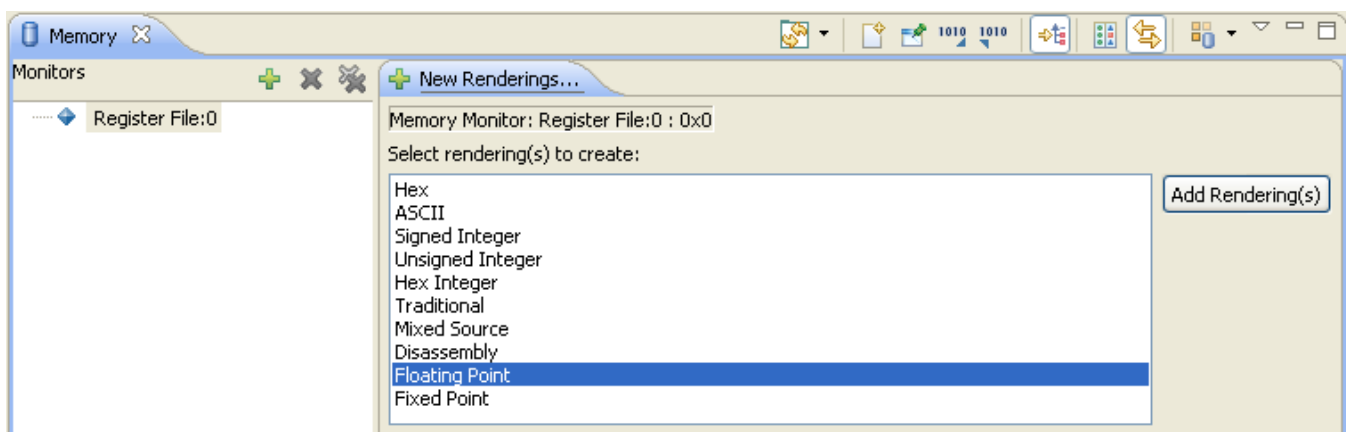
The **Memory** view contains these two panes:

- **Monitors** - Displays the list of memory monitors added to the debug session currently selected in the **Debug** view
- **Renderings** - Display memory renderings.

The content of the **Renderings** pane is controlled by the selection in the **Monitors** pane. The **Renderings** pane can be configured to display two renderings simultaneously.

## 3.17.1 Opening Memory view

To open the **Memory** view, choose **Window > Show View > Memory** from the IDE menu bar.



**Figure 3-41. Memory view**

### 3.17.2 Adding memory monitor

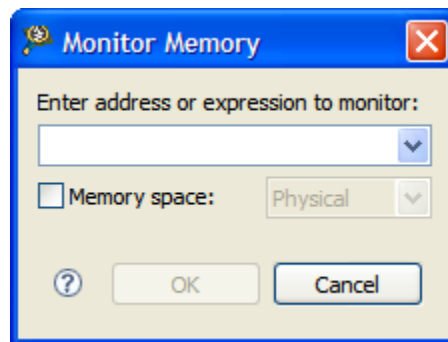
To add a memory monitor to **Memory** view:

1. Start a debugging session.
2. Click the **Memory** tab.

The **Memory** view appears.

3. In the **Monitors** pane toolbar, click the plus-sign (+) icon. Alternatively, right-click a blank area in the **Monitors** pane and choose **Add Memory Monitor** from the shortcut menu.

The **Monitor Memory** dialog appears.



**Figure 3-42. Monitor Memory dialog**

4. Specify information about the memory monitor:
  - To enter a memory space and literal address, enter an address.
  - To enter an expression, type in the expression. If you enter a literal address as the expression, use the prefix `0x` to indicate hexadecimal notation, or use no prefix to indicate decimal notation. You can use the available pop-up menu to choose a previously specified expression.

#### NOTE

If you do not select a memory space and the expression does not contain a memory space then the memory space is set to default data memory space that is specific for each architecture

5. If you want to translate the memory address or the expression to another memory space, select the **Memory space** checkbox.

The **Memory space** pop-up menu becomes available.

6. Choose one of the following values from the **Memory space** pop-up menu.
  - Physical - Indicates that the specified address or expression refers to physical memory space.
  - Data - Indicates that the specified address or expression refers to data memory space.
  - Program - Indicates that the specified address or expression refers to program memory space.
7. Click **OK**.

The memory monitor is added to the **Monitors** pane and the default rendering is displayed in the **Renderings** pane.

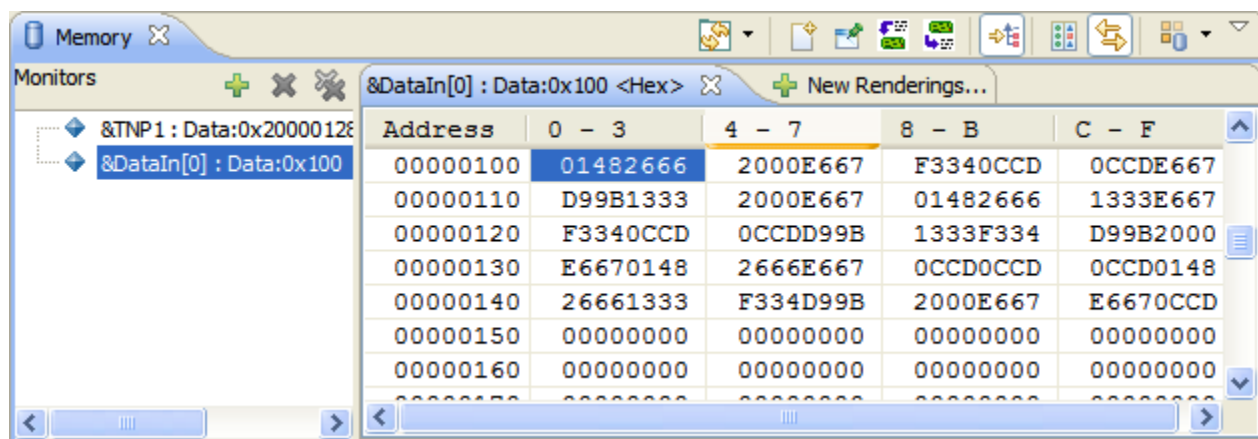


Figure 3-43. Added memory monitor

### 3.17.3 Adding memory renderings

When you add a variable, expression, or register to the **Memory** view, you can do so multiple times, each time adding a new (or the same) rendering. Alternatively, once you have added a memory monitor and rendering, you can go to the Renderings pane and click **Add Rendering(s)**. This will prompt you with a dialog to select the rendering that you want to add to the view. In this dialog, you can select more than one rendering by using the *Shift* or *Control* key. This will cause a rendering to be opened for each rendering format that is selected. When you add multiple memory renderings, they are separated by tabs.

For more details on opening the Memory view and adding memory monitors, see [Adding memory monitor](#).

You can also split the Memory Renderings pane by clicking the **Toggle Split Pane** icon in the **Memory** view toolbar. When the Memory Renderings pane is split, you can view two renderings side-by-side.

When you have multiple memory renderings for a memory monitor, you can set the renderings to be linked with one another. To do this, click the **Link Memory Rendering Panes** icon in the toolbar. When renderings are linked, they are synchronized with each other (for example, if you change the column size in one rendering, the column size in the other rendering will also change - or if you scroll or move the cursor in one rendering, the other rendering will scroll or follow the same cursor movement). Linking memory renderings only applies to the current **Memory** view. If you have multiple **Memory** views open, they do not link to each other.

To remove a rendering, select it in the Memory Renderings pane, right-click and choose **Remove Rendering** from the shortcut menu. When you remove all memory renderings for a monitored expression, variable, or register, the Memory Renderings pane will be populated with the memory rendering selection list. From this list, you can select the data format that you want to use for the memory rendering and click the **Add Rendering(s)** button.

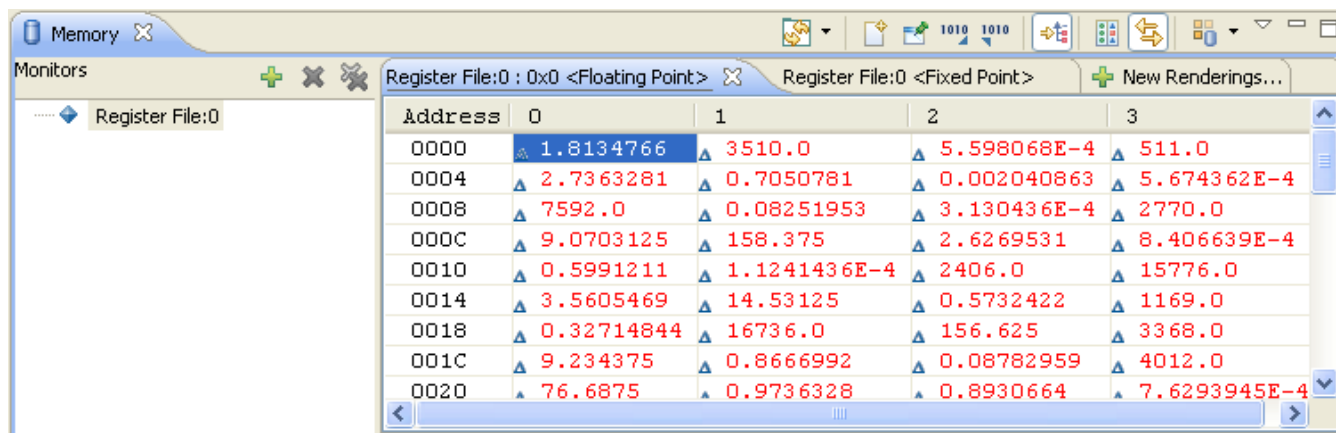


Figure 3-44. Added memory rendering

### 3.17.4 Setting memory access size

To set memory access size:

1. Open the **Memory** view, see [Opening Memory view](#).
2. Right-click on a **Memory Rendering**.

The shortcut menu appears.



3. Choose **Format** from the shortcut menu.

The **Format** dialog appears.

4. Choose a row size from the **Row Size** pop-up menu to change the number of rows displayed in the **Renderings** pane of the **Memory** view.
5. Choose a column size from the **Column Size** pop-up menu to change the number of columns.

#### NOTE

The default value for the **Column size** depends on the architecture being debugged. For example, for 32 bit architectures the default value for **Column size** is 4 and for 8 bit architectures the default value is 1. To save the newly selected values as default values, click the **Save as Defaults** button.

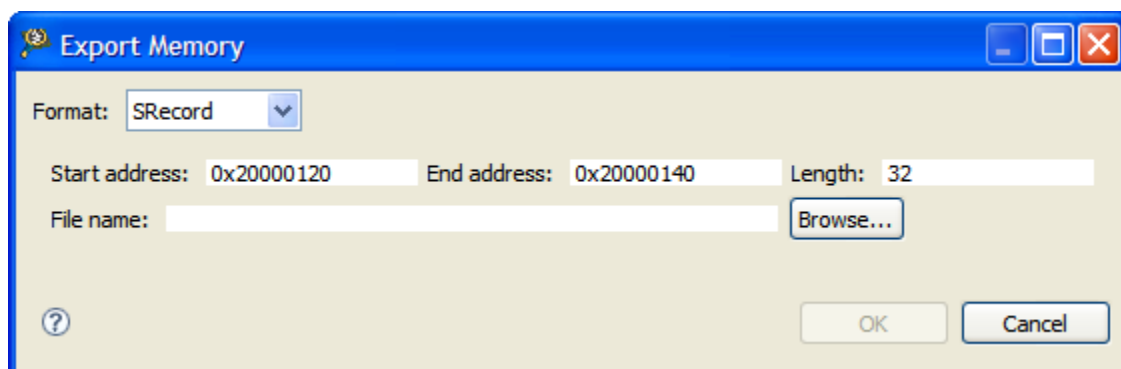
6. Click **OK**.

### 3.17.5 Exporting memory

To export memory data:

1. Open the **Memory** view, see [Opening Memory view](#).
2. Click the **Export** button in the **Memory** view toolbar.

The **Export Memory** dialog appears.



**Figure 3-45. Export Memory dialog**

- **Format** pop-up menu - Lets you choose the format in which the memory data is exported.
  - **SRecord** - Exports memory data in Motorola S-record format.

- Plain Text - Exports memory data in ASCII format.
- RAW Binary - Exports memory data in binary format.
- **Start address** textbox - Specify the start address of memory range to be exported.
- **End address** textbox - Specify the end address of the memory range to be exported.
- **Length** textbox- Displays the length of the memory range.
- **File name** textbox - Specify the file name to save the exported memory. Click the **Browse** button to select a file on your system.
- Choose memory format from the **Format** pop-up menu.
- Specify the start address of the memory range to be exported in the **Start address** textbox.
- Specify the end address of the memory range to be exported in the **End address** textbox.
- Type a file name in the **File name** textbox. Click **Browse** to select a file on your system.
- Click **OK**.

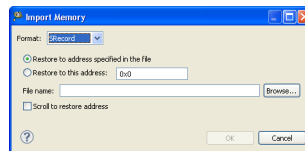
Memory data is now exported.

### 3.17.6 Importing memory

To import memory data:

1. Open the **Memory** view, see [Opening Memory view](#).
2. Click the **Import** button in the **Memory** view toolbar.

The **Import Memory** dialog appears.



**Figure 3-46. Import Memory dialog**

- **Format** pop-up menu - Allows you to choose the memory format.
- **Restore to address specified in the file** option - If selected, the imported memory is restored to the memory location specified in the memory file.
- **Restore to this address** textbox - Specify a memory address to store the imported memory. The imported memory is restored to the memory location specified in the textbox.

- **File name** textbox - Specify the file name to import memory. Click the **Browse** button to select a file from your system.
  - **Scroll to restore address** checkbox - If selected, the content in the memory view scroll to the restore point after the export operation is completed.
3. Choose memory format from the **Format** pop-up menu.
  4. Select **Restore to address specified in the file** to restore the memory to location specified in the memory file.
  5. Select **Restore to this address** option to store the memory data at the specified memory location. Type the memory location in the adjacent textbox.
  6. Type a file name in the **File name** textbox. Click **Browse** to select a file from your file system.
  7. Select the **Scroll to restore address** checkbox to scroll to restore point in memory view after the export operation is complete.
  8. Click **OK**.

The memory data is now imported.

### 3.17.7 Setting watchpoint in Memory view

To set a watchpoint using the **Memory** view:

1. Choose **Windows > Open Perspective > Debug** from the IDE menu bar to switch to the **Debug** perspective.
2. Choose **Window > Show View > Memory**.

The **Memory** view appears.

3. Select a range of bytes in the **Memory Renderings** pane of the **Memory** view.
4. Right-click and choose **Add Watchpoint (C/C++)** from the shortcut menu that appears.

### 3.17.8 Clearing watchpoints from Memory view

To clear a watchpoint from the **Memory** view:

1. Select the watchpoint expression in the **Breakpoints** view.
2. Click the **Remove Selected Breakpoints** button.

To clear *all* watchpoints from the **Memory** view:

1. Open the **Breakpoints** view.
2. Choose **Run > Remove all Breakpoints** or click the **Remove All Breakpoints** button in the **Breakpoints** view .

**NOTE**

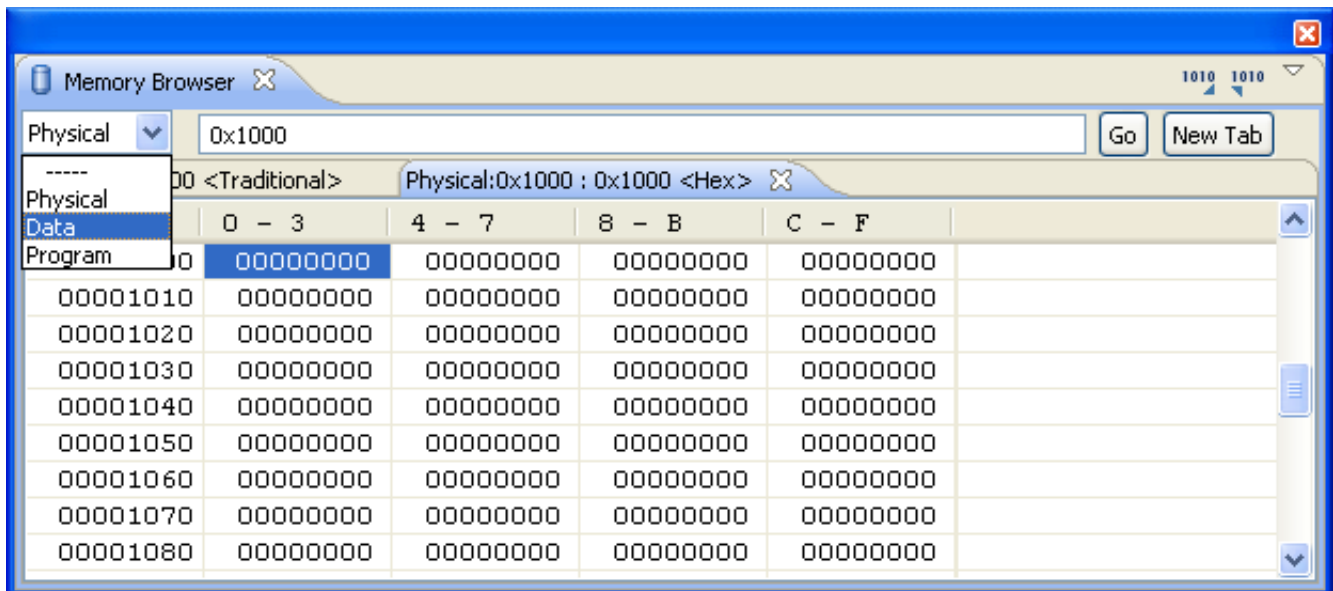
All watchpoints clear automatically when the target program terminates or the debugger terminates the program. Your watchpoints are reset the next time the program runs.

The watchpoint is cleared from memory view.

### 3.18 Memory Browser view

The **Memory Browser** view lets you monitor your process memory. This view also helps you browse through the memory rendering. You can specify a memory space along the address to browse for.

To open the **Memory Browser** view, click the **Memory Browser** tab in the **Debug** perspective. Alternatively, from the IDE menu bar, choose **Window > Show View > Memory Browser**.



**Figure 3-47. Memory Browser view**

To browse to a desired memory location, type the memory address in the **Memory Address** textbox and click the **Go** button. The memory location is highlighted in the **Memory Browser** view.

### NOTE

If you do not select a memory space and the expression does not contain a memory space then the memory space is set to default data memory space that is specific for each architecture.

If you want to translate the memory address or the expression to another memory space, choose one of the following values from the Memory space pop-up menu.

- Physical - Indicates that the specified address or expression refers to physical memory space.
- Data - Indicates that the specified address or expression refers to data memory space.
- Program - Indicates that the specified address or expression refers to program memory space.

## 3.19 Memory Management Unit configurator

The CodeWarrior Memory Management Unit (MMU) configurator allows different user tasks or programs (usually in the context of an RTOS) to use the same areas of memory. To use the MMU configurator, you set up a mapping for data and instruction addresses, then enable address translation. The mapping links virtual addresses to physical addresses. Translation occurs before software acts on the addresses.

The MMU configurator simplifies peripheral-register initialization of the MMU registers. You can use the tool to generate code that you can insert into a program. The inserted code initializes an MMU configuration or writes to the registers on-the-fly. Also, you can use the MMU configurator to examine the status of the current MMU configuration.

Use the MMU configurator to:

- configure MMU general control registers
- configure MMU program memory-address-translation properties
- configure MMU data memory-address-translation properties
- display the current contents of each register
- write the displayed contents from the MMU configurator to the MMU registers
- save to a file (in a format that you specify) the displayed contents of the MMU configurator

This chapter has these sections:

- [Creating MMU configuration](#)
- [Saving MMU Configurator settings](#)
- [MMU Configurator toolbar](#)
- [MMU Configurator pages](#)
- [Opening MMU Configurator view](#)

### 3.19.1 Creating MMU configuration

To use the MMU configurator, you must create an MMU configuration. To create the configuration:

1. From the main menu bar, choose **File > New > Other**.

The **New** wizard appears.

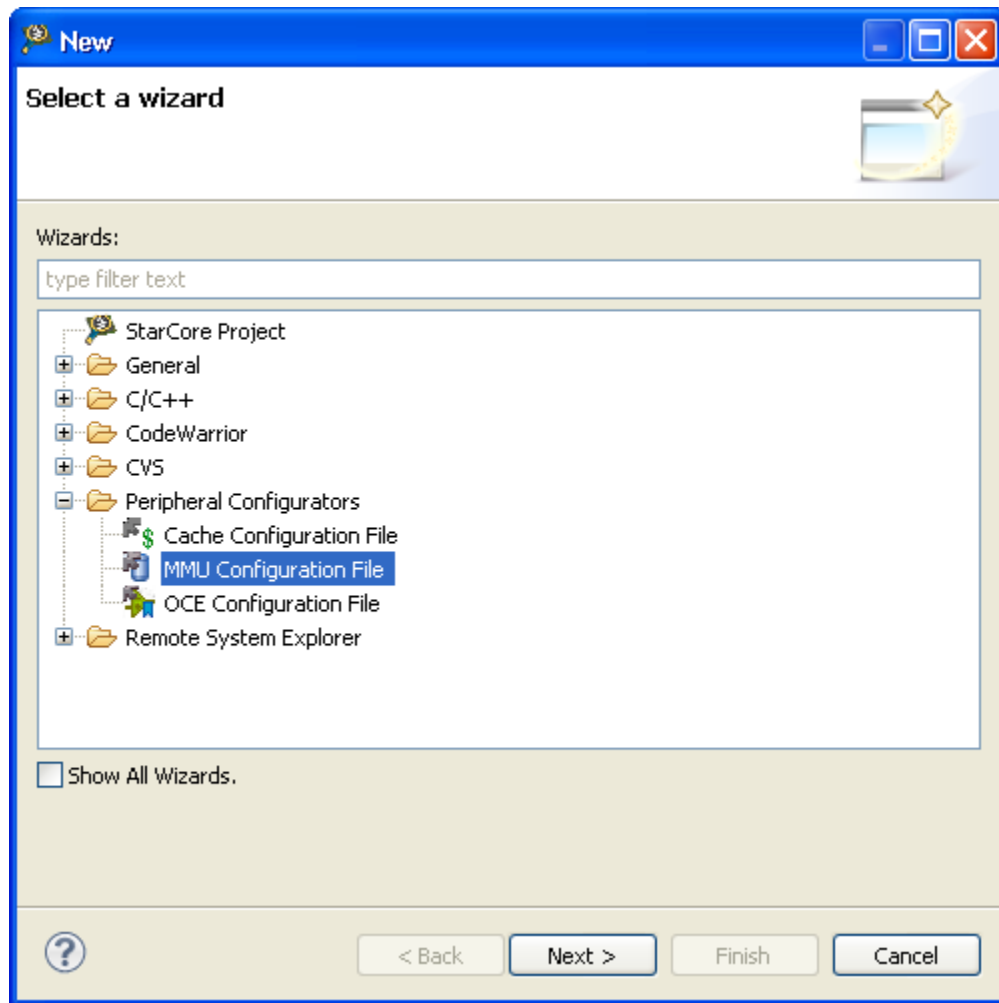
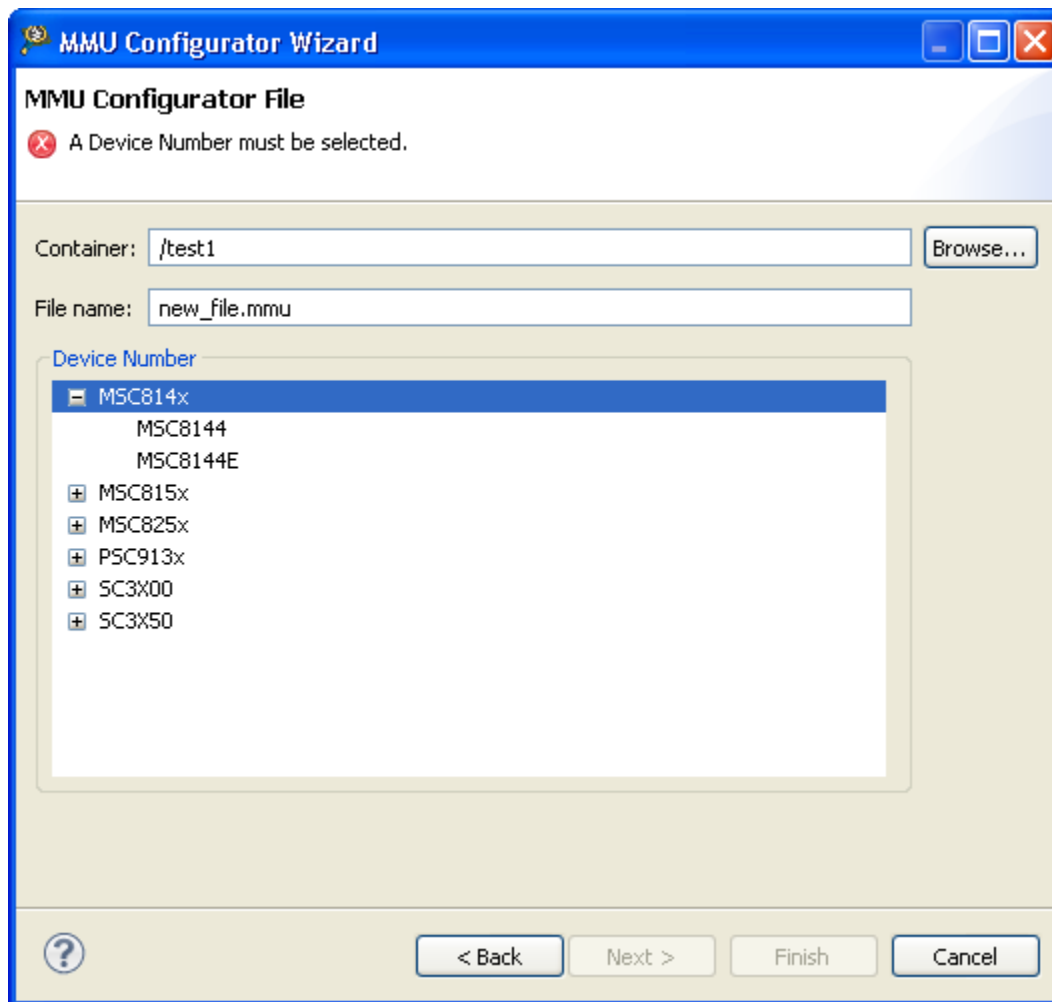


Figure 3-48. New wizard - MMU configuration

2. Choose **Peripheral Configurators > MMU Configuration File**.
3. Click **Next**.

The **MMU Configurator File** page appears.



**Figure 3-49. MMU Configurator File page**

4. Enter in the **Container** textbox the path to the directory in which you want to store the MMU configuration. Alternatively, click **Browse** and use the resulting dialog to specify the directory.
5. Enter in the **File name** textbox a name for the MMU configuration. Alternatively, leave the default name intact.

#### **NOTE**

If you enter a new name, make sure to preserve the `.mmu` filename extension.

6. Expand **Device Number**, and select the target hardware for which you are creating the MMU configuration. (**SC3x50**)
7. Click **Finish**.

The IDE generates the MMU configuration file in the specified container directory and opens the **MMU Configuration File Editor** view.

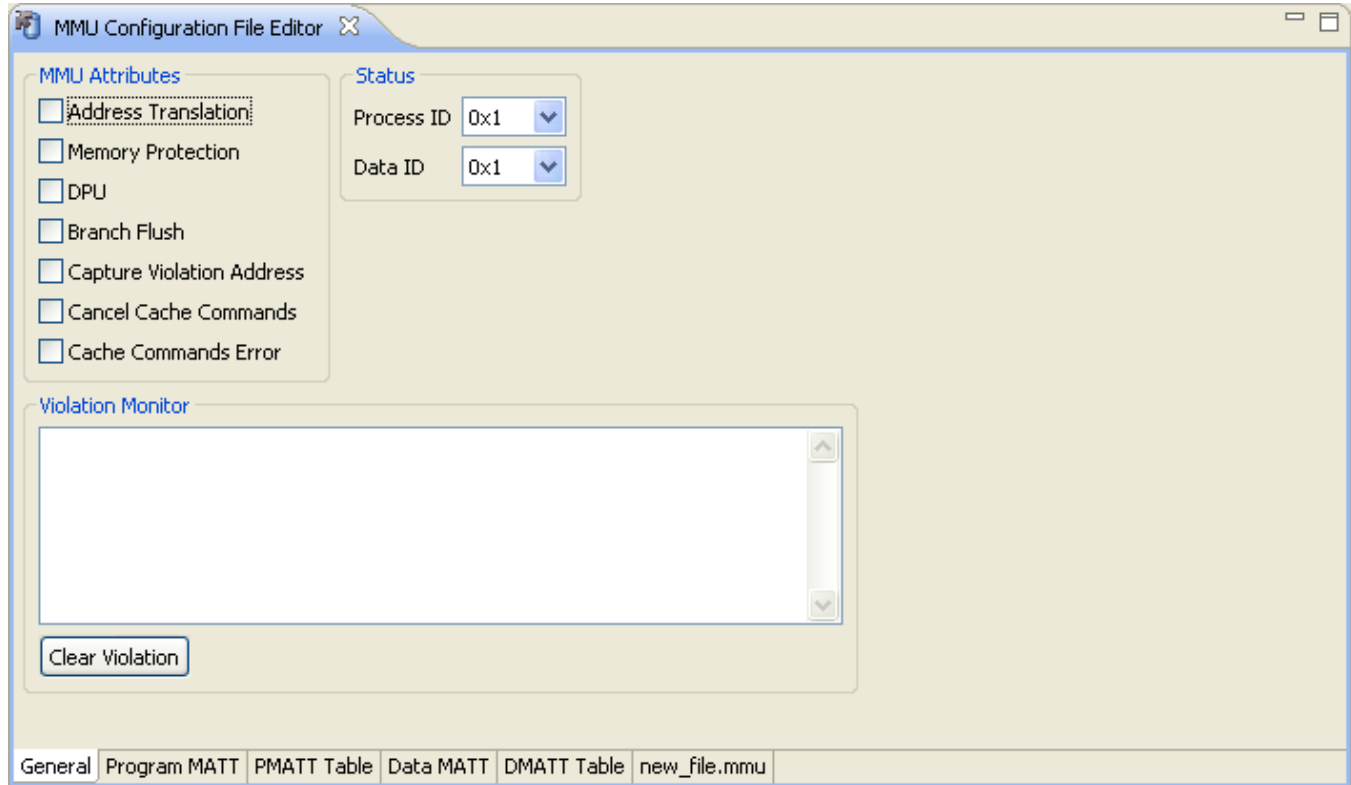


Figure 3-50. MMU Configuration File Editor view

### 3.19.2 Saving MMU Configurator settings

Each time you change a setting on a page of the MMU configurator, you create a pending (unsaved) change. In order to commit those pending changes, you must save the MMU configurator settings to a file. An asterisk (\*) appears to the left of the **MMU Configuration File Editor** tab text to indicate that the MMU configurator still has pending changes among its pages.

To save to a file the current settings on each page of the **MMU Configuration File Editor** view:

1. Click the **MMU Configuration File Editor** tab.

The corresponding view becomes active.

2. From the main menu bar, choose **File > Save**.








The IDE saves to a file the pending changes to each page of the MMU configurator.

### 3.19.3 MMU Configurator toolbar

The MMU Configurator has an associated toolbar. Depending on how you open the MMU configurator, this toolbar appears either in the main IDE toolbar, or in the MMU configurator view toolbar. The following table explains each toolbar button.

**Table 3-14. MMU configurator toolbar buttons**

Name	Icon	Explanation
Save C Source		Save the generated C code to a new .c file.
Save ASM Source		Save the generated Assembly code to a new .asm file.
Save TCL Source		Save the generated TCL script to a new .tcl file.
Read Target Registers		Updates the content of the MMU Configuration File Editor pages to reflect the current values of the target hardware registers.
Write Target Registers		Writes the modified content of all the MMU Configuration File Editor pages. You must click this button, or use the corresponding toolbar menu command to write the MMU Configurator modifications to the target hardware registers.

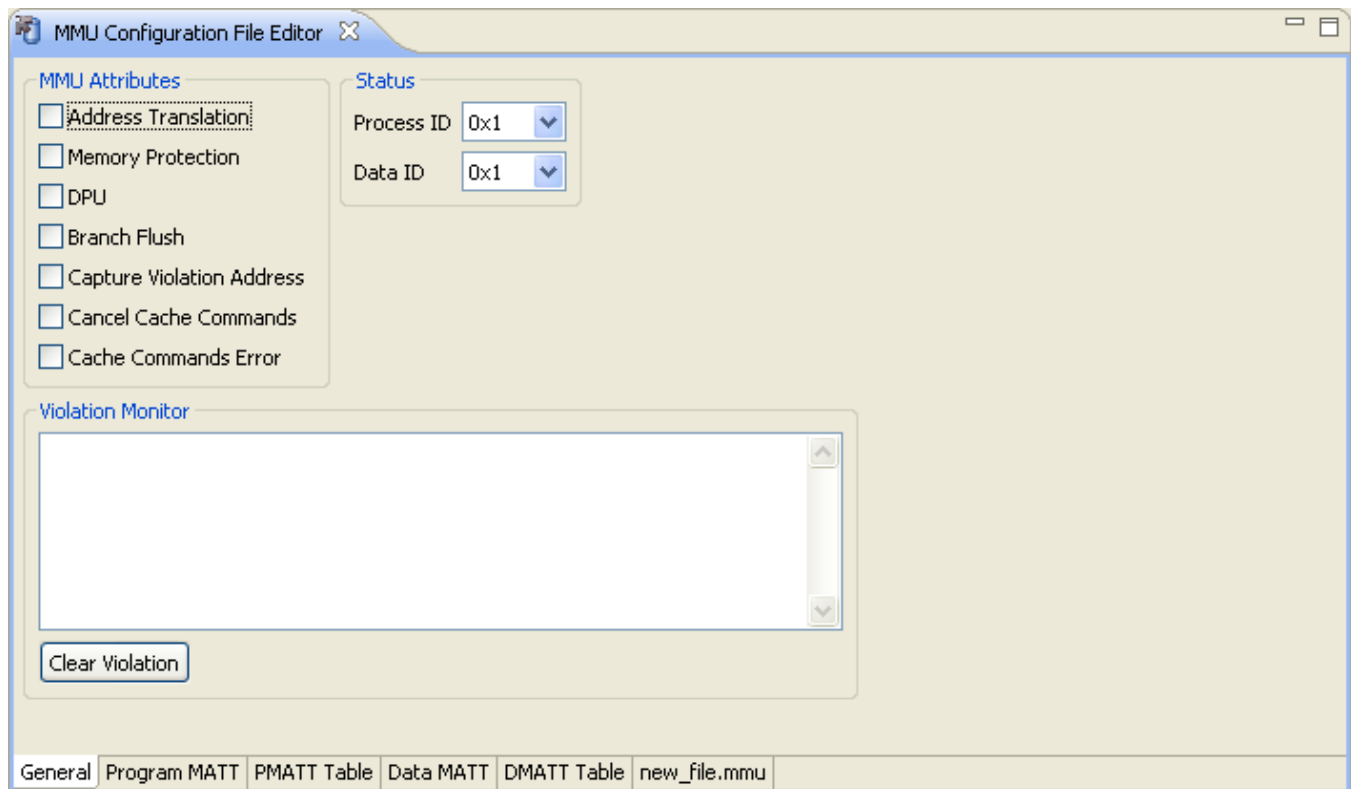
### 3.19.4 MMU Configurator pages

This section explains each MMU configurator page. You use these pages to configure MMU mapping and translation properties. The MMU configurator's tabbed interface displays pages for configuration options and pages for generated code.

#### 3.19.4.1 General page

Use the **General** page to configure the overall MMU properties.

## Memory Management Unit configurator



**Figure 3-51. MMU Configuration File Editor- General page**

The following table explains options on the **General** page.

**Table 3-15. General page settings**

Page Item	Explanation
Address Translation	Selected - Allows address translation. For example, translation occurs from a virtual address to a physical address. Deselected - Disables address translation. For example, translation does not occur from a virtual address to a physical address. This checkbox corresponds to the Address Translation Enable (ATE) bit of the MMU Control Register (M_CR).
Memory Protection	Selected - Allows protection checking for all enabled segment descriptors. With this checkbox selected, the system consumes more power. Deselected - Disables protection checking for all enabled segment descriptors. With this checkbox deselected, the system consumes less power. This checkbox corresponds to the Memory Protection Enable (MPE) bit of the MMU Control Register (M_CR).
DPU	Selected - Allows the Debug and Profiling Unit (DPU). Deselected - Disables the DPU. With this checkbox deselected, DPU registers are disabled for read and write accesses. This checkbox corresponds to the Debug and Profiling Unit Enable (DPUE) bit of the MMU Control Register (M_CR).
Branch Flush	Selected - Allows automatic branch-target buffer flush. Deselected - Disables automatic branch-target buffer flush.

*Table continues on the next page...*

**Table 3-15. General page settings (continued)**

Page Item	Explanation
Cancel Cache Commands	Selected - Cancels the cache command for program and data except for DFLUSH and DSYNC. This checkbox is not available for MSC8144 target device.
Capture Violation Address	Selected - Includes the address at which the violation occurred. Deselected - Does not include the address at which the violation occurred.

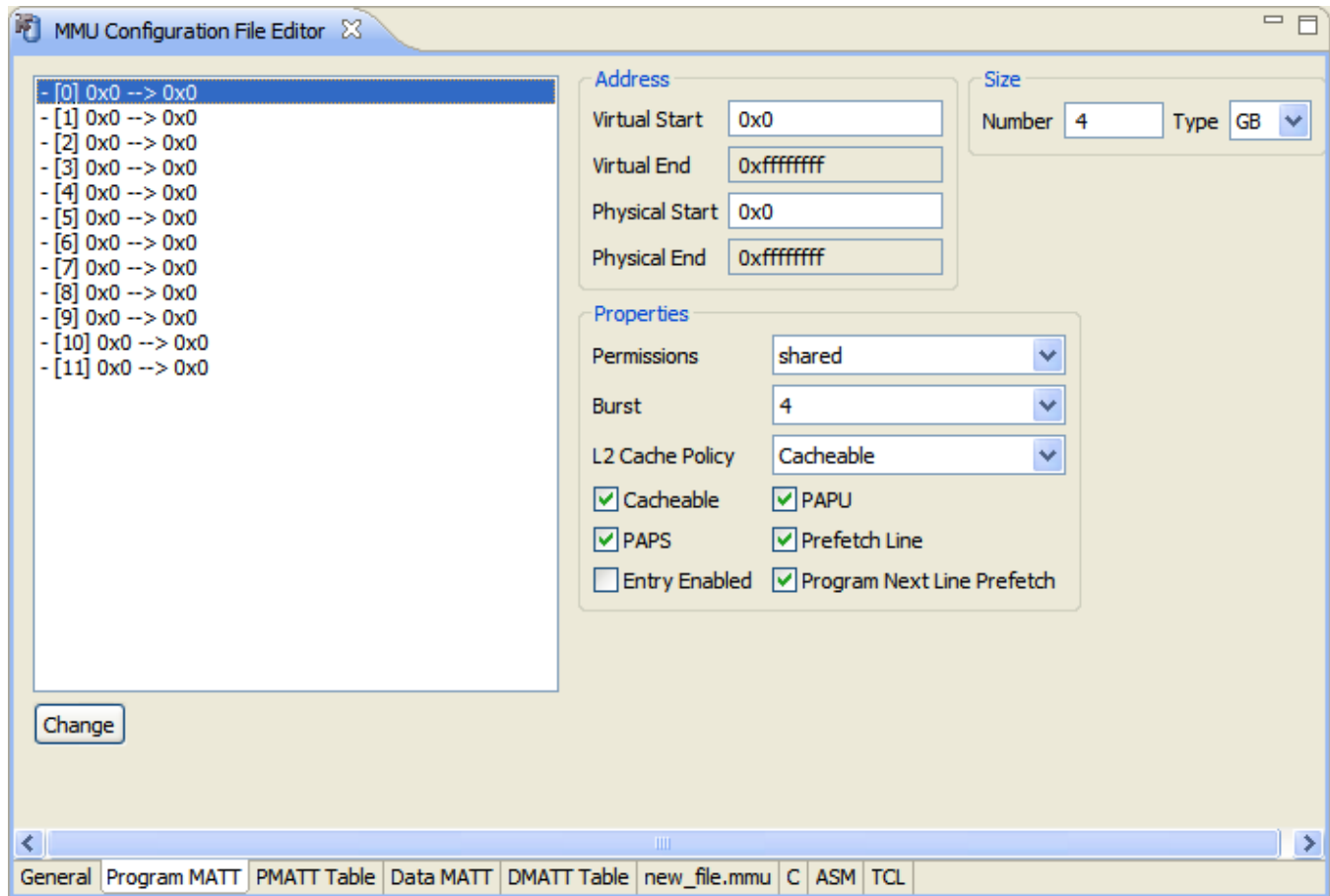
### 3.19.4.2 Program MATT page

Use the **Program MATT** page ( [Figure 3-52](#)) to define and display program memory-space mappings (virtual-to-physical address mappings) for the StarCore DSP. The MMU configurator generates the appropriate descriptors for the program memory-address translation table (MATT).

Each memory-space mapping has a corresponding entry in the list on the left-hand side of the Program MATT page. Each entry shows an abbreviated expression which summarizes the settings on the right-hand side of the page. A plus sign to the left of an entry indicates an enabled mapping, and a minus sign indicates a disabled mapping.

To change an entry, select it from the left-hand side of the page, then use the Address, Size, and Properties settings to specify options that the MMU configurator verifies as a group. Click the **Change** button to assign the specified options to the selected entry. To cancel your changes, select another entry from the left-hand side of the page, without clicking the **Change** button.

## Memory Management Unit configurator



**Figure 3-52. MMU Configuration File Editor - Program MATT page**

The following table explains each option on the **Program MATT** page.

**Table 3-16. Program MATT page settings**

Option	Explanation
Virtual	Enter the virtual base address of the program segment. This option corresponds to the Program Segment Virtual Base Address and Size (PSVBAS) bits of the Program Segment Descriptor Registers A (M_PSDAx) that configure the virtual base address.
Physical	Enter the most-significant part of the physical address to use for translation. This option corresponds to the Data Segment Physical Base Address (DSPBA) bits of the Data Segment Descriptor Registers B (M_DSDBx)."
Size	Specify the PMATT Units number in Number box. Select the PMATT Units type from the <b>Type</b> pop-up menu: B, KB, MB, GB
Permissions	Specify whether to share the program segment. This option corresponds to the System/Shared Virtual Program Memory (SSVPM) bit of the Program Segment Descriptor Registers A (M_PSDAx).

*Table continues on the next page...*

Table 3-16. Program MATT page settings (continued)

Option	Explanation
Burst	Specify the number of transactions (beats) on the bus that the bus controller cannot interrupt. This burst size applies in the region to a cacheable segment. This option corresponds to the Program Burst Size (PBS) bits of the Program Segment Descriptor Registers B (M_PSDBx).
L2 Cache Policy	Determines the cache policy for the L2 cache for accesses from the core through L1 Instruction cache: Cacheable, NonCacheable, and Reserved. The pop-up menu has two Reserved values. This is because the L2 Cache Policy Values is stored on 2 bits so they are 4 possible values (2 valid and 2 reserved). Every entry in the combo box corresponds to a combination of bits.
Cacheable	Selected - Allows caching of the segment in instruction cache. Deselected - Disables caching of the segment in instruction cache. This checkbox corresponds to the Instruction Cacheability (IC) bit of the Program Segment Descriptor Registers A (M_PSDAx).
PAPS	Selected - The segment has supervisor-level fetch permission for program accesses. If you select the PAPU checkboxes well, you disable program-protection checks for this segment. Deselected - The segment does not have supervisor-level fetch permission for program accesses. This checkbox corresponds to the Program Access Permission in Supervisor Level (PAPS) bit of the Program Segment Descriptor Registers A (M_PSDAx).
Entry Enabled	Selected - The MMU enables this mapping entry. Deselected - The MMU disables this mapping entry.
PAPU	Selected - The segment has user-level fetch permission for program accesses. If you select the PAPS checkbox as well, you disable program-protection checks for this segment. Deselected - The segment does not have user-level fetch permission for program accesses. This checkbox corresponds to the Program Access Permission in User Level (PAPU) bit of the Program Segment Descriptor Registers A (M_PSDAx).
Prefetch Line	Selected - Allows the fetch unit's program-line pre-fetch to a segment cacheable in instruction cache. Deselected - Disables the fetch unit's program-line prefetch to a segment cacheable in instruction cache. This checkbox corresponds to the Program Pre-fetch Line Enable (PPFE) bit of the Program Segment Descriptor Registers B (M_PSDBx).
Program Next Line Prefetch	Selected - Allows the fetch unit's program next line pre-fetch mechanism to an ICache cacheable segment. Deselected - Enables the fetch unit's program next line pre-fetch mechanism to an ICache cacheable segment.

The **PMATT Table** page ( [Figure 3-53](#)) shows an alternate, tabular rendering of the settings that you specify on the **Program MATT** page. Use this page to view the configuration of all **Program MATT** mappings. The MMU configurator uses the settings that you specify on the **Program MATT** page to generate the column headers of this page. The table data shows the validated records for each **Program MATT** entry. You

can resize the table columns to hide columns or view the larger data fields. A plus sign ( + ) in a table cell represents a selected checkbox in the associated **Program MATT** configuration page.

**NOTE**

The **PMATT Table** page shows just a tabular summary of the settings that you specify on the **Program MATT** page. To make changes, use the **Program MATT** page.

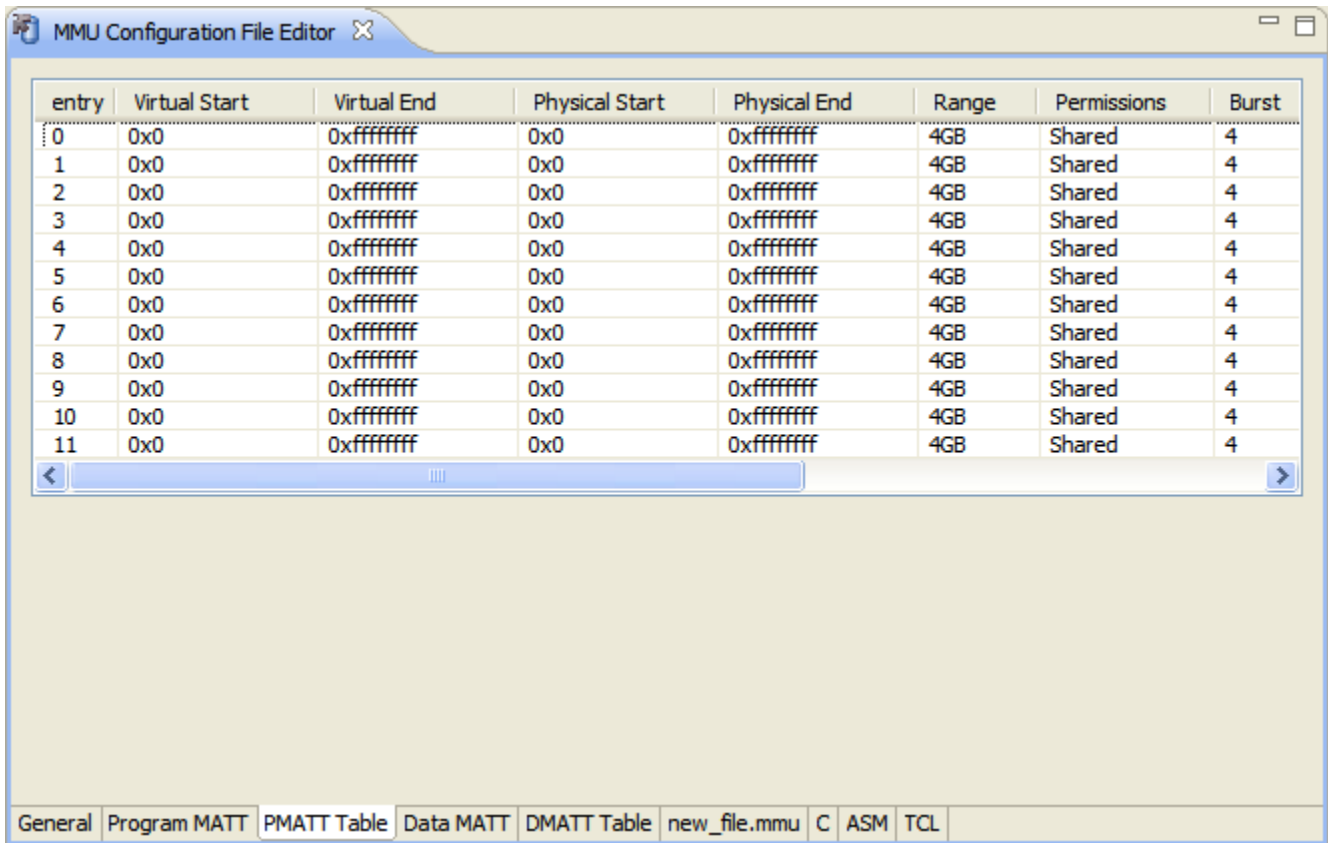


Figure 3-53. MMU Configuration File Editor - PMATT Table page

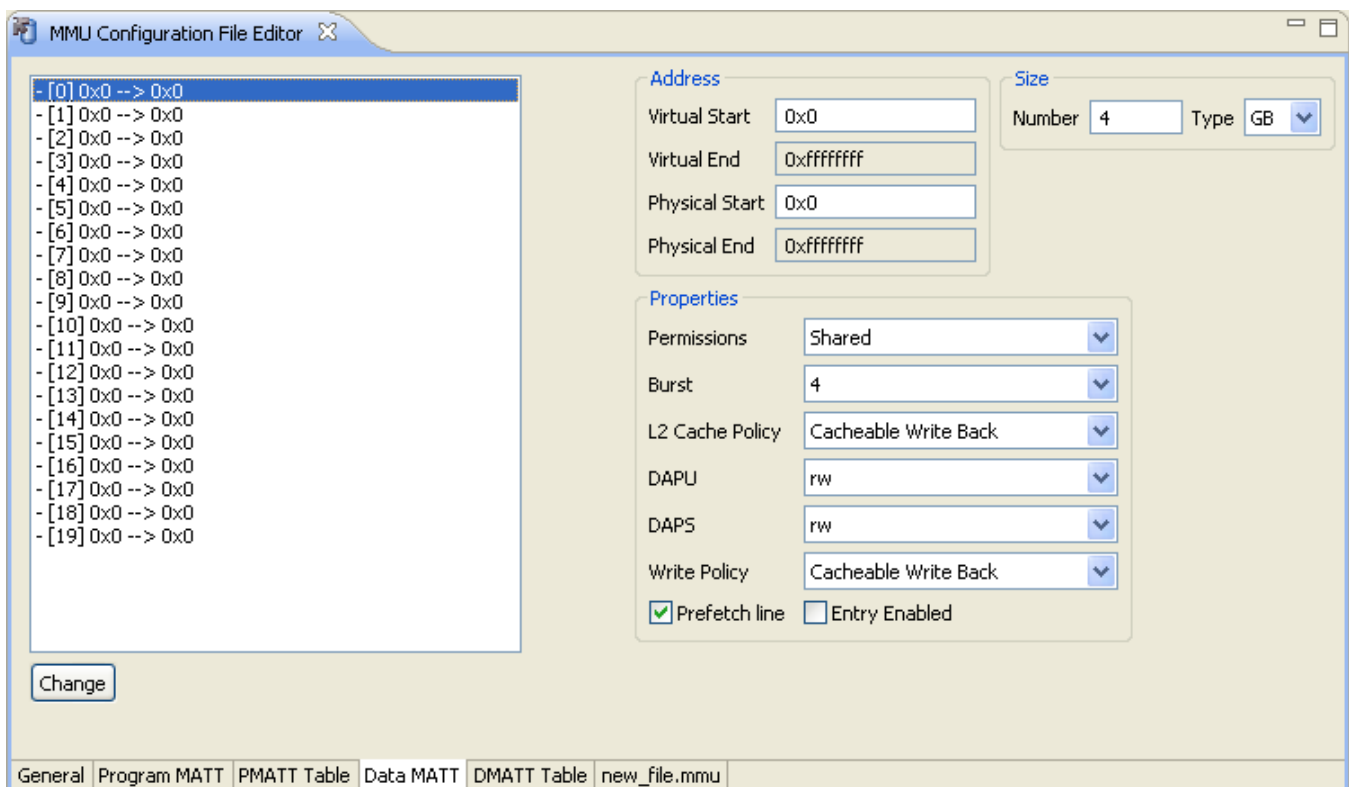
### 3.19.4.3 Data MATT page

Use the **Data MATT** page to define and display data memory-space mappings (virtual-to-physical address mappings) for the **StarCore DSP**. The MMU configurator generates the appropriate descriptors for the data memory-address translation table (MATT).

Each memory-space mapping has a corresponding entry in the list on the left-hand side of the **Data MATT** page. Each entry shows an abbreviated expression which summarizes the settings on the right-hand side of the page. A plus sign to the left of an entry indicates an enabled mapping, and a minus sign indicates a disabled mapping.

To change an entry, select it from the left-hand side of the page, then use the **Address**, **Size**, and **Properties** settings to specify options that the MMU configurator verifies as a group. Click the **Change** button to assign the specified options to the selected entry. To cancel your changes, select another entry from the left-hand side of the page, without clicking the **Change** button.

The following figure shows the **Data MATT** page.



**Figure 3-54. MMU Configuration File Editor - Data MATT page**

The following table explains each option on the **Data MATT** page

**Table 3-17. Data MATT page settings**

Option	Explanation
Virtual	Enter the virtual base address of the data segment. This option corresponds to the Data Segment Virtual Base Address and Size (DSVBAS) bits of the Data Segment Descriptor Registers A (M_DSDAx) that configure the virtual base address.

*Table continues on the next page...*

**Table 3-17. Data MATT page settings (continued)**

Option	Explanation
Physical	Enter the most-significant part of the physical address to use for translation. The value that you specify determines the size of the most- significant part. This option corresponds to the Data Segment Physical Base Address (DSPBA) bits of the Data Segment Descriptor Registers B (M_DSDBx).
Size	Specify the PMATT Units number in Number box. Select the PMATT Units type from the pop-up menu: B, KB, MB, GB
Permissions	Specify whether to share the data segment: shared and non-shared This option corresponds to the Supervisor/Shared Virtual Data Memory (SSVDM) bit of the Data Segment Descriptor Registers A (M_DSDAx).
Burst	Specify the number of transactions (beats) on the bus that the bus controller cannot interrupt. This burst size applies in the region to a cacheable segment. This option corresponds to the Data Burst Size (DBS) bits of the Data Segment Descriptor Registers B (M_DSDBx).
L2 Cache Policy	Determines the cache policy for the L2 cache for accesses from the core through L1 Data Cache: Cacheable write through, Cacheable write-back, Non-cacheable, and Adaptive write.
DAPU	Specify whether to allow user-level read (-r-), write (-w), both (rw), or neither(--) types of data access. This option corresponds to the Data Access Permission in User Level (DAPU) bits of the Data Segment Descriptor Registers A (M_DSDAx).
DAPS	Specify whether to allow supervisor-level read (-r-), write (-w), both (rw), or neither (--) types of data access. This option corresponds to the Data Access Permission in Supervisor Level (DAPS) bits of the Data Segment Descriptor Registers A (M_DSDAx).
Write Policy	Specify the policy to use for data writes and cache: <ul style="list-style-type: none"> <li>• Cacheable write through-Writes are buffered in the write queue (WRQ) and goes both to the cache and to the higher-level memory. The write-through is a non-write allocate, and a cacheable write-through access is not updated in the cache unless there is a hit.</li> <li>• Cacheable write back-writes are buffered in the write queue (WRQ) and goes through the DCache and the write back buffer (WBB). The information is written to the VBR in the cache only. The modified cache VBR is written to higher-level memory only when it is replaced. The resulting WBB is combined with a write-allocate write-miss policy in which the required VBR is loaded to cache when a write-miss occurs.</li> <li>• Non Cacheable write through-writes are buffered in the WRQ and goes through the write through buffer (WTB) to the higher-level memory</li> <li>• Non-cacheable write-through destructive area-writes are buffered in the WRQ and goes through the write through buffer (WTB) to the higher-level memory. Speculative read accesses are blocked in the platform level and does not goes to a higher level memory.</li> </ul>

*Table continues on the next page...*



**Table 3-17. Data MATT page settings (continued)**

Option	Explanation
Prefetch Line	Selected - Enables the fetch unit's data-line prefetch to a segment cacheable in data cache. Deselected - Disables the fetch unit's data-line prefetch to a segment cacheable in data cache. This checkbox corresponds to Data Pre-fetch Line Enable (DPFE) bit of the Data Segment Descriptor Registers B (M_DSDBx).
Entry Enabled	Selected - The MMU enables this mapping entry. Deselected - The MMU disables this mapping entry.

entry	Virtual Start	Virtual End	Physical Start	Physical End	Range	Permissions	Burst
0	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
1	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
2	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
3	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
4	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
5	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
6	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
7	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
8	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
9	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
10	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
11	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
12	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
13	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
14	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
15	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
16	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
17	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
18	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4
19	0x0	0xffffffff	0x0	0xffffffff	4GB	Shared	4

General Program MATT PMATT Table Data MATT DMATT Table new\_file.mmu C ASM TCL

**Figure 3-55. MMU Configuration File Editor - Data MATT Table page**

The **DMATT Table** page ( [Figure 3-55](#)) shows an alternate, tabular rendering of the settings that you specify on the **Data MATT** page. Use this page to view the configuration of all Data MATT mappings. The MMU configurator uses the settings that you specify on the Data MATT page to generate the column headers of this page. The table data shows the validated records for each **Data MATT** entry. You can resize the table columns to hide columns or view the larger data fields. A plus sign ( + ) in a table cell represents a selected checkbox in the associated **Data MATT** configuration page.

**NOTE**

The **DMATT Table** page shows the summary of the settings that you specify on the **Data MATT** page in the tabular format. To changes these settings, use the **Data MATT** page.

**3.19.4.4 Saving MMU configurator generated code**

In this section:

- [Saving generated C code](#)
- [Saving generated assembly code](#)
- [Saving generated TCL script](#)

**3.19.4.4.1 Saving generated C code**

The generated C code is unique for different targets. Follow these steps to save the C code generated by the MMU Configuration File Editor:

1. From the CodeWarrior IDE menu bar, choose **MMU Editor > Save C** to save the generated C code. Alternatively, click the corresponding toolbar buttons in the MMU Configurator toolbar.

A standard **Save** dialog appears.

2. Specify the filename in the **File name** textbox and click **Save** to save the generated code as a new file.

**NOTE**

The **MMU Configuration File Editor** regenerates the C code when you change settings in the configuration pages or when you click **Change** on the **Program MATT** or **Data MATT** pages.

**3.19.4.4.2 Saving generated assembly code**

The generated Assembly (ASM) code is unique for different targets. Follow these steps to save the ASM code generated by the MMU Configuration File Editor:

1. From the **CodeWarrior IDE** menu bar, choose **MMU Editor > Save ASM** to save the generated Assembly code. Alternatively, click the corresponding toolbar buttons in the MMU Configurator toolbar.

A standard **Save** dialog appears.

2. Specify the name of the file in the **File name** textbox and click **Save** to save the generated code as a new file.

#### **NOTE**

The **MMU Configuration File Editor** regenerates the Assembly code when you change settings in the configuration pages or when you click **Change** on the **Program MATT** or **Data MATT** pages.

#### **3.19.4.4.3 Saving generated TCL script**

The generated TCL script can be executed within the Debugger Shell view, or the Debugger Shell can execute the generated TCL script as an initialization script for the target hardware. The generated TCL script is unique for different targets.

Follow these steps to save the TCL script generated by the MMU Configuration File Editor:

1. From the **CodeWarrior IDE** menu bar, choose **MMU Editor > Save TCL** to save the generated TCL script. Alternatively, click the corresponding toolbar buttons in the MMU Configurator toolbar.

A standard **Save** dialog appears.

2. Specify the filename in the **File name** textbox and click **Save** to save the generated code as a new file.

#### **NOTE**

The **MMU Configuration File Editor** regenerates the TCL script when you change settings in the configuration pages or when you click **Change** on the **Program MATT** or **Data MATT** pages.

#### **3.19.5 Opening MMU Configurator view**

Using the New window to create an MMU configuration is just one way to work with MMU. Alternatively, you can open the **MMU Configurator** view, such as during a debugging session. You can use this view to examine the current state of a thread's MMU configuration during the course of the debugging session. Also, you can detach the **MMU Configurator** view into its own floating window and reposition that window into other collections of views.

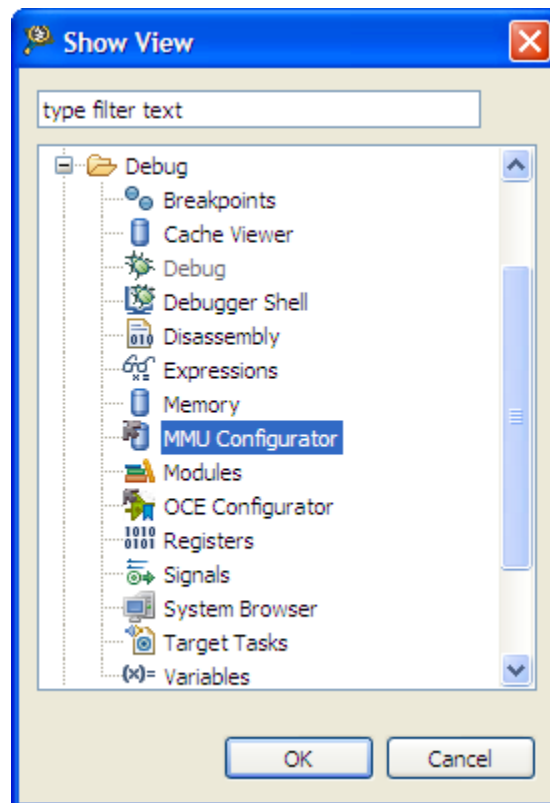
### NOTE

Because the MMU configurator view does not have an associated configuration file initially, the MMU tab appears in place of the tab that shows the name of the configuration file. Saving the **MMU Configurator** view settings to a file (by choosing **File > Save** ) replaces the MMU tab with the name of the saved configuration file.

To open the **MMU Configurator** view:

1. Start a debugging session.
2. In the **Debug** view of the **Debug** perspective, select the process for which you want to work with MMU.
3. Choose **Window > Show View > Other** from the IDE menu bar.

The **Show View** dialog appears.



**Figure 3-56. Show View dialog - MMU Configurator**

4. Expand **Debug** group, and choose **MMU Configurator** .
5. Click **OK**.

The **MMU Configurator** view appears, attached to an existing collection of views in the current perspective.

You just finished opening the **MMU Configurator** view. You can right-click the **MMU Configurator** tab to choose the menu command that detaches the view into a floating window. Also, you can drag the **MMU Configurator** tab to a different collection of view tabs.

## 3.20 Multicore debugging

The debugger allows simultaneous debugging of multiple projects. This feature provides multi-core debugging capability for some embedded processors. By configuring each project to operate on a single core, the debugger can debug multiple cores by debugging multiple projects.

**NOTE**

CodeWarrior for Microcontrollers v10.x does not support debugging multiple projects on multiple cores in the same multi-core target. CodeWarrior for Microcontrollers v10.x supports creating and/or debugging Single Multi Processing (SMP) projects.

Configuring multi-core debugging involves these tasks:

- creating a project for each core
- configuring specific target settings for each project
- for some cores, specifying a configuration file for initializing multi-core debugging

You can use either the user interface or the **Debugger Shell** to perform multicore operations. In the user interface, you can access multicore operations from these locations in the **Debug** perspective:

- Run menu
- Debug view shortcut menu
- Debug view toolbar
- Debug view toolbar pop-up menu

### 3.20.1 Multicore Suspend

To suspend execution of a core:

1. Enable multicore groups for multicore operations (see [Multicore Groups](#)).
2. In the **Debug** view, select a thread that corresponds to a core for bareboard debugging.
3. Click **Multicore Suspend**.

Alternatively, in the **Command-Line Debugger Shell**, select a thread using the `switchtarget` command and then use the `mc::stop` command to suspend execution of a core during a debugging session.

**NOTE**

If **Use all cores** is enabled, then all cores in the processor are suspended. Otherwise, if the core is in a multicore group, then all cores in the multicore group are suspended. In either case, cores that are not being debugged can still be affected by the command. If this is not the desired behavior, then reconfigure your multicore groups.

## 3.20.2 Multicore Resume

To resume execution of a core:

1. Enable multicore groups for multicore operations (see [Multicore Groups](#)).
2. In the **Debug** view, select a thread that corresponds to a core for bareboard debugging.
3. Click **Multicore Resume**.

Alternatively, in the **Command-Line Debugger Shell**, select a thread using the `switchtarget` command and then use the `mc::go` command to resume execution of a core during a debugging session.

### NOTE

If **Use all cores** is enabled, all cores in the processor are resumed. Otherwise, if the core is in a multicore group then all cores in the Multicore Group are resumed. In either case, note that cores that are not being debugged can still be affected by the command. If this is not the desired behavior, reconfigure your multicore groups.

## 3.20.3 Multicore Terminate

To terminate execution of a core:

1. Enable multicore groups for multicore operations (see [Multicore Groups](#)).
2. In the **Debug** view, select a thread that corresponds to a core for bareboard debugging.
3. Click **Multicore Terminate**.

Alternatively, in the **Command-Line Debugger Shell**, select a thread using the `switchtarget` command and then use the `mc::kill` command to terminate execution of a core during a debugging session.

### NOTE

If **Use all cores** is enabled then all Debug Threads for the processor will be terminated. Otherwise, if the core is in a multicore group then all threads corresponding to the cores in the multicore group will be terminated.

### 3.20.4 Multicore Restart

To restart execution of a core:

1. Enable multicore groups for multicore operations (see [Multicore Groups](#)).
2. In the **Debug** view, select a thread that corresponds to a core for bareboard debugging.
3. Click **Multicore Restart**.

Alternatively, in the **Command-Line Debugger Shell**, select a thread using the `switchtarget` command and then use the `mc::restart` command to restart execution of a core during a debugging session.

### 3.21 Multicore Groups

The multicore grouping feature helps you define multiple arbitrary groupings of cores and then perform multicore operations on the groups. Clicking the **Multicore Groups** button in the **Debug** view toolbar allows you to create new multicore groups, see [Creating multicore group](#). For more information on multicore debugging, see [Multicore debugging](#).

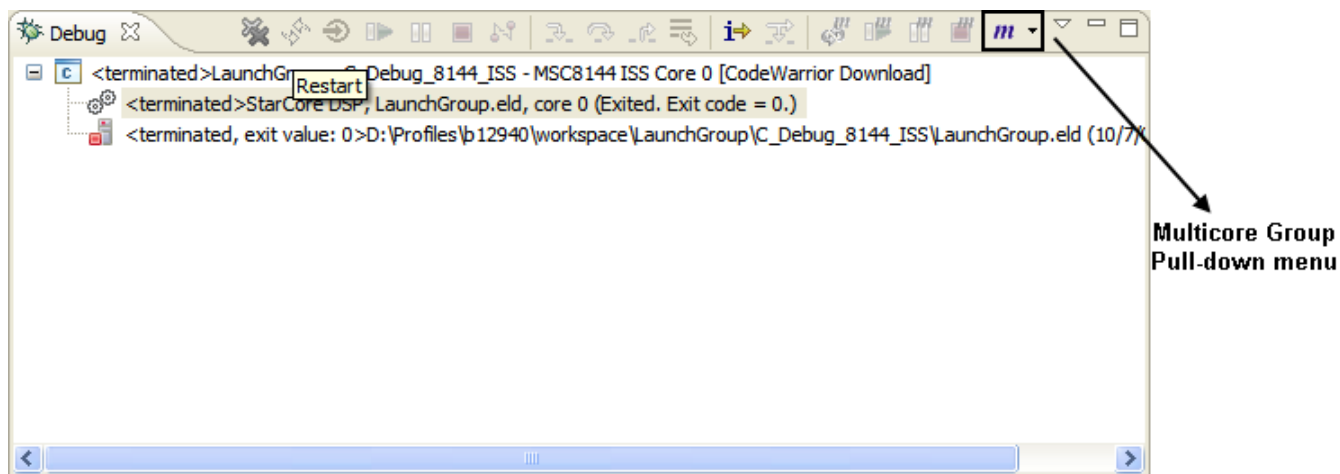


Figure 3-57. Multicore Groups

The **Multicore Groups** pop-up menu provides the following options:

- **Use All Cores** - If the selected debug context is a multicore system, then all cores are used for multicore operations.



- **Disable Halt Groups** - Disables breakpoint halt groups, see [Multicore breakpoint halt groups](#).
- **Limit new breakpoints to current group** - If selected, all new breakpoints set during a debug session are reproduced only on cores belonging to the group of the core on which the breakpoint is set.
- **Edit Target Types** - Opens the **Target Types** dialog to add or remove target types, see [Editing multicore group](#).
- **Edit Multicore Groups** - Opens the **Multicore Groups** dialog to create multicore groups, see [Creating multicore group](#). You can also use this option to modify existing multicore groups, see [Modifying multicore group](#).

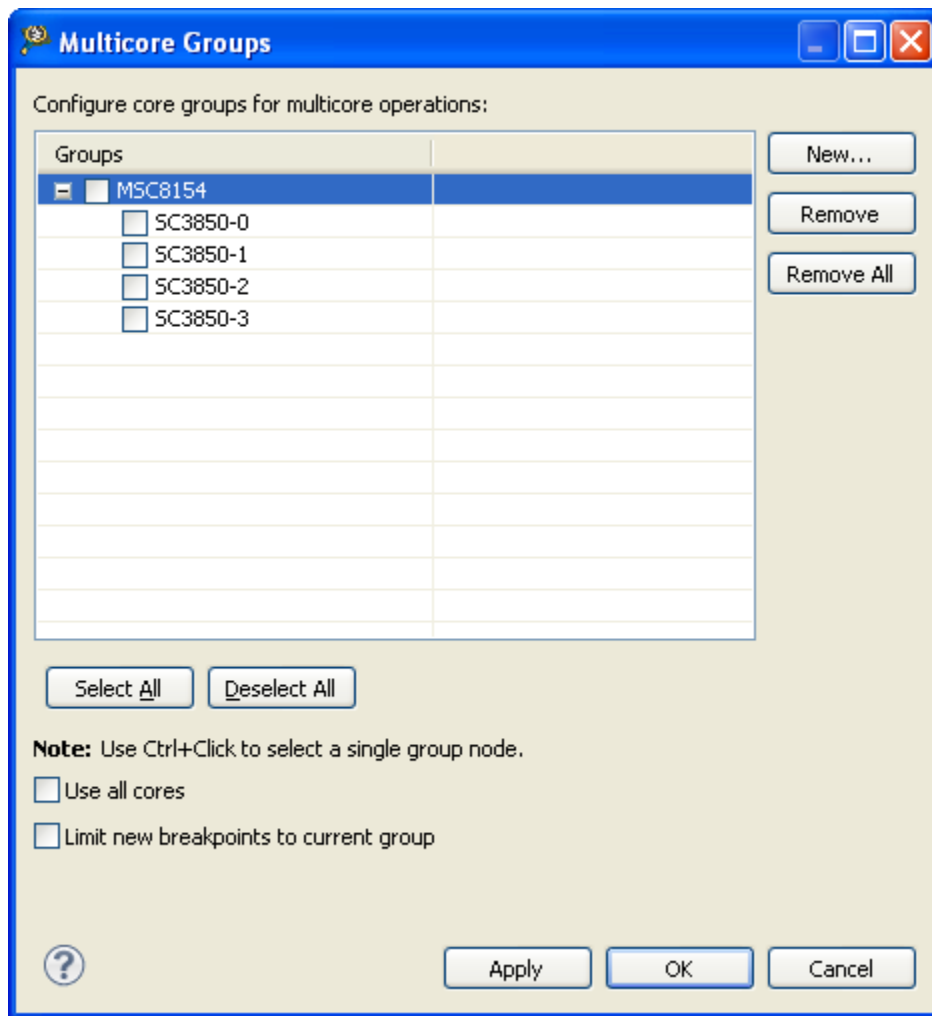
The **Multicore Groups** pop-up menu also shows the list of groups that are shown in the **Multicore Groups** dialog.

### 3.21.1 Creating multicore group

To create a multicore group:

1. Click the **Multicore Groups** button from the **Debug** view toolbar.

The **Multicore Groups** dialog appears.

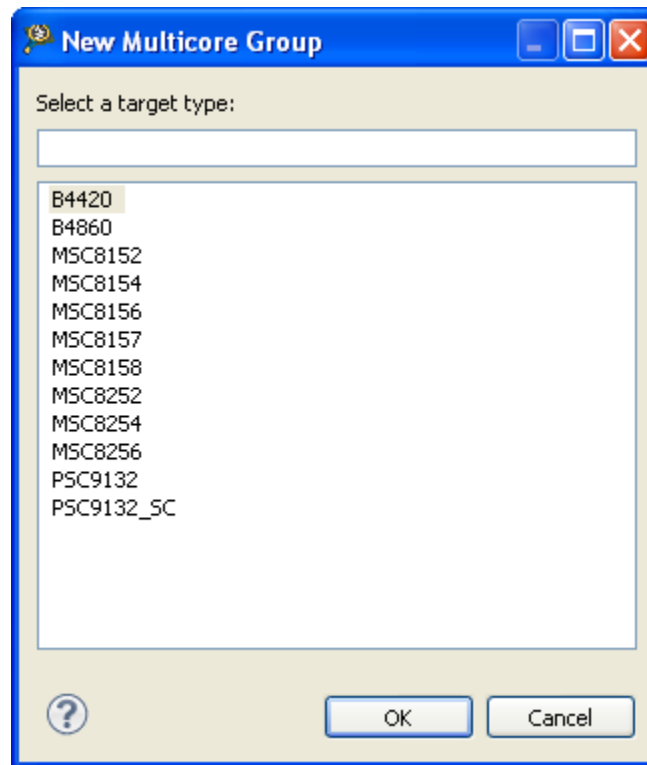


**Figure 3-58. Multicore Groups dialog**

- **New** button - Creates a new group using the **New Multicore Group** dialog. The initial name of the group is the name unless the name is already in use. If the name is already in use then an index is appended to the group name. The initial enablement of the group and its descendants will be non-cores enabled, cores disabled. This guarantees an initial state with no error due to overlap.
- **Remove** button - Removes a selected group.
- **Remove All** button - Remove all groups.
- **Use all cores** checkbox - If selected, all cores are used for multicore operations irrespective of multicore groups.
- **Limit new breakpoints to current group** checkbox - If selected, all new breakpoints set during a debug session are reproduced only on cores belonging to the group of the core on which the breakpoint is set. When the **Use all cores** checkbox is selected, this checkbox appears dimmed and is not used on breakpoints filtering, as all cores are considered on the same group for multicore operations.

- Click the **New** button.

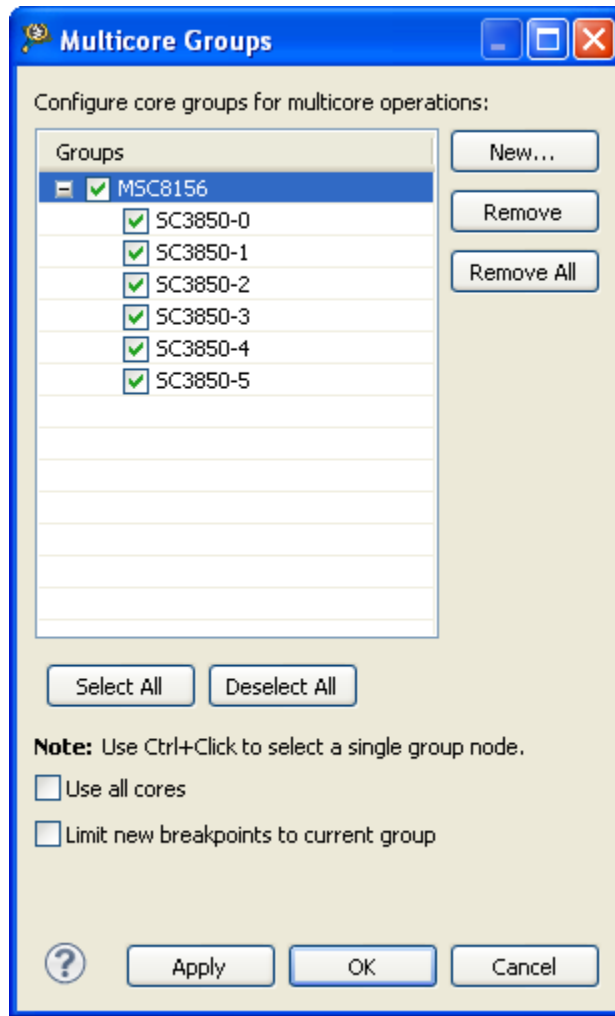
The **New Multicore Group** dialog appears.



**Figure 3-59. New Multicore Group dialog**

- Select a target type from the list.
- Click **OK**.

The group appears in the **Multicore Groups** dialog.



**Figure 3-60. Added multicore group**

- Repeat **Steps 2 - 4** to add more core groups for multicore operations.
- Click **OK**.

You have just created multicore group.

### 3.21.2 Modifying multicore group

You can also modify an existing multicore group.

**NOTE**

You are not allowed to enable a group that overlaps with another group.

To modify a multicore group:

1. Choose **Edit Multicore Groups** from the **Multicore Groups** pop-up menu in the **Debug** view toolbar to open **Multicore Groups** dialog.
2. Select the cores you want to add to the multicore group.
3. Deselect the cores you want to remove from the multicore group.
4. Click **OK**.

### 3.21.3 Editing multicore group

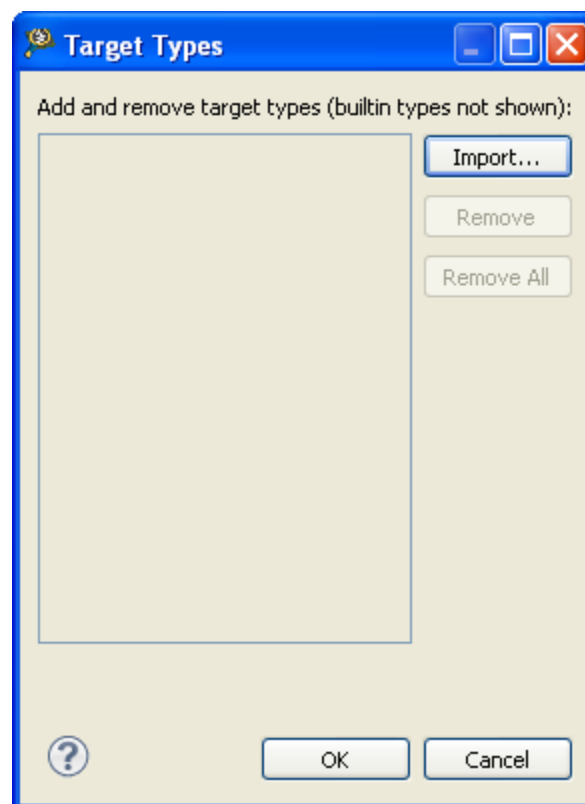
You can add custom target types by importing files from:

- JTAG configuration files
- Device Tree Blob files (for Power Architecture)

To add and remove system types from multicore groups:

1. Choose **Edit Target Type** from the **Multicore Groups** pop-up menu.

The **Target Types** dialog appears.

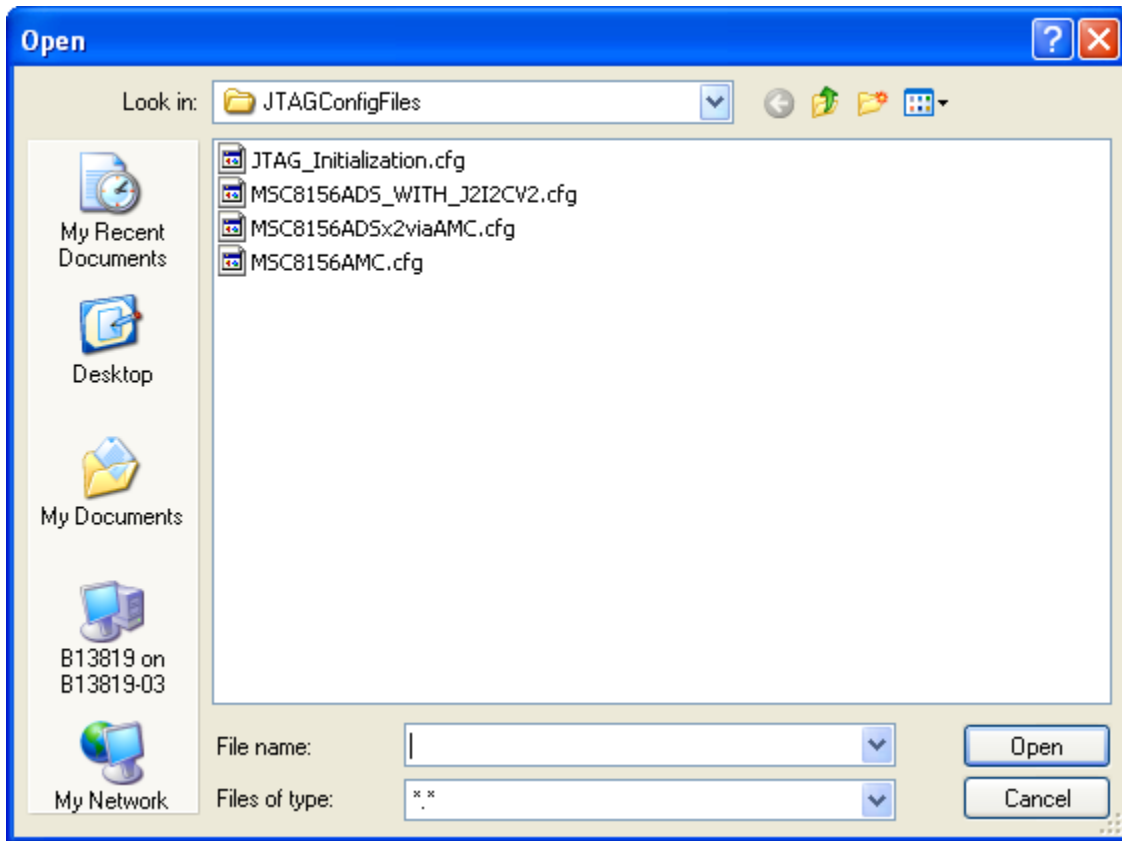


**Figure 3-61. Target Types dialog**

- **Import** - Creates a custom target type by importing it from a configuration file.

- **Remove** - Removes a target type from the list.
  - **Remove All** - Removes all target types from the list.
2. Click **Import**.

The **Open** dialog appears.



**Figure 3-62. Import target type**

3. Select a multicore configuration file and click **Open**.

The multicore appears in the **Target Types** dialog.

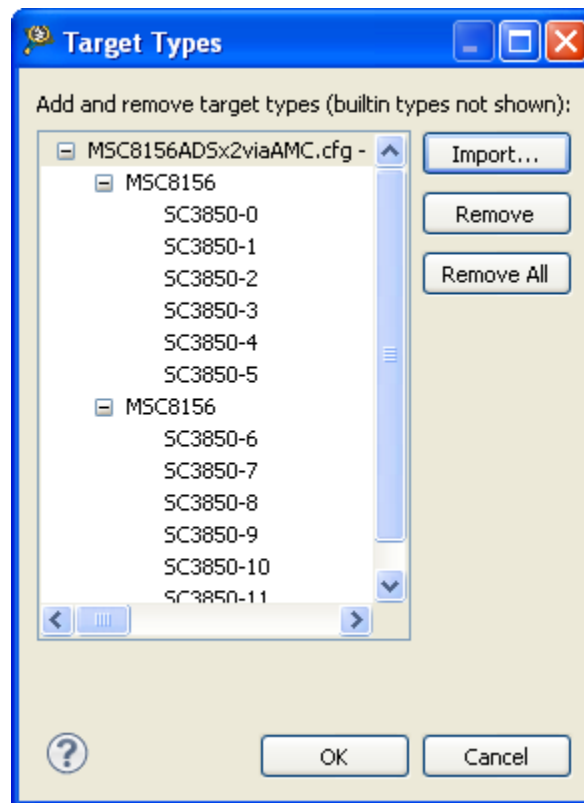


Figure 3-63. Added target types

4. Click **OK**.

### 3.21.4 Using multicore group debugging commands

Multicore Group features can also be accessed from the Debugger Shell command line. The following table lists and defines different multicore group debugging commands.

**Table 3-18. Multicore group debugging commands**

Command	Description
<code>mc::type</code>	Syntax <code>mc::type</code> Lists the available target types.
<code>mc::type import</code>	Syntax <code>mc::type import &lt;filename&gt;</code> Imports a new specified using the <code>filename</code> .
<code>mc::type remove</code>	Syntax <code>mc::type remove &lt;filename&gt; &lt;type-index&gt; ...</code> Removes the specified imported or types. Built-in target types cannot be removed and will return an error.
<code>mc::type removeall</code>	Syntax <code>mc::type removeall</code> Removes all imported target types.
<code>mc::group</code>	Syntax <code>mc::group</code> Lists the defined groups.

*Table continues on the next page...*

**Table 3-18. Multicore group debugging commands (continued)**

Command	Description
<code>mc::group new</code>	Syntax <code>mc::group new &lt;type-name&gt; &lt;type-index&gt; [&lt;name&gt;]</code> Creates a new group for the system specified using the <code>type-name</code> or <code>type-index</code> . If no name is specified, then a unique default name is assigned to the group.
<code>mc::group rename</code>	Syntax <code>mc::group rename &lt;name&gt; &lt;group-index&gt; &lt;new-name&gt;</code> Renames an existing group. Specifying a duplicate name results in an error.
<code>mc::group remove</code>	Syntax <code>mc::group remove &lt;name&gt; &lt;group-index&gt; ...</code> Removes the specified group or groups.
<code>mc::group removeall</code>	Syntax <code>mc::group removeall</code> Removes all groups.
<code>mc::group enable disable</code>	Syntax <code>mc::group enable disable &lt;index&gt; ... all</code> Enables or disables nodes in the group tree.

### 3.21.5 Multicore breakpoint halt groups

A halt group is a group of cores that will stop execution simultaneously whenever any one of the cores in the group hits a breakpoint. In multicore groups, each group can be configured as a run control group, a breakpoint halt group, or both. [Creating multicore group](#) shows the **Multicore Groups** dialog.

The halt groups are configured on any applicable debug target. Similarly, whenever a debug session is launched, all applicable halt groups are applied to the debug target.

#### NOTE

Multicore breakpoint halt groups are supported by P4080 processor only.

## 3.22 Multicore reset

This CodeWarrior debugger feature lets you configure `reset` and `run out of reset action` for your target system. It also enables you to configure your target system to perform `system reset action`.

#### NOTE

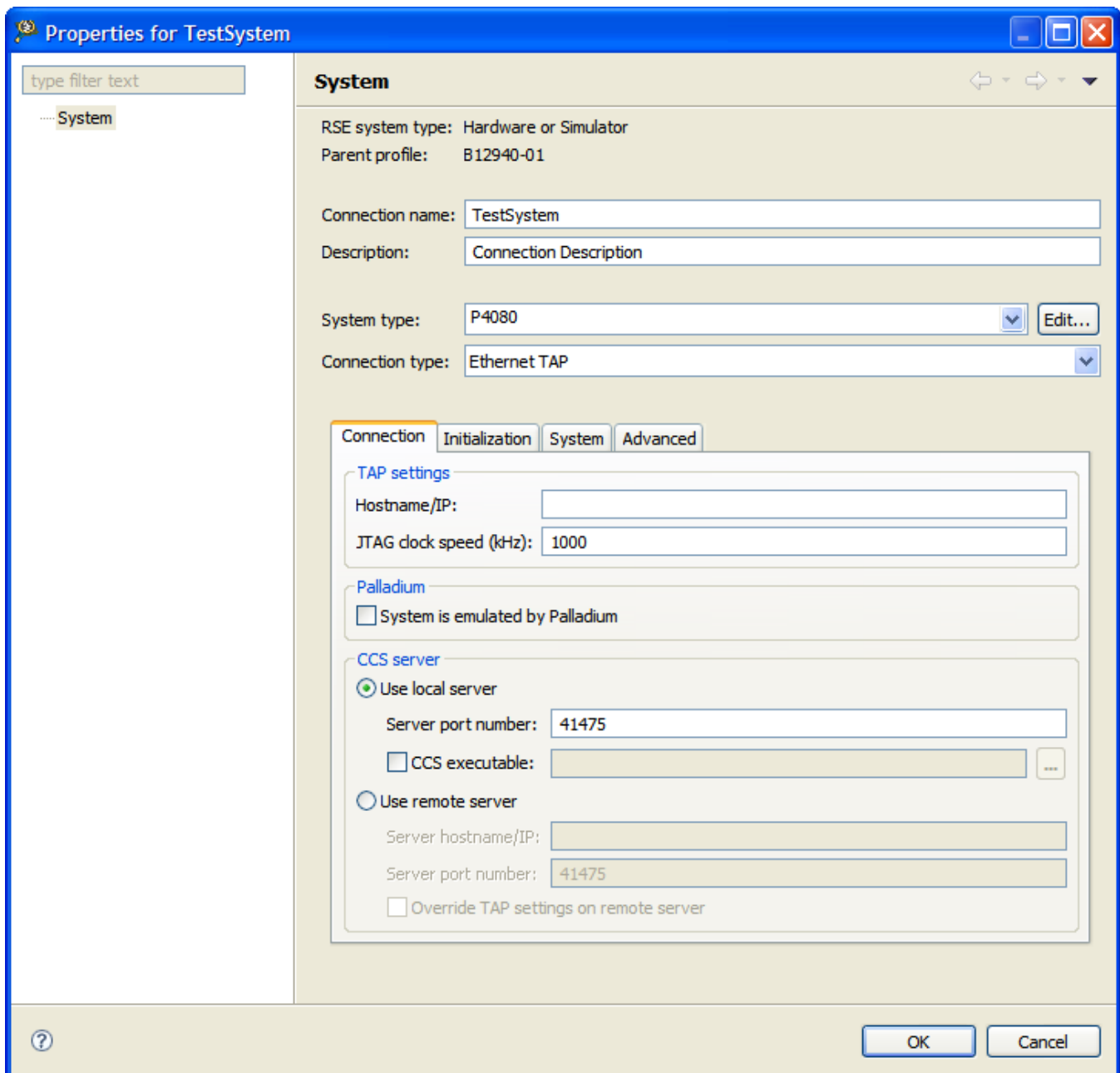
The `system reset` action is applicable for initial launch only.

To specify reset setting for cores in a multicore environment:



1. Go to the [Remote Systems view](#).
2. Right-click a remote system and choose **Properties** from the shortcut menu.

The **Properties for <Remote System>** dialog appears.



**Figure 3-64. Properties for <Remote System> dialog**

3. Click the **Initialization** tab.

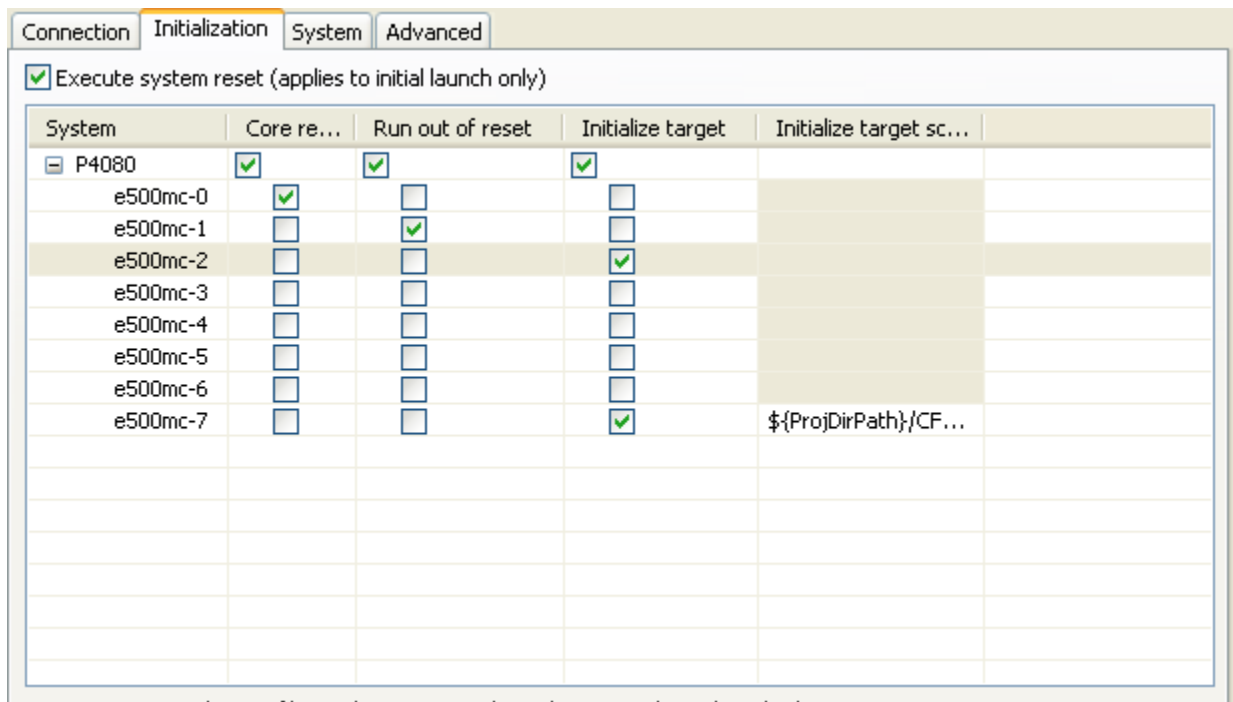


Figure 3-65. Initialization pane

- **Execute system reset** - Resets the entire Remote System. This checkbox is available only if the processor supports system reset. Reset system is executed only for the initial launch.
  - **Core reset** - Independently resets one or more cores from the Remote System. This is available only if the processor supports core reset. Use this column in RSE configuration if you want to independently reset the core on launch or restart. Initial launches with system reset and core reset options will execute only the system reset.
  - **Run out of reset** - Puts a core in run mode after reset. This is available only if **System Reset** or **Core Reset** is selected.
  - **Initialize target** - Allows **initialize target script** configuration
  - **Initialize target script** - Script to initialize the target. This is available only if initialize target is selected. Target initialization scripts and reset cores are applied to cores being launched.
4. Select the **Execute system reset** checkbox to perform system reset. The system reset applies only to initial launch.
  5. Select the **Core reset** checkbox adjacent to the core on which you want to perform a reset action.
  6. Select the **Run out of reset** checkbox adjacent to the core on which you want to perform run out of reset action.
  7. Click **OK**.

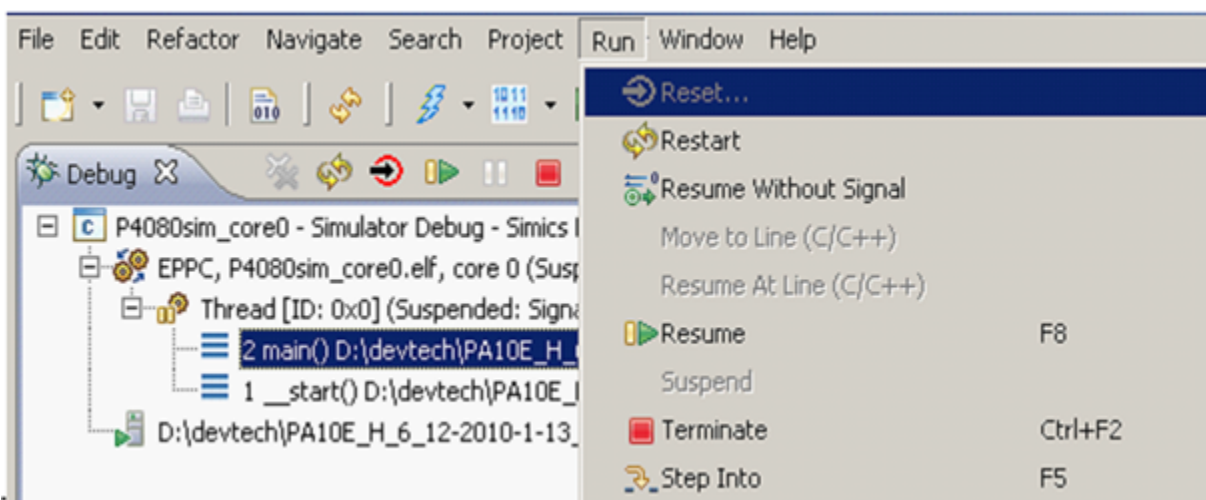
**NOTE**

Initialization files are executed only for cores selected for debug.

**3.22.1 On demand reset**

The on demand settings are serialized when the user performs the reset action. The **Reload** button allows user to load the settings from the remote system configuration. The on demand reset configurations apply to the whole system, these configurations are not filtered to the active debug context. The initialization files are executed only for cores under debug.

You can access the **Reset** command from the **Run** menu in the debug view.



**Figure 3-66. On demand reset**

**3.23 Path mappings**

The Path Mapping settings are used in IDE to resolve a partial or absolute path from a binary executable during debugging to effectively locate a source file. A binary executable used for debugging typically contains a list of source files in its debugger that were used to build the executable. The source file list is used by the debugger to provide source level debugging. The CodeWarrior IDE supports automatic as well as manual path mapping.

In this section:

- [Automatic path mappings](#)
- [Manual path mappings](#)

### 3.23.1 Automatic path mappings

The Automatic Path Mapping feature focuses on reducing as much as possible the manual steps required by the user to set up the path mapping settings in order to support source level debugging.

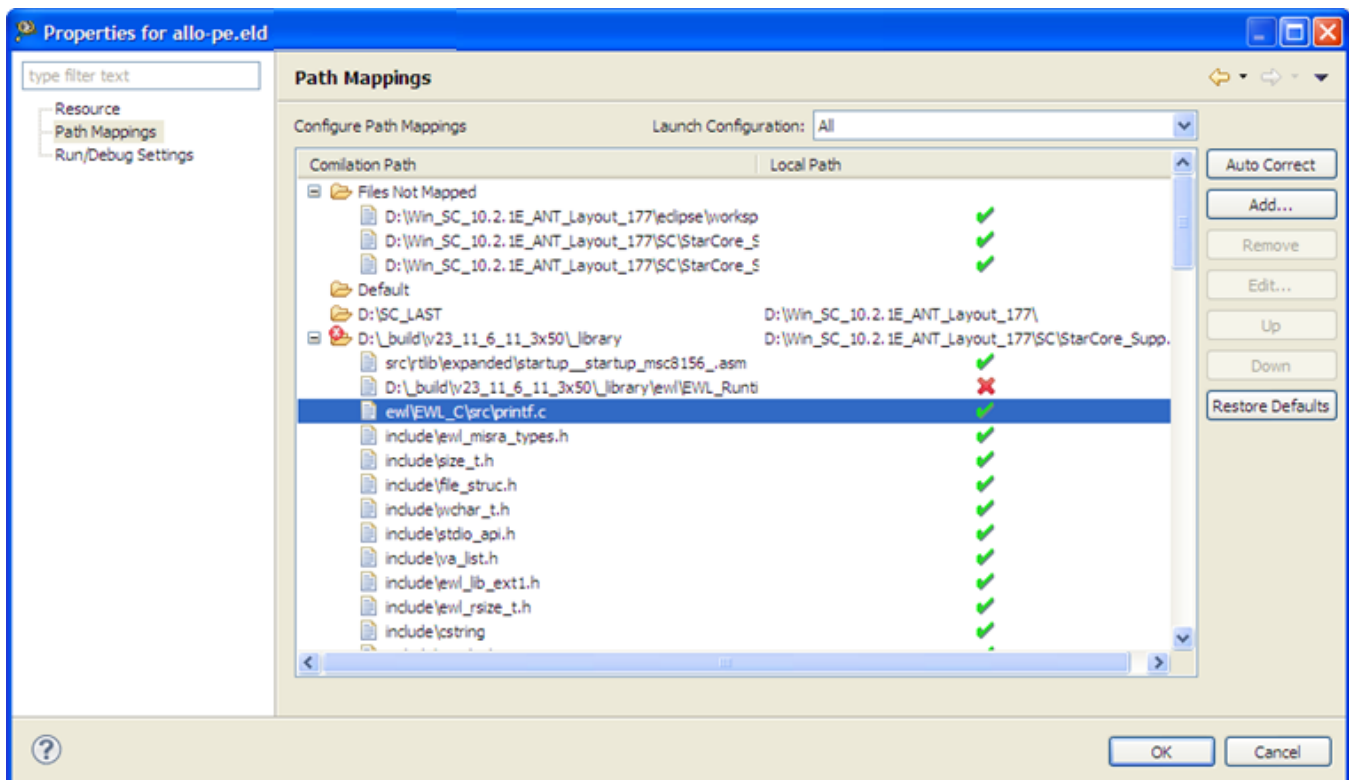
For automatic path mapping:

1. In the **CodeWarrior Projects** view, expand **Binaries** folder and right-click the **\*.eld file**.
2. Choose **Properties** from the shortcut menu that appears.

The **Properties for \*.eld** dialog appears.

3. Select **Path Mappings** on the left side of the dialog.

The **Path Mappings** page appears. This page displays every path mapping settings for the launch configurations associated with a project.



**Figure 3-67. Automatic path mapping**

You can edit either a single set of settings for all launch configurations associated with a project or the settings for a given launch configuration by choosing the appropriate value from the **Launch Configuration** pop-up menu.

Under each path mapping, the table displays a list of source files that exist in the binary executable that share the same source mapping prefix. In the Local Path column, a green sign ( ✓ ) appears if the file exists after being mapped by the destination path or a red ( ✗ ) if it does not. Also, the local path itself is displayed in red if it does not exist on the local file system.

A default folder named **Files Not Mapped** is created if you explicitly remove existing mappings. All unmapped files that are not found on the file system are automatically shown under this folder.

The following table describes various options available in the **Path Mappings** page.

**Table 3-19. Automatic path mappings options**

Options	Description
Auto Correct	When clicked, iterates automatically through all the files not found on the file system and attempt to group them with their common prefix. This action often generates satisfactory results from the source

*Table continues on the next page...*

**Table 3-19. Automatic path mappings options (continued)**

Options	Description
	files listed in the binaries so that the manual steps required by the user are kept at a minimum.
Add	Allows you to create a new Path Mapping entry. If any paths are selected, the dialog will be pre-initialized with their common prefix.
Remove	Allows you to remove any path mapping or default entry.
Edit	Allows you to change the values of the selected path mapping entry. Editing non-path mapping entry is not supported.
Up	Allows you to reorder the entries by moving the selected entry up in the list. Note that path mappings need always to be grouped together, and as such moving up the top most path mapping will always move its siblings above the preceding entry as well.
Down	Allows you to reorder the entries by moving the selected entry down in the list. Note that path mappings need always to be grouped together, and as such moving down the bottom most path mapping will always move its siblings below the following entry as well.
Restore Defaults	Resets the launch configuration path mappings settings to their previous values, including the library path mapping automatically generated by the APM plug-in.

### NOTE

If you create a new path mappings manually from the source lookup path, the source files are automatically resorted to their most likely path mapping parent.

4. Click **OK**.

The **Path Mappings** dialog closes.

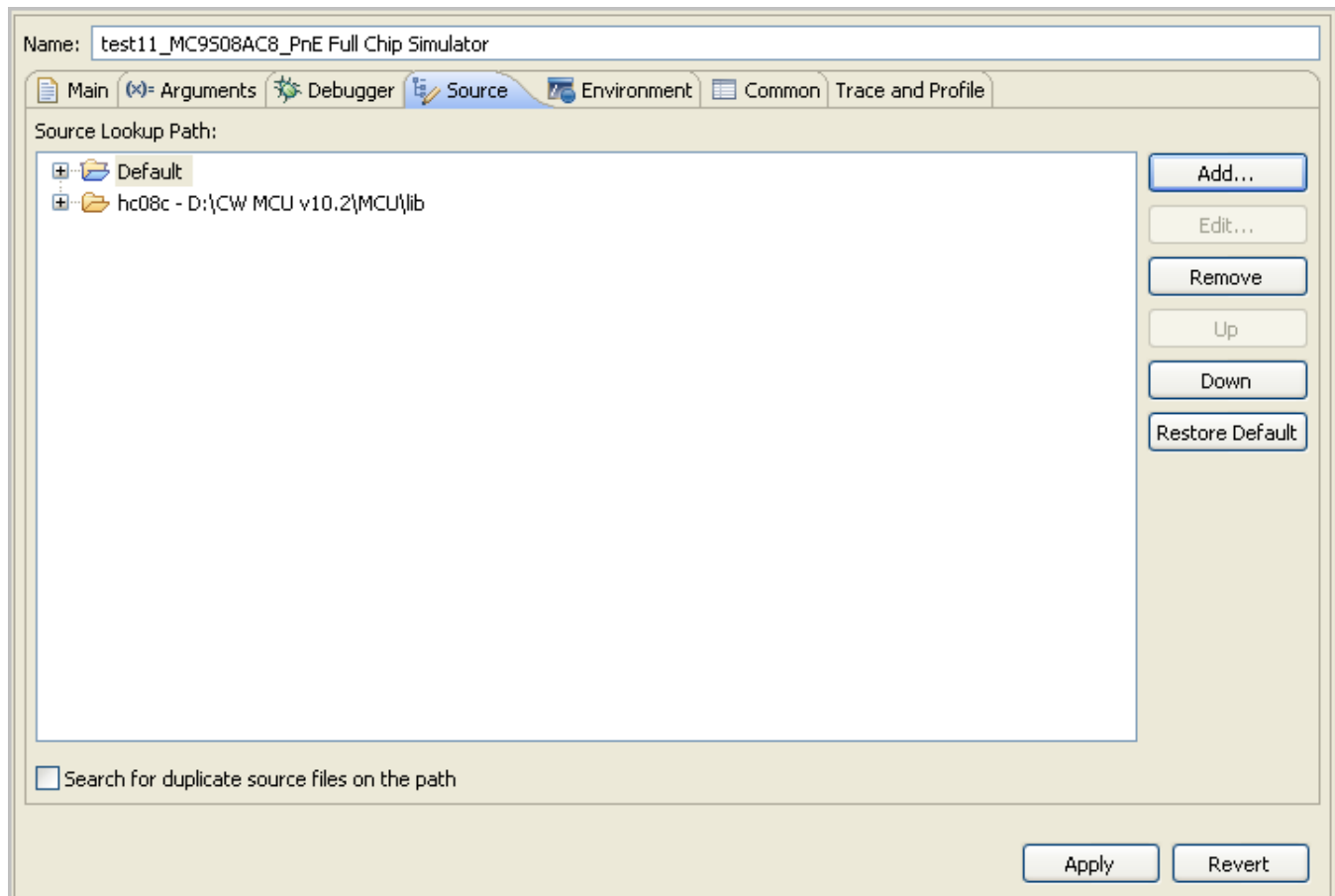
## 3.23.2 Manual path mappings

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. Path mappings can be added per launch configuration or global, per workspace. In the latest case the mapping will be valid for all the projects within the workspace.

To add a path mapping to a launch configuration:

1. Click the **Source** tab of the **Debug Configurations** dialog.



**Figure 3-68. Debug Configurations dialog - Source page**

2. Click **Add**.

The **Add Source** dialog appears.

3. Select **Path Mapping**.

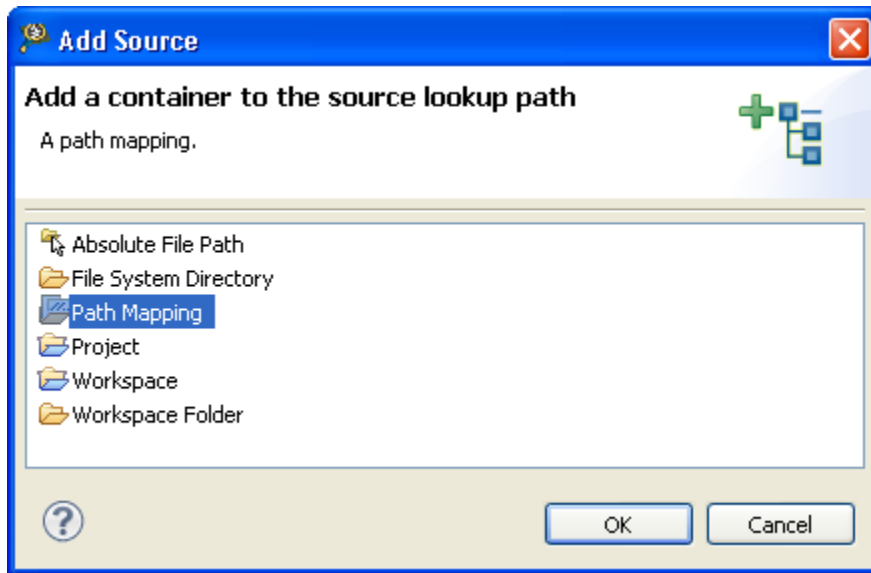


Figure 3-69. Add Source dialog

4. Click **OK**.

The **Path Mappings** dialog appears.

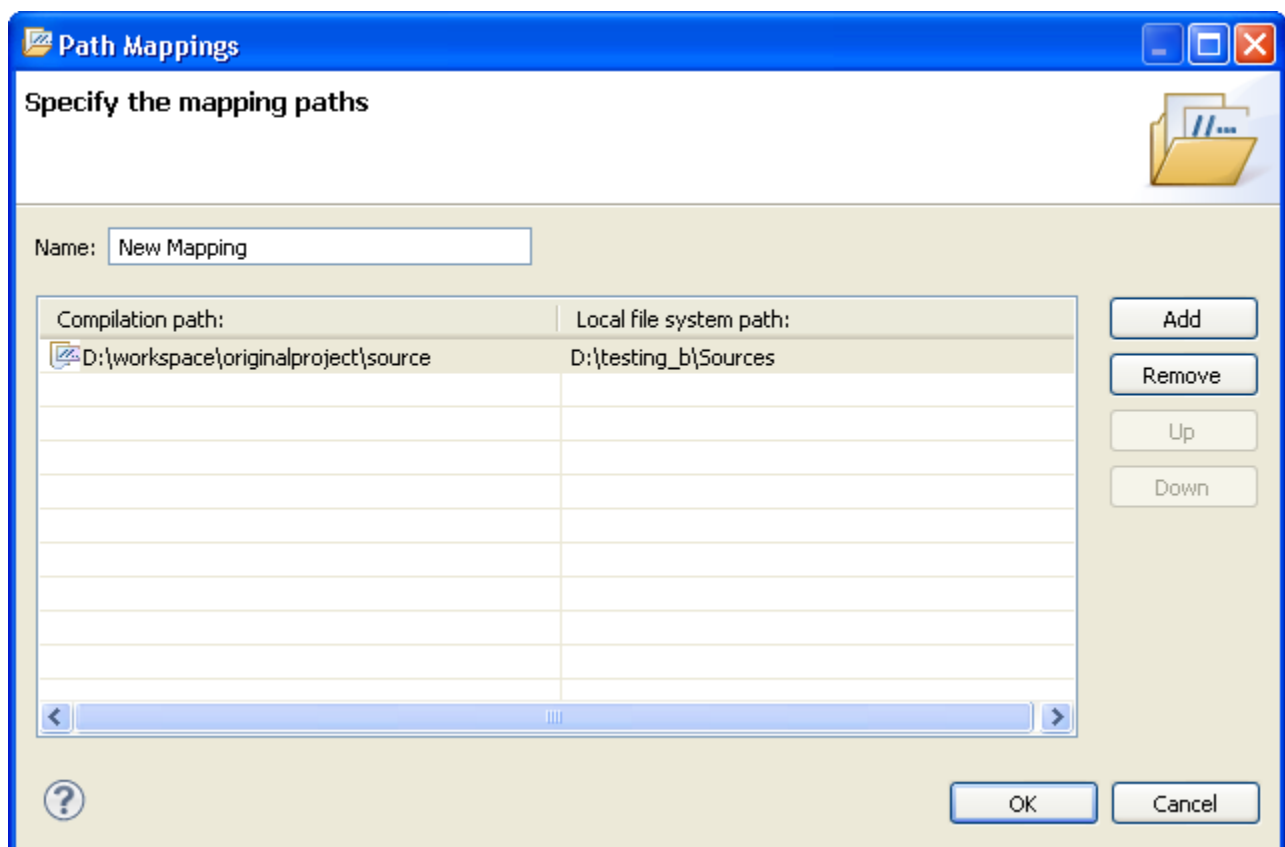


Figure 3-70. Path Mappings dialog

5. Specify the Path mappings name in the **Name** textbox.

6. Click **Add**.



7. In the **Compilation path** textbox, enter the path to the parent project of the executable file, relative to the computer that generated the file.

For example, the computer on which you debug the executable file is not the same computer that generated that executable file. On the computer that generated the executable file, the path to the parent project is D:\workspace\originalproject. Enter this path in the **Compilation path** textbox.

### 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** textbox.

8. In the **Local file system path** textbox, 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.

An intermediate dialog appears, where the local path can be specified from the Local System or based on one or more Eclipse variables.

9. Click **OK**.

The **Path Mappings** dialog closes. The mapping information now appears under the path mapping shown in the **Source Lookup Path** list of the **Source** page.

10. If needed, 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.

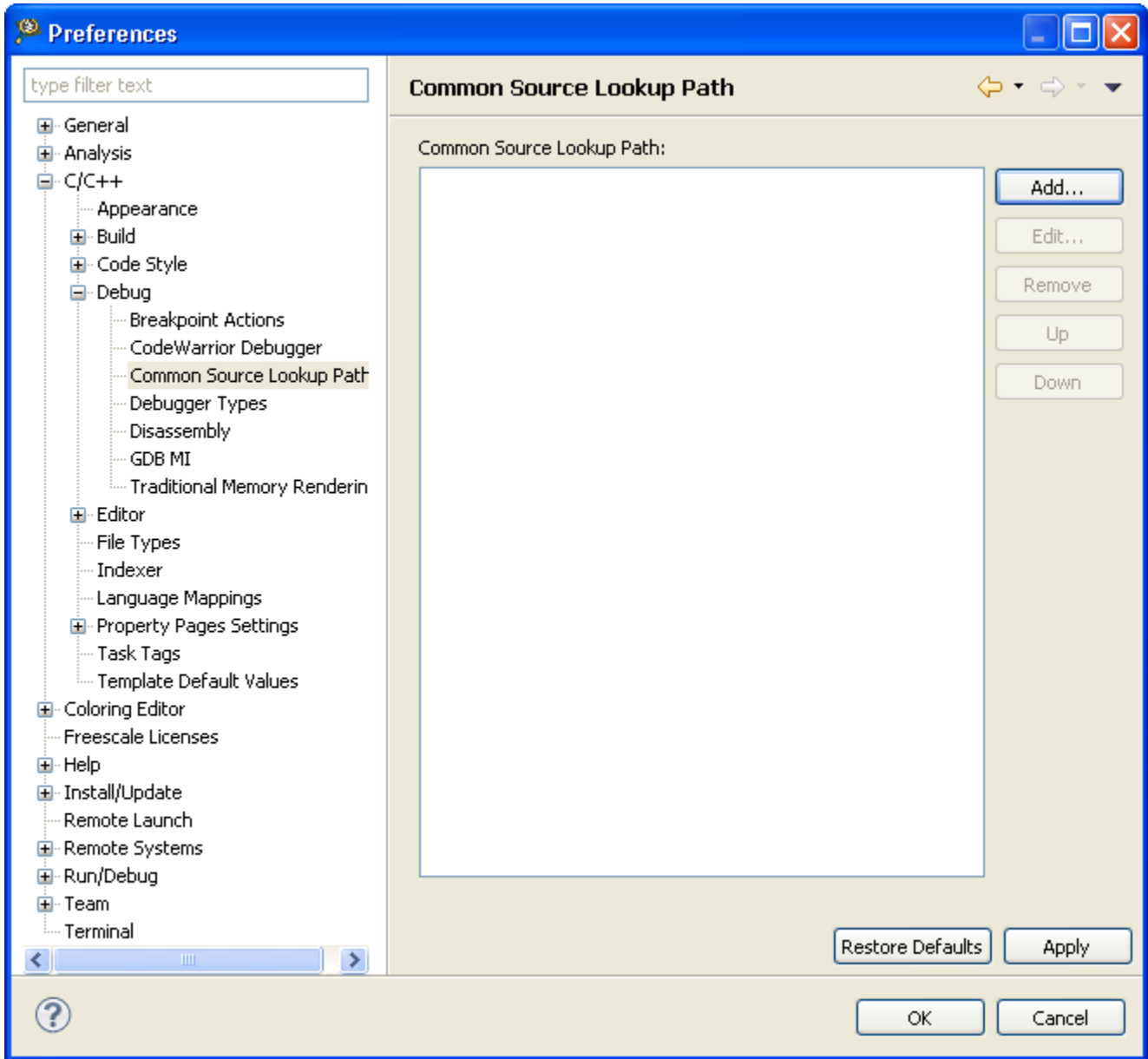
11. Click **Apply**.

The IDE saves your changes.

### 3.23.2.1 Adding path mapping to workspace

To add a path mapping to the workspace:

1. Choose **Window > Preferences** from the CodeWarrior IDE menu bar.  
The **Preferences** dialog appears.
2. Expand **C/C++ > Debug > Common Source Lookup Path**.



**Figure 3-71. Preferences dialog - Common Source Lookup Path**

3. Repeat steps 2-11. provided in the [Manual path mappings](#) section for adding a path mapping for a single launch configuration.

## 3.24 Redirecting standard output streams to socket

This CodeWarrior feature allows you to redirect standard output ( `stdout` , `stderr` ) of a process being debugged to a user specified socket.

To specify the initial connection redirection settings:

1. In the **CodeWarrior Projects** view, right-click the project folder to display a shortcut menu.
2. Choose **Debug As > Debug Configurations** from the shortcut menu.

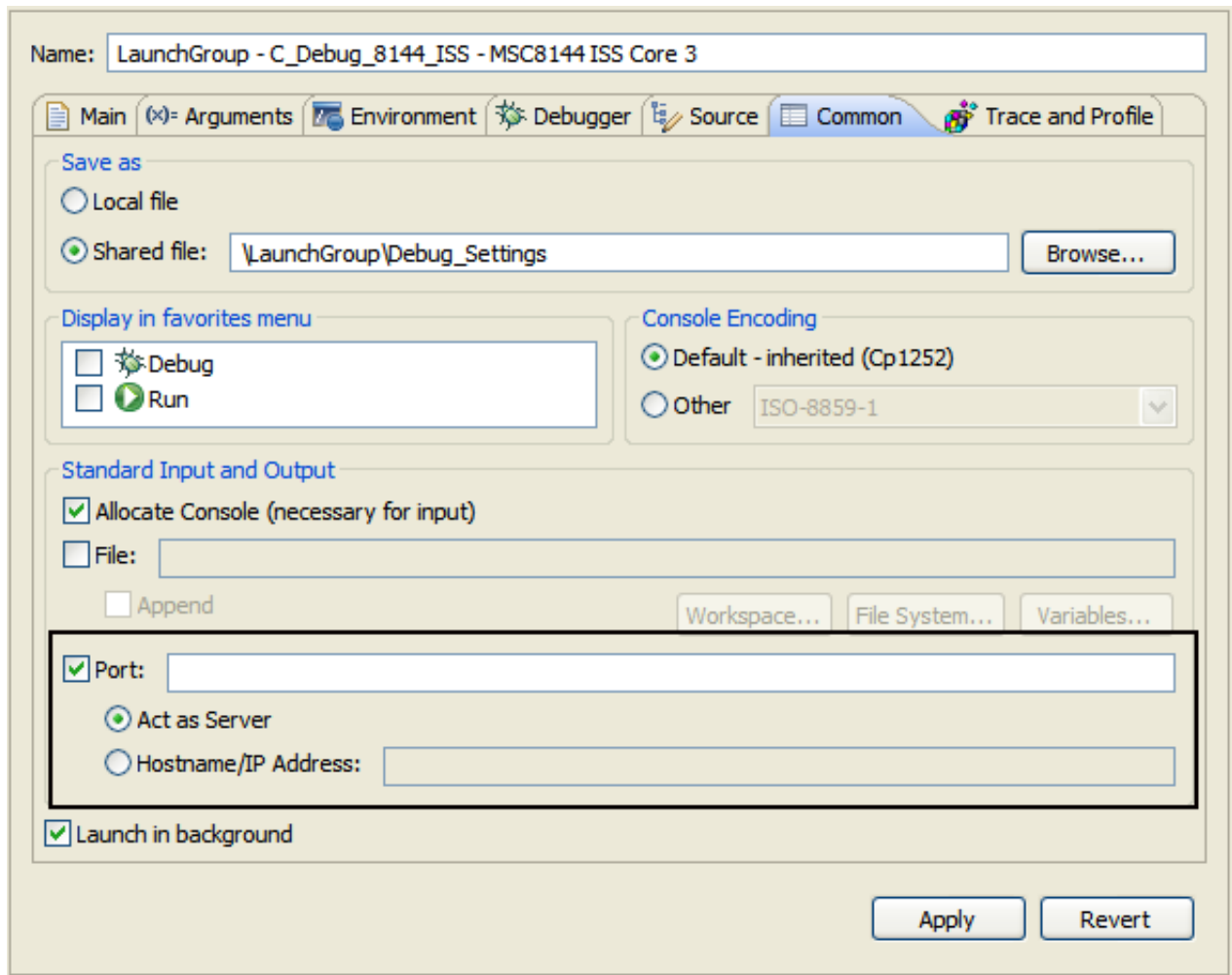
The **Debug Configurations** dialog appears. The left pane of the **Debug Configurations** dialog has a list of debug configurations that apply to the current application.

3. Expand the **CodeWarrior** tree, and select the name of the debug configuration for which you want to modify debugger settings.

The right pane of the **Debug Configurations** dialog shows the settings for the configuration that you selected.

4. Click the **Common** tab.

The common settings are available in the right pane of the **Debug Configurations** dialog.



**Figure 3-72. Debug Configurations dialog**

5. Select the **Port** checkbox.

The **Act as Server** or **Hostname/IP address** options become available.

6. Type the port number in the **Port** textbox.
7. Select **Act as Server** to redirect the output from this process to a local server socket bound to the specified port.
8. Select **Hostname/IP address** to redirect the output from this process to a server socket located on the specified host and bound to the specified port. The debugger will connect and write to this server socket via a client socket created on an ephemeral port
9. Click **Apply**.

The changes are applied to the selected debug configuration.

**NOTE**

You can also use the `redirect` command in the debugger shell to redirect standard output streams to a socket.

## 3.25 Refreshing data during runtime

This debugger feature refreshes the memory and registers data non-intrusively during runtime. The data is automatically refreshed after a specified interval during runtime.

You can also refresh data by clicking the **Refresh** button from a view toolbar. If you choose **Refresh While Running** from the pop-up menu, the data is refreshed automatically after the interval specified in debug configurations settings.

The data can be refreshed for the following views:

- Memory view
- Variable view
- Registers view

To specify a time interval to automatically refresh view data during runtime:

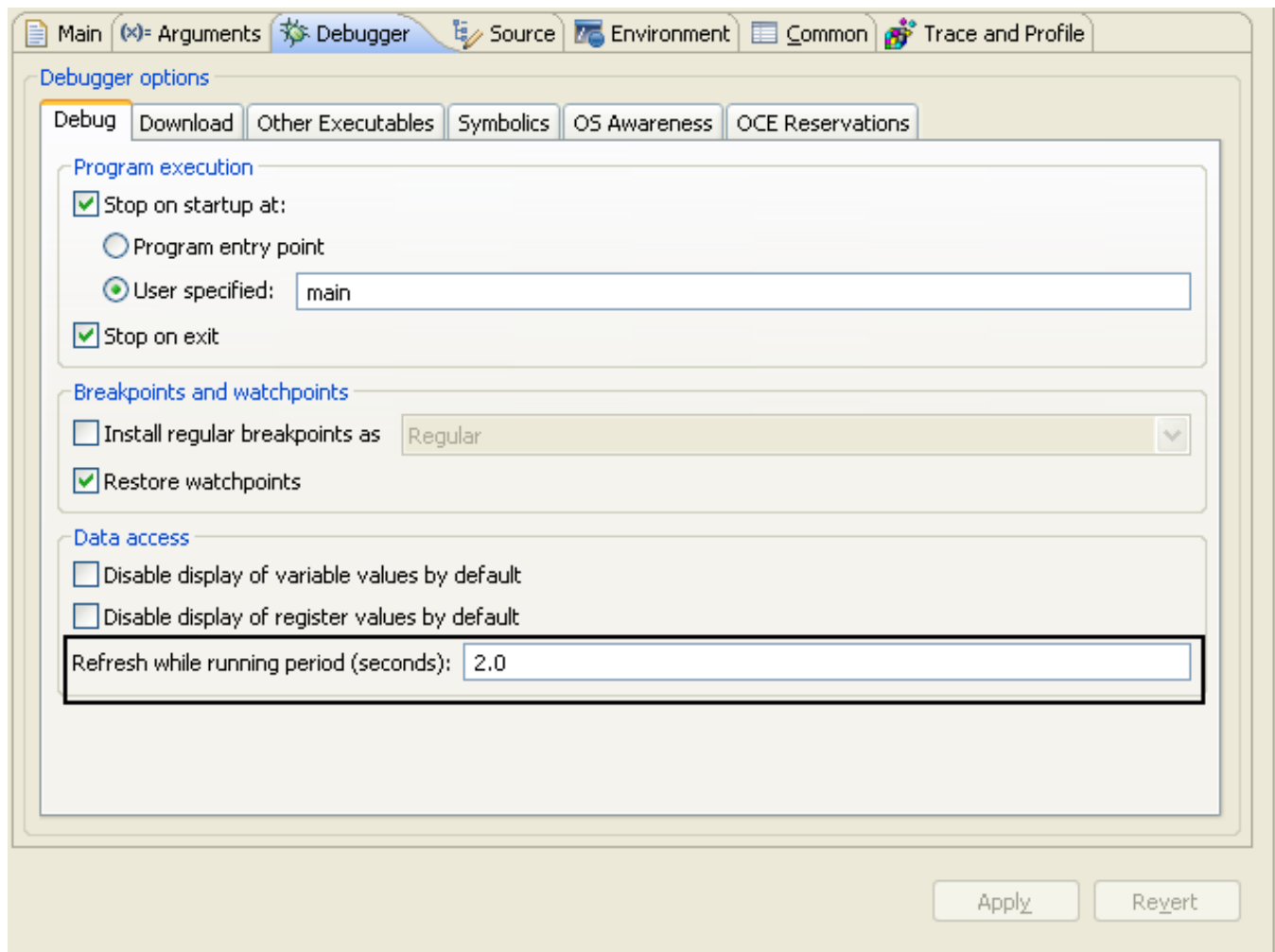
1. In the **CodeWarrior Projects** view, right-click the project folder to display a shortcut menu.
2. Choose **Debug As > Debug Configurations** from the shortcut menu.

The **Debug Configurations** dialog appears. The left pane of the **Debug Configurations** dialog lists debug configurations that apply to the current project.

3. Expand the **CodeWarrior** tree, and choose the name of the debug configuration for which you want to modify debugger settings.

The right pane of the **Debug Configurations** dialog shows the settings for the configuration that you selected.

4. Click the **Debugger** tab.
5. Click the **Debug** tab from the **Debugger Options** group.



**Figure 3-73. Refresh settings**

6. Type the refresh interval in the **Refresh while running period (seconds)** textbox.
7. Click **Apply**.

The changes are applied to the selected debug configuration.

## 3.26 Registers view

The **Registers** view lists information about the registers in a selected stack frame. Values that have changed are highlighted in the **Registers** view when your program stops.

You can use the **Registers** view to:

- add, edit, or remove groups of registers
- view register details, such as explanations of a register's bit fields and values

- change register values
- import/export register data

You can also change the number system in which the debugger displays register values. These number systems are supported:

- Default
- Decimal
- Hexadecimal
- Octal
- Binary
- Fractional

The **Registers** view also allows you to cast existing data type to complex data types that may or may not exist in the debugged executable. For more information on casting a data type, see [Cast to Type](#).

#### **NOTE**

Casting a register to a type requires that the size of the register must match the size of the type, otherwise the cast will fail. Therefore, if the type is a complex one (for example, structure, union), it should be declared first to avoid padding done by compilers.

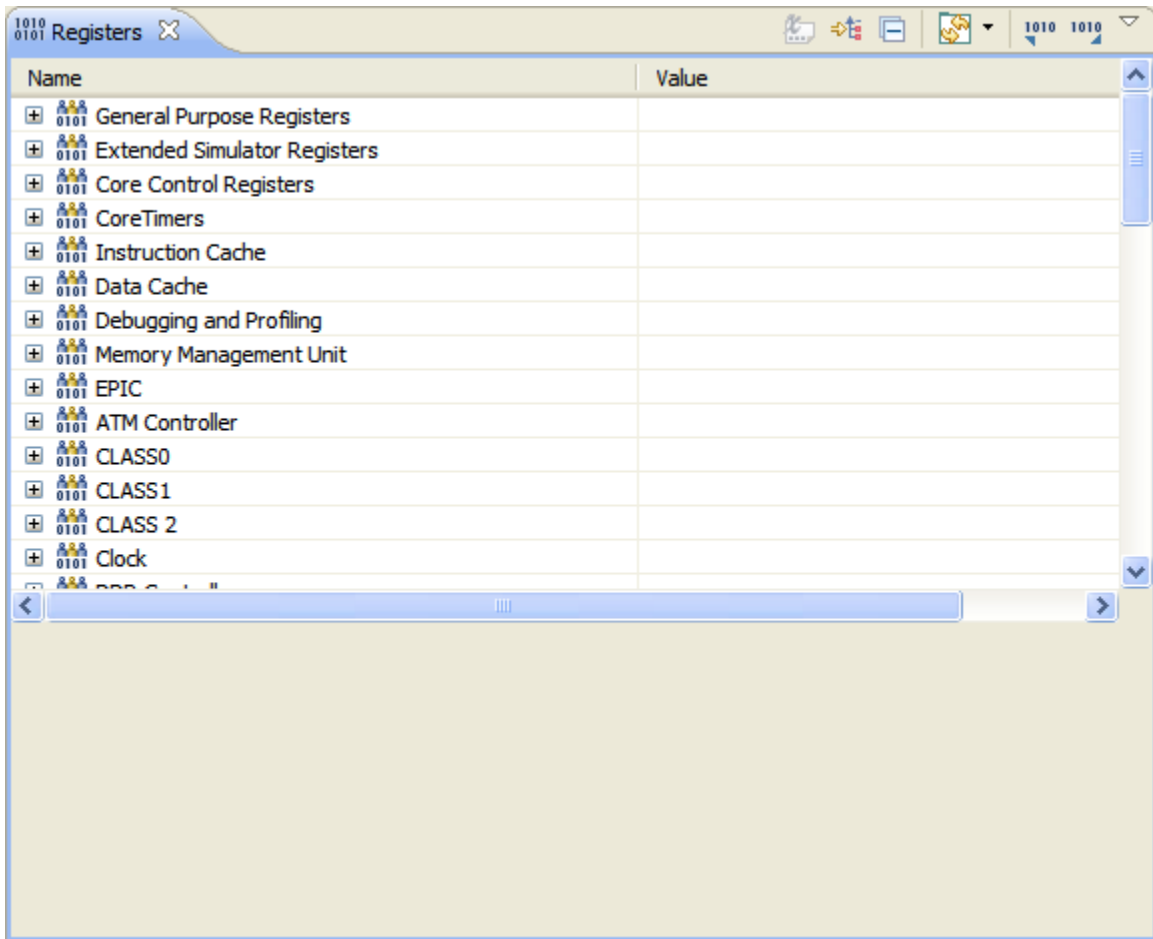


Figure 3-74. Registers view

### 3.26.1 Opening Registers view

To open the **Registers** view:

1. Switch to the **Debug** perspective.
2. Choose **Window > Show View > Registers** from the IDE menu bar.

### 3.26.2 Viewing registers

To view registers content:

1. Open the **Registers** view ( [Registers view](#)).
2. Expand a register group.



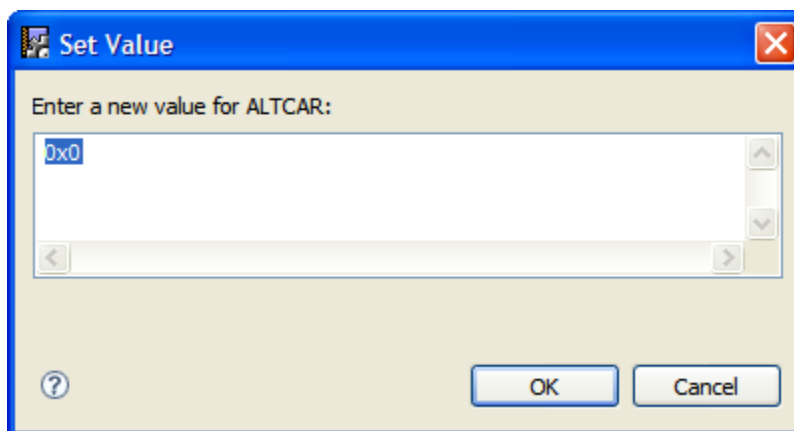
Expanding a group shows its content by register name and the content of each register in the group.

### 3.26.3 Changing register values

To change the value of a register:

1. Open the **Registers** view ( [Registers view](#)).
2. Expand the hierarchical list to reveal the register whose value you want to modify.
3. Right-click the register value that you want to change and choose **Change Value** from the shortcut menu that appears.

The **Set Value** dialog appears.



**Figure 3-75. Set Value dialog**

4. Enter a new value in the **Enter a new value for ALTCAR** textbox.
5. Click **OK**.

The debugger assigns the specified value to the selected register.

#### **Tip**

Alternatively, you can click on the value and edit it to change the Registers value.

### 3.26.4 Exporting registers

The export operation generates two files:

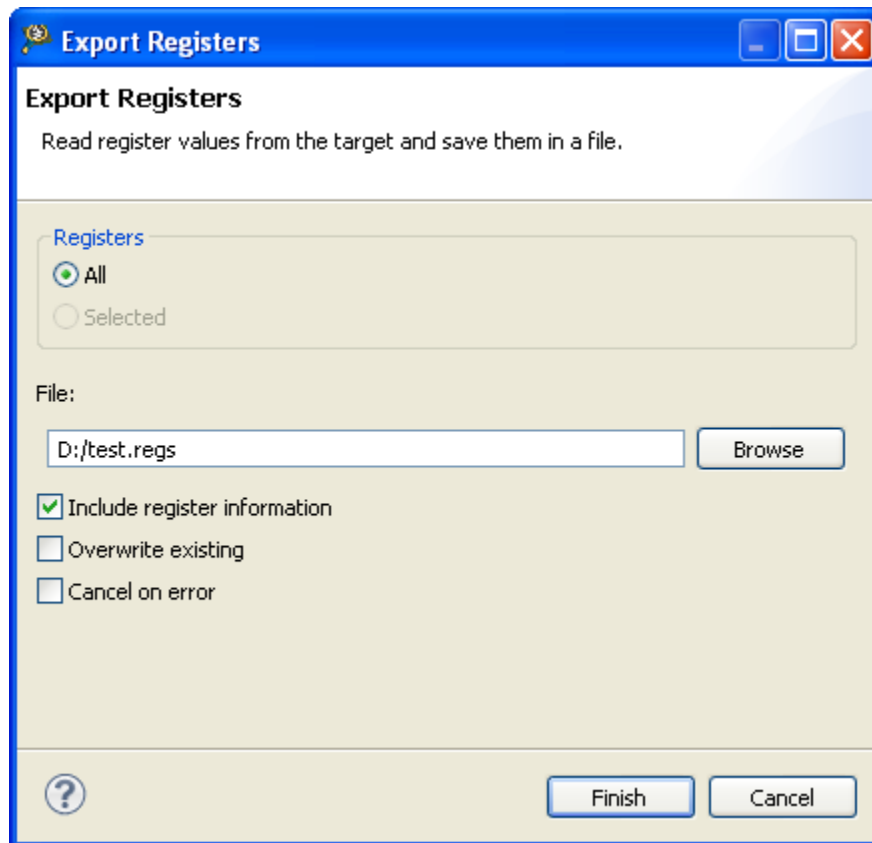
## Registers view

- a \*.regs file that contains the registers information in XML format which is also used by the import operation.
- a \*.csv file that contains the registers information in plain text CSV (comma-separated values) format that can be used for easy visual inspection in an external text editor or MS Excel/Open Office.

To export register data to a file:

1. Open the **Registers** view ( [Registers view](#)).
2. Click the **Export registers** button in the **Registers** view toolbar.

The **Export Registers** dialog appears.



**Figure 3-76. Export Registers dialog**

- **Registers** group - Controls the scope of export operation. Selecting the **All** option exports all registers in the **Registers** view. Selecting the **Selected** option exports selected registers. If a register group is selected in the **Registers** view then the entire register tree, starting at the selected node, is exported.

### NOTE

The **Selected** option is unavailable if no register is selected in the **Registers** view.

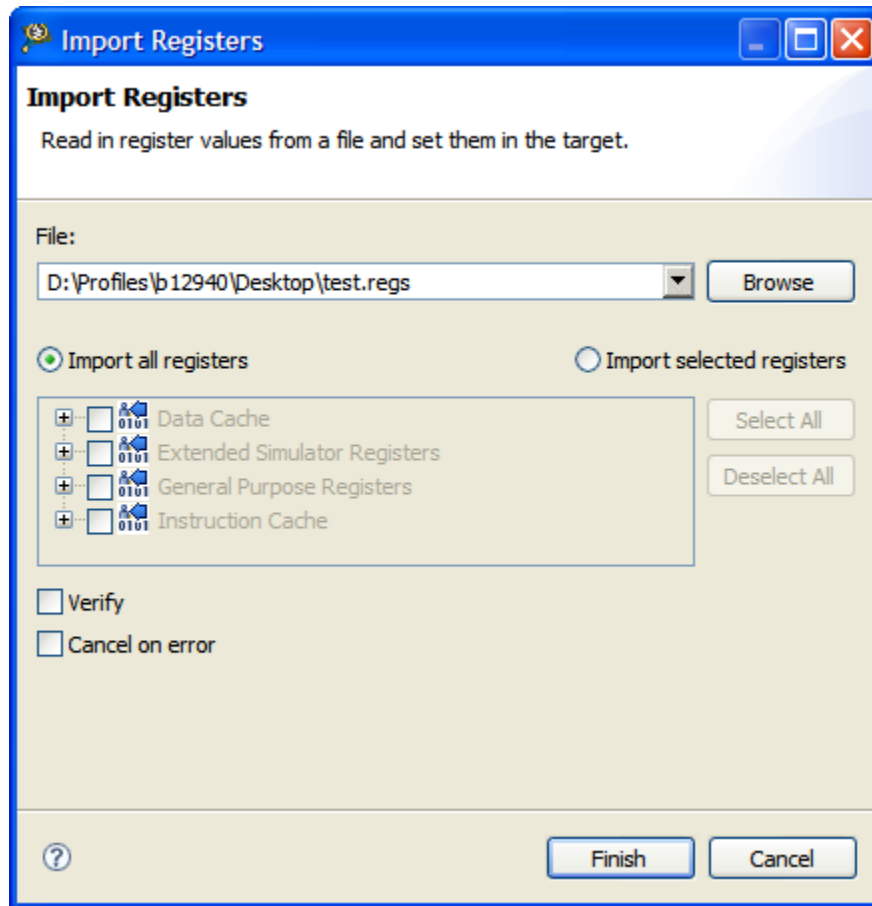
- **File** textbox - Specifies the name of the file to store the exported register information.
  - **Include register information** checkbox - Select to export the location information for registers.
  - **Overwrite existing** checkbox - Select this checkbox to overwrite an existing file.
  - **Cancel on error** checkbox - Select to stop the export operation upon encountering any error.
3. Click **Finish**.

### 3.26.5 Importing registers

To import register data from a file:

1. Open the **Registers** view ( [Registers view](#)).
2. Click the **Import registers** button in the **Registers** view toolbar.

The **Import Registers** dialog appears.



**Figure 3-77. Import Registers dialog**

- **File** pop-up menu - Specifies the name of the register data file to import register information.
  - **Import all registers** - Selecting this option allows you to import all registers from the register data file.
  - **Import selected registers** - Selecting this option allows you to select registers you want to import.
  - **Verify** checkbox - When selected, a register write to the target is followed by a read and a comparison against the written value. This ensures that the import operation on the register is successful.
  - **Cancel on error** checkbox - Select to stop the import operation upon encountering any error.
3. Click **Finish**.

### 3.26.6 Changing register data display format

You can change the format in which the debugger displays the contents of registers. For example, you can specify that a register's contents be displayed in hexadecimal, rather than binary. The debugger provides these data formats:

- Binary
- Natural
- Decimal
- Hexadecimal

To change register display format:

1. Open the **Registers** view.
2. Expand the hierarchical list to reveal the register for which you want to change the display format.
3. Select the register value that you want to view in a different format.

The value highlights.

4. Right-click and choose **Format** > *dataformat* from the shortcut menu that appears, where *dataformat* is the data format in which you want to view the register value.

The register value changes format.

## 3.27 Register Details view

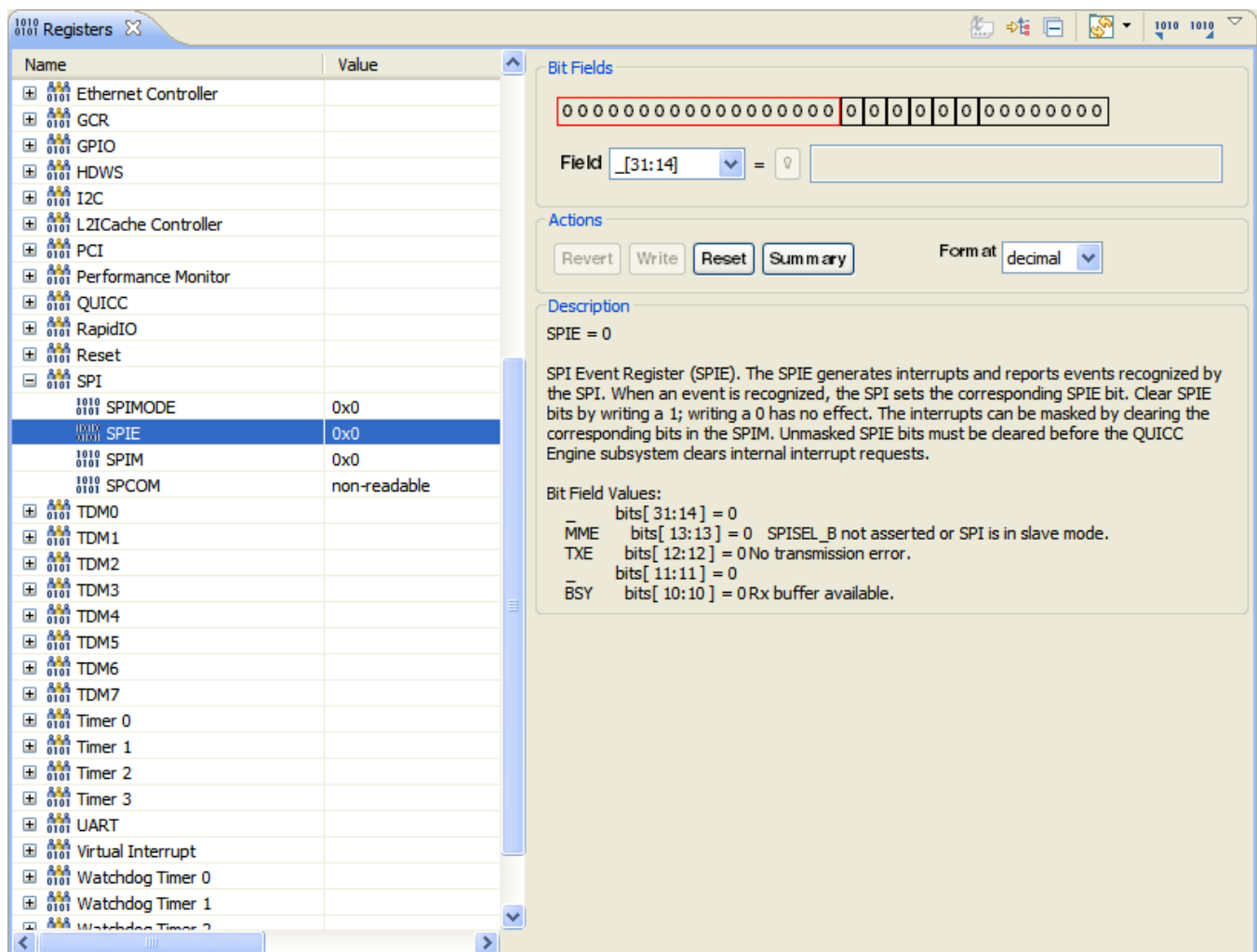
The **Register Details** view shows detailed information for a selected register. The **Register Details** view shows the following information for a register:

- Bit Fields - 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 to see additional information.
- Actions - Lets you perform various operations on the selected register's bit-field values.
- Description - Shows explanatory information for the selected register. The information includes name, current value, description, and bit-field explanations and values of the selected register.

**NOTE**

The default display of the **Registers** view shows register details, such as **Bit Fields**, **Description**, and **Actions**. To see more register contents, use the pop-up menu in the **Registers** view to choose **Layout > Registers View Only**. To restore the register details, use the pop-up menu to choose a different menu command.

To open the **Register Details** view, right-click on a register name in the **Registers** view and choose **Show Details As > Register Details pane** from the shortcut menu. You can also click the **Register Details** button on the toolbar to open the **Register Details** view.



**Figure 3-78. Register details in Registers view**


## NOTE

If the **Registers** view loses focus, all pending changes are discarded. For more information, see the *<Product> Targeting Manual*.

Following sections will help you with more details on the **Register Details** view:

- [Viewing register details offline](#)
- [Loading register dump file in offline Register Details view](#)
- [Customizing Register Details pane](#)

### 3.27.1 Viewing register details offline

The **Register Details** view allows you to browse registers information from debugger database offline (without a debug session) for a specific processor and core from all processors supported by that product. Click the **Register Details** button  in the CodeWarrior IDE toolbar to open the offline **Register Details** view. The register details are presented in the same way as in the **Registers** view. Choose a supported processor from the **Processors** pop-up menu and a core available on the chosen processor from the **Core** pop-up menu. Click the register from the list to view details offline. All registers appear in a tabular format similar to the online **Registers** view. The value shown for each register is 0 and all registers are read-only. You can view all possible values for bit fields, but the write operation is disabled.

The **Register Details** view also provides an editor for "regs" files (files exported from registers view). Choose **File > Open File** and select the previously exported registers dump (.reg) file, to open the **Register Details** view for viewing and editing registry details offline. For details on how to create a .reg file, see [Exporting registers](#).





```

1010 exported_regs regs
0101
<?xml version="1.0" encoding="UTF-8"?>
<register-groups architecture="EPPC" core="e6500" processor="B4860" processc
<register-group name="regPPCTLB0">
<register name="L2MMU_TLB0">
<value>0x0400000000000000000000000000000000000000000000000000000000000000</value>
<location>$L2MMU_TLB0</location>
<custom-groups></custom-groups>
</register>
<register name="L2MMU_TLB1">
<value>0x0400000000000000000000000000000000000000000000000000000000000000</value>
<location>$L2MMU_TLB1</location>
<custom-groups></custom-groups>
</register>

```

Figure 3-80. Viewing register details offline - Text editor

### 3.27.2 Loading register dump file in offline Register Details view

Memory Mapped Registers(MMR) have static offset information in the debug database. This offset is relative to a base address and is computed at runtime based on a specific formula. You can load a memory mapped register dump file to see the register values in the offline **Register Details** view. The dump file can be raw binary or in plain hex text format (annotated hex text format not supported yet).

The offline **Register Details** view displays the offsets from debug database (in the **Offset** column) and the offset from dump file (in the **Load dump file** column) from where registers values are loaded. The dump file can be loaded either for an IP block, or a part of an IP block, or multiple IP blocks.

When a new processor is selected, the previously mapping configuration is applied to the new selected processor.

#### NOTE

You can add optional columns to the **Register Details** view by right-clicking on the table's header and choosing the required option from the shortcut menu.

The following table provides details of the various options that help you load register dump file for mapping on MMR registers. These options are available in the shortcut menu that appears on right-clicking in the **Register Details** view.

**Table 3-20. Register Details view - Shortcut menu**

Menu Command	Description
Load dump file	Launches the <b>Import Register Dump</b> dialog asking for details of the dump file to load.
Unload dump file	Unloads the current dump file. The menu command is available only when a dump file is loaded.
Change destination offset	Launches the <b>Change Destination Offset</b> dialog asking for a new memory offset where the dump file will be loaded. The menu command is available only when a dump file is loaded.
Endianness	Shows current endianness for the dump file and allows toggling it. The menu command is available only when a dump file is loaded.
Runtime address	Launches the <b>Runtime address</b> dialog asking for runtime address details from where the dump was made. The menu command is available only when a dump file is loaded.

To load a dump file in the offline **Register Details** view, perform the following steps.

1. Right-click in the **Register Details** view, and choose **Load Dump File** from the shortcut menu. Alternatively, you can drag and drop the dump file over the registers.

The **Import Register Dump** dialog appears.

2. Browse the dump file to be loaded.
3. Specify the **Dump type**, **Destination offset**, and dump **Endianness** in the respective fields. **Destination offset** is the memory offset where the register dump file will be loaded.
4. Click **Finish**.

A column is added with the name same as that of the loaded dump file along with global offset for the file. For example, *dump.bin*. To change the value of the destination offset, choose **Change destination offset** from the shortcut menu.

In case you choose the drag and drop method to load the dump file, the **Dump file** and **Destination offset** are automatically filled in. You can change the endianness for the dump file by choosing **Endianness** from the shortcut menu. The value of the register will be loaded from dump file at displayed file offset and using the displayed endianness. The registers that are mapped outside the dump file range display “NA” in the dump file column.

### 3.27.3 Customizing Register Details pane

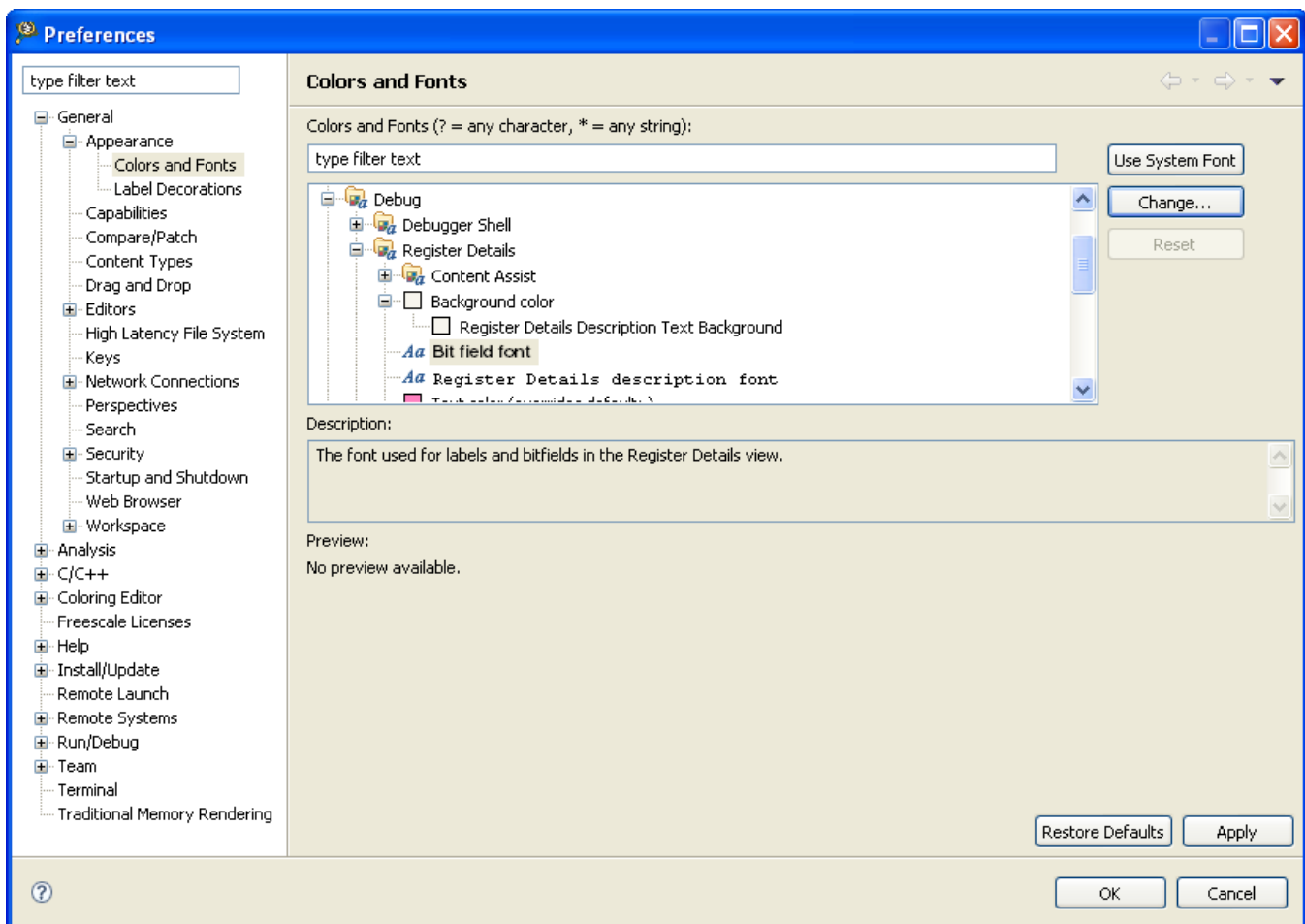
You can customize background color, fonts, and foreground color for Register Details pane. To customize Register Details pane:

1. Open the **Registers** view.
2. Choose **Window > Preferences** from the IDE menu bar.

The **Preferences** dialog appears.

3. Choose **General > Appearance > Colors and Fonts** from the left pane of the **Preferences** dialog.

The color and fonts preferences appear in the right pane of the **Preferences** dialog.



**Figure 3-81. Preferences dialog**

4. Expand **Debug > Register Details** tree controls.
5. Modify colors and fonts settings to suit your needs.
6. Click **Apply**.
7. Click **OK**.

## 3.28 Remote launch

The remote launch feature of CodeWarrior allows launch configurations to be executed remotely. A Jython script is used to declare which launch configuration to use as a basis and provides points of interaction with the executing launch configuration if desired.

The launch scripts can be submitted to CodeWarrior in these ways:

- The submissions web page
- Java and/or Python Clients

CodeWarrior requires a launch configuration to be set up on the host CodeWarrior instance in order to execute. The remote launch script will make a copy of that launch configuration, execute it, and then delete the configuration.

### 3.28.1 Remote Launch view

The **Remote Launch** view ( [Figure 3-83](#)) displays the remote launch configurations for the project. The **Enable Remote Launch** option in the pop-up menu is a toggle button to enable or disable the remote launch view. The **Open Remote Launch Web Page** opens the **CodeWarrior Remote Launch** web page where you can submit remote launch scripts.

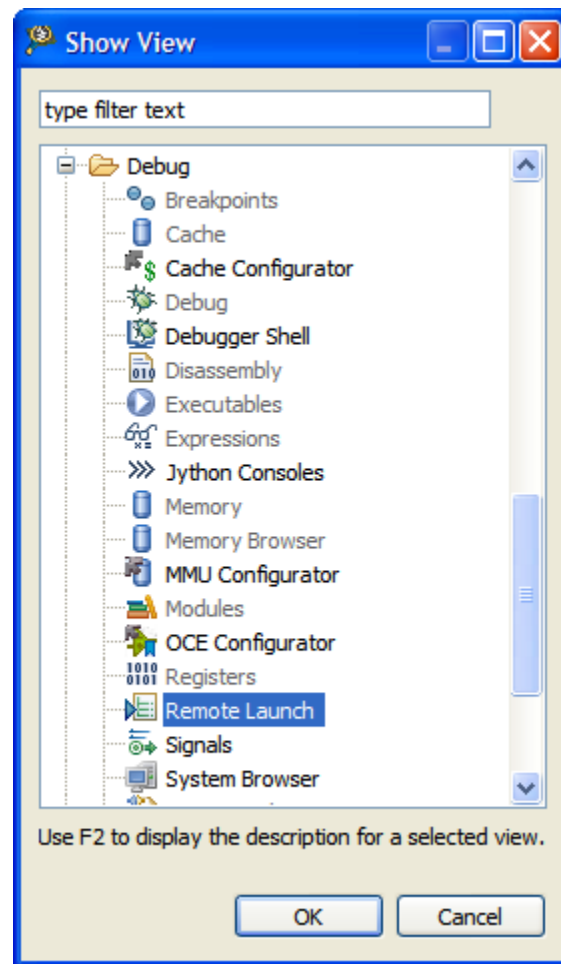
#### NOTE

Click the **Help/Examples** link in the **CodeWarrior Remote Launch** web page for remote launch examples.

To open the **Remote Launch** view:

1. Choose **Window > Show View > Others** from the IDE menu bar.

The **Show View** dialog appears.



**Figure 3-82. Show View dialog**

2. Expand the **Debug** tree control.
3. Select **Remote Launch**.
4. Click **OK**.

The Remote Launch view appears.

Id	Job State	Script	Basis Configuration	Start Time	Elapsed Time	Submitted From
4	Preparing	HelloWorld.py			00:00:00.000	127.0.0.1

**Figure 3-83. Remote Launch view**

The **Jython Consoles** view is a scripting view where you can work with Jython scripts. You can use this view to test remote launches.

```

>>> print 'Jython 2.5.1'
Jython 2.5.1
>>>
>>> execfile( "D:/Freescale/CW SC v10.1/eclipse/plugins/com.freescale.jython_1.0.0.32266-20091117
>>> execfile( "D:/Freescale/CW SC v10.1/eclipse/plugins/com.freescale.analysis_1.1.0/jython/codew
>>> execfile( "D:/Freescale/CW SC v10.1/eclipse/plugins/com.freescale.debug.scripting_1.0.0.32266
>>> execfile( "D:/Freescale/CW SC v10.1/eclipse/plugins/com.freescale.remotelaunch_1.0.0.32266-20
>>> execfile( "D:/Profiles/b12940/Desktop/HelloWorld.py" )
Traceback (most recent call last):
>>>

```

Figure 3-84. Jython Consoles view

## 3.29 Stack crawls

CodeWarrior allows you to limit the depth of stack crawls in the debugger. You can limit the stack crawl depth in two ways:

- [One Frame mode](#)
- [Global preference](#)

### 3.29.1 One Frame mode

In the one frame mode, only the topmost frame is retrieved by the debugger engine and displayed in the **Debug** view and in the debugger shell. The following figure shows selecting the one-frame mode from the **Debug** view.

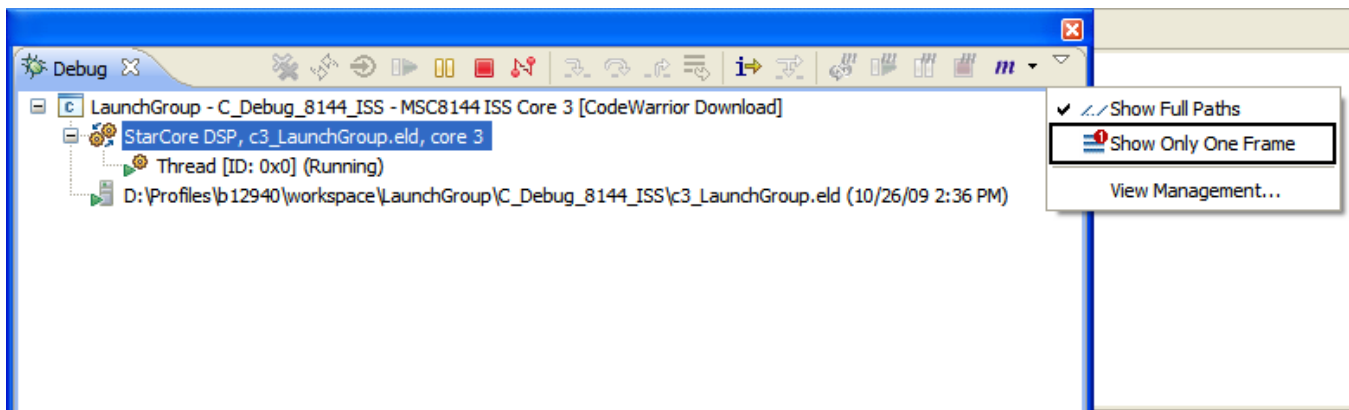


Figure 3-85. Selecting One Frame mode

The **Show Only One Frame** menu command is a two-state menu item which uses a checkmark to indicate the state. If the **Show Only One Frame** menu command is chosen then a checkmark appears and only one frame is displayed. The following figure shows the stack crawl in a one frame mode.

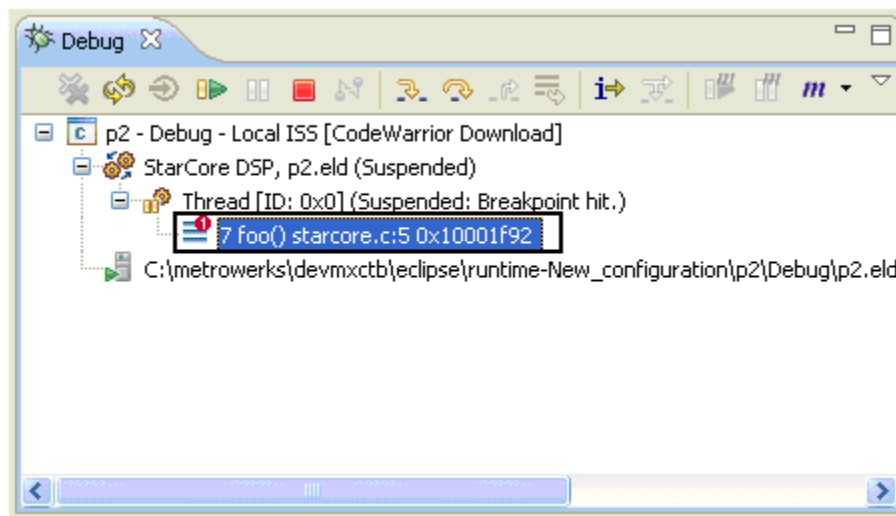


Figure 3-86. Stack crawls in One Frame mode

The decorator **1** in the stack frame element indicates that the stack crawl is limited to one.

### 3.29.2 Global preference

CodeWarrior exposes a global preference that allows you to specify the maximum number of frames that will be displayed in the **Debug** view. This limit is merely a display limit and does not restrict the depth of the stack crawl calculated by the debugger engine. This mode allows you to manage the amount of content in the **Debug** view.

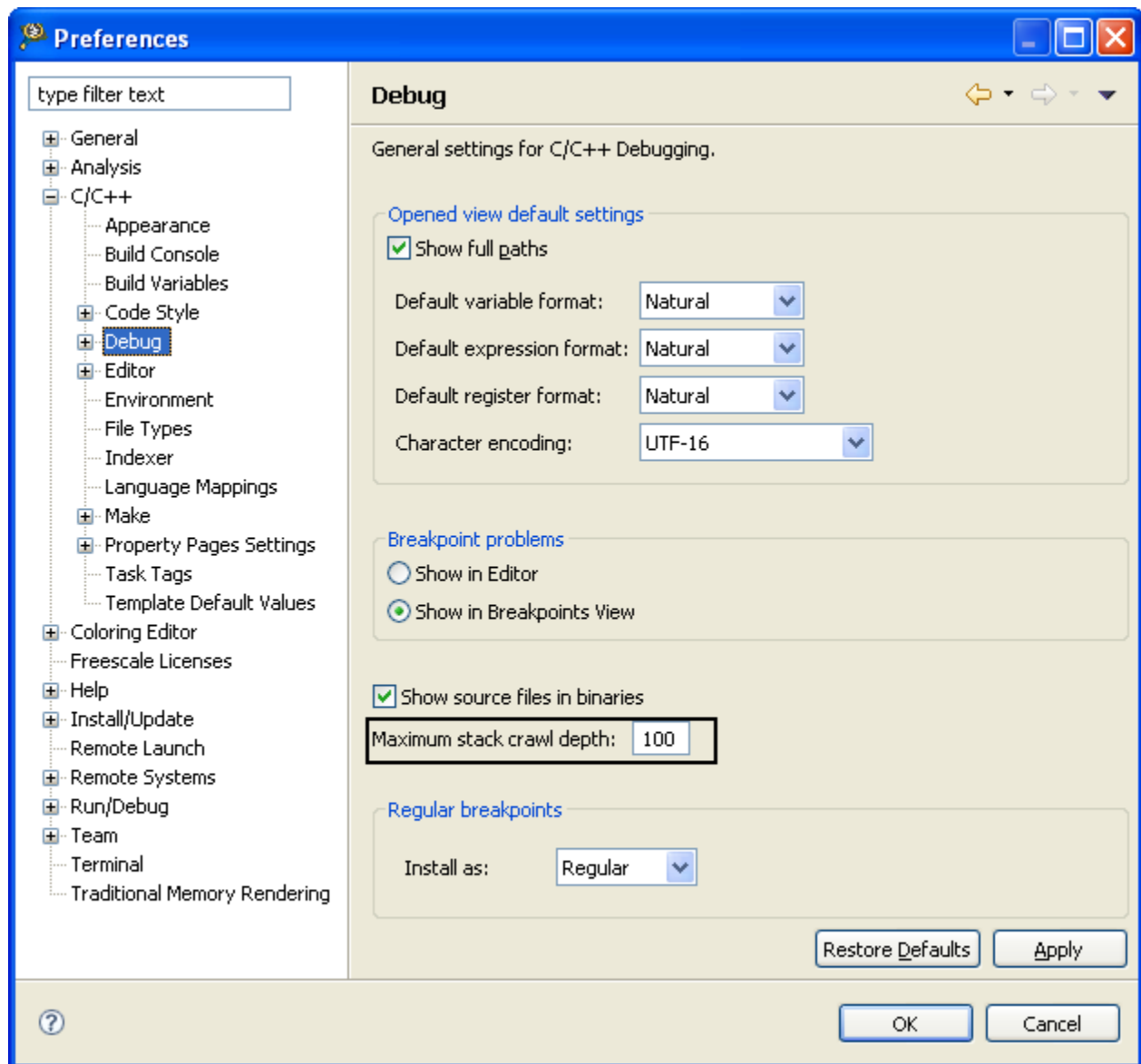
To specify the maximum frames in the global preference window:

1. Choose **Window > Preferences** from the IDE menu bar.

The **Preferences** dialog appears.

2. Expand **C/C++** and select the **Debug** group.

General C/C++ debug settings appears in the left pane of the **Preferences** dialog.



**Figure 3-87. Preferences dialog**

3. Type the maximum frame depth in the **Maximum stack crawl depth** textbox.

#### NOTE

The upper limit for maximum frame depth is 100.

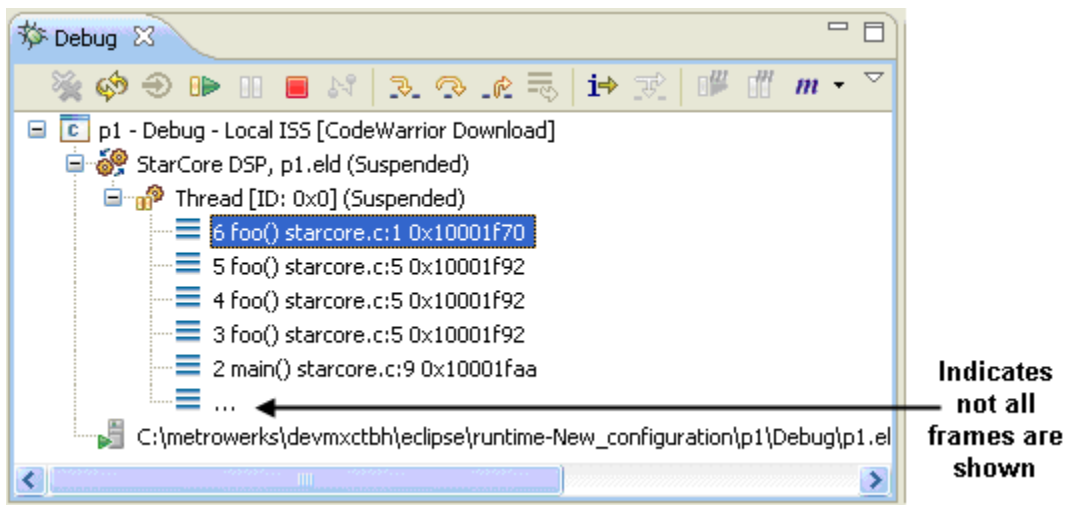
4. Click **Apply**.



5. Click **OK**.

Changing the stack crawl preference does not have an immediate effect on stack crawls currently displayed in the **Debug** view. The limit takes effect the next time the stack crawl is constructed, which happens either on the next suspended event, or after toggling in or out of the one frame mode.

When the actual stack crawl depth of a core exceeds the number of frames specified in the global preference, the stack crawl contains a final frame that is labeled ... ( [Figure 3-88](#)). This label indicates that frames are being omitted from display.



**Figure 3-88. Exceeding stack crawl depth**

### 3.30 Symbolics

Use the **Symbolics** page 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, helps when you debug a large application.

Suppose that the debugger loads symbolics for a large application, but does not download program code and data to a hardware device. Also, suppose that the debugger uses custom makefiles with several build steps in order to generate the large application. In this situation, caching symbolics helps speed up the debugging process. The debugger uses the 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 the most benefit for large applications because doing so speeds up application-launch times. If you debug a small application, caching symbolics does not significantly improve launch times.

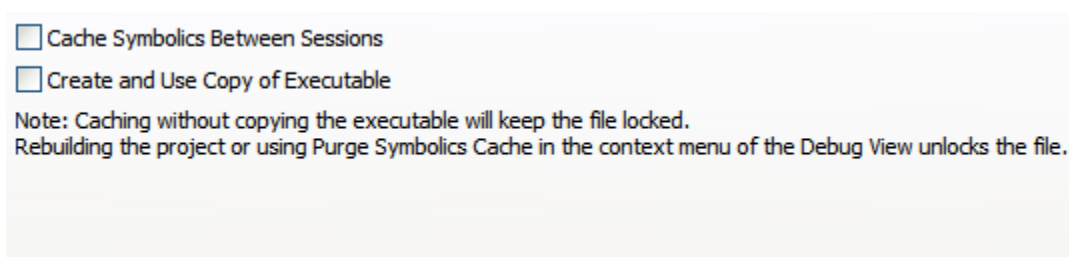
To open the **Symbolics** page:

1. Choose **Run > Debug Configurations** from the IDE menu bar.

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

2. Expand **CodeWarrior** and select the debug configuration that you want to modify.
3. Click the **Debugger** tab to view the corresponding debugger settings page.
4. Click the **Symbolics** tab in the **Debugger Options** group on the page.

The **Symbolics** page appears.



**Figure 3-89. Symbolics page**

## 3.31 System Browser view

The **System Browser** view is a framework for displaying embedded operating system (OS) information. If you are working with a target running an embedded OS, you can use the **System Browser** view to gather information about the OS during a debug session.

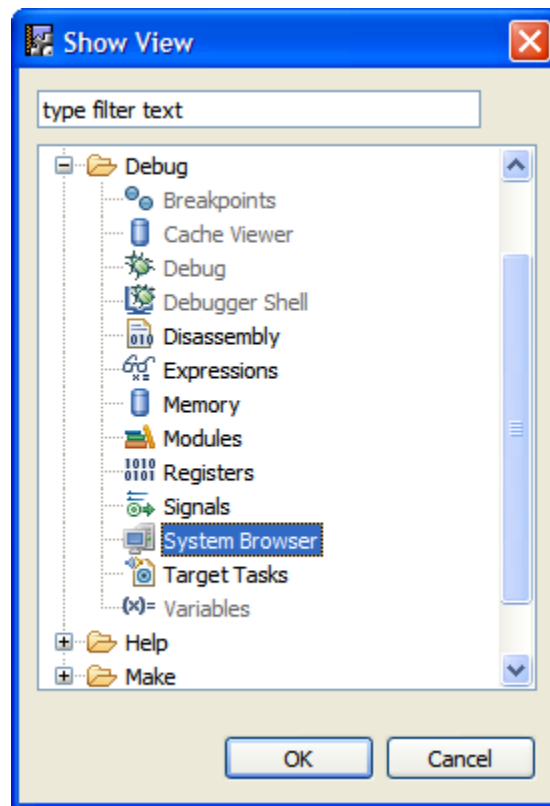
The **System Browser** view allows you to debug specific threads, tasks, and processes running in the OS.

### 3.31.1 Opening System Browser view

To open the **System Browser** view:

1. Start a debugging session.
2. Choose **Window > Show View > Other** from the IDE menu bar.

The **Show View** dialog appears.

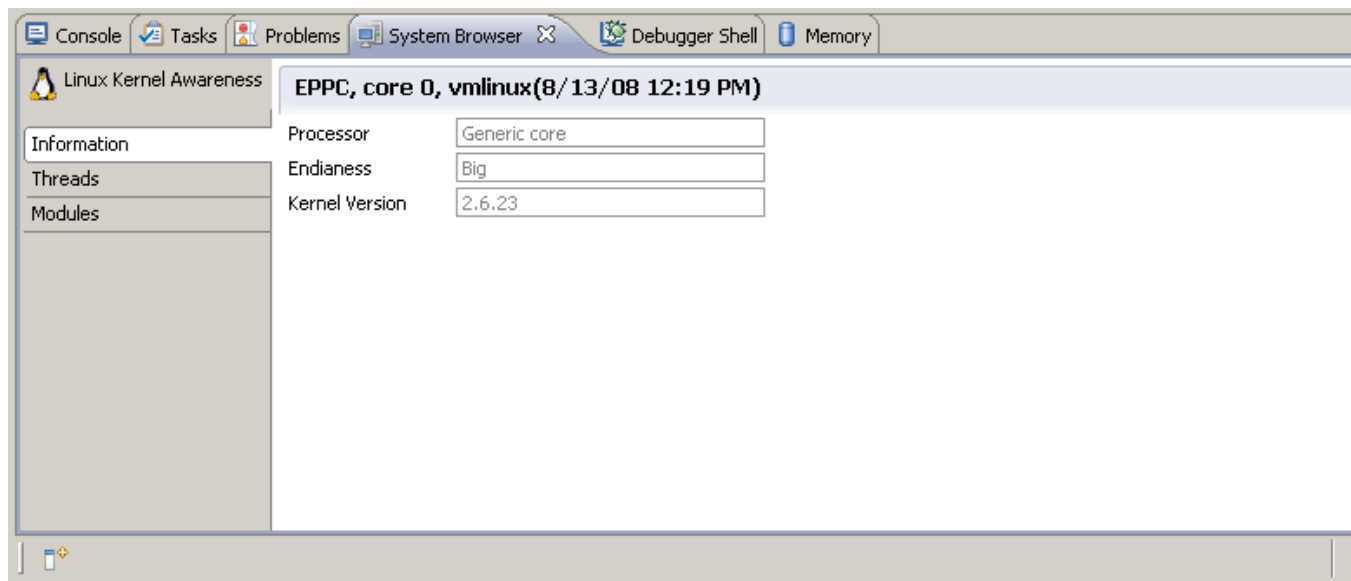


**Figure 3-90. Show View dialog**

3. Expand the **Debug** group and select **System Browser**.
4. Click **OK**.

The **System Browser** view appears.

## Target connection lost



**Figure 3-91. System Browser view**

### NOTE

The **System Browser** view shows information only when there is an OS running on the target being debugged.

## 3.32 Target connection lost

This feature allows you to configure the debugger's behavior when connection to the target is lost, such as low power modes, target power switched off, target changed communication speed, or disconnected run control. This feature helps you configure the debugger to close the connection or automatically reconnect with a specified time-out value.

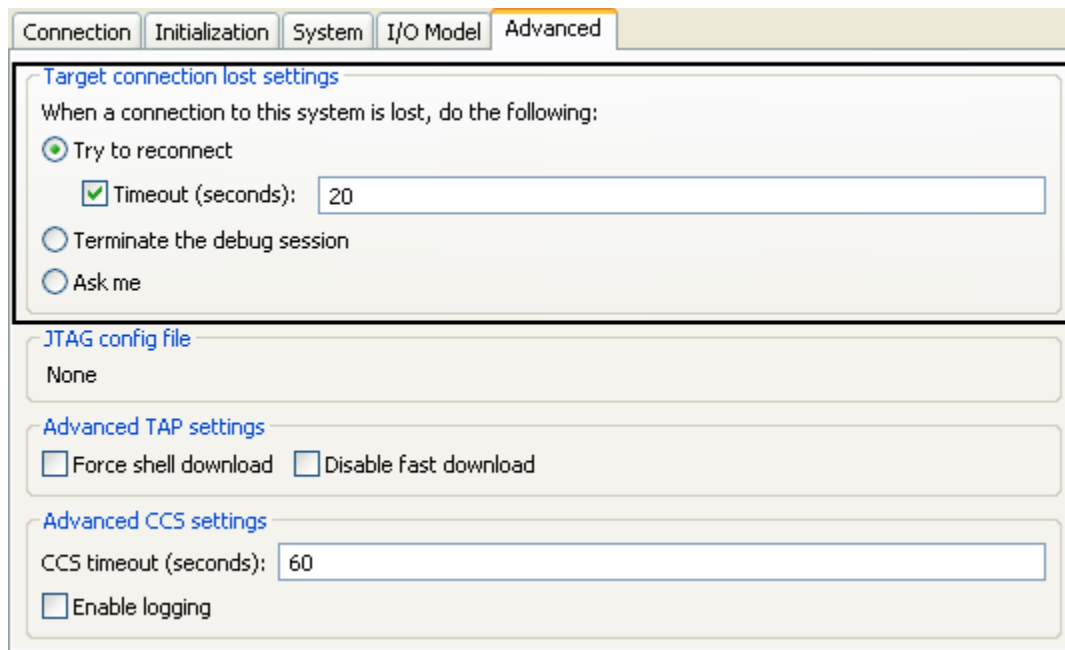
To configure target connection lost settings for debugger:

1. Open Remote System view.
2. Right-click a remote system name and choose **Properties** from the shortcut menu.

The **Properties for <Remote System>** dialog appears.

3. In the right pane, click **Advanced** tab.

The advanced connection settings appear under the **Advanced** pane.



**Figure 3-92. Advanced settings**

4. Specify the target connection lost settings to suit your needs.
  - **Try to reconnect** - Whenever target connection is lost, the debugger does not close the debug session but waits for the connection to be restored. A time-out may be specified to limit the waiting time. When the time-out expires, the debugger closes the debug session.
  - **Terminate the debug session** - Select this option to terminate the debug session when target connection is lost.
  - **Ask me** - Select this option to prompt the user for an action when target connection is lost.
5. Click **OK**.

You have just configured target connection lost settings for debugger.

### 3.33 Target initialization files

A target initialization file contains commands that initialize registers, memory locations, and other components on a target board. The most common use case is to have the CodeWarrior debugger execute a target initialization file immediately before the debugger downloads a bareboard binary to a target board. The commands in a target initialization file put a board in the state required to debug a bareboard program.

## NOTE

The target board can be initialized either by the debugger (by using an initialization file), or by an external boot loader or OS (U-Boot, Linux). In both cases, the extra use of an initialization file is necessary for debugger-specific settings (for example, silicon workarounds needed for the debug features).

### 3.33.1 Selecting target initialization file

A target initialization file is a command file that the CodeWarrior debugger executes each time the launch configuration to which the initialization file is assigned is debugged. You can use the target initialization file for all launch configuration types (Attach, Connect and Download). The target initialization file is executed after the connection to the target is established, but before the download operation takes place.

The debugger executes the commands in the target initialization file using the target connection protocol, such as a JTAG run control device.

## NOTE

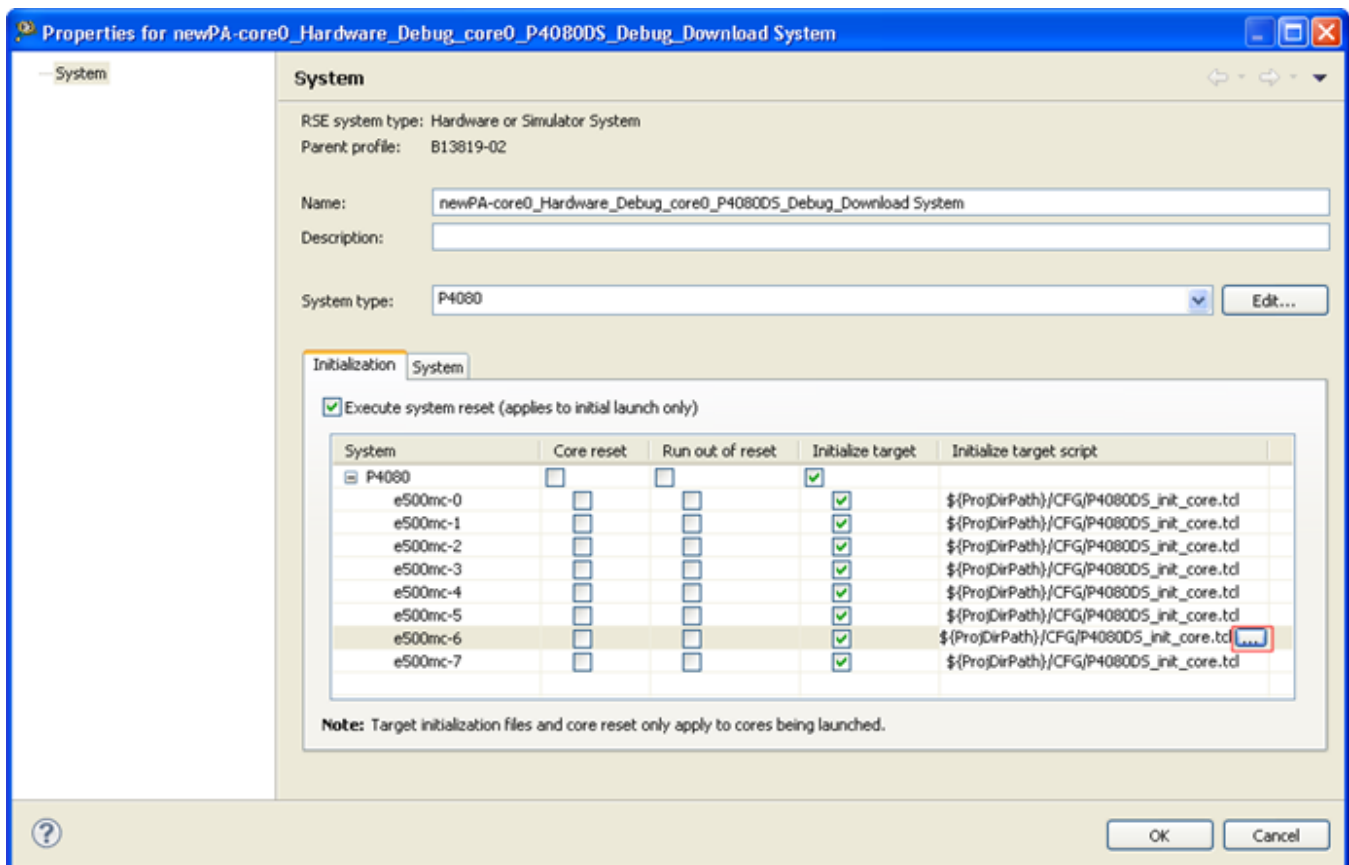
You do not need to use an initialization file if you debug using the CodeWarrior TRK debug protocol.

To select a target initialization file, follow these steps:

1. Go to the [Remote Systems view](#).
2. Right-click a remote system name and choose **Properties** from the shortcut menu.

The **Properties for <Remote System>** dialog appears.

3. Click the **Initialization** tab.



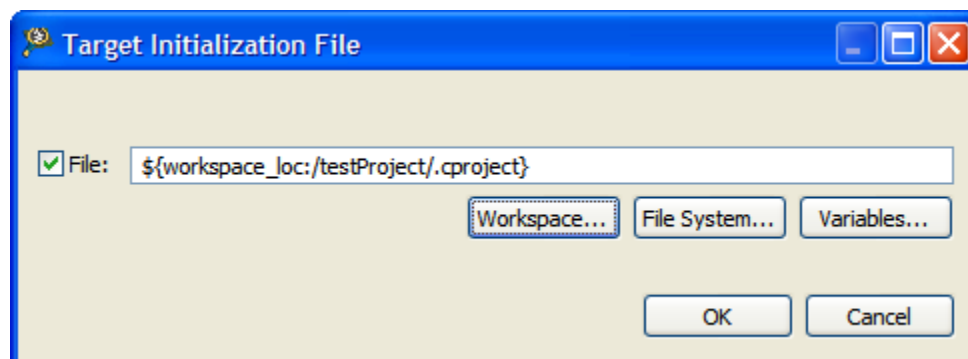
**Figure 3-93. Properties for <Remote System> - Initialization settings**

4. Click the ellipsis button in the **Initialize target script** column corresponding to the core for which you want to select the target initialization file.

### Tip

Click in the specified cell of the Initialize target script column for the ellipsis button to appear.

The **Target Initialization File** dialog appears.



**Figure 3-94. Target Initialization File dialog**

- a. Select the **File** checkbox to enable the textbox.

## Target Tasks view

- b. Enter the target initialization file path in the **File** textbox. You can use the **Workspace**, **File System**, or **Variables** buttons to select the desired file.
- c. Click **OK**.

The target initialization file path appears in the **Initialize target** column.

5. Click **OK**.

## 3.34 Target Tasks view

In order to run a hardware-diagnostic or memory operation, you must first open the Target Tasks view. To open the **Target Tasks** view:

1. Choose **Window > Show View > Other** from the IDE menu bar.

The **Show View** dialog appears.

2. Expand the **Debug** group and select **Target Tasks**.
3. Click **OK**.

The **Target Tasks View** appears in the **Debug** perspective.

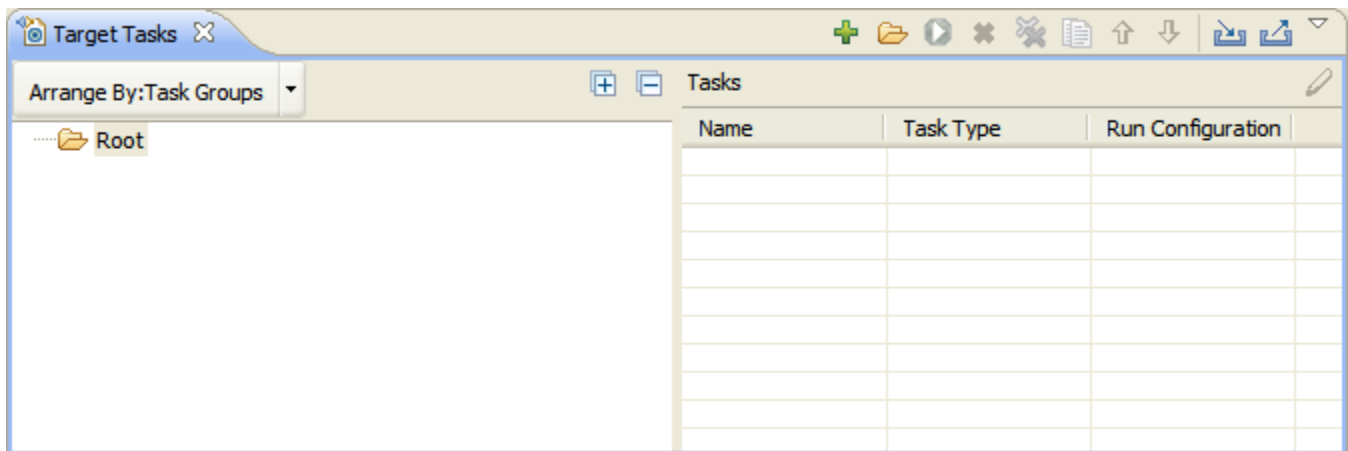


Figure 3-95. Target Task view

### 3.34.1 Exporting target tasks

You can export a target task to an external file. The exported task is stored in XML format.



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 choose **Export** from the shortcut menu.

The **Save As** dialog appears.

3. Type a file name in the **File name** pop-up menu.
4. Click **Save**.

### 3.34.2 Importing target tasks

You can import a target task from an external file. To import a target task:

1. Click the **Import** button in the **Target Tasks** view toolbar. Alternatively, right-click in the **Target Tasks** view and choose **Import** from the shortcut menu.

The **Open** dialog appears.

2. Select a target task file.
3. Click **Open**.

## 3.35 Variables

The **Variables** view shows all global and static variables for each process that you debug. Use the view to observe changes in variable values as the program executes.

Name	Value	Location	Declared Type
(x)= i	0	0x20000130` Data	int
(x)= YNP1	0	0x20000134` Data	long
(x)= YN	21495808	0x2000012c` Data	long
(x)= TNP1	644218880	0x20000128` Data	long
TN	21495808	0x20000138` Data	long
(x)= YNM2	328	0x2000013c` Data	short
(x)= YNM1	0	0x2000013e` Data	short
+ DataIn	0x00000200	0x00000200` Data	short[40]
+ DataOut	0x00000128	0x00000128` Data	short[40]

21495808

Figure 3-96. Variables View

### 3.35.1 Opening Variables view

Use the **Variables** view to display information about the variables in the currently-selected stack frame.

To open the **Variables** view:

1. Choose **Window > Show View > Other** from the IDE menu bar.

The **Show View** dialog appears.

2. Expand the **Debug** group and choose **Variables**.
3. Click **OK**.

The **Variables** view appears.

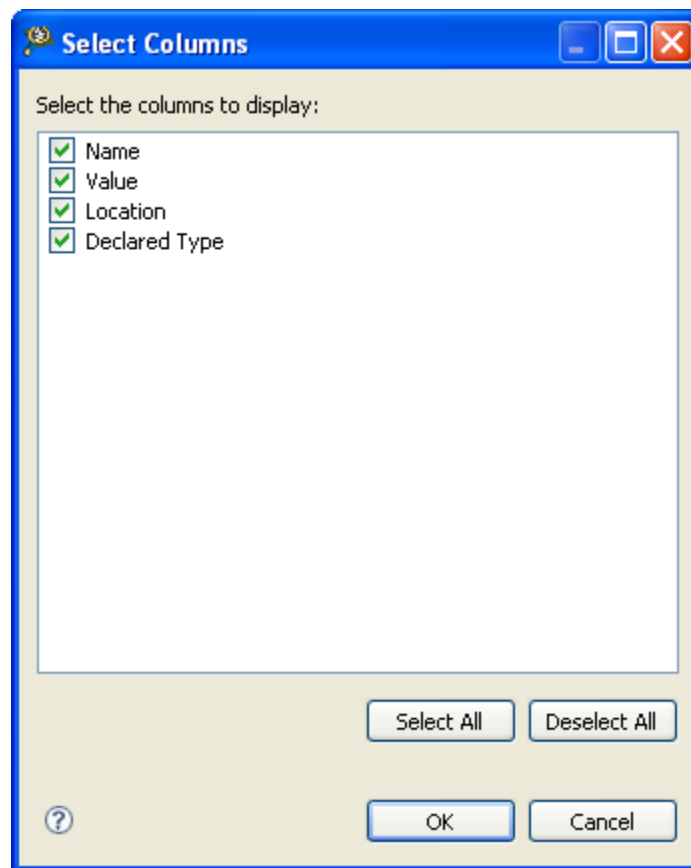
### 3.35.2 Adding variable location to view

A variable location can be a memory address or a register. This can change from one execution point to another in the target application. The return value will be a hexadecimal ("0x...") value if the variable is in memory; if it is in a register, `$(register-name)` will be returned.

To add the variable location column in the **Variables** view:

1. Open the pop-up menu in the **Variables** view .
2. Choose **Layout > Select Columns**.

The **Select Columns** dialog appears.



**Figure 3-97. Select Columns dialog**

#### NOTE

In the **Variables** view, Freescale CDT (C/C++ Development toolkit) does not support the **Actual Type** column. This column is relevant for C++ only when RTTI

(Runtime type information) is used. Choose **Window > Preferences... > C/C++ > Debug > CodeWarrior Debugger**, and select the **Attempt to show the dynamic runtime type of objects** checkbox to get declared types displaying the Actual types.

3. Select the **Location** checkbox.
4. Click **OK**.

### Tip

You can use the **Select Columns** dialog to hide/show different columns in the **Variables** view.

The variable location column appears in the **Variables** view.

## 3.35.3 Manipulating variable values

You can change the way the **Variables** view displays a variable value. To manipulate the format of a variable value, choose **Format** from the shortcut menu and choose any of the following formats:

- Binary
- Natural
- Decimal
- Hexadecimal
- Fractional

### 3.35.3.1 Fractional variable formats

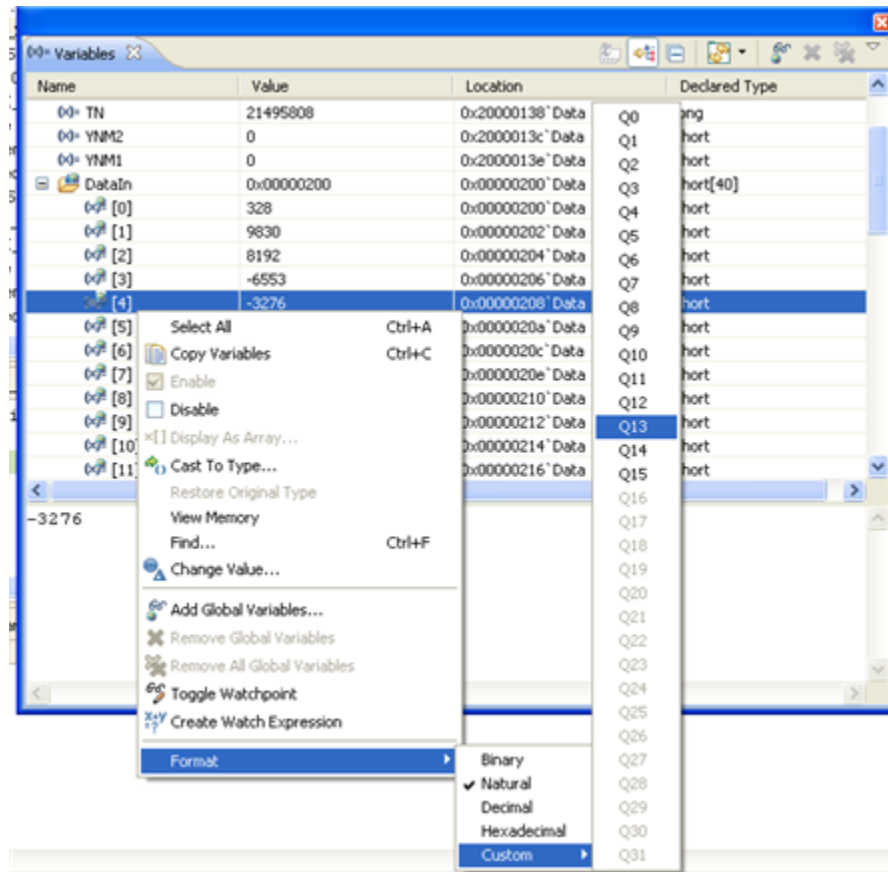
In addition to the Natural, Binary, Decimal, and Hexadecimal variable formats, CodeWarrior supports an additional class of custom fractional formats called  $Q_n$ .  $Q_n$  is a floating point representation of a fractional or fixed point number where  $n$  signifies the number of fractional bits (the number of bits to the right of the binary point).

CodeWarrior supports fractional formats ranging from  $Q_0$  to  $Q_{31}$ .

To change the variable display format to fractional format:

1. Open the **Variables** view, see [Opening Variables view](#).
2. Right-click a variable in the **Variables** view.

A shortcut menu appears.



**Figure 3-98. Choosing fractional format**

3. Choose **Format > Fractional > Qn** (where n = 0 to 31).

The variable value will be displayed in the specified Qn format.

#### NOTE

The Qn formats are available or dimmed depending on the size of the variable.


- Q0 - Q7 available for 1 byte variables
- Q0 - Q15 available for 2 byte variables
- Q0 - Q31 available for 4 byte variables

### 3.35.4 Adding global variables

## Variables

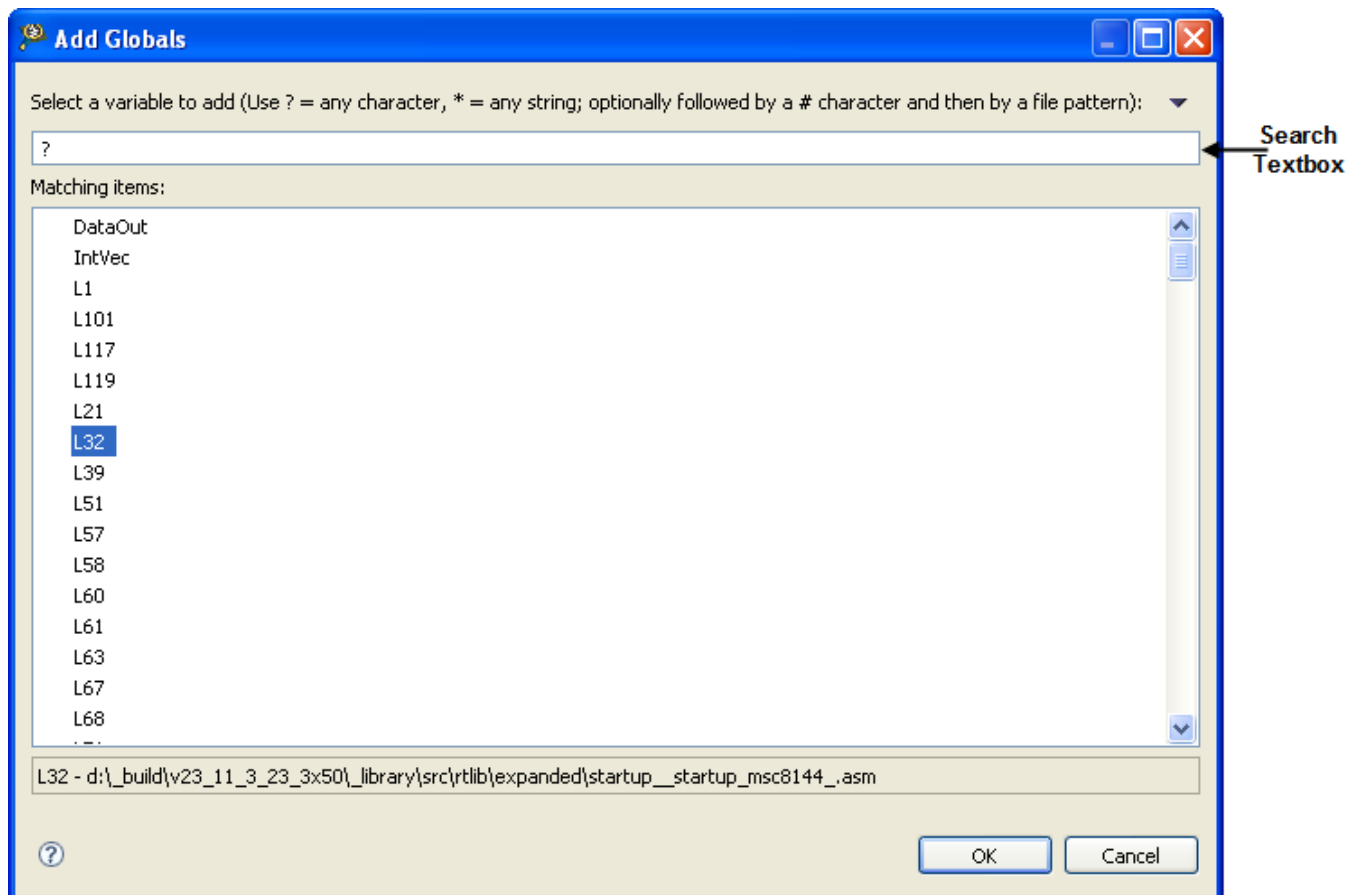
You can add global variables to the **Variables** view.

To add global variable:

1. Choose **Project > Debug** from the IDE menu bar.  
A debugging session starts.
2. In the **Variables** view toolbar, click the **Add Global Variables** button .  
The **Add Globals** dialog appears.

### Tip

You can also add a global variable by choosing the **Add Global Variable** command from the shortcut menu.



**Figure 3-99. Add Globals dialog**

3. Specify a search criteria in the available textbox to filter the list of variables.
4. Select the global variable to be added.

### NOTE

Global variables of other executables (other than the main one) are also listed in the **Add Globals** dialog.

5. Click **OK**.

### 3.35.5 Cast to Type

This feature allows the user to cast the type of a variable to a particular type. The **Cast to Type** dialog helps you filter the type list based on a search pattern specified in the search textbox.

To cast a variable to a selected type:

1. Open the **Variables** view, see [Opening Variables view](#).
2. Right-click a variable in the **Variables** view and choose **Cast to Type** from the shortcut menu.

The **Cast to Type** dialog appears.

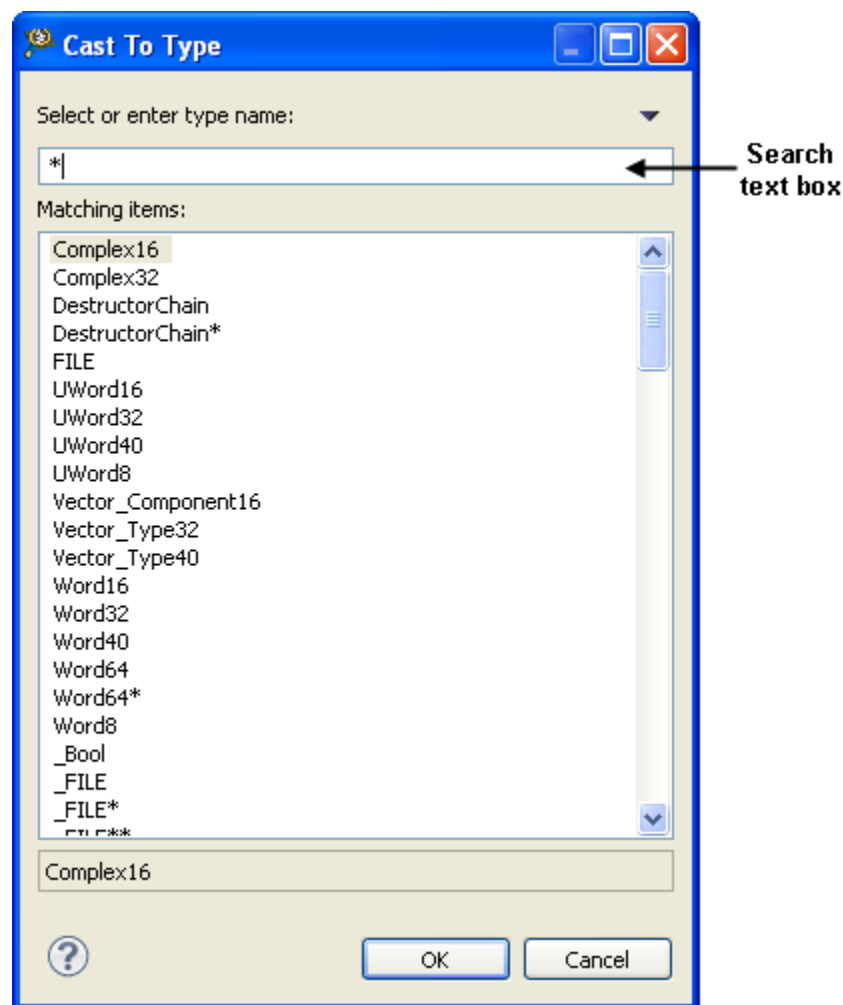


Figure 3-100. Cast to Type dialog

3. Specify a search pattern in the Search textbox.

The matching types appear in the **Matching Items** listbox.

4. Select a type from the **Matching Items** listbox.
5. Click **OK**.

### 3.36 Watchpoints

You use *watchpoints* (sometimes referred to as access breakpoints or memory breakpoints) to halt program execution when your program reads or writes to a specific memory location. You can then examine the call chain, check register and variable values, and step through your code. You can also change variable values and alter the flow of normal program execution.

You can set a watchpoint from the:

- **Breakpoints** view
- **Memory** view
- **Registers** view
- **Variables** view

#### NOTE

Not all targets support setting a watchpoint on a memory range. For example, if a target has only one or two debug watch registers, you cannot set a watchpoint on 50 bytes.

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.



### 3.36.1 Setting watchpoint

Use the **Add Watchpoint** dialog ( [Creating watchpoint](#)) to set a watchpoint. When the value at the memory address on which you set a watchpoint changes, your program's execution halts and the debugger takes control.

To set a watchpoint:

1. Open the **Debug** perspective.
2. Open any of the following views:
  - Breakpoints
  - Memory
  - Register
  - Variables
3. Right-click in the selected view.

The process of setting a watchpoint varies depending upon the type of view:

- **Registers** - select register(s) on which you want to set the watchpoint and choose **Watch** from the shortcut menu that appears.
- **Variables** - select global variable(s) and choose **Watch** from the shortcut menu.
- **Breakpoints** - choose **Add Watchpoint (C/C++)** from the shortcut menu.

The **Add Watchpoint** dialog appears.

- **Memory** - select the addressable unit or range of units on which you want to set the watchpoint, right-click, and choose **Add Watchpoint (C/C++)** from the shortcut menu that appears.

The **Add Watchpoint** dialog appears.

The **Breakpoints** view shows information about the newly set watchpoint and the number of addressable units that the watchpoint monitors.

The **Problems** view shows error messages if the debugger fails to set a watchpoint.

### 3.36.2 Creating watchpoint

Use the **Add Watchpoint** dialog to create a watchpoint. The debugger sets the watchpoint according to the settings that you specify in this dialog.

The following table describes each option.

**Table 3-21. Add Watchpoint dialog options**

Option	Description
Expression to Watch	<p>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:</p> <ul style="list-style-type: none"> <li>• An r-value, such as &amp;variable</li> <li>• 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.</li> </ul> <p>The <b>Add Watchpoints</b> dialog does not support entering expressions that evaluate to registers.</p>
Memory Space	<p>Select it if you want to specify the memory space in which the watchpoint is set. The pop-up menu to the right of the checkbox lists each memory space available for the active debug context. If no debug session is active, the pop-up menu is empty and lets you enter text. This feature lets you set a memory-space-qualified watchpoint before starting a debug session.</p>
Range	<p>If selected - enter the number of addressable units that the watchpoints monitors. If deselected - set the watchpoint on the entire range of memory occupied by the variable.</p>
Write	<p>If selected - the watchpoint monitors write activity on the specified memory space and address range. If deselected - the watchpoint does not monitor write activity.</p>
Read	<p>If selected - the watchpoint monitors read activity on the specified memory space and address range. If deselected - the watchpoint does not monitor read activity.</p>
Enabled	<p>Select the Enabled option to enable or disable a breakpoint.</p>
Condition	<p>Specifies an expression that is evaluated when the watchpoint is hit.</p>
Ignore count	<p>Set the ignore count of watchpoint number to an integer <i>n</i>. The next <i>n</i> times the watchpoint is reached, program's execution does not stop; other than to decrement the ignore count, debugger takes no action. To make the watchpoint stop the next time it is reached, specify a count of 0 (zero).</p>

### 3.36.3 Viewing watchpoint properties

After you set a watchpoint, you can view its properties. To view properties for a watchpoint:

1. Right-click the watchpoint in the **Breakpoints** view and choose **Properties** from the shortcut menu.

The **Properties for** dialog appears.

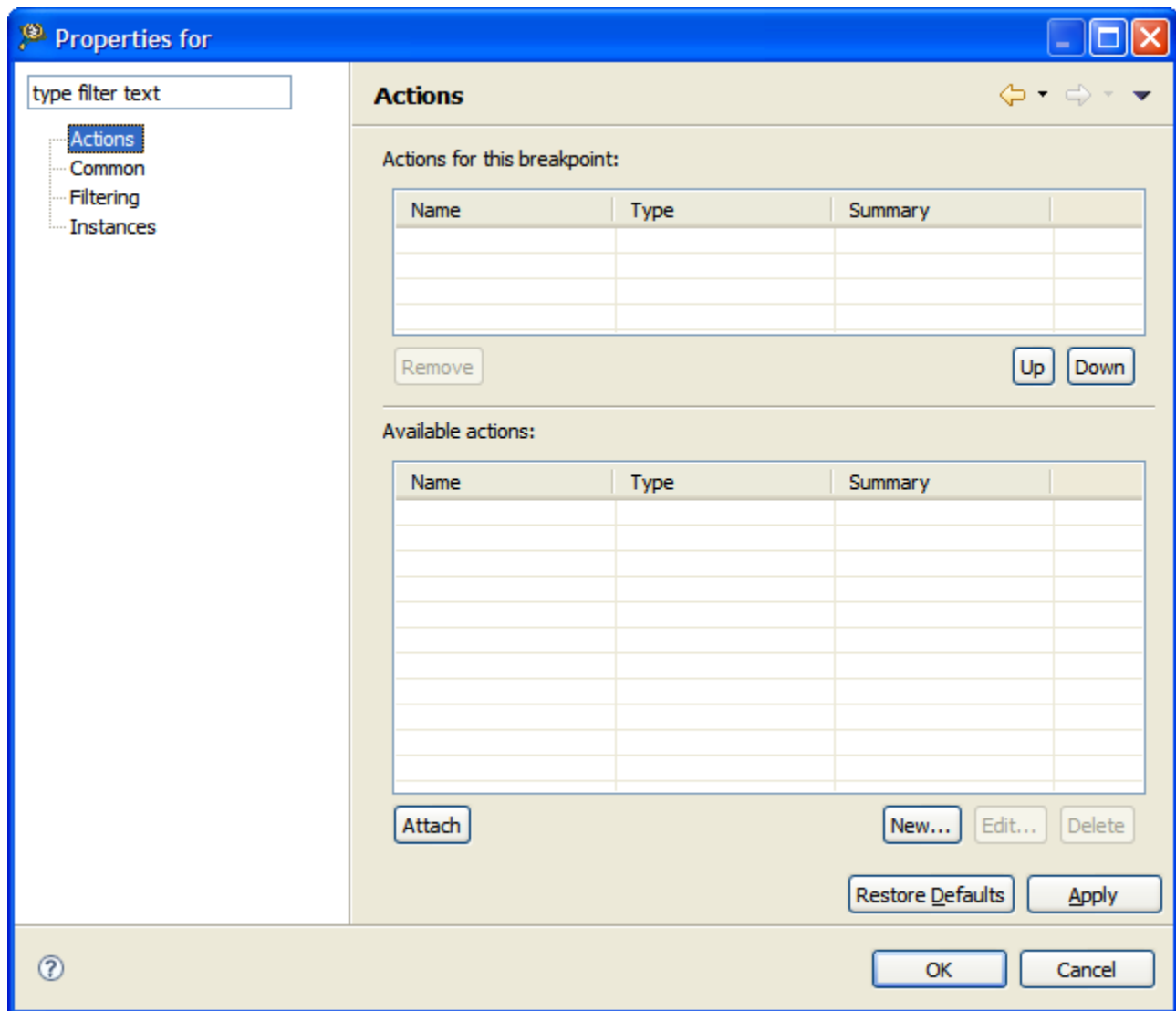


Figure 3-101. Properties for dialog

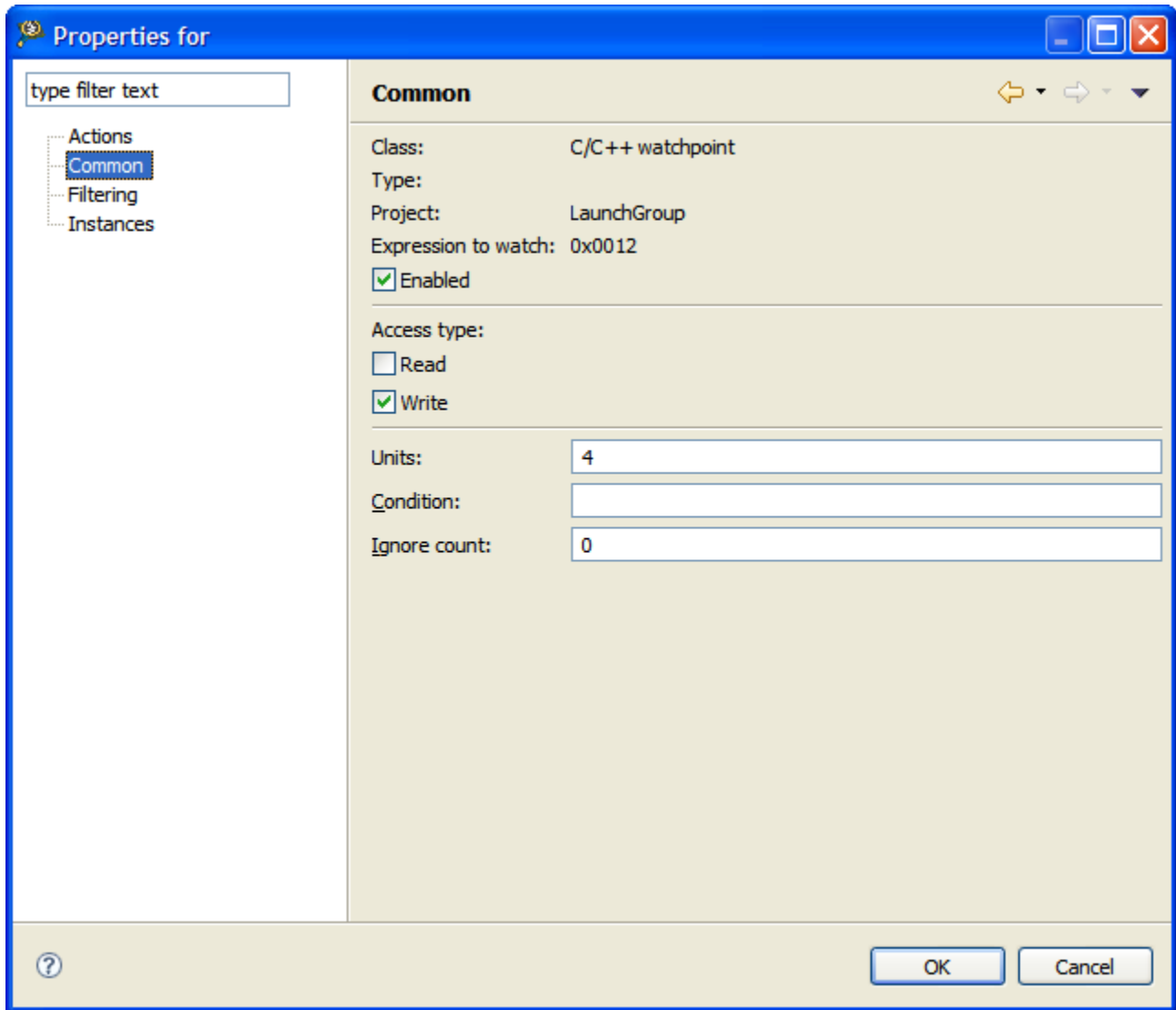
### 3.36.4 Modifying watchpoint properties

After you set a watchpoint, you can modify its properties. To modify properties for a watchpoint:

1. Right-click the watchpoint in the **Breakpoints** view and choose **Breakpoint Properties** from the shortcut menu.

The **Properties for C/C++ Watchpoint** dialog appears.

2. Select **Common** in the left pane of the **Properties for C/C++ Watchpoint** dialog. The right pane displays the common properties for the watchpoint.



**Figure 3-102. Common watchpoint properties**

3. Edit the values in the fields.
4. Click **OK**.

### 3.36.5 Disabling watchpoint

Disable a watchpoint to prevent it from affecting program execution. The disabled watchpoint remains at the memory location at which you set it, so that you can enable it later.

To disable a watchpoint, select its name in the **Breakpoints** view, right-click and choose **Disable** from the shortcut menu.

### 3.36.6 Enabling watchpoint

Enable a watchpoint to have it halt program execution when its associated memory location changes value. Enabling a watchpoint that you previously disabled is easier than clearing it and re-creating it from scratch.

To enable a watchpoint, select its name in the **Breakpoints** view, right-click and choose **Enable** from the shortcut menu.

### 3.36.7 Remove watchpoint

To remove a watchpoint in the **Breakpoints** view, select its name from the list, right-click and choose **Remove** from the shortcut menu that appears.

### 3.36.8 Remove all watchpoints

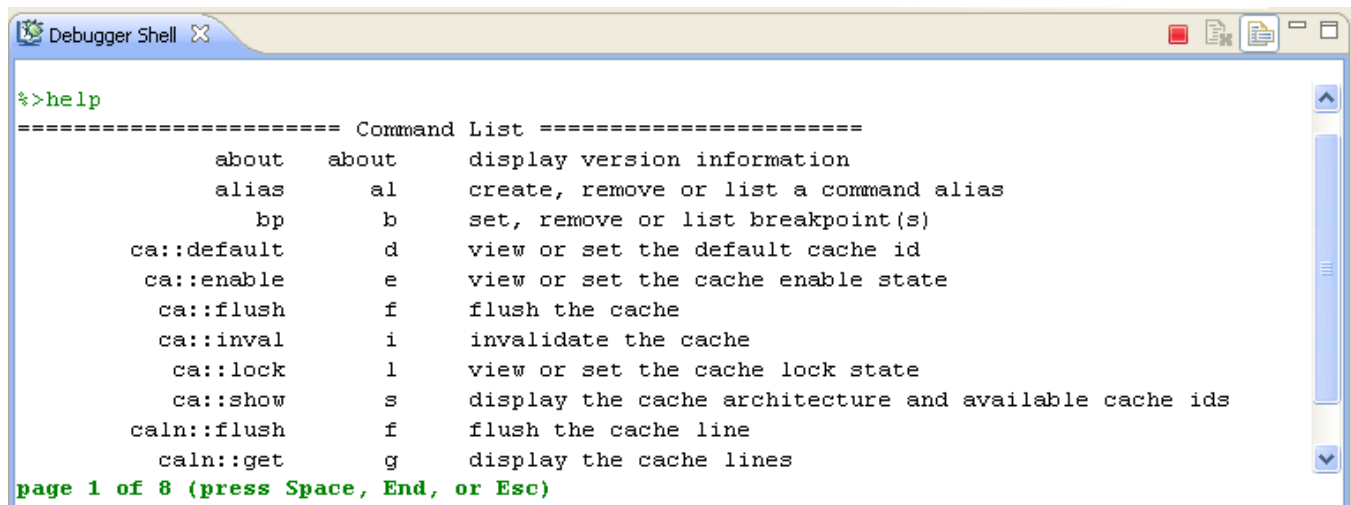
To remove all watchpoints, right-click in the **Breakpoints** view and choose **Remove All** from the shortcut menu that appears. The **Breakpoints** view reflects your changes.



## Chapter 4 Debugger Shell

CodeWarrior supports a command-line interface to some of its features including the debugger. You can use the command-line interface together with TCL scripting engine. You can even issue a command that saves the command-line activity to a log file.

The **Debugger Shell** view is used 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.



```
Debugger Shell X
$>help
===== Command List =====
      about  about  display version information
      alias  al     create, remove or list a command alias
      bp     b     set, remove or list breakpoint(s)
ca::default d     view or set the default cache id
ca::enable  e     view or set the cache enable state
ca::flush   f     flush the cache
ca::inval   i     invalidate the cache
ca::lock    l     view or set the cache lock state
ca::show    s     display the cache architecture and available cache ids
caln::flush f     flush the cache line
caln::get   g     display the cache lines
page 1 of 8 (press Space, End, or Esc)
```

**Figure 4-1. Debugger Shell view**

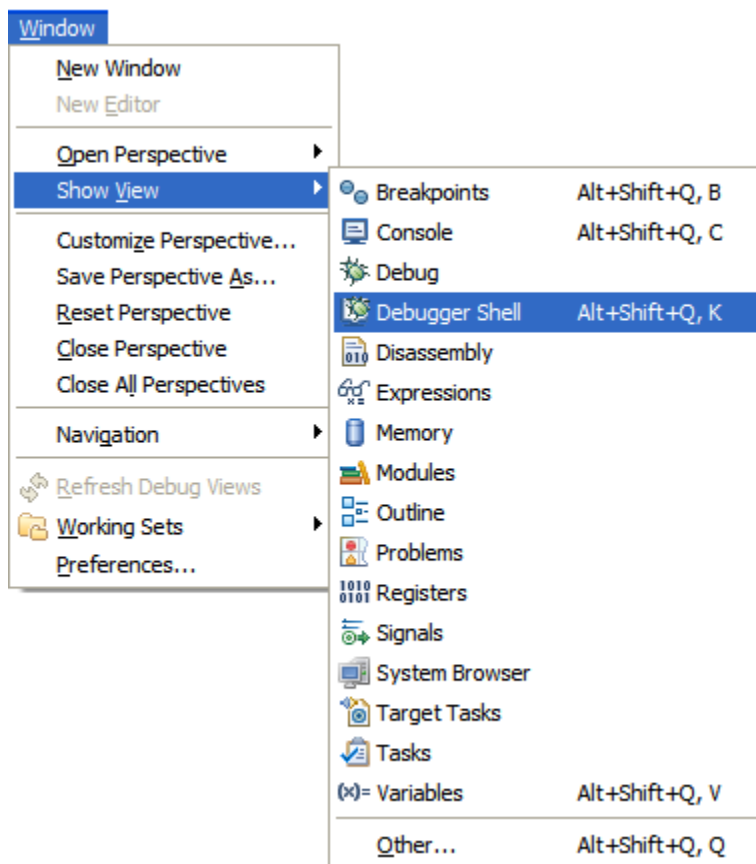
To open the **Debugger Shell** view, perform these steps.

1. Switch the IDE to the **Debug** perspective and start a debugging session.
2. Choose **Window > Show View > Debugger Shell**.

The **Debugger Shell** view appears ( [Figure 4-1](#)).

## NOTE

Alternatively, choose **Window > Show View > Other**. Expand the **Debug** tree control in the **Show View** dialog, choose **Debugger Shell**, and click **OK**.



**Figure 4-2. 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 the Enter key. 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 choose **Paging**



from the shortcut menu. Alternatively, click the **Enable Paging** icon.

## 4.1 Executing previously issued commands

The debugger shell maintains a history of previously executed commands. Instead of re-typing these commands, you can recall them from the history.

- To recall a command from the history, press the Up arrow key.

Each press of the Up arrow key shows the preceding issued command. Each press of the Down arrow key shows the succeeding issued command.

## 4.2 Using code hints

You can have the debugger shell complete the name of a command as you enter it on the command-line. As you continue typing characters, the debugger shell refines the list of possible commands. For example, you can use this technique as a shortcut to entering help to see a full list of commands.

To use code hints in the debugger shell:

1. Open the **Debugger Shell** view.
2. Type **Ctrl + Space** .

Code hints appear. As you enter additional characters, the debugger shell refines the commands that appear in the code hints. Use the arrow keys or the mouse to scroll through the command names that appear in the list. The debugger shell shows additional information for the highlighted command name.

3. Highlight the name of the command that you want to have the debugger shell complete for you.
4. Press the **Enter** key, or double-click the name of the command.

The remaining characters of the command name appear in the debugger shell.

### NOTE

Press the **Esc** key to exit code hints and return to the debugger shell.

## 4.3 Using auto-completion

The **Debugger Shell** supports auto-completion of these items:

- Debugger Shell Commands
- Arguments (such as file path)
- TCL commands (both built-in and those created with `proc` )

To use auto-completion:

1. Open the **Debugger Shell** view.
2. Type the initial characters of an item that the debugger shell can auto-complete.
3. Press the **Tab** key.

The remaining characters of the item appear in the debugger shell.

### Tip

If you enter the abbreviated form of an IDE command name, press the spacebar instead of the Tab key to have the IDE auto-complete the command name

## 4.4 Command-line debugger shell

Use the debugger shell to execute commands in a command-line environment. The command-line debugger engine executes the commands that you enter in the debugger shell, then displays the results. For example, the `launch`, `debug`, and `run` commands let you list or run launch configurations from the command line.

## 4.5 Debugger Shell commands

This topic lists and defines each command-line debugger command.

- [about](#)
- [alias](#)
- [bp](#)
- [cd](#)

- change
- cls
- cmdwin::ca
- cmdwin::caln
- config
- copy
- debug
- dir
- disassemble
- display
- evaluate
- finish
- fl::blankcheck
- fl::checksum
- fl::device
- fl::diagnose
- fl::disconnect
- fl::dump
- fl::erase
- fl::image
- fl::protect
- fl::secure
- fl::target
- fl::verify
- fl::write
- funcs
- getpid
- go
- help
- history
- jtagclock
- kill
- launch
- linux::displaylinuxlist
- linux::loadsymbolics
- linux::refreshmodules
- linux::selectmodule
- linux::unloadsymbolics
- loadsym
- log
- mc::config

- mc::go
- mc::group
- mc::kill
- mc::reset
- mc::restart
- mc::stop
- mc::type
- mem
- next
- nexti
- oneframe
- pwd
- quitIDE
- radix
- redirect
- refresh
- reg
- reset
- restart
- restore
- run
- save
- setpc
- setpicloadaddr
- stack
- status
- step
- stepi
- stop
- switchtarget
- system
- var
- wait
- watchpoint

### 4.5.1 about

Lists the version information.

## Syntax

about

### 4.5.2 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

The following table lists and defines examples of the `alias` command.

**Table 4-1. alias Command-line debugger commands - Examples**

Command	Description
alias	Lists current aliases.
alias ls dir	Issues the <code>dir</code> command when <code>ls</code> is typed.
alias ls	Removes the alias <code>ls</code> .

### 4.5.3 bp

Sets a breakpoint, removes a breakpoint, or lists the current breakpoints.

## Syntax

bp

```
bp [-{hw|sw|auto}] {<func>| [<ms>:]<addr>|<file> <line> [<column>]}
```

```
bp [-{hw|sw|auto}] {<file> <line> [<function>] [<column>]}
```

```
bp all|#<id>|#<id.instance>|<func>|<addr> off|enable|disable|{ignore <count>}
```

```
bp #<id> cond <c-expr>
```

## Examples

The following table lists and defines examples of the `bp` command.

**Table 4-2. `bp` Command-line debugger command - Examples**

Command	Description
<code>bp</code>	Lists all breakpoints.
<code>bp -hw fn</code>	Sets hardware breakpoint at function <code>fn()</code> .
<code>bp -auto file.cpp 101 1</code>	Sets an auto breakpoint on file <code>file.cpp</code> at line 101, column 1.
<code>bp -auto file.cpp 101 "int foo&lt;int&gt;()" 1</code>	Sets an auto breakpoint on file <code>file.cpp</code> at line 101 on function template instance <code>"int foo&lt;int&gt;()"</code> , column 1.
<code>bp fn off</code>	Removes the breakpoint at function <code>fn()</code> .
<code>bp 10343</code>	Sets a breakpoint at memory address 10343.
<code>bp #4 off</code>	Removes the breakpoint number 4.
<code>bp #4 disable</code>	Disables the breakpoint number 4.
<code>bp #4 ignore 3</code>	Sets ignore count to 3 for breakpoint number 4.
<code>bp #4 cond x == 3</code>	Sets the condition for breakpoint number 4 to fire only if <code>x == 3</code> .
<code>bp #4.1 off</code>	Removes the breakpoint instance number 4.1.
<code>bp #4.1 ignore 3</code>	Sets ignore count to 3 for breakpoint instance number 4.1.
<code>bp #4.1 cond x == 3</code>	Sets the condition for breakpoint instance number 4.1 to fire only if <code>x == 3</code> .

## 4.5.4 `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

The following table lists and defines examples of the `cd` command.

**Table 4-3. `cd` Command-line debugger command - Examples**

Command	Description
<code>cd</code>	Displays current directory.
<code>cd c:</code>	Changes to the C: drive root directory.
<code>cd d:/mw/0622/ test</code>	Changes to the specified D: drive directory
<code>cd c:p*s</code>	Changes to any C: drive directory whose name starts with p and ends with s.

## 4.5.5 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

The following table lists and defines parameters of the `change` command.

**Table 4-4. `change` Command-line debugger command - Parameters**

Command	Description
<code>&lt;ms&gt;</code>	On architectures supporting multiple memory spaces, specifies the memory space in which <code>&lt;addr&gt;</code> is to be found. See help for the option <code>-ms</code> of <code>display</code> or <code>mem</code> for more information on memory spaces. If unspecified, the setting "config MemIdentifier" is used.
<code>&lt;addr&gt;</code>	Target address in <code>hex</code> format.
<code>&lt;count&gt;</code>	Number of memory cells.

*Table continues on the next page...*

**Table 4-4.** change **Command-line debugger command - Parameters (continued)**

Command	Description
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 MemAccess" is used.
{8,16,32,64}bit	Sets both <cell-size> and <access-size>.
<a1>{.. <a2&gt; #&lt;n&gt;}< td=""> <td>Specifies a range of memory either by two endpoints, &lt;a1&gt; and &lt;a2&gt;, or by a startpoint and a byte count, &lt;a1&gt; and &lt;n&gt;. This alternate syntax is provided mainly for backwards compatibility. The new form of &lt;addr&gt; and &lt;count&gt; should be easier to use and thus preferred.</td> </a2&gt; #&lt;n&gt;}<>	Specifies a range of memory either by two endpoints, <a1> and <a2>, or by a startpoint and a byte count, <a1> and <n>. This alternate syntax is provided mainly for backwards compatibility. The new form of <addr> and <count> should be easier to use and thus preferred.
{rlnr}	If multiple registers are specified, then the prefix r: causes a recursive, depth-first traversal of the register hierarchy. The prefix nr: prevents recursion. If unspecified, recursion is the default. Note that different levels of the register hierarchy are represented in the manner of a path with forward-slashes '/' used to delimit the register groups. A name that contains a slash itself can be represented with an escape backward-slash '\' followed by the forward-slash. Further note that a backslash in a doubly-quoted Tcl string is itself an escape character -- in this case two backslashes are required. Alternatively, you may use curly braces '{' and '}' to denote your string in which case just one backslash is necessary.
<reg>	A register name or a register group name.
.. <a2&gt;< td=""> <td>The end point for a range of registers to access.</td> </a2&gt;<>	The end point for a range of registers to access.
<n>	Number of registers.
all	Specifies all registers.
v:	If this option appears with no <var> following it, then all variables pertinent to the current scope are printed.
<var>	Symbolic name of the variable to print. Can be a C expression as well.
v	This alternate syntax is provided mainly for backward compatibility.
-sl-ns	Specifies whether each value is to be swapped. For memory, specifies whether each cell is to be swapped. With a setting of -ns, target memory is written in order from lowest to highest byte address. Otherwise, each cell is endian swapped. If unspecified, the setting "config MemSwap" 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.

*Table continues on the next page...*



**Table 4-4.** `change` Command-line debugger command - Parameters (continued)

Command	Description
<code>%[Q&lt;n&gt;]F</code>	Fixed or Fractional. The range of a fixed point value depends on the (fixed) location of the decimal point. The default location is set by the config command option "MemFixedIntBits".
<code>%s</code>	ASCII.

## Examples

The examples assume the following settings:

- radix x
- config MemIdentifier 0
- config MemWidth 32
- config MemAccess 32
- config MemSwap off

The following table lists and defines **Memory** examples of the `change` command.

**Table 4-5.** `change` Command-line debugger command - Memory examples

Command	Description
<code>change 10000 10</code>	Change memory range 0x10000-3 to 0x10 (because radix is hex).
<code>change 1:10000 20</code>	Change memory range 0x10000-3, memory space 1, to 0x20.
<code>change 10000 16 20</code>	Change each of 16 cells in the memory range 0x10000-3f to 0x20.
<code>change 10000 16x1h8 31</code>	Change each of 16, 1-byte cells to 0x31, using a hardware access size of 8-bytes per write.
<code>change 10000 -s %d 200</code>	Change memory range 0x10000-3 to c8000000.

The following table lists and defines **Register** examples of the `change` command.

**Table 4-6.** `change` Command-line debugger command - Register examples

Command	Description
<code>change R1 123</code>	Change register R1 to 0x123.
<code>change R1..R5 5432</code>	Change registers R1 through R5 to 0x5432.
<code>change "General Purpose Registers/R1" 100</code>	Change register R1 in the General Purpose Register group to 0x100.

The following table lists and defines **Variable** examples of the `change` command.

**Table 4-7. `change` Command-line debugger command - Variable examples**

Command	Description
<code>change myVar 10</code>	Change the value of variable myVar to 16 (0x10)

## 4.5.6 `cls`

Clears the command line debugger window.

### Syntax

```
cls
```

## 4.5.7 `cmdwin::ca`

Manages global cache operations. That is, they affect the operation of the entire cache. For multi-core processors, these commands operate on a specific cache if an optional ID number is provided. If the ID number is absent, the command operates on the cache that was assigned as the default by the last `cmdwin::ca::default` command. The following table summarizes cache commands.

**Table 4-8. Global cache commands**

Command	Description
<code>cmdwin::ca::default</code>	Sets specified cache as default
<code>cmdwin::ca::enable</code>	Enables/disables cache
<code>cmdwin::ca::flush</code>	Flushes cache
<code>cmdwin::ca::inval</code>	Invalidates cache
<code>cmdwin::ca::lock</code>	Locks/Unlocks cache
<code>cmdwin::ca::show</code>	Shows the architecture of the cache

### Syntax

```
command [<cache ID>] [on | off]
```

### Parameters

<cache ID>

Selects the cache that the command affects.

[on | off]

Changes a cache state.

## 4.5.8 cmdwin::caln

The `cmdwin::caln` commands manage cache line operations. They affect memory elements within a designated cache. The following table summarizes these commands.

**Table 4-9. Cache line commands**

Command	Description
<code>cmdwin::caln::get</code>	Displays cache line
<code>cmdwin::caln::flush</code>	Flushes cache line
<code>cmdwin::caln::inval</code>	Invalidates cache line
<code>cmdwin::caln::lock</code>	Locks/unlocks cache line
<code>cmdwin::caln::set</code>	Writes specified data to cache line

### Syntax

```
command [<cache ID>] <line> [<count>]
```

### Parameters

<cache ID>

Optional. Specifies the cache that the command affects, otherwise it affects the default cache.

<line>

Specifies the cache line to affect.

<count>

Optional. Specifies the number of cache lines the command affect.

### Examples

The following table lists and defines examples of the `cmdwin::caln` commands.

**Table 4-10. `copy` Command-line debugger command - Examples**

Command	Description
<code>cmdwin::caln::get 2</code>	Displays the second cache line.

*Table continues on the next page...*

**Table 4-10. `copy` Command-line debugger command - Examples (continued)**

Command	Description
<code>cmdwin::caln:flush 2</code>	Flushes line 2 of the default cache.
<code>cmdwin::caln:set 2 = 0 1 1 2 3 5 8 13</code>	Sets the contents of cache line two, where the first word has a value of 0, the second word has a value of 1, the third word has a value of 1, the fourth word has a value of 2, and so on.

## 4.5.9 `config`

Configures the command window.

### Syntax

```
config <option> [<sub-option>] <value> [-np]
```

```
config
```

### Options

```
<none>
```

With no options, `config` displays the current configuration settings.

```
-np
```

Do not print anything to the display, only return the data.

The table below lists and defines Display options of the `config` command.

**Table 4-11. `config` Command-line debugger command - Display options**

Command	Description
<code>echoCmd on off</code>	When set on, commands executed from scripts are printed. If this option is prefixed with @ the command itself will not be printed.
<code>h/exPrefix &lt;prefix&gt;</code>	Sets the string to be used as the prefix for hex values.
<code>binPrefix &lt;prefix&gt; 3</code>	Sets the string to be used as the prefix for binary values.
<code>showCommas off   on</code>	When set on, decimal data is displayed with commas inserted every three digits. Hex and binary data is displayed with a colon inserted every four digits.
<code>hexPadding on   off</code>	When set on, hex values are padded with leading zeros.
<code>decPadding on   off</code>	When set on, decimal values are padded with leading zeros.
<code>mem/Identifier &lt;mem-space-id&gt;</code>	Sets the string to be used for the main memory space prefix.
<code>memCache off   on</code>	With <code>memCache</code> off, the Command Window will always read target memory. This setting is useful if your target memory may change while the target is paused. With <code>memCache</code> on,

*Table continues on the next page...*

**Table 4-11. `config` Command-line debugger command - Display options (continued)**

Command	Description
	the Command Window will cache target memory reads while your target is paused. This setting will improve the performance of the Command Window.
<code>memReadMax &lt;max-bytes&gt;</code>	Limits the amount of memory to be read in a single command. This prevents the Command Window from locking up on abnormally large memory read requests.
<code>memSwap off   on</code>	When set, memory values are swapped on cell boundaries by default.
<code>memWidth &lt;bits&gt;   factory</code>	Specifies the default width for display of memory data. Initially, the default width may vary depending on the active debugger; once the user has changed the value, the new value is used for all active debuggers. The initial behavior can be restored with the keyword "factory".
<code>memAccess &lt;bits&gt;</code>	Specifies the default hardware access size for target memory. A setting of 0 allows the hardware access size to match the display width of the command.
<code>memFixedIntBits &lt;bits&gt;</code>	For fixed point formatting, sets the range to the specified number of bits. For example, a value of 8 will set the range to $[-2^8, 2^8)$ , or $[-256, 256)$ .
<code>variable &lt;sub-option&gt; [on   off]</code>	Enables or disables certain fields in the output of the "evaluate" command. If neither on nor off are specified, then the field is enabled. Possible values for <sub-option> are: <ul style="list-style-type: none"> <li>• echo - the variable name</li> <li>• location - the address of the variable</li> <li>• size - the size of the variable is bytes</li> <li>• type - the variable type</li> </ul>
<code>variable format &lt;format&gt;</code>	Controls the output format of the "evaluate" command. Possible values for <format> are: <ul style="list-style-type: none"> <li>• -   Default</li> <li>• d   Signed</li> <li>• u   Unsigned</li> <li>• x   h   Hex</li> <li>• c   Char</li> <li>• s   CString</li> <li>• p   PascalString</li> <li>• f   Float</li> <li>• e   Enum</li> <li>• i   Fixed Fract</li> <li>• b   Binary Boolean SignedFixed</li> <li>• o   w   Unicode</li> </ul>

The following table lists and defines Run Control options of the `config` command.

**Table 4-12. `config` Command-line debugger command - Run control options**

Command	Description
<code>autoThreadSwitch off   interactive-only   on</code>	Allows the user to control whether the Command Window will perform automatic thread-switching. Possible settings are always on, always off, and on when running interactively, that is not from a script. If enabled, automatic thread switching is done in the following cases:

*Table continues on the next page...*

**Table 4-12. config Command-line debugger command - Run control options (continued)**

Command	Description
	<ul style="list-style-type: none"> <li>If no thread is currently selected or if the current thread exits, then the first one detected will become the current.</li> <li>If the current thread is running and another thread stops, then the current thread will switch to the stopped thread.</li> </ul>
<code>debugTimeout &lt;seconds&gt;</code>	The maximum amount of time to wait for a debug command to finish. You can also hit ESC to stop waiting.
<code>runControlSync off   script-only   on</code>	Sets how to synchronize run control commands. If set to "on", then all run control commands will wait until a thread stopped event. If set to "off", then all run control commands will return immediately. If set to "script-only", then all run control commands will wait while running a script but will return immediately while running interactively.
<code>setPCNextValidLine on   off</code>	Controls the behavior of the setpc command in the case that the specified file line number has no source code. If set to "on", the PC is set to the next line number containing source. If set to "off", an error is shown.

## Examples

`config`

Display the current config status.

The following table lists and defines Display examples of the config command.

**Table 4-13. Conf Command-Line Debugger Command - Display Examples**

Command	Description
<code>config echoCmd on</code>	If "reg D1" is a command executed from a script, the output will have on top the command itself:  cmdwin::reg D1 + General Purpose Registers D1=\$ffffffff
<code>config hexPrefix 0x</code>	Show hexadecimal numbers with "0x" prefix.
<code>config ShowCommas o n</code>	Show hexadecimal and binary numbers with a colon, as in \$0000:0000, and show decimal numbers with a comma, as in 1,000,000.00.
<code>config HexPadding off</code>	Show hex and binary numbers with leading zeros, as in 0x0000. config MemIdentifier 0. Use "0" as the default memory space for memory commands.
<code>config MemCache off</code>	Turn off caching of target memory. AFFECTS COMMAND WINDOW ONLY.
<code>config MemReadMax 2048</code>	Limit memory commands to 2048 (decimal) bytes.
<code>config MemSwap on</code>	Swap memory on cell boundaries before accessing the target.
<code>config MemWidth 16</code>	Displays and writes 16bit values.

*Table continues on the next page...*

**Table 4-13. Conf Command-Line Debugger Command - Display Examples (continued)**

Command	Description
<code>config MemWidth factory</code>	Reset the MemWidth to factory settings.
<code>config MemAccess 8</code>	Uses an 8-bit access size for reading and writing target memory.
<code>config MemFixedIntBits 8</code>	Sets the fixed point range to $[-2^8, 2^8)$ , or $[-256, 256)$ .
<code>config var echo on</code>	Include the variable name in the output of the "evaluate" command.
<code>config var format d</code>	Set the default display format of the "evaluate" command to decimal. The format may be one of the following strings or the corresponding character abbreviation: Default('-'), Signed('d'), Unsigned('u'), Hex('h x'), Char('c'), CString('s'), PascalString('p'), Float('f'), Enum('e'), Fixed('i'), Fract(no abbrev), Binary('b'), Boolean(no abbrev), SignedFixed(no abbrev), Unicode('o w').
<code>config var type off</code>	Exclude the variable type name in the output of the "evaluate" command.
<code>config var location on</code>	Include the memory address in the output of the "evaluate" command.
<code>config var size on</code>	Include the variable size in the output of the "evaluate" command.

The following table lists and defines Run Control examples of the `config` command.

**Table 4-14. config Command-line debugger command - Run control examples**

Command	Description
<code>config AutoThreadSwitch interactive-only</code>	If commands are being entered interactively, that is not from a script, automatic thread switching will be performed. If no thread is currently selected or if the current thread exits, then the first one detected will become the current. If the current thread is running and another thread stops, then the current thread will switch to the stopped thread.
<code>config DebugTimeout 10</code>	Wait up to 10 seconds for debug command to finish.
<code>config RunControlSync on</code>	Run control commands will wait for thread-stopped event.
<code>config SetPCNextValidLine on</code>	If <code>setpc</code> is called for a file line number with no source code, the line number is automatically increased to the next line with source code.

## 4.5.10 copy

Copies contents of a memory address or address block to another memory location.

### Syntax

## Debugger Shell commands

```
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

The following table lists and defines examples of the `copy` command.

**Table 4-15. `copy` Command-line debugger command - Examples**

Command	Description
<code>copy 00..1f 30</code>	Copies memory addresses 00 through 1f to address 30.
<code>copy 20#10 50</code>	Copies 10 memory locations beginning at memory location 20 to memory beginning at location 50.

## 4.5.11 debug

Launches a debug session.

### Syntax

```
debug [[-index] <index> | [-name] <debug-config-name>]
```

### Examples

The following table lists and defines examples of the `debug` command.

**Table 4-16. `debug` Command-line debugger command - Examples**

Command	Description
<code>debug</code>	Starts debugging using the default launch configuration, which is the last debugged configuration if one exists and index 0 otherwise.
<code>debug -index 3</code>	Starts debugging using the launch configuration at index 3. Type <code>`launch'</code> for the current set of launch configurations.
<code>debug -name 3</code>	Starts debugging using the launch configuration named <code>`3'</code> . Type <code>`launch'</code> for the current set of launch configurations.
<code>debug 3</code>	Starts debugging using the launch configuration named <code>`3'</code> . If <code>`3'</code> does not exist then launch configuration with index 3 will be launched. Type <code>`launch'</code> for the current set of launch configurations.

*Table continues on the next page...*



**Table 4-16.** `debug` Command-line debugger command - Examples (continued)

Command	Description
<code>debug {My Launch Config}</code>	Starts debugging using the launch configuration named 'My Launch Config'. Type 'launch' for the current set of launch configurations.

## 4.5.12 `dir`

Lists directory contents.

### Syntax

```
dir [path|files]
```

### Examples

The following table lists and defines examples of the `dir` command.

**Table 4-17.** `dir` Command-line debugger command-Examples

Command	Description
<code>dir</code>	Lists all files of the current directory.
<code>dir *.txt</code>	Lists all current-directory files that have the .txt file name extension.
<code>dir c:/tmp</code>	Lists all files in the tmp directory on the C: drive.
<code>dir /ad</code>	Lists only the subdirectories of the current directory.

## 4.5.13 `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

The following table lists and defines examples of the `disassemble` command.

**Table 4-18. `disassemble` Command-line debugger command - Examples**

Command	Description
<code>disassemble</code>	Lists the next block of instructions.
<code>disassemble reset</code>	Resets the next block to the PC and the instruction count to one screenful.
<code>disassemble pc</code>	Lists instructions starting at the PC.
<code>disassemble pc 4</code>	Lists 4 instructions starting at the PC. Sets the instruction count to 4.
<code>disassemble 1000</code>	Lists instructions starting at address 0x1000.
<code>disassemble p:1000 4</code>	Lists 4 instructions from memory space p, address 1000. Sets the instruction count to 4.

## 4.5.14 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>]
```

### Options

The following table lists and defines parameters of the `display` command.

**Table 4-19. `display` Command-line debugger command - Options**

Command	Description
<ms>	On architectures supporting multiple memory spaces, specifies the memory space in which <addr> is to be found. See help for the option -ms of <code>display</code> or <code>mem</code> 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 MemAccess" is used.
{8,16,32,64}bit	Sets both <cell-size> and <access-size>.
-np	Don't print anything to the display, only return the data.

*Table continues on the next page...*

**Table 4-19. `display` Command-line debugger command - Options (continued)**

Command	Description
-ms	On architectures supporting multiple memory spaces, displays the list of available memory spaces including a mnemonic and/or an integer index which may be used when specifying a target address.
<a1>{.. <a2&gt; #&lt;n&gt;}< td=""> <td>Specifies a range of memory either by two endpoints, &lt;a1&gt; and &lt;a2&gt;, or by a startpoint and a byte count, &lt;a1&gt; and &lt;n&gt;. This alternate syntax is provided mainly for backwards compatibility. The new form of &lt;addr&gt; and &lt;count&gt; should be easier to use and thus preferred.</td> </a2&gt; #&lt;n&gt;}<>	Specifies a range of memory either by two endpoints, <a1> and <a2>, or by a startpoint and a byte count, <a1> and <n>. This alternate syntax is provided mainly for backwards compatibility. The new form of <addr> and <count> should be easier to use and thus preferred.
{r nr}	If multiple registers are specified, then the prefix r: causes a recursive, depth-first traversal of the register hierarchy. The prefix nr: prevents recursion. If unspecified, recursion is the default. Note that different levels of the register hierarchy are represented in the manner of a path with forward-slashes '/' used to delimit the register groups. A name that contains a slash itself can be represented with an escape backward-slash '\' followed by the forward-slash. Further note that a backslash in a doubly-quoted Tcl string is itself an escape character -- in this case two backslashes are required. Alternatively, you may use curly braces '{' and '}' to denote your string in which case just one backslash is necessary.
<reg>	A register name or a register group name.
.. <a2&gt;< td=""> <td>The end point for a range of registers to access.</td> </a2&gt;<>	The end point for a range of registers to access.
<n>	Number of registers.
all	Specifies all registers.
-d	Print detailed data book information.
-nr	Print only register groups, that is no registers.
-nv	Print only register groups and register names, that is no values.
-np	Don't print anything to the display, only return the data.
regset	Display the register group hierarchy.
v:	If this option appears with no <var> following it, then all variables pertinent to the current scope are printed.
<var>	Symbolic name of the variable to print. Can be a C expression as well.
-s -ns	Specifies whether each value is to be swapped. For memory, specifies whether each cell is to be swapped. With a setting of -ns, target memory is written in order from lowest to highest byte address. Otherwise, each cell is endian swapped. If unspecified, the setting "config MemSwap" 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.

Table continues on the next page...

**Table 4-19.** `display` Command-line debugger command - Options (continued)

Command	Description
<code>%f</code>	Floating point.
<code>%[Q&lt;n&gt;]F</code>	Fixed or Fractional. The range of a fixed point value depends on the (fixed) location of the decimal point. The default location is set by the config command option "MemFixedIntBits".
<code>%s</code>	ASCII.

## Examples

The examples assume the following settings:

- radix x
- config MemIdentifier 0
- config MemWidth 32
- config MemAccess 32
- config MemSwap off

The following table lists and defines examples of the `display` command.

**Table 4-20.** `display` Command-line debugger command - Examples

Command	Description
<code>display 10000</code>	Displays memory range 0x10000-3 as one cell.
<code>display 1:10000</code>	Displays memory range 0x10000-3, memory space 1, as one cell.
<code>display 10000 16</code>	Displays memory range 0x10000-3f as 16 cells.
<code>display 10000 16x1h8</code>	Displays 16, 1-byte cells, with a hardware access size of 8-bytes per read.
<code>display 10000 8bit</code>	Displays one byte, with a hardware access size of one byte.
<code>display 10000 -np</code>	Returns one cell, but don't print it to the Command Window.
<code>display 10000 -s</code>	Displays one cell with the data endian-swapped.
<code>display 10000 %d</code>	Displays one cell in decimal format.
<code>display -ms</code>	Displays the available memory spaces, if any.
<code>display -regset</code>	Lists all the available register sets on the target chip.
<code>display R1</code>	Displays the value of register R1.
<code>display "General Purpose Registers/R1"</code>	Displays the value of register R1 in the General Purpose Register group.
<code>display R1 -d</code>	Displays detailed "data book" contents of R1, including bitfields and definitions.
<code>display "nr:General Purpose Registers/R1" 25</code>	Beginning with register R1, display the next 25 registers. Register groups are not recursively searched.
<code>display myVar -s %d</code>	Displays the endian-swapped contents of variable myVar in decimal.

## 4.5.15 evaluate

Display 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

The following table lists and defines examples of the `evaluate` command.

**Table 4-21. `evaluate` Command-line debugger command - Examples**

Command	Description
<code>evaluate</code>	Lists the types for all the variables in current and global stack.
<code>evaluate i</code>	Returns the value of variable 'i'
<code>evaluate #b i</code>	Returns the value of variable 'i' formatted in binary
<code>evaluate -l 10</code>	Returns the address for line 10 in the current file
<code>evaluate -l myfile.c,10</code>	Returns the address for line 10 in file myfile.c
<code>evaluate -l +10</code>	Returns the address to an offset of 10 lines starting from the current line
<code>evaluate -l myfile.c:mymymbol</code>	Returns the address of the symbol 'mymymbol' defined in file 'myfile.c'.
<code>evaluate -l mymymbol</code>	Returns the address of the global symbol 'mymymbol'.
<code>evaluate -l mymymbol +10</code>	Returns the address of the 10'th line belonging to the global symbol 'mymymbol'.
<code>evaluate -l myfile.c:mymymbol</code>	Returns the address of the local symbol 'mymymbol' defined in the file 'myfile.c'.
<code>evaluate -l myfile.c:mymymbol 10</code>	Returns the address of the 10'th line belonging to the local symbol.

## 4.5.16 finish

Execute until the current function returns.

### Syntax

```
finish
```

## 4.5.17 fl::blankcheck

Test that the flash device is in the blank state.

### Syntax

```
blankcheck all | list
```

### Parameters

```
all
```

Check that all sectors are in the blank state.

## Debugger Shell commands

list

Check that specific sectors are in the blank state. The sector list is set with the "device" command.

### Examples

The following table lists and defines examples of the `fl::blankcheck` command.

**Table 4-22.** `fl::blankcheck` Command-line debugger command - Examples

Command	Description
<code>blankcheck all</code>	Tests if the flash device is in the blank state. All sectors will be tested regardless of the enabled list maintained by the "device" command.
<code>blankcheck list</code>	Tests whether the sectors in the enabled list are in the blank state.

## 4.5.18 fl::checksum

Calculates a checksum.

### Syntax

```
checksum [-host | -range <addr> <size> | -dev]
```

### Options

The following table lists and defines options of the `fl::checksum` command.

**Table 4-23.** `fl::checksum` Command-line debugger command - Options

Command	Description
<none>	When no options are specified, calculate the checksum for the target memory contents corresponding to the settings of the <code>fl::image</code> command. The target is defined by the <code>fl::target</code> command.
<code>-host</code>	Calculates the checksum for the host image file contents corresponding to the settings of the <code>fl::image</code> command.
<code>-range</code>	<addr> <size> Calculate the checksum for the target memory contents specified by a beginning address <addr> and number of bytes <size>, both given in hex. The target is defined by the <code>fl::target</code> command.
<code>-dev</code>	Calculates the checksum for the entire flash contents. The flash is defined by the <code>fl::device</code> command. The target is defined by the <code>fl::target</code> command.

### Examples



checksum

Calculates a checksum.

## 4.5.19 fl::device

Defines the flash device.

### Syntax

device

device <setting> ...

device ls

device ls org [<dev>]

device ls sect [[<dev>] <org>]

### Options

The following table lists and defines options of the `fl::device` command.

**Table 4-24. fl::device Command-line debugger command - Options**

Command	Description
<none>	With no options, lists the current settings.
<setting>	Used to set a configuration setting. Possible values are: <code>-d &lt;dev&gt;</code> , <code>-o &lt;org&gt;</code> , <code>-a &lt;addr&gt; [&lt;end&gt;]</code> , <code>-se all   &lt;index&gt; ...</code> , <code>-sd all   &lt;index&gt; ...</code>
<code>-d &lt;dev&gt;</code>	Sets the device to <dev>.
<code>-o &lt;org&gt;</code>	Sets the organization to <org>.
<code>-a &lt;addr&gt; [&lt;end&gt;]</code>	Sets the start <addr> and optional end <end> address for the device, both given in hex.
<code>-se all   &lt;index&gt; ...</code>	Enable sectors for "erase" and "blankcheck". Sectors are specified with a zero-based index.
<code>-sd all   &lt;index&gt; ...</code>	Disables sectors for "erase" and "blankcheck". Sectors are specified with a zero-based index.
ls	Lists all the supported devices.
ls org [<dev>]	Lists the organizations for a particular device. The device may be specified with <dev>, otherwise the current device is used.
ls sect [[<dev>] <org>]	Lists the sectors for a particular device and organization. The organization may be specified with <org>, otherwise the current device and organization is used. If <org> is specified, the device may be specified with <dev>, otherwise the current device is used. If <dev> is specified, then 0 is used for the starting address; otherwise, the current device start address is used.

## Examples

`device`

Lists the current settings.

### 4.5.20 fl::diagnose

Dumps flash information.

#### Syntax

`diagnose [full]`

#### Options

`full`

Also dump sector status (programmed/erased). This could take a few minutes for large flashes.

#### Examples

The following table lists and defines examples of the `fl::diagnose` command.

**Table 4-25. fl::diagnose Command-line debugger command - Examples**

Command	Description
<code>diagnose</code>	Dumps flash information like ID, sector map, sector factory protect status. <code>fl::device</code> command needs to be called prior to this command in order to set the device.

### 4.5.21 fl::disconnect

Closes the connection to the target.

#### Syntax

`disconnect`

#### Examples

`disconnect`

Closes the connection to the target. The first flash command that needs to access the target opens a connection to the target that remains open for further flash operations.

## 4.5.22 fl::dump

Dumps the content of entire flash to the specified file.

### Syntax

```
fl::dump [all | -range start_addr end_addr] -o <file>
```

### Parameter

-all

Dumps content of entire flash to the specified file.

-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. This is mandatory.

### Examples

```
dump -all -t "Binary/Raw Format" -o "myfile"
```

Dumps all flash or flash region from <start\_addr> to <end\_addr> to the file specified with -o argument.

## 4.5.23 fl::erase

Erases the flash device.

### Syntax

```
erase all | list | image
```

### Parameters

all

## Debugger Shell commands

Erases all sectors using an all-chip erase function.

```
list
```

Erases specific sectors as set with the "device" command.

```
image
```

Erases all sectors occupied by the file specified with `fl::image`.

### Examples

The following table lists and defines examples of the `fl::erase` command.

**Table 4-26. `fl::erase` Command-line debugger command - Examples**

Command	Description
<code>erase all</code>	Erases the device using the all-chip erase operation. This is not supported by all flash devices. All sectors will be erased regardless of the enabled list maintained by the "device" command. Erase the device one sector at a time. All sectors will be erased regardless of the enabled list maintained by the "device" command.
<code>erase list</code>	Erases the sectors in enabled list.
<code>erase image</code>	Erases the sectors occupied by the file defined with <code>fl::image</code> .

## 4.5.24 `fl::image`

Defines the flash image settings.

### Syntax

```
image
```

```
image <setting> ...
```

```
image ls
```

### Options

The following table lists and defines options of the `fl::image` command.

**Table 4-27. `fl::image` Command-line debugger command - Options**

Command	Description
<none>	With no options, lists the current settings.

*Table continues on the next page...*

**Table 4-27.** `fl::image` Command-line debugger command - Options (continued)

Command	Description
<setting>	Used to set a configuration setting. Possible values are: -f <file>, -t <type>, -re on off, -r <addr> [<end>], -oe on off, -o <offset>
-f <file>	Sets the image file.
-t <type>	Sets the type of the image file. Possible values are shown by "image ls".
-re on off	If -re is set to on, the range settings of this command will be used to restrict all flash commands to a particular address range. Otherwise no restriction is made.
-r <addr> [<end>]	Sets the start <addr> and optional end <end> address for the restricting flash access, both given in hex. The range must also be enabled by the option "-re".
-oe all   <index> ...	If -oe is set to on, the offset setting of this command will be used.
-o	If -oe is set to on, then the value of this setting is added to all addresses in the image file. The value is given in hex.

## Examples

```
image
```

Lists the current settings.

## 4.5.25 fl::protect

Protects the sectors.

### Syntax

```
fl::protect [on | off]
```

### Parameter

```
[on | off]
```

Enables or disables protection of sectors.

## 4.5.26 fl::secure

Secures/unsecures the device.

### Syntax

## Debugger Shell commands

```
fl::secure [on | off] [password <pass>]
```

### Parameter

[on | off]

Secures or unsecures a device.

password <pass>

Password used to secure the device.

## 4.5.27 fl::target

Defines the target configuration settings.

### Syntax

```
target
```

```
target <setting> ...
```

```
target ls [p|c]
```

### Options

The following table lists and defines options of the `fl::target` command.

**Table 4-28. fl::target Command-line debugger command - Options**

Command	Description
<none>	With no options, lists the current settings.
<setting>	Used to set a configuration setting. Possible values are: -c <conn>, -p <proc>, -ie on off , -i <initfile>, -b <addr> [<size>] , -v on off , -l on off
-lc <launch configuration name>	Sets the launch configuration that will be used.
-c <conn>	Sets the connection to <conn> .
-p <proc>	Sets the processor to <proc> .
-ie on off	Enables or disables the initfile set by -i.
-i <initfile>	Sets the target initialization file to <initfile> . Only used if -ie is on.
-b <addr> [<size>]	Sets the target RAM buffer for downloading image data to begin at <addr> with <size> bytes, both given in hex.
-v on off	Sets the target memory verification on or off.
-l on off	Enable or disable logging.
ls [p c]	Lists the supported processors and/or the available connections.

## Examples

```
target
```

Lists the current settings.

### 4.5.28 fl::verify

Verifies the flash device.

#### Syntax

```
verify
```

### 4.5.29 fl::write

Writes the flash device.

#### Syntax

```
write
```

### 4.5.30 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.

### 4.5.31 getpid

Lists the ID of the process being debugged.

#### Syntax

```
getpid
```

### 4.5.32 go

Starts to debug your program from the current instruction.

#### Syntax

```
go [nowait | <timeout_s>]
```

#### Parameter

<none>

Runs the default thread. The command may wait for a thread break event before returning, depending on the settings **config runControlSync** and **config autoThreadSwitch**.

nowait

Returns 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

The following table lists and defines examples of the `go` command.

**Table 4-29. go Command-line debugger command - Examples**

Command	Description
<code>go</code>	Runs the default thread.
<code>go nowait</code>	Runs the default thread without waiting for a thread break event.
<code>go 5</code>	Runs the default thread. If <code>config runControlSync</code> is enabled, then the command will wait for a thread break event for a maximum of 5 seconds.



### 4.5.33 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

The following table lists and defines examples of the `help` command.

**Table 4-30. `help` Command-Line Debugger Command - Examples**

Command	Description
<code>help</code>	Lists all debug commands.
<code>help b</code>	Lists help information for the break command.

### 4.5.34 history

Lists the history of the commands entered during the current debug session.

#### Syntax

```
history
```

### 4.5.35 jtagclock

Reads or updates the current JTAG clock speed.

#### Syntax

```
jtagclock
```

```
jtagclock <chain-position> [<speed-in-kHz>]
```

## Examples

The following table lists and defines examples of the `jtagclock` command.

**Table 4-31. `jtagclock` Command-line debugger command - Examples**

Command	Description
<code>jtagclock 3</code>	Reads the current jtag clock speed for chain position 3.
<code>jtagclock 3 1000</code>	Updates the jtag clock speed to 1000kHz for chain position 3.

## 4.5.36 kill

Closes the specified debug session.

### Syntax

```
kill [all | <index> ...]
```

### Examples

The following table lists and defines examples of the `kill` command.

**Table 4-32. `kill` Command-line debugger command - Examples**

Command	Description
<code>kill</code>	Kills the debug session for the current process.
<code>kill all</code>	Kills all active debug sessions.
<code>kill 0 1</code>	Kills debug sessions 0 and 1.

## 4.5.37 launch

Lists the launch configurations.

### Syntax

```
launch
```

### Examples

```
launch
```

List the launch configurations. The last debugged configuration is denoted with an asterisk '\*', last run with a greater than '>'.

## 4.5.38 linux::displaylinuxlist

Lists the expression for each element of a Linux list.

### Syntax

```
displaylinuxlist -list <listName> -function <functionWhereListIsVisible> -address
<listAddress> -type <elementTypeName> [-next <nextPath>]
```

### Options

The following table lists and defines options of the `linux::displaylinuxlist` command.

**Table 4-33. linux::displaylinuxlist Command-line debugger command - Options**

Command	Description
-l[ist] <listName>	The name of the list (must be global).
-f[unction] <functionWhereListIsVisible>	Some function where the list is visible, optional.
-a[ddress] <listAddress>	The address of the list, in hexa, only in case when (listName,functionWhereListIsVisible) are not specified, to be used with local lists.
-t[ype] <elementTypeName>	The type of the list elements.
-n[ext] <nextPath>	Specifies in order all the structure member names needed to reach the next element.

### Examples

The following table lists and defines examples of the `linux::displaylinuxlist` command.

**Table 4-34. linux::displaylinuxlist Command-line debugger command - Examples**

Command	Description
<code>linux::displaylinuxlist -list workqueues -function __create_workqueue -type workqueue_struct -next list next</code>	Lists the current workqueues.
<code>linux::displaylinuxlist -address 0xC00703fc -type workqueue_struct -next list next</code>	Lists the current workqueues, 0xC00703fc should be the address of workqueues. Available only if the kernel is stopped.

## 4.5.39 linux::loadsymbolics

Loads the symbolics for the selected module.

## Syntax

```
loadsymbolics <absolute_file_path>
```

### 4.5.40 linux::refreshmodules

Lists loaded modules.

## Syntax

```
refreshmodules
```

### 4.5.41 linux::selectmodule

Sets the current module.

## Syntax

```
selectmodules <index>
```

### 4.5.42 linux::unloadsymbolics

Unloads the symbolics for the specified module.

## Syntax

```
unloadsymbolics
```

### 4.5.43 loadsym

Loads a symbolic file.

## Syntax

```
loadsym <filename> [PIC load addr (hex)]
```

## Examples

The following table lists and defines examples of the `loadsym` command.

**Table 4-35. `loadsym` Command-line debugger command - Examples**

Command	Description
<code>loadsym myapp.elf</code>	Loads the debug information in <code>myapp.elf</code> into the debugger.
<code>loadsym mypicapp.elf 0x40000</code>	Loads the debug information in <code>mypicapp.elf</code> into the debugger; symbolics addresses are adjusted based on the alternate load address of <code>0x40000</code> .

## 4.5.44 `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

The following table lists and defines examples of the `log` command.

**Table 4-36. `log` Command-line debugger command - Examples**

Command	Description
<code>log</code>	Lists currently opened log files.
<code>log s session.log</code>	Logs all display entries to file <code>session.log</code> .
<code>log off c</code>	Closes current command log file.

*Table continues on the next page...*

**Table 4-36. log Command-line debugger command - Examples (continued)**

Command	Description
log off	Closes current command and log file.
log off all	Closes all log files.

### 4.5.45 mc::config

Displays or edits multicore groups options.

#### Syntax

```
config [useAllCores|haltGroups|smartSelect [enable|disable]]
```

#### Examples

The following table lists and defines examples of the mc::config command.

**Table 4-37. mc::config Command-Line Debugger Command - Examples**

Command	Description
mc::config	Shows the current configuration settings.
mc::config useAllCores disable	Disables Use All Cores mode.
mc::config haltGroups enable	Enables halt groups (where supported)
mc::config smartSelect disable	Disables smart select mode so that the mc::group enable disable commands behave analogously to pressing Ctrl+Click on a Multicore Groups Dialog group node. Note : This setting does not affect the Multicore Groups dialog operation.

### 4.5.46 mc::go

Resumes multiple cores.

#### Syntax

```
mc::go
```

#### Remarks

mc::go resumes the selected cores associated with the current thread context (see [switchtarget](#)).

## 4.5.47 mc::group

Displays or edits multicore groups.

### Syntax

```
group
```

```
group new <type-name> [<name>]
```

```
group rename <name>|<group-index> <new-name>
```

```
group remove <name>|<group-index> ...
```

```
group removeall
```

```
group enable|disable [-context ops|swbps|hwbps|wps ...] <group-index> ...|all
```

### Examples

The following table lists and defines examples of the `mc::group` command.

**Table 4-38. mc::group Command-line debugger command - Examples**

Command	Description
<code>mc::group</code>	Shows the defined groups, including indices for use in the <code>mc::group renamelenablelremove set</code> of commands.
<code>mc::group new 8572</code>	Creates a new group for target type 8572. The group name will be based on the target name and will be unique. The enablement of the group elements will be all non-cores enabled, all cores disabled.
<code>mc::group rename 0 "My Group Name"</code>	Renames the group at index 0 to "My Group Name".
<code>mc::group enable 0 1.0</code>	Enables the group at index 0 and the element at index 1.0 of the <code>mc::group</code> command.
<code>mc::group enable -context swbps hwbps 0</code>	Enables the group contexts for software and hardware breakpoints at index 0 of the <code>mc::group</code> command. Note, the index must correspond to a group, not a specific core.
<code>mc::group remove "My Group Name"</code>	Removes the group named "My Group Name".
<code>mc::group removeall</code>	Removes all groups.

## 4.5.48 mc::kill

Terminates multiple cores.

### Syntax

`mc::kill`

## Remarks

`mc::kill` terminates the debug session for the selected cores associated with the current thread context (see [switchtarget](#)).

## 4.5.49 mc::reset

Resets multiple cores.

### Syntax

`mc::reset`

### Remarks

`mc::reset` resets the debug session associated with the current thread context (see [switchtarget](#)).

## 4.5.50 mc::restart

Restarts multiple cores.

### Syntax

`mc::restart`

### Remarks

`mc::restart` restarts the debug session for the selected cores associated with the current thread context (see [switchtarget](#)).

## 4.5.51 mc::stop

Suspends multiple cores.

### Syntax

`mc::stop`

### Remarks



`mc::stop` stops the selected cores associated with the current thread context (see [switchtarget](#)).

## 4.5.52 mc::type

Displays or edits target types

### SYNTAX

```
type
type import <filename>
type remove <filename>|<type-index> ...
ype removeall
```

### Examples

The following table lists and defines examples of the `mc::type` command.

**Table 4-39. mc::type Command-line debugger command - Examples**

Command	Description
<code>mc::type</code>	Shows the target types available for multicore debugging as well as type indices for use by the <code>mc::type remove</code> and <code>mc::group new</code> commands.
<code>mc::type import 8572_jtag.txt</code>	Creates a new type from the JTAG configuration file.
<code>mc::type remove 8572_jtag.txt</code>	Removes the type imported from the specified file.
<code>mc::group removeall</code>	Removes all imported types.

## 4.5.53 mem

Reads and writes memory.

### Syntax

```
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] [-np]
mem
mem <addr-spec> [<range>] [-s|-ns] [%<conv>] =<value>
mem -ms
```

### Overview

The mem command reads or writes one or more adjacent "cells" of memory, where a cell is defined as a contiguous block of bytes. The cell size is determined by the <cell-size> parameter or by the config command option "MemWidth".

### Options

The following table lists and defines options of the mem command.

**Table 4-40. mem Command-line debugger command - Options**

Command	Description
[none]	With no option, next block of memory is read.
<ms>	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.
<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 MemAccess" is used.
{8,16,32,64}bit	Sets both <cell-size> and <access-size> .
-np	Don't print anything to the display, only return the data.
-ms	On architectures supporting multiple memory spaces, displays the list of available memory spaces including a mnemonic and/or an integer index which may be used when specifying a target address.
-s   -ns	Specifies whether each value is to be swapped. For memory, specifies whether each cell is to be swapped. With a setting of -ns , target memory is written in order from lowest to highest byte address. Otherwise, each cell is endian swapped. If unspecified, the setting "config MemSwap" 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.
% [Q<n>] F	Fixed or Fractional. The range of a fixed point value depends on the (fixed) location of the decimal point. The default location is set by the config command option "MemFixedIntBits" .
%s	ASCII.

## Examples

The examples assume the following settings:

- radix x
- config MemIdentifier 0
- config MemWidth 32
- config MemAccess 32
- config MemSwap off

The following table lists and defines examples of the `mem` command.

**Table 4-41. `mem` Command-line debugger command - Examples**

Command	Description
<code>mem</code>	Displays the next block of memory.
<code>mem 10000</code>	Changes memory range 0x10000-3 as one cell.
<code>mem 1:10000</code>	Changes memory range 0x10000-3, memory space 1, as one cell.
<code>mem 10000 16</code>	Displays memory range 0x10000-3f as 16 cells.
<code>mem 10000 16x1h8</code>	Displays 16, 1-byte cells, with a hardware access size of 8-bytes per read.
<code>mem 10000 8bit</code>	Displays one byte, with a hardware access size of one byte.
<code>mem 10000 -np</code>	Returns one cell, but don't print it to the Command Window.
<code>mem 10000 -s</code>	Displays one byte with the data endian-swapped.
<code>mem 10000 %d</code>	Displays one cell in decimal format.
<code>mem -ms</code>	Displays the available memory spaces, if any.
<code>mem 10000 =10</code>	Changes memory range 0x10000-3 to 0x10 (because radix is hex).
<code>mem 1:10000 =20</code>	Changes memory range 0x10000-3 , memory space 1, to 0x20 .
<code>mem 10000 16x1h8 =31</code>	Changes each of 16, 1-byte cells to 0x31 , using a hardware access size of 8-bytes per write.
<code>mem 10000 -s %d =200</code>	Changes memory range 0x10000-3 to c8000000.

### 4.5.54 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.

### 4.5.55 nexti

Executes over function calls, if any, to the next assembly instruction.

#### Syntax

```
nexti
```

#### Remarks

If you execute nexti command, it will execute the thread to the next assembly instruction unless current instruction is a function call. In such a case, the thread is executed until the function returns.

### 4.5.56 oneframe

Query or set the one-frame stack crawl mode for the current thread.

#### Syntax

```
oneframe [on | off]
```

#### Examples

The following table lists and defines examples of the oneframe command.

**Table 4-42.** oneframe Command-line debugger command - Examples

Command	Description
oneframe on	Tells the debugger to only query and show one frame in stack crawls.
oneframe off	Turns off one-frame mode.
oneframe	Reveals if one-frame mode is on or off.

## 4.5.57 pwd

Lists current working directory.

### Syntax

```
pwd
```

## 4.5.58 quitIDE

Quits the IDE.

### Syntax

```
quitIDE
```

## 4.5.59 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

## Debugger Shell commands

f

Fractional

h

Hexadecimal

### Examples

The following table lists and defines examples of the `radix` command.

**Table 4-43. `radix` Command-line debugger command - Examples**

Command	Description
<code>radix</code>	Lists the current setting.
<code>radix d</code>	Changes the setting to decimal.
<code>radix x</code>	Changes the setting to hexadecimal.

## 4.5.60 redirect

Redirects I/O streams of the current target process.

### Syntax

```
redirect <stream> <destination>
```

### Options

The following table lists and defines options of the `red` command.

**Table 4-44. `red` Command-line debugger command - Options**

Command	Description
<code>&lt;stream&gt;</code>	<code>stdout</code>   <code>stderr</code>   <code>both</code>
<code>&lt;destination&gt;</code>	<code>stop</code>   <code>server &lt;port&gt;</code>   <code>socket [&lt;host&gt;] &lt;port&gt;</code>
<code>&lt;port&gt;</code>	TCP/IP port number of destination socket.
<code>&lt;host&gt;</code>	IP4 address or IP6 address or hostname of target system. Assumed to be "localhost" if omitted.
<code>stop</code>	Ends redirection for the specified stream(s).
<code>server</code>	Attempts to establish a server socket on the specified port. Client sockets may connect to this server socket and read the redirected data. Data written by the target while no client is connected is discarded.
<code>socket</code>	Attempts to connect to the specified server socket. All target output data is written to this connection.

## Examples

The following table lists and defines examples of the `red` command.

**Table 4-45. `red` Command-line debugger command - Examples**

Command	Description
<code>redirect stdout server 27018</code>	Redirects output of stdout for the current process to a server socket on local port 27018.
<code>redirect stderr socket logmachine.com 22018</code>	Attempts to connect to the server socket at port 22018 on host "logmachine.com" and redirects output of stderr for the current process to that connection.
<code>redirect both stop</code>	Ends redirection (if any) currently in place for both stdout and stderr for the current process.

## 4.5.61 refresh

Discards all cached target data and refresh views.

### Syntax

```
refresh [all | -p <pid> <pid> ...]
```

### Options

The following table lists and defines options of the `refresh` command.

**Table 4-46. `refresh` Command-line debugger command - Options**

Command	Description
<code>[none]</code>	No option will refresh current process only.
<code>all</code>	Refreshes all currently debugged processes.
<code>-p &lt;+pid&gt;</code>	Specifies list of process ID for the processes to be refreshed.

### Examples

```
refresh -p 0 1
```

Refreshes debugger data for debugged processes with PID `0' and `1'.

## 4.5.62 reg

Reads and writes registers.

## Syntax

```
reg export <reg-spec> [<n>] <file>

reg export <file>

reg import <file>

reg <reg-spec> [<n>] [-{d|nr|nv|np} ...] [-s|-ns] [%<conv>]

reg <reg-spec>{..<reg>|#<n>} [-{d|nr|nv|np} ...] [-s|-ns] [%<conv>]

reg all|r:|nr: [-{d|nr|nv|np} ...] [-s|-ns] [%<conv>]

reg <reg-spec> [<n>] [-s|-ns] [%<conv>] =<value>

reg <reg-spec>{..<reg>|#<n>} [-s|-ns] [%<conv>] =<value>

reg -regset

reg
```

## Options

The following table lists and defines options of the `reg` command.

**Table 4-47. `reg` Command-line debugger command - Options**

Command	Description
export	Exports all or a set (specified through <reg-spec> [<n>]) of registers into a specified file. The traversal of the register hierarchy is recursive. Existing files are overwritten.
import	Imports registers from a specified file.
[none]	No option is equivalent to <code>reg -regset .</code>
<reg-spec> [{r nr}:]<reg> {r nr}	If multiple registers are specified, then the prefix <code>r:</code> causes a recursive, depth-first traversal of the register hierarchy. The prefix <code>nr:</code> prevents recursion. If unspecified, recursion is the default. Note that different levels of the register hierarchy are represented in the manner of a path with forward-slashes '/' used to delimit the register groups. A name that contains a slash itself can be represented with an escape backward-slash '\' followed by the forward-slash. Further note that a backslash in a doubly-quoted Tcl string is itself an escape character -- in this case two backslashes are required. Alternatively, you may use curly braces '{' and '}' to denote your string in which case just one backslash is necessary.
<reg>	A register name or a register group name.
..<reg>	The end point for a range of registers to access.
<n>	Number of registers.
all	Specifies all registers.
-d	Print detailed data book information.
-nr	Print only register group, that is no registers.

*Table continues on the next page...*



**Table 4-47. `reg` Command-line debugger command - Options (continued)**

Command	Description
<code>-nv</code>	Print only register groups and register names, that is no values.
<code>-np</code>	Do not print anything to the display, only return the data.
<code>regset</code>	Display the register group hierarchy.
<code>-s   -ns</code>	Specifies whether each value is to be swapped. For memory, specifies whether each cell is to be swapped. With a setting of <code>-ns</code> , target memory is written in order from lowest to highest byte address. Otherwise, each cell is endian swapped. If unspecified, the setting "config MemSwap" is used.
<code>%&lt;conv&gt;</code>	Specifies the type of the data. Possible values for <code>&lt;conv&gt;</code> are given below. The default conversion is set by the <code>radix</code> command for memory and registers and by the <code>config var</code> command for variables.
<code>%x</code>	Hexadecimal
<code>%d</code>	Signed decimal.
<code>%u</code>	Unsigned decimal.
<code>%f</code>	Floating point.
<code>% [Q&lt;n&gt;] F</code>	Fixed or fractional. The range of a fixed point value depends on the (fixed) location of the decimal point. The default location is set by the <code>config</code> command option <code>MemFixedIntBits</code> .
<code>%s</code>	ASCII

## Examples

The following table lists and defines examples of the `reg` command.

**Table 4-48. `reg` Command-line debugger command - Examples**

Command	Description
<code>reg -regset</code>	Lists all the available register sets on the target chip.
<code>reg R1</code>	Displays the value of register R1.
<code>reg "General Purpose Registers/R1"</code>	Displays value of register R1 in the General Purpose Register group.
<code>reg R1 -d</code>	Displays detailed "data book" contents of R1, including bitfields and definitions.
<code>reg "nr:General Purpose Registers/R1" 25</code>	Beginning with register R1, display the next 25 registers. Register groups are not recursively searched.
<code>reg R1 =123</code>	Changes register R1 to <code>0x123</code> .
<code>reg R1..R5 =5432</code>	Changes registers R1 through R5 to <code>0x5432</code> .
<code>reg "General Purpose Registers/R1" =100</code>	Changes register R1 in the General Purpose Register group to <code>0x100</code> .
<code>reg export filename</code>	Exports all registers from the target to the specified file.
<code>reg export R1 filename</code>	Exports the value of register R1 to the specified file.

*Table continues on the next page...*

**Table 4-48. `reg` Command-line debugger command - Examples (continued)**

Command	Description
<code>reg export "General Purpose Registers/R1" 25 filename</code>	Beginning with register R1, export the next 25 registers to the specified file.
<code>reg import filename</code>	Imports registers from the specified file.

## 4.5.63 `reset`

Resets the target hardware.

### Syntax

```
reset [h/ard|s/oft] [run]
```

### Options

`h/ard|s/oft`

The type of reset, either hard or soft. If unspecified, the default depends on the hardware support. If soft is supported, then that is the default. Otherwise, if hard is supported, then that is the default.

`run`

Let's the target run after the reset, also called "reset to user". Otherwise, the target is halted at the reset vector.

### Examples

The following table lists and defines examples of the `reset` command.

**Table 4-49. `reset` Command-line debugger command - Examples**

Command	Description
<code>reset</code>	Issues a soft reset if supported, otherwise a hard reset.
<code>reset s</code>	Issues a soft reset.
<code>reset hard</code>	Issues a hard reset.
<code>reset run</code>	Issues a soft reset if supported, otherwise a hard reset. The target is allowed to run after the reset.

## 4.5.64 `restart`

Restarts the current debug session.

## Syntax

```
restart
```

## Examples

```
restart
```

This command will restart the current debug session.

## 4.5.65 restore

Writes file contents to memory.

## Syntax

```
restore -h <filename> [[<ms>:]<addr>|+<offset>] [8bit|16bit|32bit|64bit]
```

```
restore -b <filename> [<ms>:]<addr> [8bit|16bit|32bit|64bit]
```

## Options

The following table lists and defines options of the `restore` command.

**Table 4-50. `restore` Command-line debugger command - Options**

Command	Description
<code>-h -b</code>	Specifies the input file format as hex or binary.
<code>[&lt;ms&gt;:]&lt;addr&gt;</code>	Address to load to. For hex format, this selection overrides the address specified in the file. For architectures with multiple memory spaces, a memory space id may be specified. See config <code>MemIdentifier</code> and <code>mem -ms</code> for more details.
<code>&lt;offset&gt;</code>	Loads the contents of the hex file at an offset of the original location.
<code>8bit 16bit 32bit 64bit</code>	Controls the memory access size.

## Examples

The following table lists and defines examples of the `restore` command.

**Table 4-51. `restore` Command-line debugger command - Examples**

Command	Description
<code>restore -h dat.txt</code>	Loads the contents of the hex file <code>dat.txt</code> into memory.

*Table continues on the next page...*

**Table 4-51. `restore` Command-line debugger command - Examples (continued)**

Command	Description
<code>restore -b dat.bin 0x20</code>	Loads the contents of binary file <code>dat.bin</code> into memory beginning at <code>0x20</code> .
<code>restore -h dat.bin +0x20</code>	Loads the contents of the binary file <code>dat.lod</code> into memory with an offset of <code>0x20</code> relative to the address saved in <code>dat.bin</code> .

## 4.5.66 `run`

Launches a process

### Syntax

```
run [[-index] <index> | [-name] <debug-config-name>]
```

### Examples

The following table lists and defines examples of the `run` command.

**Table 4-52. `run` Command-line debugger command-Examples**

Command	Description
<code>run</code>	Starts a process using the default launch configuration, which is the last run configuration if one exists and index 0 otherwise.
<code>run -index 3</code>	Starts a process using the launch configuration at index 3. Type 'launch' for the current set of launch configurations.
<code>run -name 3</code>	Starts a process using the launch configuration named '3'. Type 'launch' for the current set of launch configurations.
<code>run 3</code>	Starts a process using the launch configuration named '3'. If '3' does not exist then configuration with index 3 will be started. Type 'launch' for the current set of launch configurations.
<code>run {My Launch Config}</code>	Starts debugging using the launch configuration named 'My Launch Config'. Type 'launch' for the current set of launch configurations.

## 4.5.67 `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.

8bit|16bit|32bit|64bit

Controls the memory access size.

## Examples

The following table lists and defines examples of the `save` command.

**Table 4-53. `save` Command-line debugger command - Examples**

Command	Description
<pre>set addressBlock1 "p:10..`31" set addressBlock2 "p:10000#20" save -h \$addressBlock1 \$addressBlock2 hexfile.txt -a</pre>	Dumps contents of two memory blocks to the text file hexfile.txt (in append mode).
<pre>set addressBlock1 "p:10..`31" set addressBlock2 "p:10000#20" save -b \$addressBlock1 \$addressBlock2 binfile.bin -o</pre>	Dumps contents of two memory blocks to the binary file binfile.bin (in overwrite mode).

## 4.5.68 setpc

Sets the value of the program counter register.

### Syntax

## Debugger Shell commands

```
setpc {[-va|-ve|-vn]} -address <address>
setpc {[-va|-ve|-vn]} -line <line_number> {source_file} {target}
setpc {[-va|-ve|-vn]} -line [+|-]n
setpc {[-va|-ve|-vn]} -gsymbol <symbol>
setpc {[-va|-ve|-vn]} -lsymbol <symbol> <source_file> {target}
setpc {[-va|-ve|-vn]} -line [+|-]n <symbol>
setpc {[-va|-ve|-vn]} -line [+|-]n <symbol> <source_file> {target}
setpc {[-va|-ve|-vn]} -line [+|-] <symbol> <source_file> {target}
```

## Examples

The following table lists and defines examples of the `setpc` command.

**Table 4-54. `setpc` Command-line debugger command - Examples**

Command	Description
<code>setpc -address 0x1000</code>	Sets the PC to address 0x1000.
<code>setpc -line 10</code>	Sets the PC to source line 10 in the current source file.
<code>setpc -line 10 myfile.c</code>	Sets the PC to source line 10 in source file 'myfile.c'.
<code>setpc -line +10</code>	Sets the PC to an offset of 10 lines from the current source line.
<code>setpc -gsymbol my_extern_function</code>	Sets the PC to the address of the 'my_extern_function' global symbol.
<code>setpc -lsymbol my_static_function myfile.c</code>	Sets the PC to the address of the 'my_static_function' local symbol defined in source file 'myfile.c'.
<code>setpc -line +10 my_extern_function</code>	Sets the PC to the address corresponding to an offset of 10 source lines from the location where 'my_extern_function' global symbol was defined.
<code>setpc -line +10 my_static_function myfile.c</code>	Sets the PC to the address corresponding to an offset of 10 source lines from the location where 'my_static_function' local symbol was defined, in source file 'myfile.c'.
<code>setpc -line 10 myfile.c mymodule.ko</code>	Sets the PC to source line 10 in source file 'myfile.c'. The file 'myfile.c' is used by the target 'mymodule.ko'.

## 4.5.69 `setpicloadaddr`

Indicates where a PIC executable is loaded.

### Syntax

```
setpicloadaddr [symfile] <PIC load addr (hex) | reset>]
```

### Examples

The following table lists and defines examples of the `setpicloadaddr` command.

**Table 4-55. `setpicloadaddr` Command-line debugger command - Examples**

Command	Description
<code>setpicloadaddr 0x40000</code>	Tells the debugger the main executable is loaded at 0x40000.
<code>setpicloadaddr myapp.elf 0x40000</code>	Tells the debugger <code>myapp.elf</code> is loaded at 0x40000.
<code>setpicloadaddr myapp.elf reset</code>	Tells the debugger <code>myapp.elf</code> is loaded at the address set in the ELF.

## 4.5.70 `stack`

Prints the call stack.

### Syntax

```
stack [num_frames] [-default]
```

### Examples

The following table lists and defines examples of the `stack` command.

**Table 4-56. `stack` Command-line debugger command - Examples**

Command	Description
<code>stack</code>	Prints the entire call stack unless limited with <code>stack -default</code> .
<code>stack 6</code>	Prints the 6 innermost call stack levels.
<code>stack -6</code>	Prints the 6 outermost call stack levels.
<code>stack 6 -default</code>	Limits the number of stack frames shown to the 6 innermost levels.
<code>stack -default</code>	Removes the stack frame limit.

## 4.5.71 `status`

Lists the debug status of all existing active targets.

### Syntax

```
status
```

## 4.5.72 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

The following table lists and defines examples of the `step` command.

**Table 4-57. `step` Command-line debugger command - Examples**

Command	Description
<code>step</code>	Steps into the current source or assembly line.
<code>step over</code>	Steps over the current source or assembly line.
<code>step out</code>	Steps out of a function.
<code>step asm</code>	Steps over a single assembly instruction.



### 4.5.73 stepi

Executes to the next assembly instruction.

#### Syntax

```
stepi
```

### 4.5.74 stop

Stops a running program (started by a go, step, or next command).

#### Syntax

```
stop
```

#### Examples

The following table lists and defines examples of the `stop` command.

**Table 4-58. `stop` Command-line debugger command - Examples**

Command	Description
<code>stop</code>	Using it after command go/step out/next, this will stop the target program.

### 4.5.75 switchtarget

Displays information about debugged threads, processes and connections or changes the debug context for subsequent commands.

#### Syntax

```
switchtarget [<index> | -cur | -ResetIndex -pid | -tid | -conn | -arch]
```

```
switchtarget -tid [-pid=<procID>] [[-arch==<name>] | [-conn==<name>]]
```

```
switchtarget -pid [[-arch==<name>] | [-conn==<name>]]
```

```
switchtarget -arch [-conn==<name>]
```

```
switchtarget -conn [-arch==<name>]
```

## Debugger Shell commands

```
switchtarget [-pid=<procID>] [-tid=<threadID>] [[-arch==<name>] | [- conn==<name>]]
```

### Parameter

index

Session Index number.

### Examples

The following table lists and defines examples of the `switchtarget` command.

**Table 4-59. `switchtarget` Command-line debugger command - Examples**

Command	Description
<code>switchtarget</code>	Lists currently available debug sessions.
<code>switchtarget 0</code>	Selects the thread with index 0
<code>switchtarget -cur</code>	Lists the index of the current thread.
<code>switchtarget -ResetIndex</code>	Resets the index counter to 0, not valid while debugging.
<code>switchtarget -tid</code>	Lists the thread IDs of the current process of the current connection.
<code>switchtarget -pid</code>	Lists the process IDs of the debugged processes of the current connection.
<code>switchtarget -pid -arch=EPPC</code>	Lists the process IDs of the debugged processes of EPPC architecture on the current debug system.
<code>switchtarget -pid -conn=Launch-1</code>	Lists the process IDs of the debugged processes of the Launch-1 connection.
<code>switchtarget -arch -conn=Launch-1</code>	Lists the architectures debugged on Launch-1 connection.
<code>switchtarget -conn -arch=EPPC</code>	Lists the name of the connection of EPPC architecture on the current debug system.
<code>switchtarget -pid=0 -tid=0 -arch=EPPC</code>	Switches current context to thread 0 of process 0 of EPPC architecture on the current debug system.
<code>switchtarget -pid=0 -tid=0 -conn=Launch-1</code>	Switches current context to thread 0 of process 0 on Launch-1 connection.

## 4.5.76 system

Executes system command.

### Syntax

```
system [command]
```

### Parameter

command

Any system command that does not use a full screen display.

## Examples

The following table lists and defines examples of the `system` command.

**Table 4-60. `system` Command-line debugger command - Examples**

Command	Description
<code>system del *.tmp</code>	Deletes from the current directory all files that have the <code>.tmp</code> filename extension.

## 4.5.77 var

Reads and writes variables or C-expressions.

### Syntax

`var`

`var <var-spec> [-np] [-s|-ns] [%<conv>]`

`var v: [-np] [-s|-ns] [%<conv>]`

`var <var-spec> [-s|-ns] [%<conv>] =<value>`

### Options

The following table lists and defines options of the `var` command.

**Table 4-61. `var` Command-line debugger command - Options**

Command	Description
[none]	No option is equivalent to "var v:".
v:	If this option appears with no <var> following it, then all variables pertinent to the current scope are printed.
<var>	Symbolic name of the variable to print. Can be a C expression as well.
-np	Don't print anything to the display, only return the data.
-s -ns	Specifies whether each value is to be swapped. For memory, specifies whether each cell is to be swapped. With a setting of -ns, target memory is written in order from lowest to highest byte address. Otherwise, each cell is endian swapped. If unspecified, the setting "config MemSwap" 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.

*Table continues on the next page...*

**Table 4-61. var Command-line debugger command - Options (continued)**

Command	Description
%u	Unsigned decimal.
%f	Floating point.
% [Q<n>] F	Fixed or Fractional. The range of a fixed point value depends on the (fixed) location of the decimal point. The default location is set by the config command option "MemFixedIntBits".
%s	ASCII.

## Examples

The following table lists and defines examples of the `var` command.

**Table 4-62. var Command-line debugger command - Examples**

Command	Description
<code>var myVar -s %d</code>	Displays the endian-swapped contents of variable <code>myVar</code> in decimal.
<code>var myVar =10</code>	Changes the value of variable <code>myVar</code> to 16 (0x10).

## 4.5.78 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

The following table lists and defines examples of the `wait` command.

**Table 4-63. wait Command-line debugger command - Examples**

Command	Description
<code>wait</code>	Debugger waits until you press the space bar.
<code>wait 2000</code>	Wait for 2 seconds.

## 4.5.79 watchpoint

Sets, removes, disables, enables or list watchpoints. You can also set condition on watchpoint.

### Syntax

```
watchpoint
```

```
watchpoint [-{r|w|rw}] {<var>| [<ms>:]<addr> <size>}
```

```
watchpoint all|#<id>|<var>| [<ms>:]<addr> off|enable|disable
```

```
watchpoint #<id> ignore <count>
```

```
watchpoint #<id> cond <c-expr>
```

```
watchpoint #<id> type -{r|w|rw}
```

```
watchpoint #<id> size <units>
```

### Examples

The following table lists and defines examples of the `watchpoint` command.

**Table 4-64.** `watchpoint` Command-line debugger command - Examples

Command	Description
<code>watchpoint</code>	Displays all watchpoints.
<code>watchpoint gData</code>	Sets read-write (the default) watchpoint on variable <code>gData</code> .
<code>watchpoint -r gData</code>	Sets read-only watchpoint on variable <code>gData</code> .
<code>watchpoint all off</code>	Removes all watchpoints.
<code>watchpoint #4 disable</code>	Disables watchpoint number 4.
<code>watchpoint 10343 4</code>	Sets a watchpoint at memory address 10343 of length 4.
<code>watchpoint #4 ignore 3</code>	Sets ignore count to 3 for watchpoint number 4.
<code>watchpoint #4 cond x == 3</code>	Sets the condition for watchpoint number 4 to fire only if <code>x == 3</code> .
<code>watchpoint #4 type -rw</code>	Sets the access type read/write for watchpoint number 4.
<code>watchpoint #4 size 8</code>	Sets the size to 8 units for watchpoint number 4.



## Chapter 5

# Debugger Script Migration

This chapter describes the migration from the Command window of the CodeWarrior Classic IDE to the debugger shell of the CodeWarrior Eclipse IDE. The **Debugger Shell** of the CodeWarrior Eclipse IDE uses the same TclScript scripting engine as the Command Window with some notable exceptions and changes, as follows:

- new command line syntax for launching the CodeWarrior Eclipse IDE
- removal of the build commands
- removal of the display commands, which are replaced by GUI preferences
- improved step command syntax
- new commands for starting a debug session

This chapter explains:

- [Command-line syntax](#)
- [Launching debug session](#)
- [Stepping](#)
- [Settings of config command](#)

## 5.1 Command-line syntax

Start the CodeWarrior Eclipse IDE and execute a Debugger Shell script with a TclScript script as input from the command-line, as shown in the example below:

```
D:\SC\eclipse>cwide.exe -vmargsplus -Dcw.script=D:\my_script.tcl
```

### NOTE

Users familiar with the `-vmargs` option in the CodeWarrior Eclipse IDE should note that CodeWarrior will not work properly if `-vmargs` is used. Use the custom `-vmargsplus` option in place of the `-vmargs` option.

## 5.2 Launching debug session

In the CodeWarrior Classic IDE, you use the project -list command to browse the list of projects to debug and the debug command to start a debug session. However, in the CodeWarrior Eclipse IDE, you use the following commands in the Debugger Shell:

- launch: to list the launch configurations
- debug: to start a debug session
- run: to start a process

```

$>launch
  0 - MyFirstProject - Release - SC3x00 Platform ISS [CodeWarrior Download]
 *>1 - MyFirstProject - Debug - SC3x00 Platform ISS [CodeWarrior Download]
$>
    
```

**Figure 5-1.** launch command



```

%>debug
Launching 'MyFirstProject - Debug - SC3x00 Platform ISS': 0% complete
: 0% complete
(Preparing launch delegate...): 0% complete
(Performing pre-launch check...): 0% complete
(Performing final launch validation...): 0% complete
(!AbstractCLaunchDelegate.searching_for_errors_inMyFirstProject!): 0% complete
: 0% complete
(Initializing source locator...): 0% complete
(Initializing source locator...): 7% complete
(Launching delegate...): 7% complete
thread set: Running, 0x0, 0x8000, cpuSC100Big, MyFirstProject.eld
D:\Profiles\b17105\workspace\MyFirstProject\Debug\MyFirstProject
.eld (state, tid, pid, cpu, target)
(Launching delegate...): 100% complete
thread break: Stopped, 0x0, 0x8000, cpuSC100Big, MyFirstProject.eld
D:\Profiles\b17105\workspace\MyFirstProject\Debug\MyFirstProje
ct.eld (state, tid, pid, cpu, target)
%>run
Running 'MyFirstProject - Debug - SC3x00 Platform ISS': 0% complete
: 0% complete
(Preparing launch delegate...): 0% complete
(Performing pre-launch check...): 0% complete
(Performing final launch validation...): 0% complete
(!AbstractCLaunchDelegate.searching_for_errors_inMyFirstProject!): 0% complete
: 0% complete
(Initializing source locator...): 0% complete
(Initializing source locator...): 7% complete
%>

```

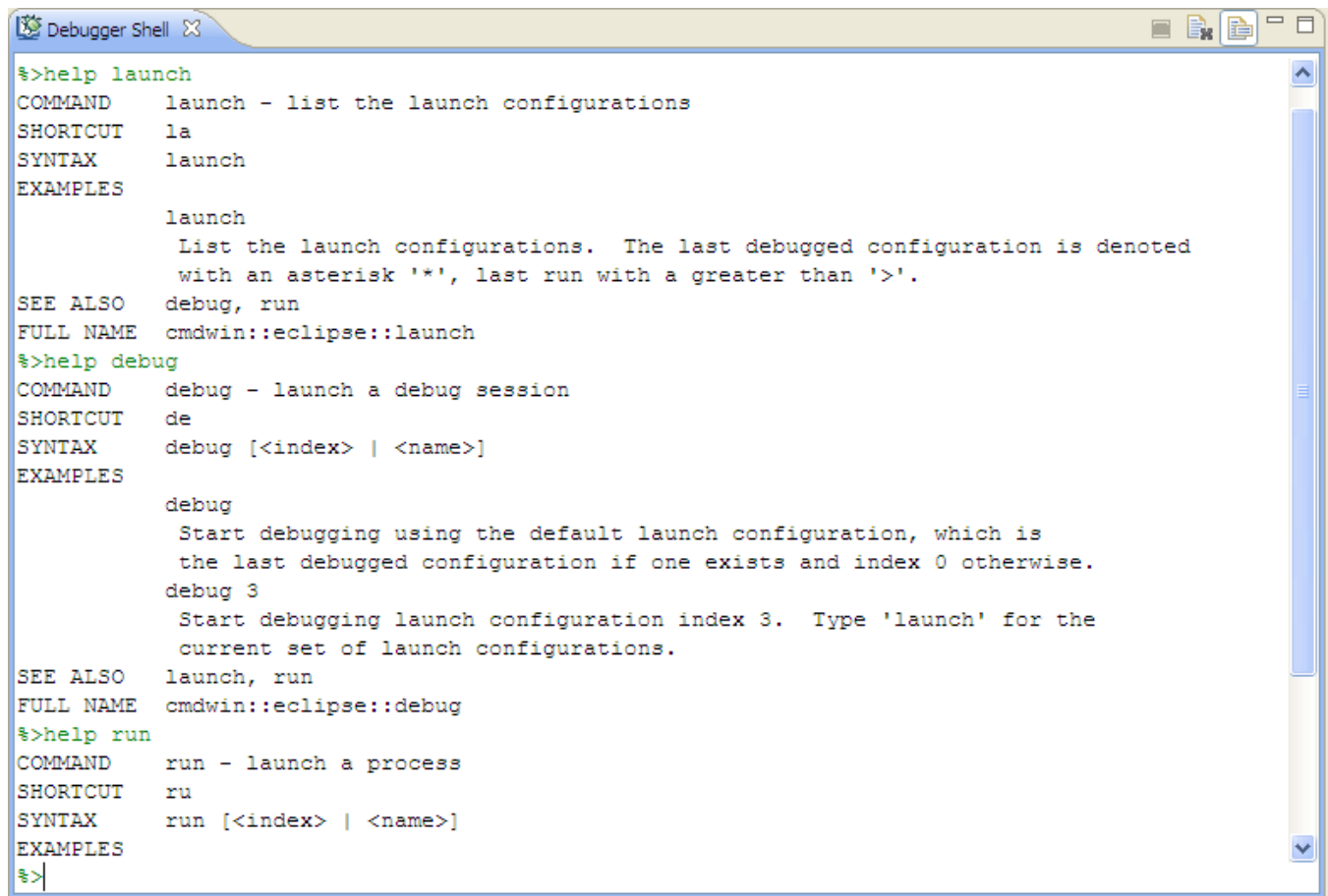
**Figure 5-2.** debug and run commands

### NOTE

The debug command in the CodeWarrior Eclipse IDE also replaces the attach and connect commands, which have been removed in the CodeWarrior Eclipse IDE.

The help launch, help debug, and help run commands display the help details of the respective commands, as shown in [Figure 5-3](#).

## Stepping



```
Debugger Shell X
$>help launch
COMMAND    launch - list the launch configurations
SHORTCUT   la
SYNTAX     launch
EXAMPLES

    launch
        List the launch configurations. The last debugged configuration is denoted
        with an asterisk '*', last run with a greater than '>'.
SEE ALSO   debug, run
FULL NAME  cmdwin::eclipse::launch
$>help debug
COMMAND    debug - launch a debug session
SHORTCUT   de
SYNTAX     debug [<index> | <name>]
EXAMPLES

    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 launch configuration index 3. Type 'launch' for the
        current set of launch configurations.
SEE ALSO   launch, run
FULL NAME  cmdwin::eclipse::debug
$>help run
COMMAND    run - launch a process
SHORTCUT   ru
SYNTAX     run [<index> | <name>]
EXAMPLES
$>
```

Figure 5-3. help command

## 5.3 Stepping

In the CodeWarrior Classic IDE, the `cmdwin::step` command uses the Thread window source view mode to determine if the step is performed at the assembly instruction level or at the source instruction level. The CodeWarrior Eclipse IDE does not support the view mode concept. Use the new commands, `stepi` and `nexti`, at the assembly instructional level. The `stepi` command executes to the next assembly instruction, and the `nexti` command executes to the next assembly instruction unless the current instruction is a function call.

In addition, the syntax of the step commands has been redesigned to match the expected behavior. The `step` command in the CodeWarrior Classic IDE is used to step over a source line. However, in the CodeWarrior Eclipse IDE, the `step` or `step in` command means 'step into', which is used to step into a source line and the `next` command means 'step over'. The `step li` command has been removed. A new command, `finish` has been added for stepping out of a function.

**NOTE**

For backwards compatibility, you can enable the original CodeWarrior Classic IDE syntax by setting the environment variable, `FREESCALE_CMDWIN_CLASSIC_STEP`.

## 5.4 Settings of config command

The table below shows the `config` command settings that have been removed in the CodeWarrior Eclipse IDE.

**Table 5-1. `config` command settings**

Command	Description
<code>config c</code>	Sets the syntax coloring
<code>config o</code>	Aborts a script
<code>config page</code>	Controls the paging behavior
<code>config s</code>	Sets the page size
<code>config project</code>	Accesses the build projects
<code>config target</code>	Accesses the build targets

The remaining `config` command settings work the same as in the CodeWarrior Classic IDE.



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