Freescale Semiconductor
Application Note

Document Number: AN4316

Configuring Compiler Options for Optimal Performance of ColdFire Devices

1 Introduction

This document provides two sets of options in the CodeWarrior tools to produce optimal performance of the ColdFire devices. One set optimizes speed; another set optimizes code size.

2 Optimizing Speed

To optimize ColdFire devices for speed you can configure compiler settings from:

- MCU 10.x Eclipse IDE
- Command Line

> **NOTE** The following procedure assumes that you have already created a project for a ColdFire device.

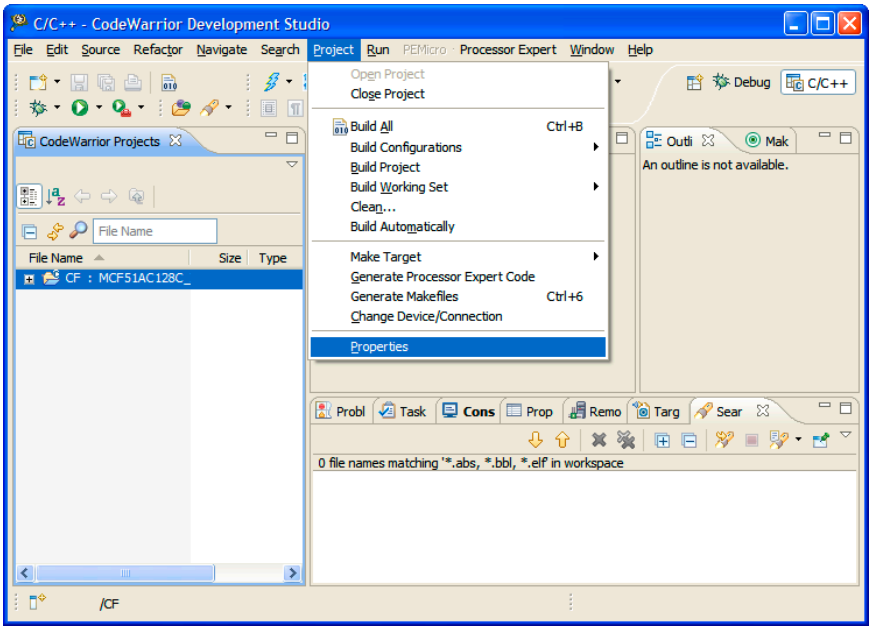
Contents

2.1 Optimizing Speed from MCU 10.x Eclipse IDE

To optimize ColdFire devices for speed:

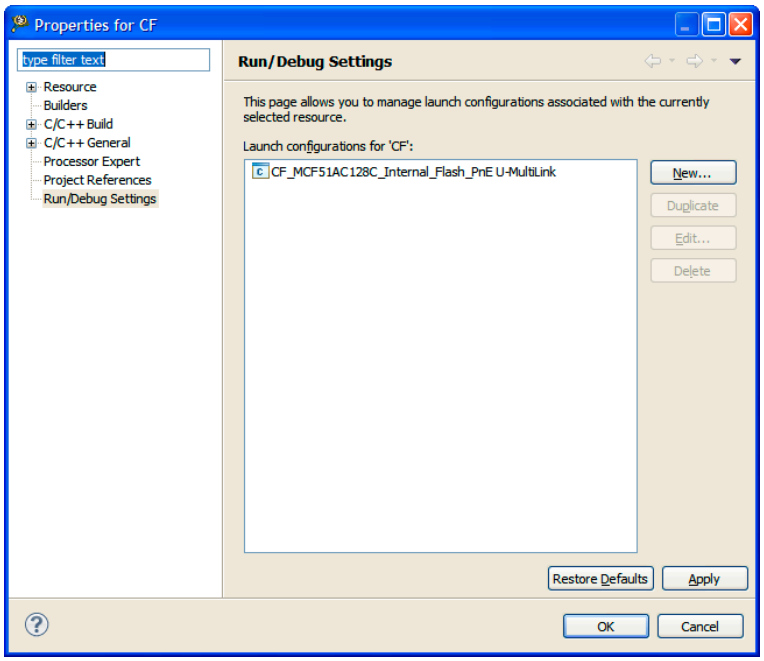
1. Select a ColdFire project in the **CodeWarrior Projects** view.
2. Select **Project** > **Properties**.

Figure 1. Project Menu



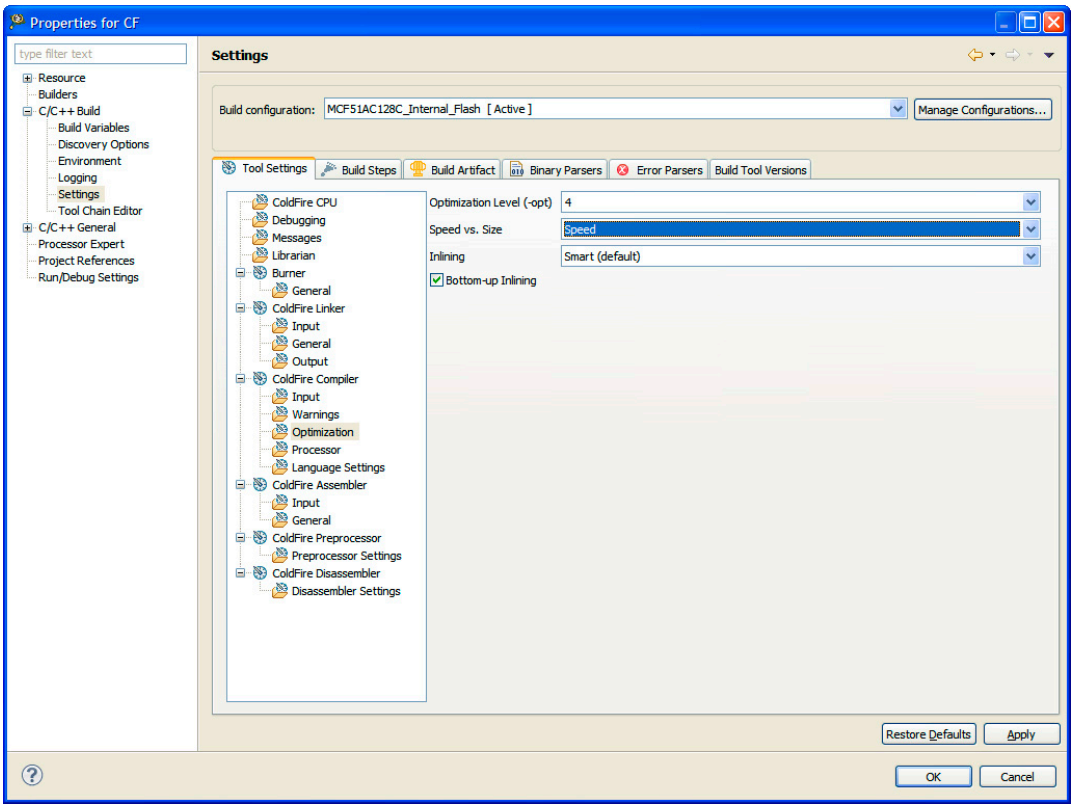
The **Properties for <project_name>** window appears.

Figure 2. Properties for <project_name> Window



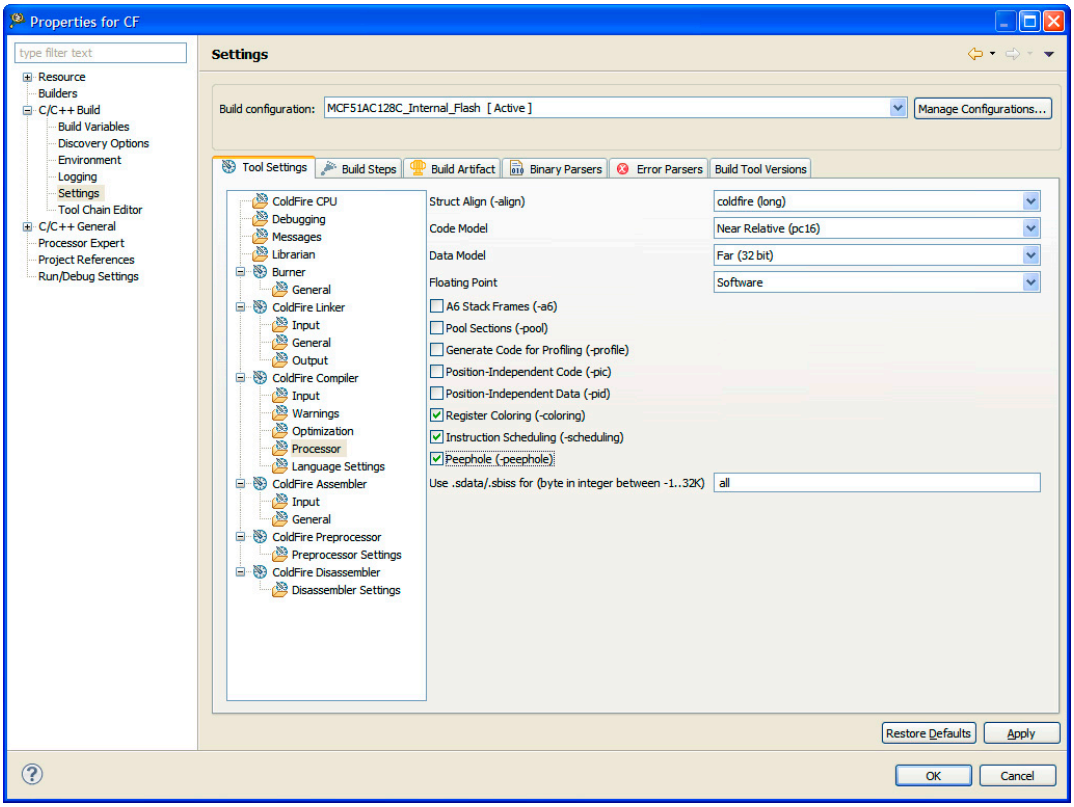
3. Select **C/C++ Build > Settings > ColdFire Compiler > Optimization**.
4. From the **Optimization Level (-opt)** drop-down list select **4**.
5. From the **Speed vs. Size** drop-down list select **Speed**.

Figure 3. ColdFire Compiler > Optimization Panel



6. Select **C/C++ Build > Settings > ColdFire Compiler > Processor**.
7. Check the following checkboxes.
   - **Register Coloring (-coloring)**
   - **Scheduling (-scheduling)**
   - **Peephole (-peephole)**

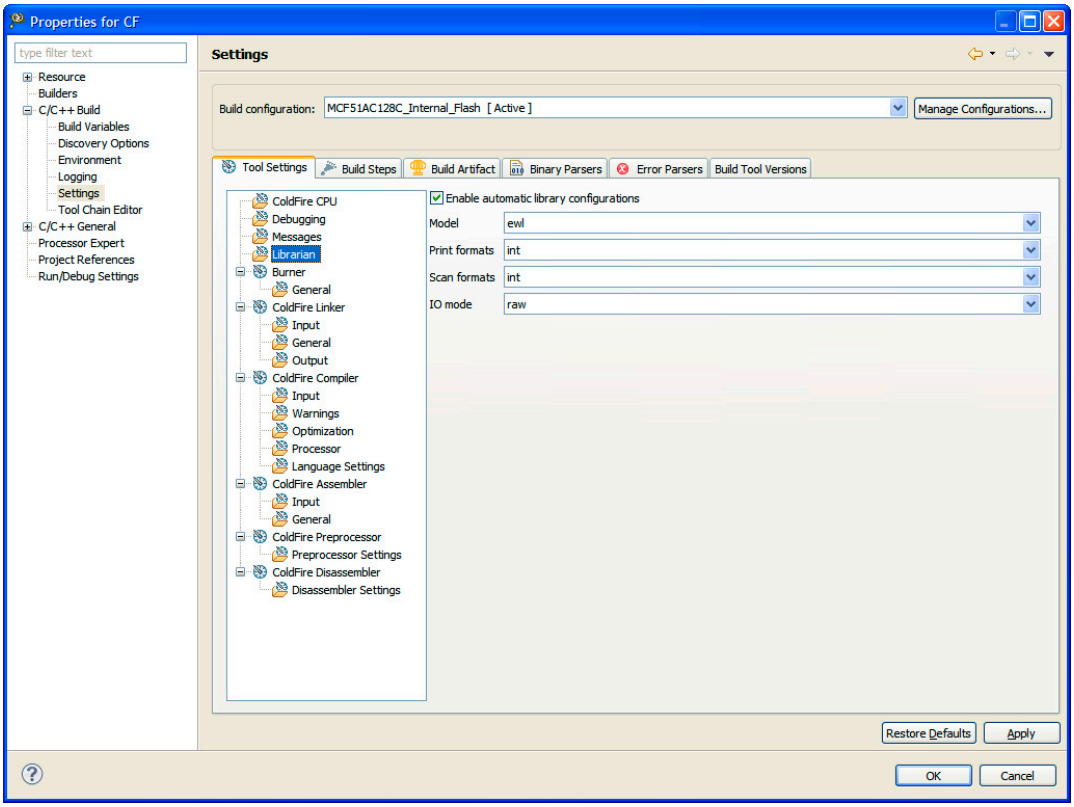
Figure 4. ColdFire Compiler > Processor



NOTE If the current project can be accommodated with a smaller library following is the best configuration but can be modified as per the requirement. However, the following steps are optional.

8. Select **C/C++ Build > Settings > Librarian**.
9. Check the **Enable library automatic configurations** checkbox.
10. From the **Model** drop-down list select **ewl**.
11. From the **Print formats** drop-down list select **int**.
12. From the **Scan formats** drop-down list select **int**.
13. From the **IO mode** drop-down list select **raw**.

Figure 5. Settings > Librarian Panel



14. Click **Apply**.
15. Click **OK**.

> **NOTE** Alternatively, select **Project > Properties > C/C++ Build > Settings > ColdFire Compiler > Language Settings** and select **File** from the **IPA** drop-down list.

2.2 Optimizing Speed from Command Line

From the command line, the compiler should get these options

```
-opt level=4 -opt speed -coloring -scheduling -peephole
```

(Optional)

```
-lavender model=ewl ,print=int ,scan=int ,io=raw
```

3 Optimizing Code Size

To optimize ColdFire devices for code size you can configure compiler settings from:

- MCU 10.x Eclipse IDE
- Command Line

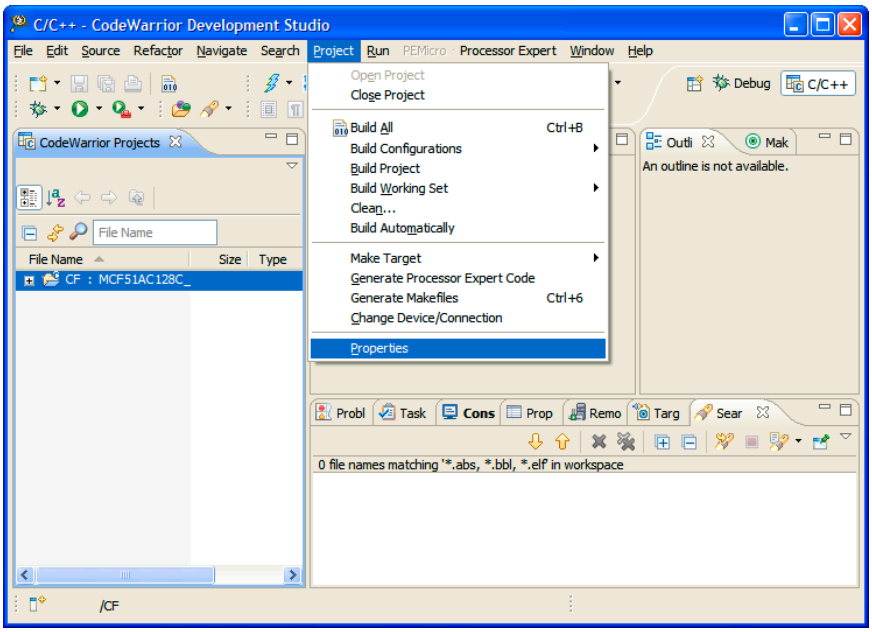
NOTE The following procedure assumes that you have already created a project Optimizing Code Size from MCU 10.x Eclipse IDE.

3.1 Optimizing Size from MCU 10.x Eclipse IDE

To optimize ColdFire devices for code size:

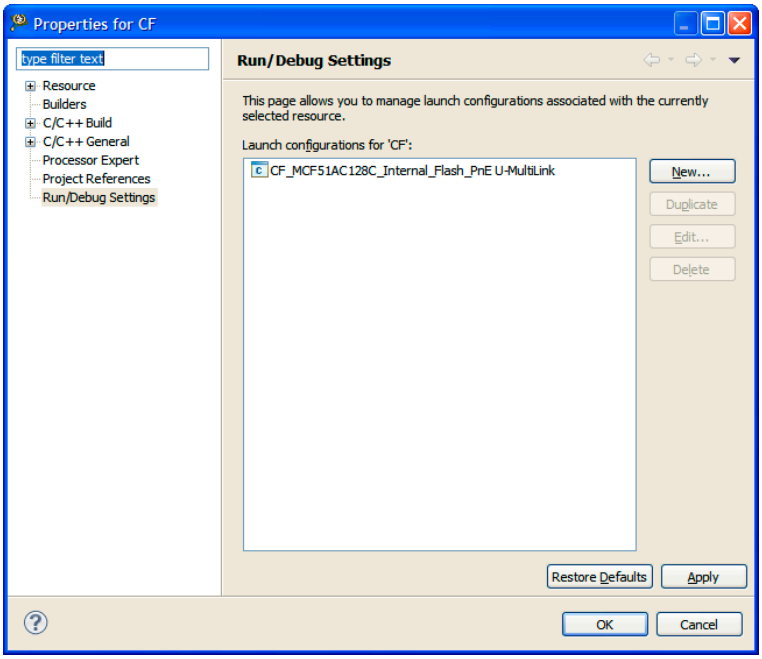
1. Select a ColdFire project in the **CodeWarrior Projects** view.
2. Select **Project > Properties**.

Figure 6. Project Menu



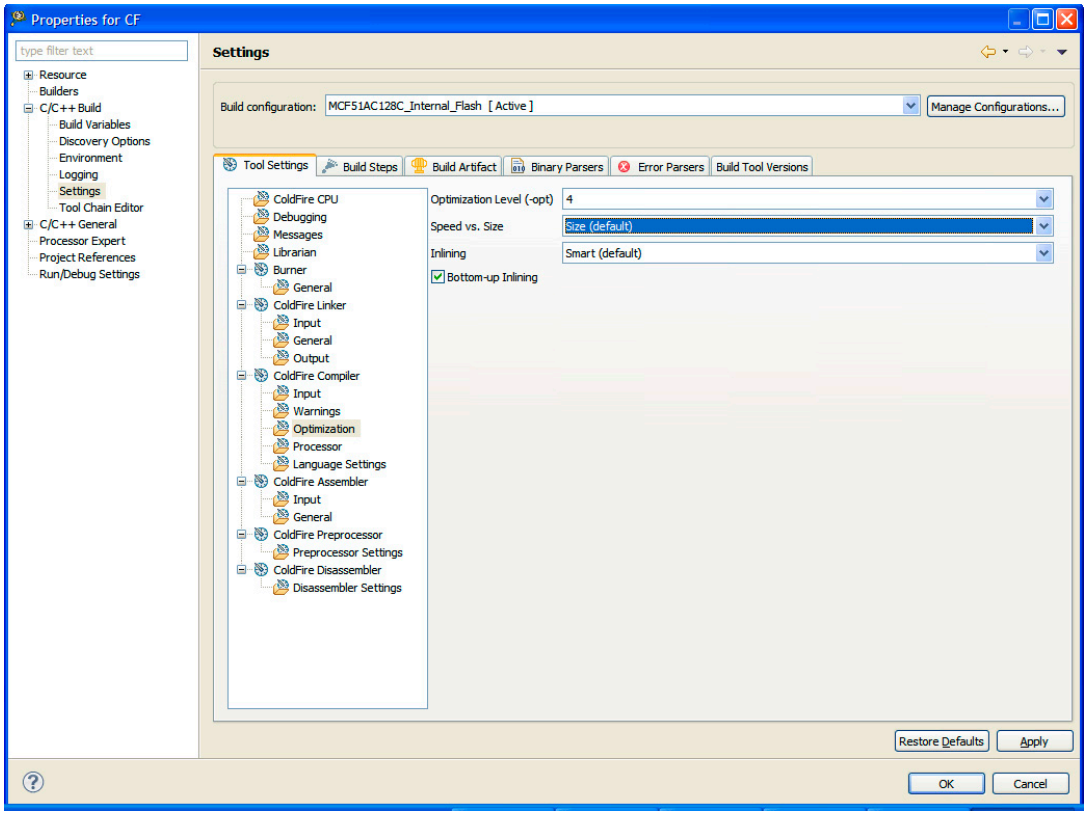
The **Properties for <project_name>** window appears.

Figure 7. Properties for <project_name> Window



3. Select **C/C++ Build > Settings > ColdFire Compiler > Optimization**.
4. From the **Optimization Level (-opt)** drop-down list select **4**.
5. From the **Speed vs. Size** drop-down list select **Size (default)**.
6. Select **C/C++ Build > Settings > ColdFire Compiler > Processor**.
7. Check the following checkboxes.
   - **Register Coloring (-coloring)**
   - **Scheduling (-scheduling)**
   - **Peephole (-peephole)**

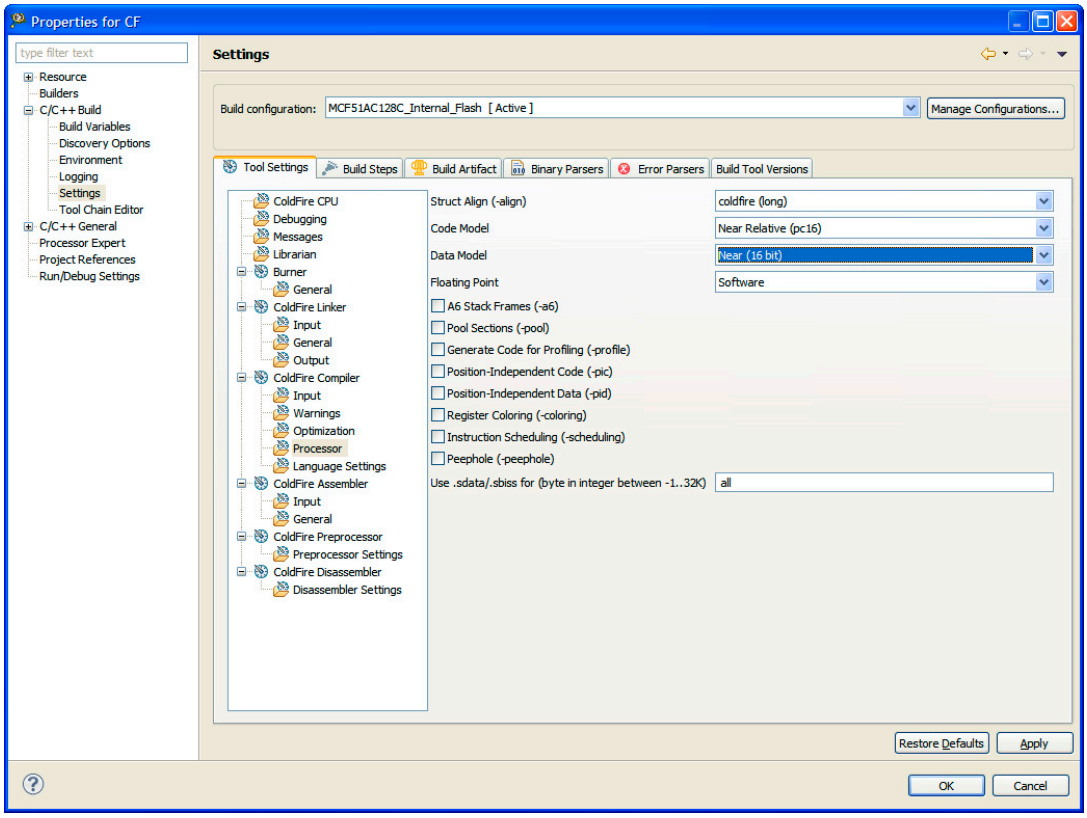
Figure 8. ColdFire Compiler > Optimization Panel



(Optional (1)), if the current project can fit its code / data in 16-bit following is the best configuration but can be modified as per the requirement.

8. From the **Code Model** drop-down list select **Near Relative (pc16)**.
9. From the **Data Model** drop-down list select **Near (16 bit)**.

Figure 9. ColdFire Compiler > Processor Panel



(Optional (2)), depending on the complexity of the compiled code, one can use A6 Stack Frames, but with the cost of reserving A6 register. If the code is too complex and requires more data registers, reserving A6 might come with register allocation penalties, resulting in worse size as before. Using this option is not predictable and should be used only if better size is achieved.

10. Check the **A6 Stack Frames (-a6)** checkbox.

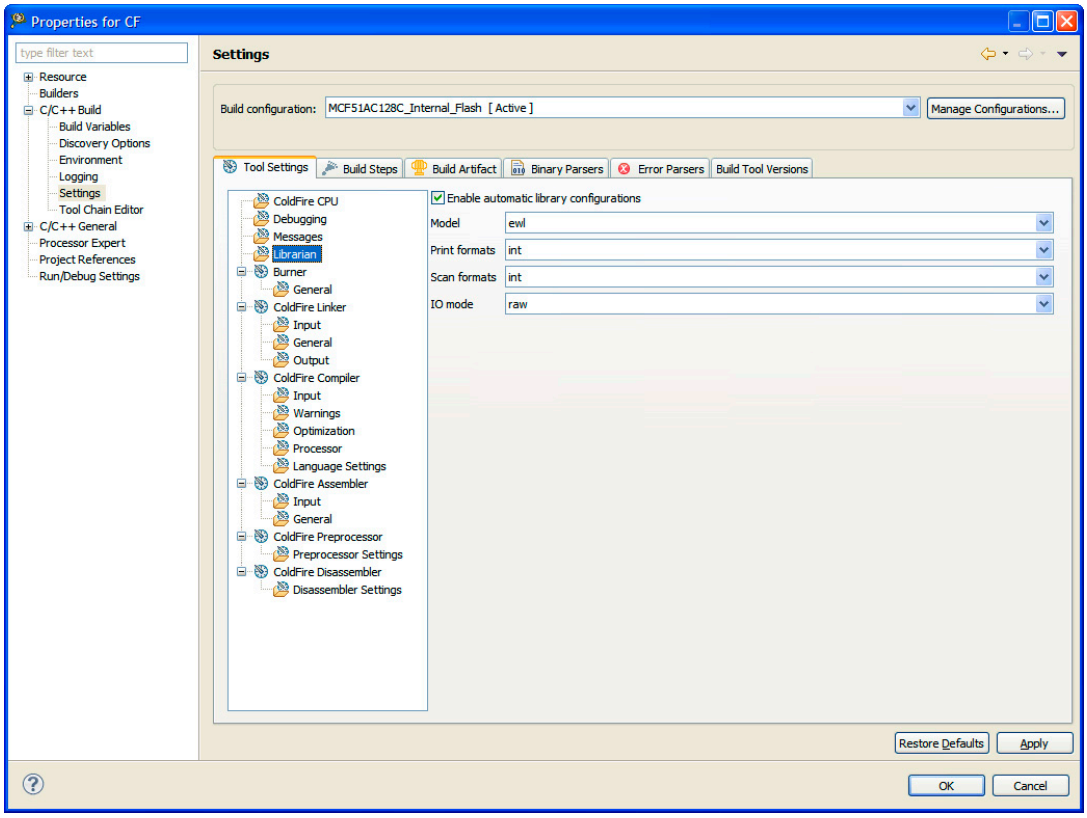
(Optional (3)), depending on the complexity of the compiled code, one can use Small Data Areas .sdata/ .sbss, but with the cost of reserving A5 register. If the code is too complex and requires more data registers, using SDA might come with register allocation penalties, resulting in worse size as before.

11. Set the **Use .sdata/.sbss for (byte in integer between -1..32K)** option as per the requirement.

(Optional (4)), if the current project can be accommodated with a smaller library following is the best configuration but can be modified as per the requirement.

12. Select **C/C++ Build > Settings > ColdFire Compiler > Librarian**.

Figure 10. ColdFire Compiler > Librarian Panel



13. Check the **Enable library automatic configurations** checkbox.
14. From the **Model** drop-down list select **ewl**.
15. From the **Print formats** drop-down list select **int**.
16. From the **Scan formats** drop-down list select **int**.
17. From the **IO Mode** drop-down list select **raw**.
18. Click **Apply**.
19. Click **OK**.

> **NOTE** Alternatively, select **Project > Properties > C/C++ Build > Settings > ColdFire Compiler > Language Settings** and select **File** from the **IPA** drop-down list.

3.2 Optimizing Speed from Command Line

From the command line, the compiler should get these options

```
-opt level=4 -opt size -coloring -scheduling -peephole
```

(optional (1))

```
-model nearRelCode -model nearData
```

(optional (2))

```
-a6
```

(optional (3))

```
-sdata all
```

(optional (4))

```
-lavender model=ewl ,print=int ,scan=int ,io=raw
```

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