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Application Note

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CodeWarrior Build Tools Options for Optimal Performance on the Power Architecture® e200 Core

by Mark Anderson
Senior Compiler Engineer
CodeWarrior Tools

1 Introduction

This document provides two sets of options in the CodeWarrior tools to produce optimal code generation for the Power Architecture e200 core. One set optimizes for speed; another set optimizes for size.

For more information on the build tools, refer to the following compiler documents:

- *CW C-C++Notes 4.x.txt*
- *CW Embedded PPC Notes 4.0.x.txt*
- *CodeWarrior Development Studio for Power Architecture Processors Build Tools Reference*.

Contents

2 Optimization for Speed

Compiler (mwcceppc) options

```
-proc Zen -fp spfp_only -vle -ppc_asm_to_vle -char
unsigned -sym dwarf-2,full -wchar_t off -enum min -
O4 -opt speed -inline auto,smart -ipa program -
use_lmw_stmw on -use_isel on -flag no-switch_tables
-flag switch_op -lang c99 -flag c9x_alias_by_type -
sdata 71 -sdata2 127 -prefix
ansi_prefix.PPCEABI.bare.h -schedule on -
spe_vector
```

Linker (mwldeppc) options

```
-proc Zen -fp spfp_only -lRuntime.PPCEABI.V.SP.UC.a -lMSL_C.PPCEABI.bare.V.SP.UC.a -
lMSL_C++.PPCEABI.bare.V.SP.UC.a -sym dwarf-2,full -code_merging all,aggressive -
far_near_addressing -vle_enhance_merging -vle_bl_opt -char unsigned -sdata 71 -sdata2 127 -map
```

TIP Experiment with the values of the `-sdata` and `-sdata2` options. The compiler and linker need to have the same thresholds. Make them as large as possible until link errors are generated saying that the small data errors have overflowed. The threshold for *sdata* is independent of the threshold for *sdata2*. The default is 8 for each. If there is lots of small data, this value may need to be lowered to less than 8. One way to determine the optimal threshold is to look at *.data*, *.bss* and *.rodata* sections in the link map file. Ideally, only CodeWarrior library data is in these sections. If any application code in these sections, try to make the thresholds match the largest application data. If a link error is generated saying that relocation 109 does not match the section of an object and the object is in a library, bump down the threshold or rebuild the library with larger thresholds that match the application small data thresholds. If no link error is generated, it is OK if library and application thresholds do not match. *.rodata* corresponds to *sdata2* and *.data* and *.bss* corresponds to *sdata*.

TIP Change `-spe_vector` to either
`-spe_addl_vector` or
`-spe2_vector`
depending on processor support. For example z3 and some z6 processors, e.g. MPC5566 (Viper), support `-spe_addl_vector`

TIP Change `-schedule on` to either
`-pragma "schedule z750"` or
`-pragma "schedule z760"`
if the targeted processor is in the z750 or z760 families.

TIP The option `-ipa program` generally produces the best code both when trying to obtain fastest speed or smallest size.

3 Optimization for Size

Compiler (mwcceppc) options

```
-proc Zen -fp spfp_only -vle -ppc_asm_to_vle -char unsigned -sym dwarf-2,full -enum min -O4 -
func_align 4 -opt space -inline auto,smart -ipa program -use_lmw_stmw on -Cpp_exceptions off -
RTTI off -wchar_t off -bool off -use_isel on -flag no-switch_tables -flag switch_op -lang c99
```

```
-flag c9x_alias_by_type -sdata 32767 -sdata2 127 -prefix ansi_prefix.PPCEABI.bare.SZ.h -
schedule on -spe_vector
```

Linker (mwldeppc) options

```
-proc Zen -fp spfp_only -lRuntime.PPCEABI.V.SP.UC.a -lMSL_C.PPCEABI.bare.SZ.V.SP.UC.a -
lMSL_C++.PPCEABI.bare.SZ.V.SP.UC.a -sym dwarf-2,full -code_merging all,aggressive -
far_near_addressing -vle_enhance_merging -vle_bl_opt -char unsigned -sdata 32767 -sdata2 127 -
map
```

NOTE The tips in the previous Section 2, “Optimization for Speed” also apply to this section.

How to Reach Us:

Home Page:
www.freescale.com

E-mail:
support@freescale.com

USA/Europe or Locations Not Listed:
Freescale Semiconductor
Technical Information Center, CH370
1300 N. Alma School Road
Chandler, Arizona 85224
+1-800-521-6274 or +1-480-768-2130
support@freescale.com

Europe, Middle East, and Africa:
Freescale Halbleiter Deutschland GmbH
Technical Information Center
Schatzbogen 7
81829 Muenchen, Germany
+44 1296 380 456 (English)
+46 8 52200080 (English)
+49 89 92103 559 (German)
+33 1 69 35 48 48 (French)
support@freescale.com

Japan:
Freescale Semiconductor Japan Ltd.
Headquarters
ARCO Tower 15F
1-8-1, Shimo-Meguro, Meguro-ku,
Tokyo 153-0064, Japan
0120 191014 or +81 3 5437 9125
support.japan@freescale.com

Asia/Pacific:
Freescale Semiconductor Hong Kong Ltd.
Technical Information Center
2 Dai King Street
Tai Po Industrial Estate
Tai Po, N.T., Hong Kong
+800 2666 8080
support.asia@freescale.com

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