FAQ 210

Compilation Problems when using large Models

Keywords
RTI; RTI-MP; Build Process; PowerPC compiler, compiler optimization, RTI general build options

Question
I am using RTI1005, RTI1103, RTI1104 or RTI1401 (PowerPC-based platforms). When compiling a large model, I get warnings or error messages from the compiler. What can I do to avoid them?

Answer
At first it is recommended to install Updates of the PowerPC Compiler. The mentioned PowerPC Compiler Updates can be downloaded at http://www.dspace.de/goto?patchessfc.

If a Simulink model is very large, the PowerPC Compiler might issue warnings or error messages during the compilation. This might happen if one of the dSPACE platforms DS1005, DS1103, DS1104 or MicroAutoBox (DS1401) is used.

The warnings / error messages are

1. **Caution: routine <model> contains <n> Basic Blocks and <n> Expressions. Normally, aggressive register-allocation would be disabled for this routine, to improve compile-time. But it is not possible to disable Inter-Procedural Register Allocation (IRA) after part of the compilation is complete. It is strongly suggested to re-compile with IRA disabled by, for example, not using the -Ox option.**

   During the compilation of complex models, the Microtec PowerPC compiler (version 3.x) issues this warning and recommends to disable aggressive register-allocation, to reduce the optimization level and to start the compilation again.

   Disable the aggressive register-allocation by omitting the optimization option –Ox. (You can set the optimization level on the Configuration Parameter’s page RTI general build options (beneath Real-Time Workshop page (with Real-Time Workshop®) or Code Generation page (with Simulink Coder®)).

2. **Caution: current program unit "MdlOutputs" is too large for constant and copy propagation optimizations, turning them 'off'**

   or

   **Caution: current program unit "MdlOutputs" is too large for O<n> or higher level optimizations, will do only <m> optimizations**

   These warning messages can be ignored unless your real-time application runs into execution speed problems (task overruns). The warnings point to a general compiler limitation regarding large C code functions.

   To suppress these warnings, refer to Possible Workarounds.

3. **Caution: Main Global Optimizations not done, recompile with -OXM<nnn> (Mbytes)**

   or

   **Caution: Main Global Optimizations not done, recompile with -Xmemlimit<nnn> (Mbytes)**

   These warnings are issued by the PowerPC Optimizer of Power PC Compiler 2.0 and mean that additional host PC memory is necessary for full optimization. The value <nnn> in the warning message will vary, depending on the actual source file complexity.

   To circumvent this warning, set the -OXM option with the respective value:

   **dSPACE Release 3.5 up to dSPACE Release 5.4**

   - For RTI models and MATLAB® R13.x (since dSPACE RLS 3.5 up to dSPACE RLS 5.2) open the Simulation Parameters dialog of the model, change to the Real-Time
Workshop page and select the “RTI general build options” category. Enter -OXM<nnn> at the Compiler options setting

- **For RTI models and MATLAB® R14.x (dSPACE RLS 4.1 up to dSPACE Release 5.4)** open the Configuration Parameters dialog of the model, select the "RTI general build options" page (beneath Real-Time Workshop page). Enter OXM<nnn> at the Compiler options setting.

- **For RTI-MP models** open the Multiprocessor Setup dialog of the model, change to the individual CPUs' pages and open the CPU Options dialog on the Build Options page. Enter -OXM<nnn> at the Compiler options setting

For further possibilities to avoid these warnings, refer to Possible Workarounds

**Possible workarounds**

1. **Reduce compiler optimization**

   RTI uses a default compiler optimization. Reduce this optimization by specifying a lower optimization level. For specifying a lower optimization level please refer to FAQ 030

2. **Reduce the model size or complexity.**

   Since MATLAB® R12, this can be achieved by using atomic subsystems:
   
   - Open the 'Subsystem Parameters' dialog
   - Select 'Treat as atomic unit'.
   - The 'RTW system code' option should be set to ‘Function’.

   As a result, the code of the ‘MdlOutputs’ function is split into several smaller functions, which reduces the probability of compilation problems.

   To additionally reduce the source file size, it is recommended to generate the atomic subsystem functions to separate files by selecting something different than 'Auto' as the 'RTW file name options'. This can also help avoiding compiler problems. Using atomic subsystems might also result in a faster compilation process.
Related documents

- For more information about atomic subsystems refer to the MATLAB HelpDesk.
- *Optimizing the Build Process and Simulation via Atomic Subsystems* in the *RTI and RTI-MP Implementation Guide*

Related FAQs

- *FAQ 030:* Options to Prevent Model Compilation Delays
How to Contact dSPACE Support

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dSPACE recommends that you use the support request form on the internet to contact dSPACE support. It is available under


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FAQ

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