

Compilation Problems when Using Large Models

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 the 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 are disabled for this routine to improve compile-time. However, it is not possible to disable inter-procedural register allocation (IRA) after part of the compilation is complete. It is strongly suggested to recompile with IRA disabled, for example, by not using the -Ox option.**

During the compilation of complex models, the Microtec PowerPC compiler (version 3.x) issues this warning and recommends disabling 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 **RTI general build options** page (beneath the Real-Time Workshop page in Real-Time Workshop® or the Code Generation page in Simulink Coder®))

2. **Caution: The current MdlOutputs program unit is too large for constant and copy propagation optimizations. Turning them off**
or
Caution: The current MdlOutputs program unit is too large for O<n> or higher level optimizations, will perform 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 could not be completed, recompile with -OXM<nnn> (Mbytes)**
or
Caution: Main global optimizations could not be completed, recompile with -Xmemlimit<nnn> (Mbytes)

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

To avoid this warning, set the -OXM option to the respective value:

dSPACE Release 3.5 up to dSPACE Release 5.4

- **For RTI models and MATLAB® R13.x (as of dSPACE RLS 3.5 up to dSPACE RLS 5.2)**, open the simulation parameters dialog of the model, go 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 the 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 CPU pages and open the CPU options dialog on the Build Options page. Enter -OXM<nnn> at the compiler options setting

For more options to avoid these warnings, refer to [Possible Workarounds](#)

Possible workarounds

1. Reduce Compiler Optimization

RTI uses a default compiler optimization. Reduce optimization by specifying a lower optimization level. For specifying a lower optimization level, refer to [FAQ 030](#)

2. Reduce the Model Size or Complexity.

As of 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 must 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 a different option 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

FAQ Overview

<http://www.dspace.com/go/faq>

Support

To request support, please use the form at <http://www.dspace.com/go/supportrequest>

Updates and Patches

Software updates and patches are available at <http://www.dspace.com/go/patches>.
dSPACE strongly recommends to use the most recent patches for your dSPACE installation.

Important Notice

This document contains proprietary information that is protected by copyright. All rights are reserved. The document may be printed for personal or internal use provided all the proprietary markings are retained on all printed copies. In all other cases, the document must not be copied, photocopied, reproduced, translated, or reduced to any electronic medium or machine-readable form, in whole or in part, without the prior written consent of dSPACE GmbH.

© 2018 by:

dSPACE GmbH
Rathenaustraße 26
33102 Paderborn
Germany

This publication and the contents hereof are subject to change without notice.

A list of registered dSPACE trademarks is available at: <http://www.dspace.com/go/Trademarks>