Freescale MQX Example Guide
Benchmark codesize example

This document describes the benchmark codesize example application. The application is to analyze the memory usage of MQX RTOS components together with additional components like MQX MFS, MQX RTCS. The result is generated in the form of an .html file which shows the memory space in bytes occupied by the specified components.

Running the example

Following steps are required to generate the .html report of memory usage.

- Build all the required libraries with the configuration file mqx_sdk_config.h located in folder *[install_dir]\rtos\mqx\mqx\examples\benchmark\codesize\config\<board_name>\<config>*
  where the <config> is one of **maximum**, **small**, or **typical** to enable different MQX RTOS, the MQX MFS and the MQX RTCS components.
- By default IAR Embedded Workbench does not generate map file, the following configuration must be enabled to generate .map file: *[Project properties]/Linker/List/Generate linker map file*

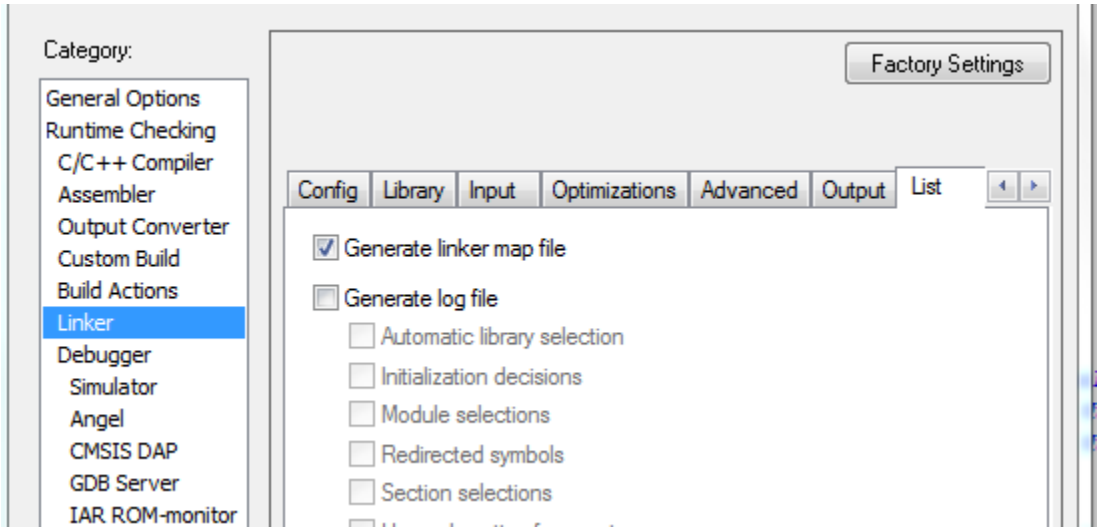

Figure 1: How to generate a map file on IAR

- By default ARMGCC does not generate map file, open CMakeLists.txt file, locate the block starts with *#linker flags* and insert the following line at the end of this block:
  SET(CMAKE_EXE_LINKER_FLAGS "${CMAKE_EXE_LINKER_FLAGS} -Wl,-Map,codesize.map")
  CMakeLists.txt is placed in the ARMGCC build folder, you can use any text editor to open it.
- Build the application project file *codesize_<board_name>* with each of the configuration file as when build the libraries.

- The .map file of the application project file is generated in the following folders or sub-folder inside:
  <project_dir>/int flash max release
  <project_dir>/int flash typical release
  <project_dir>/int flash small release
  <project_dir>/int flash tiniest release
  with **<project_dir>** = *[install_dir]\rtos\mqx\mqx\examples\benchmark\codesize\build\<compiler>\codesize_<board_name>*

  Note that ARMGCC will not place .map files into these folders, it will replace .map file each time you build the project. In ARMGCC, locate .map file in **<project_dir>** folder. IAR will place .map file in **<project_dir>/<target>/list**
- In the **map_files** folder at location: *[install_dir]\rtos\mqx\mqx\examples\benchmark\codesize\map_files* unzip the file map_files.zip and copy the generated map files after build into the appropriate folders. We also provided a pre-built mapfiles which are built for a specific release and stored in the zip file, the folder structure if you want to run the example by yourself should as same as the folder structure in this zip file.

  For example with **IAR** compiler, the **maximum** configuration mqx_sdk_config.h and the codesize example with **int flash typical release** target, copy the generate map file **codesize.map** into folder *[install_dir]\rtos\mqx\mqx\examples\benchmark\codesize\map_files\map_files\<board_name>.iar\maximum_TYPICAL*
- In Windows, run the file codesize.<compiler>.bat, this file is located in folder *[install_dir]\rtos\mqx\mqx\examples\benchmark\codesize\generator* where <compiler> could be **atl** for Atollic TrueStudio, **iar** for IAR, **mdk** for Keil, etc... Type help for more detail about the usage of script.
  The .html report file is generated in folder: *[install_dir]\rtos\mqx\mqx\examples\benchmark\reports*

Explanation of the example

The benchmark codesize example is not designed to generate any physical output on any target platform but rather it is to analyze the MQX RTOS components of how much memory they occupy to assist user in design of application using MQX RTOS and the accompanied elements like MQX MFS, MQX RTCS and to select appropriate platform with affordable RAM/ROM for desired applications.

There are three different configurations for MQX RTOS kernel. They are **maximum** configuration with all the optional and core components of MQX RTOS plus MQX RTCS and MQX MFS, **typical** configuration without some optional components like semaphores, events, logs, etc... and the **small** configuration with some core components of MQX RTOS. For detail of the components used please take a look at the **mqx_sdk_config.h** of each configuration.

The .html report file lists the memory usage of components in a tabular form. Those components not available for specific MQX RTOS configuration and application build target is shown with “-” symbol.