

**PRELIMINARY**

|  |  |
| --- | --- |
| MEC2016 | |
| SDK project usage document | |
| Rev 2.0 | 04/29/2015 |

**MCHP CONFIDENTIAL**

|  |
| --- |
| Copyright © 2015 MICROCHIP TECHNOLOGY INC. or its subsidiaries. All rights reserved.  The information contained herein is confidential and proprietary to MICROCHIP TECHNOLOGY INC., shall be used solely in accordance with the agreement pursuant to which it is provided, and shall not be reproduced or disclosed to others without the prior written consent of MICROCHIP TECHNOLOGY INC.. Although the information is believed to be accurate, no responsibility is assumed for inaccuracies. MICROCHIP TECHNOLOGY INC. reserves the right to make changes to this document and to specifications and product descriptions at any time without notice. Neither the provision of this information nor the sale of the described semiconductor devices conveys any licenses under any patent rights nor other intellectual property rights of MICROCHIP TECHNOLOGY INC. or others. The product may contain design defects or errors known as anomalies, including but not necessarily limited to any which may be identified in this document, which may cause the product to deviate from published specifications. MICROCHIP TECHNOLOGY INC. products are not designed, intended, authorized or warranted for use in any life support or other application where product failure could cause or contribute to personal injury or severe property damage. Any and all such uses without prior written approval of an officer of MICROCHIP TECHNOLOGY INC. will be fully at the risk of the customer..  MICROCHIP TECHNOLOGY INC. DISCLAIMS AND EXCLUDES ANY AND ALL WARRANTIES, INCLUDING WITHOUT LIMITATION ANY AND ALL IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND AGAINST INFRINGEMENT AND THE LIKE, AND ANY AND ALL WARRANTIES ARISING FROM ANY COURSE OF DEALING OR USAGE OF TRADE. IN NO EVENT SHALL MICROCHIP TECHNOLOGY INC. BE LIABLE FOR ANY DIRECT, INCIDENTAL, INDIRECT, SPECIAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES; OR FOR LOST DATA, PROFITS, SAVINGS OR REVENUES OF ANY KIND; REGARDLESS OF THE FORM OF ACTION, WHETHER BASED ON CONTRACT; TORT; NEGLIGENCE OF MICROCHIP TECHNOLOGY INC. OR OTHERS; STRICT LIABILITY; BREACH OF WARRANTY; OR OTHERWISE; WHETHER OR NOT ANY REMEDY OF BUYER IS HELD TO HAVE FAILED OF ITS ESSENTIAL PURPOSE, AND WHETHER OR NOT MICROCHIP TECHNOLOGY INC. HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. |

**Table of Contents**

[1 INTRODUCTION 3](#_Toc449714304)

[2 Project usage 4](#_Toc449714305)

[3 Project settings with peripheral project as active 5](#_Toc449714306)

[3.1 Under Device Tab 5](#_Toc449714307)

[3.2 Under Target Tab 5](#_Toc449714308)

[3.3 Under Output Tab 6](#_Toc449714309)

[3.4 Under Listing Tab 6](#_Toc449714310)

[3.5 Under User Tab 7](#_Toc449714311)

[3.6 Under C/C++ Tab 7](#_Toc449714312)

[3.7 Under Asm Tab 8](#_Toc449714313)

[3.8 Under Linker Tab 9](#_Toc449714314)

[3.9 Under Utilities Tab 10](#_Toc449714315)

[4 Project settings with skern project as active 11](#_Toc449714316)

[4.1 Under Output Tab 11](#_Toc449714317)

[4.2 Under Output Tab 12](#_Toc449714318)

[4.3 Under C/C++ Tab 12](#_Toc449714319)

[4.4 Under Asm Tab 13](#_Toc449714320)

[4.5 Under Linker Tab 13](#_Toc449714321)

[4.6 Under Debug Tab 14](#_Toc449714322)

[5 Revision History 16](#_Toc449714323)

# INTRODUCTION

The MEC2016 SDK project is a multi – project package that consists of the following two individual projects –

* **Peripheral project** – it consists of the low level peripheral functions for accessing the hardware along with the API layer
  + NOTE – this project generates a library output only.
* **Skern project** – it consists of the sample application codes for the all the peripheral blocks based upon an in – house developed RTOS called as the SKERN.
  + This project utilizes the above mentioned library.

Both, the skern project and the peripheral project have been built and compiled using the Keil’s uVision tools.

* 1. **General information** –

**Project infrastructure related…**

Keil ARM uVision, Compiler, Assembler, Linker

* IDE - Version: uVision V5.15.0
* C Compiler: Armcc.exe V5.05 update 2 (build 169)
* Assembler: Armasm.exe V5.05 update 2 (build 169)
* Linker/Locator: ArmLink.exe V5.05 update 2 (build 169)
* Library Manager: ArmAr.exe V5.05 update 2 (build 169)
* Hex Converter: FromElf.exe V5.05 update 2 (build 169)

**Project settings related…**

* By default, the option for generating the debug and browse information for Peripheral library is disabled. If the user wishes to debug the library code, then, they will have to enable these settings from the *Output* tab of the project settings window and recompile the project.
* Upon compiling the Peripheral project, the output library file is copied into the target directory as *MEC2016\_hw\_blks\_peripheral.lib* by the copy\_lib.bat file. And by default, the Skern project is configured to link with this file.

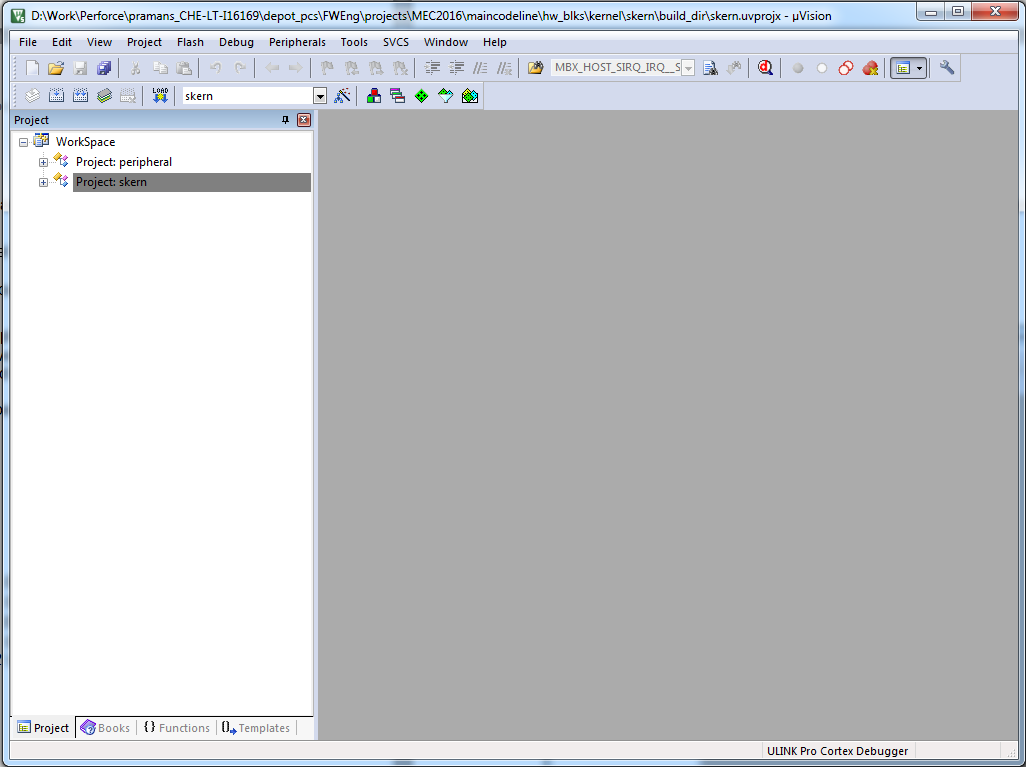
* Additionally, there are two pre – built versions of the library file - one with trace (*MEC2016\_hw\_blks\_peripheral\_wt.lib*) and one without trace (*MEC2016\_hw\_blks\_peripheral\_nt.lib*) under the target directory. If the user wishes to use any one of these files instead, then the proper file name must be specified in the Skern project’s linker path. Refer to *Misc controls* string under section 4.5 to know about the linking process between the two projects.

# Project usage

The user may either choose to open each of the individual projects separately or can open them together as a multi - project workspace.

To open it as a multi – project workspace, go to

hw\_blks 🡪 build 🡪 hw\_blks.uvmpw



In order to compile and build the entire project, the user should first start with the compilation of the peripheral project. To do so,

* Right click on the **Project: peripheral**(as shown in the project window) and select **Set as active project**option from the drop down menu
* Click on the **Rebuild** icon present from the above toolbar

After the successful compilation of the peripheral project, repeat the above procedure for the skern project as well.

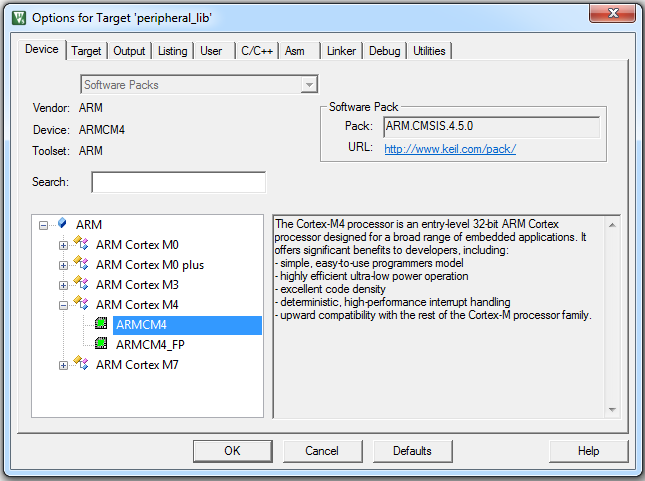
Alternatively, the user may choose to build the entire project by selecting the batch build option from *Project* 🡪 *Batch Build…* on the toolbar.

To open individual projects, one can do so by

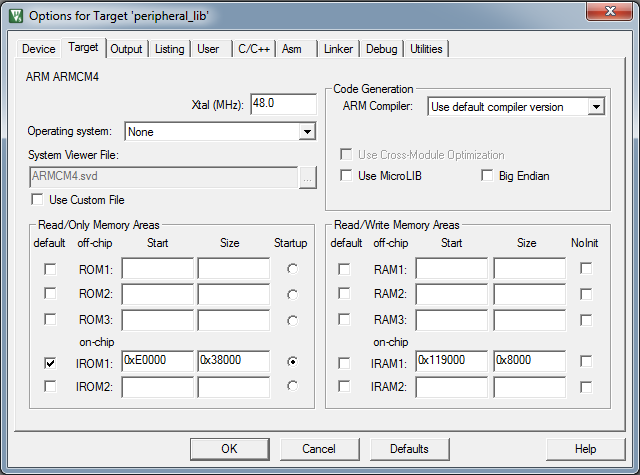
1. hw\_blks 🡪 peripheral 🡪 build\_dir 🡪 peripheral.uvprojx – For peripheral project
2. hw\_blks 🡪 kernel 🡪 skern 🡪 build\_dir 🡪 skern.uvprojx – For skern project

# Project settings with peripheral project as active

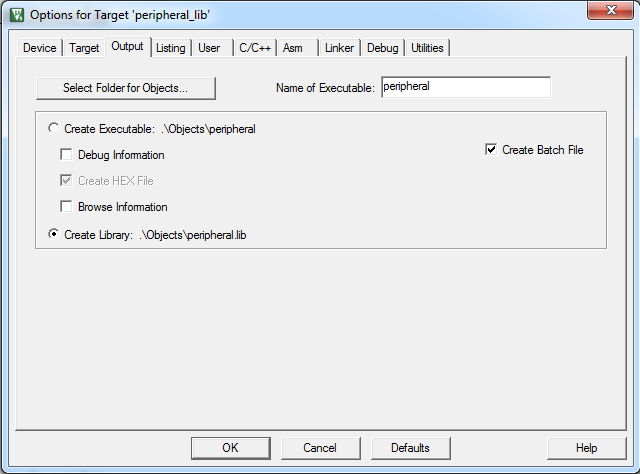
## Under Device Tab



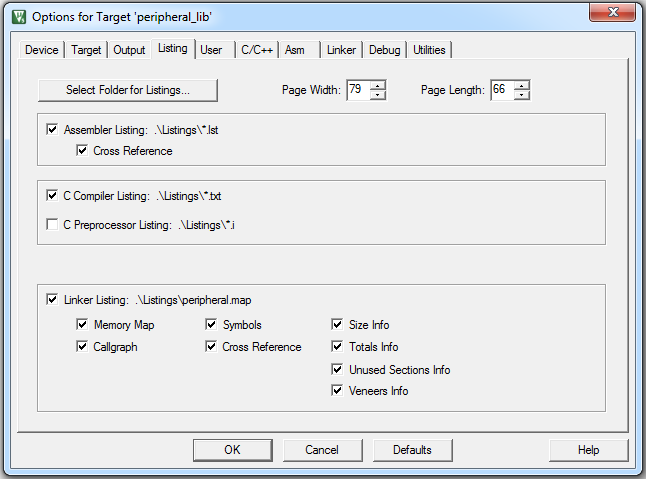
## Under Target Tab



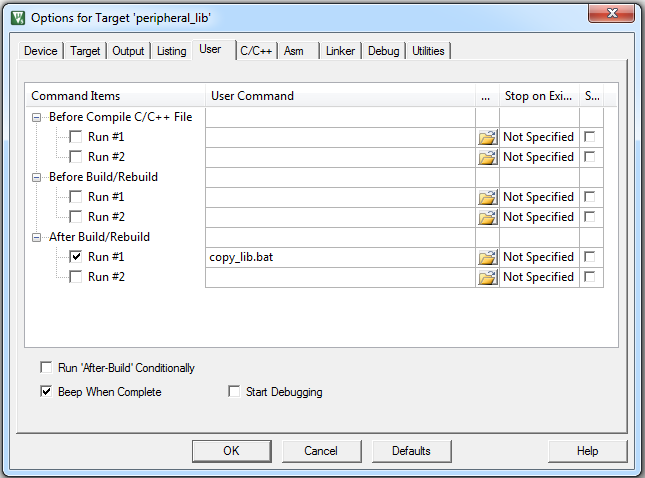
## Under Output Tab



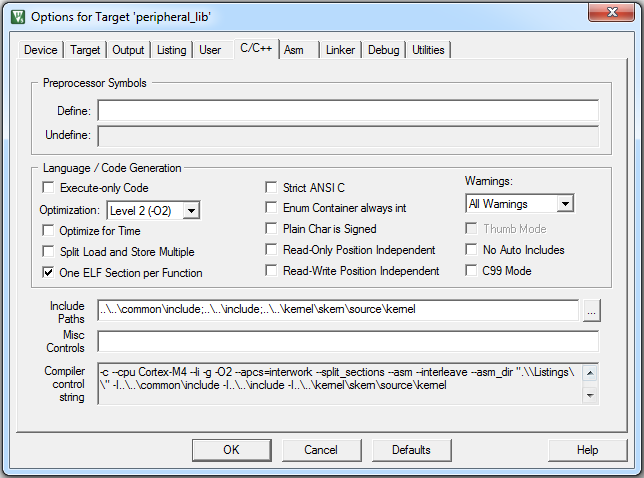
## Under Listing Tab



## Under User Tab



## Under C/C++ Tab



### Compiler control string

-c --cpu Cortex-M4 --li -O2 --apcs=interwork --split\_sections --asm --interleave --asm\_dir ".\\Listings\\" -I..\..\common\include -I..\..\include -I..\..\kernel\skern\source\kernel

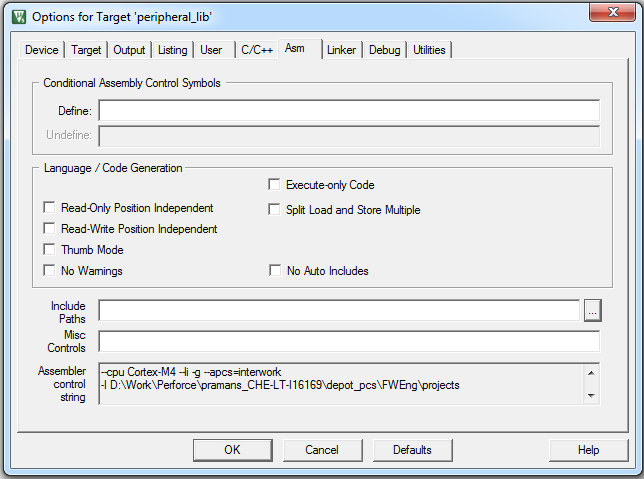
-I D:\Work\Perforce\pramans\_CHE-LT-I16169\depot\_pcs\FWEng\projects\MEC2016\maincodeline\hw\_blks\peripheral\build\_dir\RTE

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\CMSIS\Include

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\Device\ARM\ARMCM4\Include

-D\_\_UVISION\_VERSION="515" -D\_RTE\_ -DARMCM4 -o ".\Objects\\*.o" --list\_dir ".\\Listings\\" --list --depend ".\Objects\\*.d"

## Under Asm Tab



### Assembler control string

--cpu Cortex-M4 --li --apcs=interwork

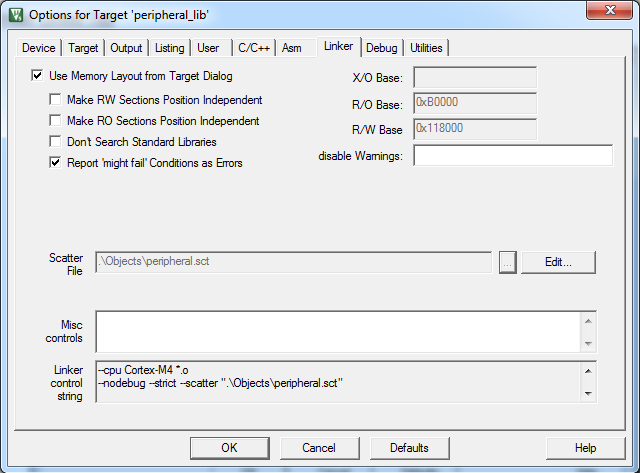
-I D:\Work\Perforce\pramans\_CHE-LT-I16169\depot\_pcs\FWEng\projects\MEC2016\maincodeline\hw\_blks\peripheral\build\_dir\RTE

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\CMSIS\Include

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\Device\ARM\ARMCM4\Include

--pd "\_\_UVISION\_VERSION SETA 515" --pd "\_RTE\_ SETA 1" --pd "ARMCM4 SETA 1" --list ".\Listings\\*.lst" --xref -o "\*.o" --depend "\*.d"

## Under Linker Tab



### Linker control string

--cpu Cortex-M4 \*.o

--nodebug --strict --scatter ".\Objects\peripheral.sct"

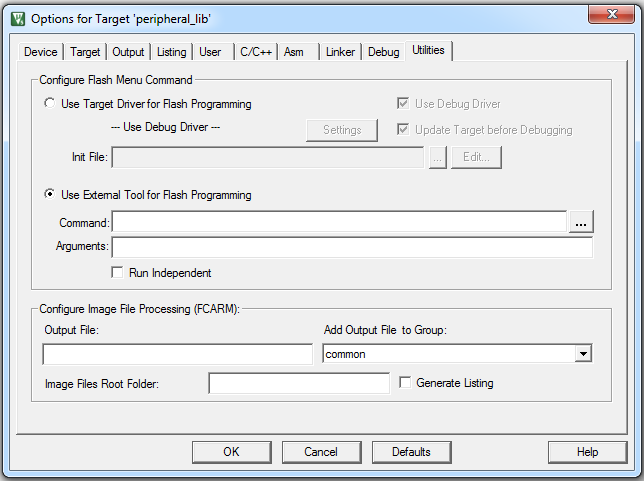
--summary\_stderr --info summarysizes --map --xref --callgraph --symbols

--info sizes --info totals --info unused --info veneers

--list ".\Listings\peripheral.map"

-o .\Objects\peripheral.axf

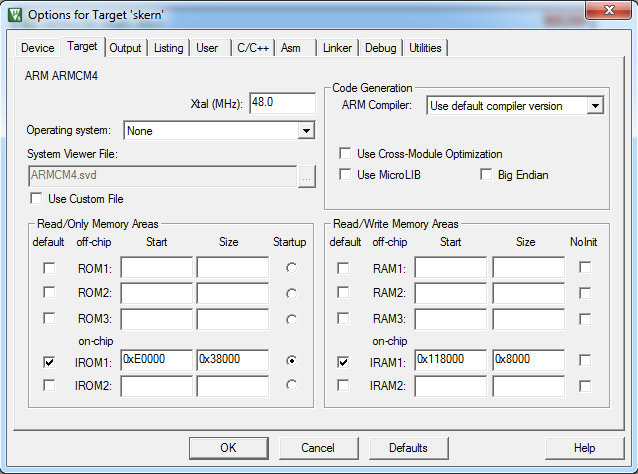
## Under Utilities Tab



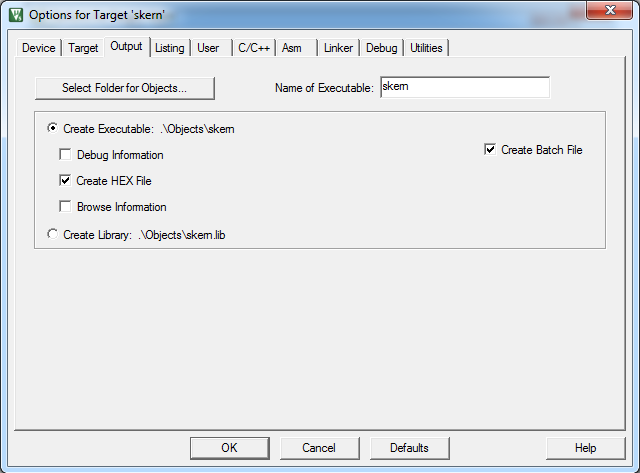
# Project settings with skern project as active

**Note** – This chapter only lists the tabs that differ from the peripheral project

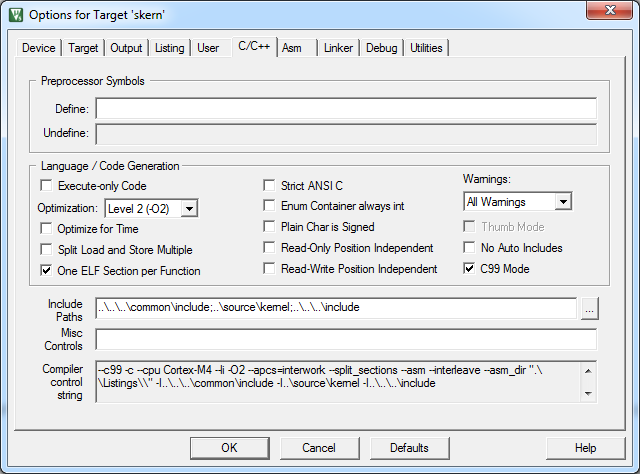
## Under Output Tab



## Under Output Tab



## Under C/C++ Tab



### Compiler control string

--c99 -c --cpu Cortex-M4 --li -O2 --apcs=interwork --split\_sections --asm --interleave --asm\_dir ".\\Listings\\" -I..\..\..\common\include -I..\source\kernel -I..\..\..\include

-I D:\Work\Perforce\pramans\_CHE-LT-I16169\depot\_pcs\FWEng\projects\MEC2016\maincodeline\hw\_blks\kernel\skern\build\_dir\RTE

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\CMSIS\Include

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\Device\ARM\ARMCM4\Include

-D\_\_UVISION\_VERSION="515" -D\_RTE\_ -DARMCM4 -o ".\Objects\\*.o" --list\_dir ".\\Listings\\" --list --depend ".\Objects\\*.d"

## Under Asm Tab

### Assembler control string

--cpu Cortex-M4 --li --apcs=interwork

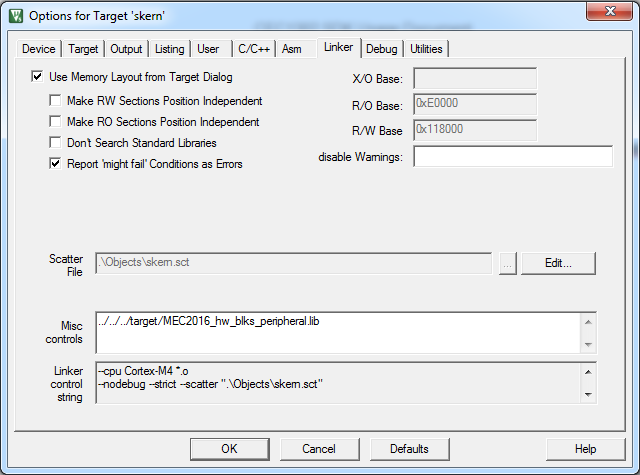
-I D:\Work\Perforce\pramans\_CHE-LT-I16169\depot\_pcs\FWEng\projects\MEC2016\maincodeline\hw\_blks\kernel\skern\build\_dir\RTE

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\CMSIS\Include

-I C:\Keil\_v5\ARM\PACK\ARM\CMSIS\4.5.0\Device\ARM\ARMCM4\Include

--pd "\_\_UVISION\_VERSION SETA 515" --pd "\_RTE\_ SETA 1" --pd "ARMCM4 SETA 1" --list ".\Listings\\*.lst" --xref -o "\*.o" --depend "\*.d"

## Under Linker Tab



### Linker control string

--cpu Cortex-M4 \*.o

--nodebug --strict --scatter ".\Objects\skern.sct"

../../../target/MEC2016\_hw\_blks\_peripheral.lib

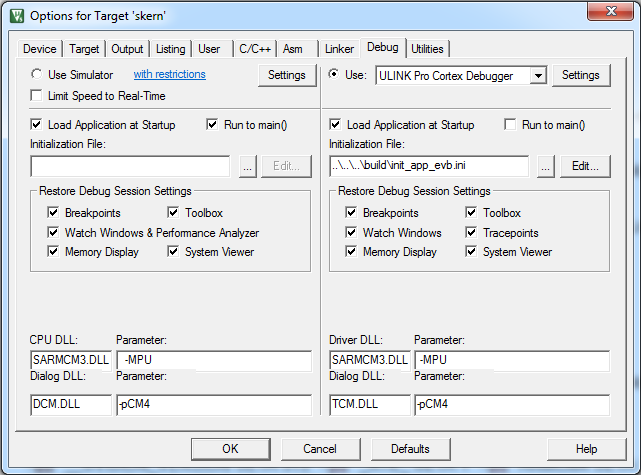
--summary\_stderr --info summarysizes --map --xref --callgraph --symbols

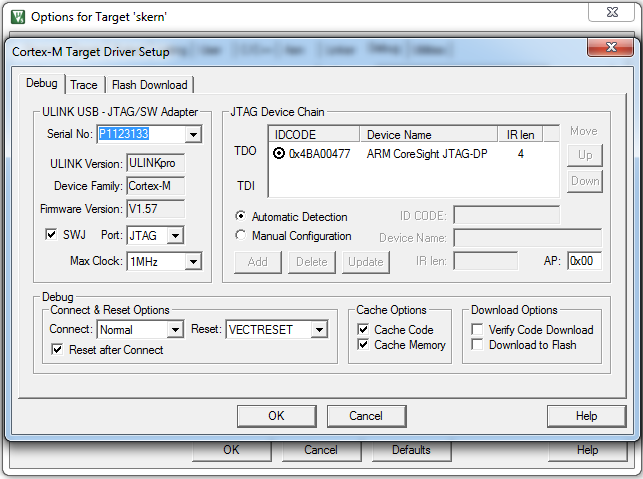
--info sizes --info totals --info unused --info veneers

--list ".\Listings\skern.map"

-o .\Objects\skern.axf

## Under Debug Tab





# Revision History

|  |  |  |  |
| --- | --- | --- | --- |
| Date | Revision | Name | Changes |
| 12/23/2015 | 1.0 | Swastik | Intial Draft |
| 04/29/2016 | 2.0 | Swastik | Reformatted the doc and updated project info |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |