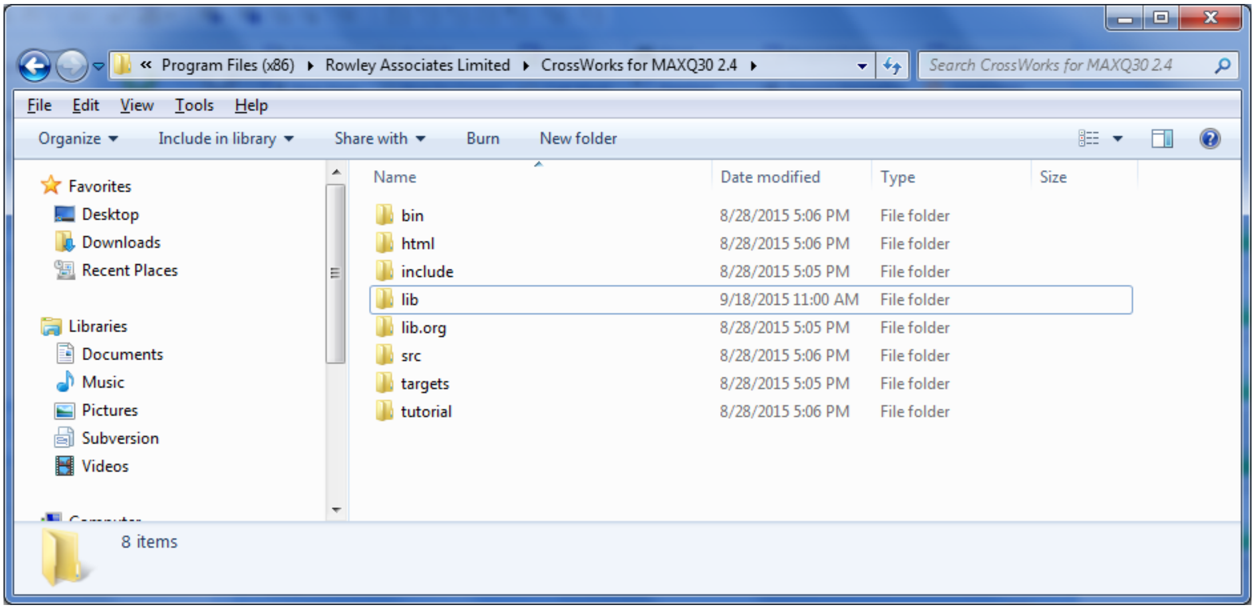
Rowley library placement and code separation:

1. See the attached new Rowley library ‘lib.zip’. Go to *C:\Program Files (x86)\Rowley Associates Limited\CrossWorks for MAXQ30 2.4* , rename \lib directory to \lib.org and, copy \lib directory by extracting lib.zip.



Name	Date modified	Type	Size
bin	8/28/2015 5:06 PM	File folder	
html	8/28/2015 5:06 PM	File folder	
include	8/28/2015 5:05 PM	File folder	
lib	9/18/2015 11:00 AM	File folder	
lib.org	8/28/2015 5:05 PM	File folder	
src	8/28/2015 5:06 PM	File folder	
targets	8/28/2015 5:05 PM	File folder	
tutorial	8/28/2015 5:06 PM	File folder	

2. This new Rowley library (\lib directory) uses LR_CODE, LR_CONST, LR_UDATA and LR_IDATA. Therefore in the source code and section_placement_app.xml change UDATA2 and IDATA2 to LR_UDATA and LR_IDATA. I have done the changes in your source code; perform source diff. to view the changes.

3. Changes in \Project\MAXQ30_Config_app\startup_zon_p5s.asm

   a. I have placed all library functions immediately after the interrupt vector. Now, these library functions are located at an absolute location and can be called by Legally relevant (fixed) code even if there are changes in the startup code, provided the start of FLASH memory segment (currently at 0x5000) is not changed. So, the lib.asm is not required.

   b. When the library functions are at located in lib.asm and placed in the legally relevant code, the code sizes increases because the function call at a higher address takes more instructions. Here is the comparison.

      ___uint8_load_c located in startup (lower address), call instructions are two 16-bit instructions.

      ```
      2a0bc13d        CALL    ___uint8_load_c
      ```

      ___uint8_load_c located in legally relevant code(higher address), call instructions are three 16-bit instructions, which increased the code size.

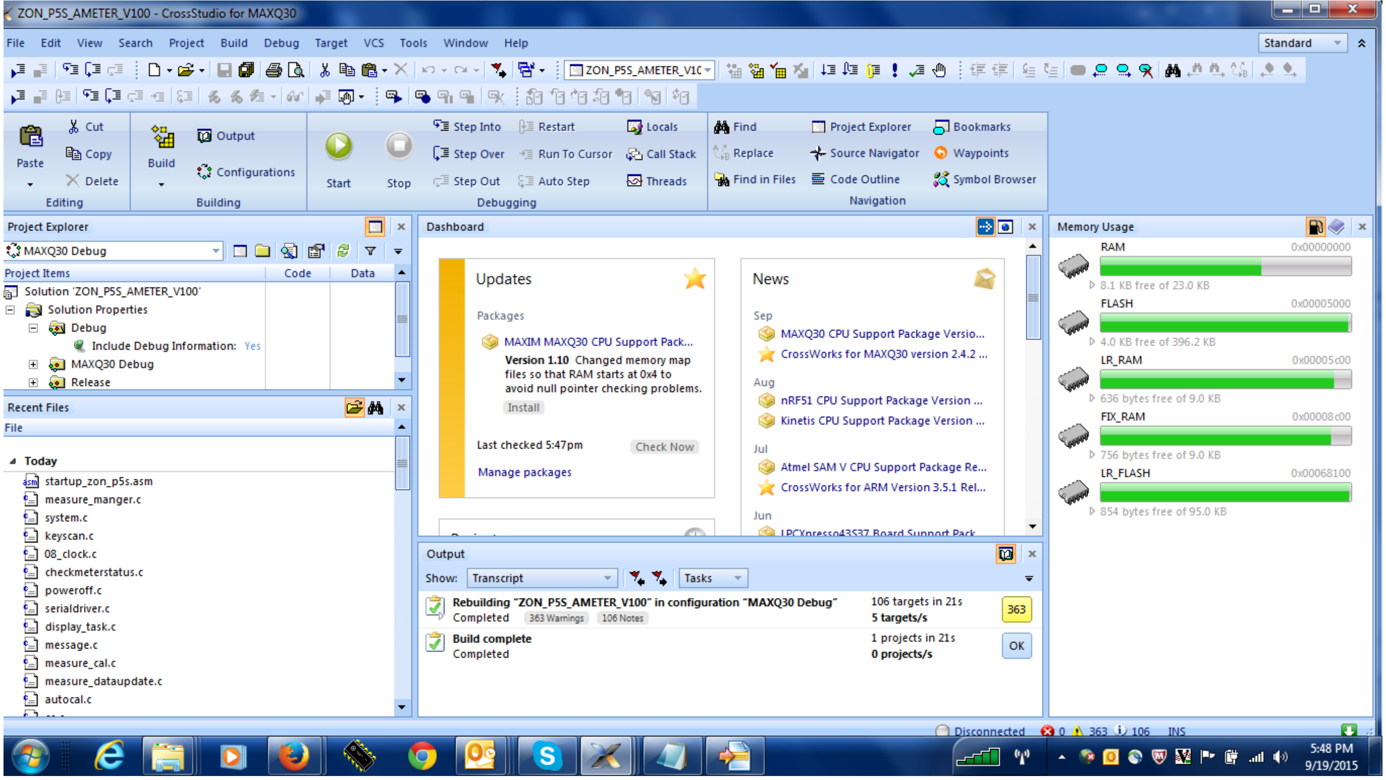
      ```
      030b7d0b143d            CALL    ___uint8_load_c
      ```

c. LR_UDATA and UDATA_FIX are intialized to zero similar to UDATA0.
d. Like wise, LR_IDATA and IDATA_FIX are intialized with its init value similar to IDATA0

4. Below is comparison of memory usage by placing Rowley Library in Legally Relevant code. Flash memory is ~9KB free and LR_FLASH is overflow by 4.2 KB.

   You have change zon_p5s_app.xml to partition FLASH and LR_FLASH according to your need.

Rowley Library in FLASH memory segment.


ZON_P5S_AMETER_V100 - CrossStudio for MAXQ30

Memory Usage

RAM 0x00000000
8.1 KB free of 23.0 KB

FLASH 0x00005000
4.0 KB free of 396.2 KB

LR_RAM 0x00005c00
636 bytes free of 9.0 KB

FIX_RAM 0x00008c00
756 bytes free of 9.0 KB

LR_FLASH 0x00068100
854 bytes free of 95.0 KB

Output

Show: Transcript

Rebuilding "ZON_P5S_AMETER_V100" in configuration "MAXQ30 Debug" 106 targets in 21s
Completed 363 Warnings 106 Notes 5 targets/s 363

Build complete 1 projects in 21s
Completed 0 projects/s OK

Project Explorer

MAXQ30 Debug

Solution 'ZON_P5S_AMETER_V100'
Solution Properties
Debug
Include Debug Information: Yes
MAXQ30 Debug
Release

Recent Files

Today
startup_zon_p5s.asm
measure_manger.c
system.c
keyscan.c
08_clock.c
checkmeterstatus.c
poweroff.c
serialdriver.c
display_task.c
message.c
measure_cal.c
measure_dataupdate.c
autocal.c

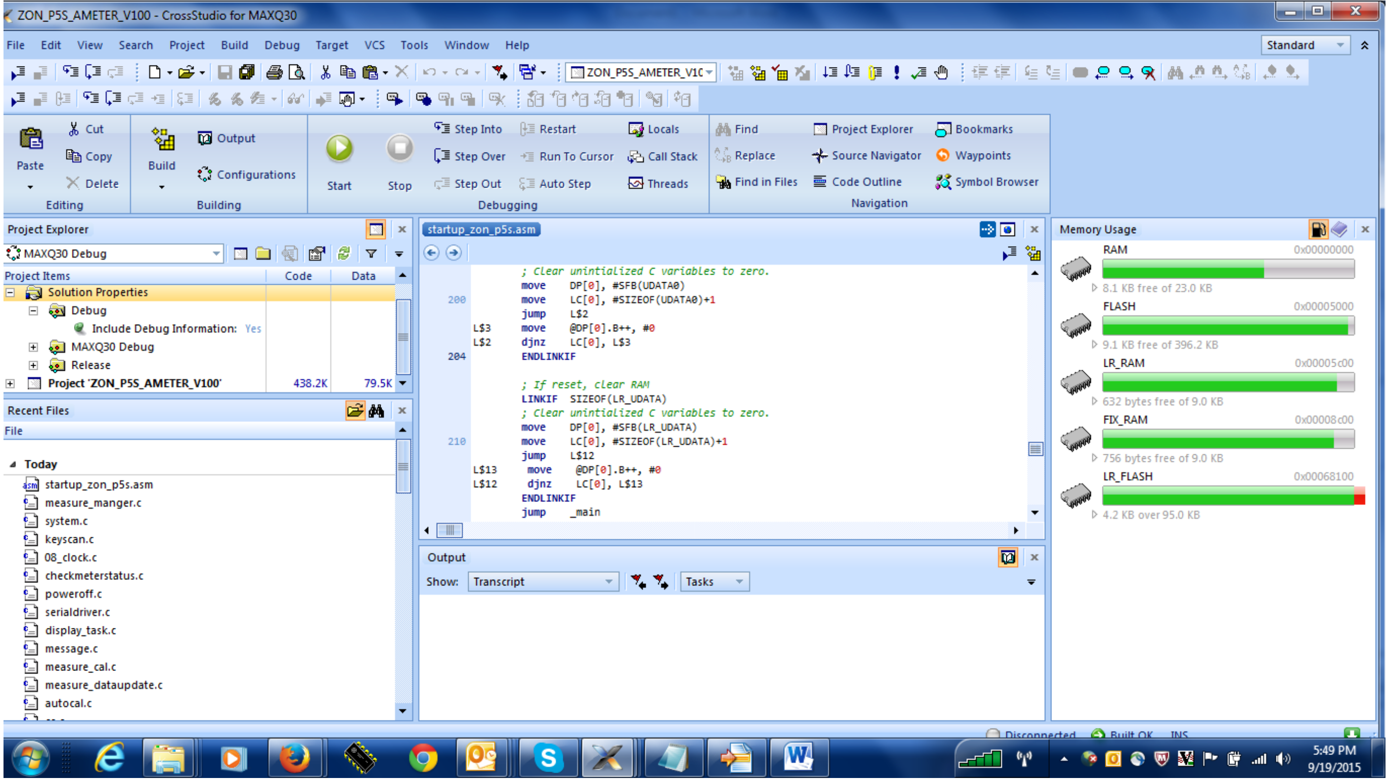
Dashboard

Updates
Packages
MAXIM MAXQ30 CPU Support Pack...
Version 1.10 Changed memory map files so that RAM starts at 0x4 to avoid null pointer checking problems.
Install
Last checked 5:47pm Check Now
Manage packages

News
Sep
MAXQ30 CPU Support Package Versio...
CrossWorks for MAXQ30 version 2.4.2 ...
Aug
nRF51 CPU Support Package Version ...
Kinetis CPU Support Package Version ...
Jul
Atmel SAM V CPU Support Package Re...
CrossWorks for ARM Version 3.5.1 Rel...
Jun
LPCXpresso43S37 Board Support Pack...

File Edit View Search Project Build Debug Target VCS Tools Window Help
Standard
Paste Cut Copy Delete Editing
Build Output Configurations Building
Start Stop Step Into Step Over Step Out Restart Run To Cursor Auto Step Locals Call Stack Threads Debugging
Find Replace Find in Files Project Explorer Source Navigator Code Outline Bookmarks Waypoints Symbol Browser Navigation
Project Items Code Data
File
Disconnected 0 363 106 INS
5:48 PM
9/19/2015

Rowley Library in LR_FLASH memory segment.



Project Explorer

MAXQ30 Debug

Project Items	Code	Data
Solution Properties		
Debug		
Include Debug Information: Yes		
MAXQ30 Debug		
Release		
Project 'ZON_P5S_AMETER_V100'	438.2K	79.5K

Recent Files

File

Today

- startup_zon_p5s.asm
- measure_manger.c
- system.c
- keyscan.c
- 08_clock.c
- checkmeterstatus.c
- poweroff.c
- serialdriver.c
- display_task.c
- message.c
- measure_cal.c
- measure_dataupdate.c
- autocal.c

startup_zon_p5s.asm

```
        ; Clear unintialized C variables to zero.
        move    DP[0], #SFB(UDATA0)
        move    LC[0], #SIZEOF(UDATA0)+1
        jump    L$2
L$3     move    @DP[0].B++, #0
L$2     djnz    LC[0], L$3
        ENDLINKIF

        ; If reset, clear RAM
        LINKIF  SIZEOF(LR_UDATA)
        ; Clear unintialized C variables to zero.
        move    DP[0], #SFB(LR_UDATA)
        move    LC[0], #SIZEOF(LR_UDATA)+1
        jump    L$12
L$13     move    @DP[0].B++, #0
L$12     djnz    LC[0], L$13
        ENDLINKIF
        jump    _main
```

Memory Usage

RAM 0x00000000
8.1 KB free of 23.0 KB

FLASH 0x00005000
9.1 KB free of 396.2 KB

LR_RAM 0x00005c00
632 bytes free of 9.0 KB

FIX_RAM 0x00008c00
756 bytes free of 9.0 KB

LR_FLASH 0x00068100
4.2 KB over 95.0 KB