Atmel SAMV71 Xplained Ultra: Blinky Lab

MDK Version 5 Tutorial

Spring 2015, V 1.0

**ARM**KEIL®

Microcontroller Tools

Abstract

This tutorial shows how to create the Blinky project using the Atmel SAMV71 Xplained Ultra development board.

Create a New Project for the Xplained Ultra Board

1.   In the main µVision menu, select **Project → New µVision Project…**
     The 'Create New Project' window opens up.
2.   Create a new directory called **Blinky** and enter **Blinky** for the File name. Press **Save**.
3.   In the 'Select Device for Target' window select **ATSAMV71Q21** and press **OK**.
4.   In the 'Manage Run-Time Environment' window select the following Software Components:
     a.   **CMSIS:RTOS (API):Keil RTX**
     b.   **Board Support:LED (API):LED**
     c.   When done, press **Resolve** and afterwards **OK**.
5.   The Project window should look like this
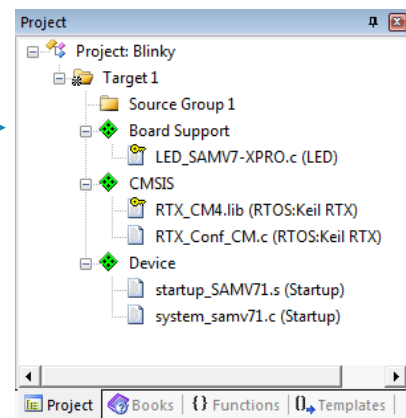
Add user code templates *main.c* and *Thread.c*

6.   Right-Click **Source Group 1** and select **Add New Item to Group 'Source Group 1'…**
7.   In the upcoming window, select **User Code Template** and then expand **CMSIS**. Select **CMSIS-RTOS 'main' function** and click **Add**:
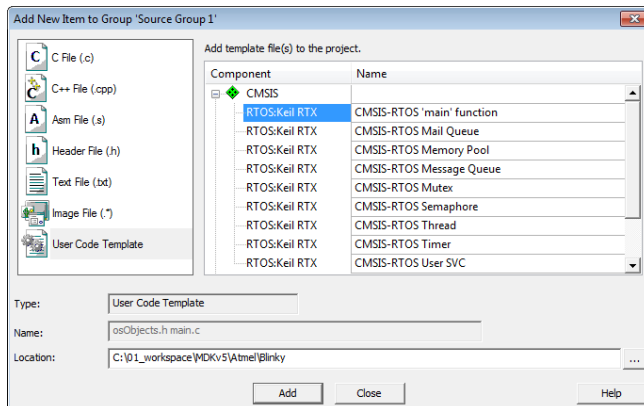
8.   Repeat the process and choose **CMSIS-RTOS Thread**. You now should see a *main.c* and a *Thread.c* file below the Source Group 1.

Configure CMSIS-RTOS RTX

9.   Open *RTX_Conf_CM.c*, select the **Configuration Wizard** tab and press **Expand All**.
10. Change the **RTOS Kernel Timer input clock frequency [Hz]** to **300000000** as the Xplained Ultra board runs on 300 MHz.

Configure the Target Options

11. Click on   or press **ALT+F7**
12. Select the **Debug** tab and choose **CMSIS-DAP Debugger**. Press **OK**.

Add the Blinky code

13. Change *main.c* as follows:

```c
#define osObjectsPublic                    // define objects in main module
#include "osObjects.h"                     // RTOS object definitions
#include "samv71.h"                        // Device header
#include "Board_LED.h"                     // ::Board Support:LED

extern int Init_blink_LED (void);

int main (void) {
  osKernelInitialize ();                   // initialize CMSIS-RTOS

  LED_Initialize();
  Init_blink_LED();

  osKernelStart ();                        // start thread execution
  while(1);
}
```

14. Change *Thread.c* as follows:

```c
#include <cmsis_os.h>                      // CMSIS RTOS header file
#include "Board_LED.h"                     // ::Board Support:LED

void blink_LED (void const *argument);             // thread function
osThreadId tid_blink_LED;                           // thread id
osThreadDef (blink_LED, osPriorityNormal, 1, 0);   // thread object

int Init_blink_LED (void) {

  tid_blink_LED = osThreadCreate (osThread(blink_LED), NULL);
  if(!tid_blink_LED) return(-1);

  return(0);
}

void blink_LED (void const *argument) {

  while (1) {
    LED_On (0);
    osDelay(500);
    LED_Off (0);
    osDelay(500);
    osThreadYield();
  }
}
```
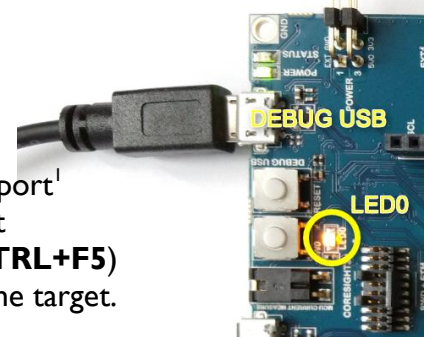
Build the Project and run it on the Target

15. Go to **File → Save All**
16. Go to **Project → Build Target** (or press **F7**)
17. Connect the PC using a Micro-USB cable to **DEBUG USB** port[1]
18. Go to **Flash → Download** to flash the project to the target
19. Go to **Debug → Start/Stop Debug Session** (or press **CTRL+F5**)
20. Go to **Debug → Run** (or press **F5**) to run the project on the target. **LED0** will start flashing.

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[1] The installation of the USB driver might show an error. This can safely be ignored.