

Writing embedded systems code in C using Metrowerks

Installation

Projects

Mixed C/assembly

PLL

Debugger

Importing TExaS code from previous labs

Exporting object code to simulate in TExaS

Installation

9S12/Metrowerks link

<http://users.ece.utexas.edu/~valvano/S12C32.htm>

How to download Metrowerks

StarterFiles

xxxx_DP512.zip is a DP512 Metrowerks project

xxxx_DP512asm.zip is a DP512 TExaS example

xxxx_DG128.zip is a DG128 Metrowerks project

xxxx_DG128asm.zip is a DG128 TExaS example

Projects, look at an example starter file, OC_DG128.zip

See Folders

Sources programs

bin object code, TExaS files

xxx.mcp project, can double click this

Source code files (you create these) (text)

xxx.asm assembly source

xxx.c C source code file

xxx.h C header file

Object code files (created when you compile) (text)

xxx.lst multiple assembly listing files

xxx.map symbol table **xxx.sx** object code

Create a new project

Add a new file called pll.asm

```
SYNR      equ $0034 ; CRG Synthesizer Register
REFDV     equ $0035 ; CRG Reference Divider Register
CRGFLG    equ $0037 ; CRG Flags Register
CLKSEL    equ $0039 ; CRG Clock Select Register
PLLCTL    equ $003A ; CRG PLL Control Register

    absentry PLL_Init
;***** PLL_Init *****
; Active PLL so the 9S12 runs at 24 MHz
; Inputs: none
; Outputs: none
; Errors: will hang if PLL does not stabilize
PLL_Init
    movb #$02,SYNR      ; 9S12DP512 OSCCLK is 16 MHz
    movb #1,REFDV
    movb #0,CLKSEL      ; PLLCLK = 2 * OSCCLK * (SYNR + 1) / (REFDV + 1)
    movb #$D1,PLLCTL    ; Clock monitor, PLL On, high bandwidth filter
    brclr CRGFLG,$08,*  ; wait for PLLCLK to stabilize.
    bset CLKSEL,$80     ; Switch to PLL clock
    rts
```

Add this to main

```
void PLL_Init(void);
```

We are starting Metrowerks for Labs 7,8,9,10

Here is how to download the limited version (free)

<http://users.ece.utexas.edu/~valvano/S12C32.htm#Metrowerks>

This is an output compare interrupt (cannot be used directly in EE319K lab, but useful for understanding interrupts)

http://users.ece.utexas.edu/~valvano/Starterfiles/OC_DG128.zip

or http://users.ece.utexas.edu/~valvano/Starterfiles/OC_DP512.zip

Here is a start project for Lab 8

<http://users.ece.utexas.edu/~valvano/EE319K/Lab8Starter.zip>

This site has movies about the book and TExaS

<http://users.ece.utexas.edu/~valvano/Lessons/>

including 6 movies about how to use Metrowerks

<http://users.ece.utexas.edu/~valvano/Lessons/#Metrowerks>

This site covers C programming syntax

<http://users.ece.utexas.edu/~ryerraballi/CPrimer/>

This is an easy first program

http://users.ece.utexas.edu/~valvano/Starterfiles/LEDtoggle_DG128.zip

http://users.ece.utexas.edu/~valvano/Starterfiles/LEDtoggle_DP512.zip

This is also an easy program

http://users.ece.utexas.edu/~valvano/Starterfiles/Moore_DG128.zip

http://users.ece.utexas.edu/~valvano/Starterfiles/Moore_DP512.zip