

Demo Set-up

The SW MC56F84000_PWM_sine_duty demonstrates PWMA SM0 and SM1 modules in complementary mode configuration with varying sine duty wherein duty cycle of modules varies as $(0.5+x)$ and $(0.5-x)$ ($x=0.5\sin\phi$) respectively . It is targeted at MC56F84789 and its derivatives.

The application control and variable access is provided using FreeMASTER communication tool. The FreeMASTER communicates with the MAPS-MC56F84000 board using OSBDM via SCI1.

H/W Setup

The h/w consists of:

1. MAPS-MC56F84000 populated with MC56F84789 device
2. USB cable connected to MAPS OSBDM connector
3. 5V Power supply

Before the demo starts, the HW with OSBDM link needs to be set-up.

Application SW

The demo s/w is located in a folder MC56F84000_PWM_sine_duty. The s/w was designed using CodeWarrior CW10.x

Development Tools

In order to compile run, load and flash the demo the following s/w is necessary to:

1. Install CodeWarrior_CW_MCU_v10.x and Run the CodeWarrior
2. Drag and drop < MC56F84000_PWM_sine_duty\project into the opened CodeWarrior CW10.x
3. Clean(if the project is the first time run in your workspace) and Build the application code target MC56F84789_Internal_PFlash_SDM
4. Connect a USB cable between the PC host and the mbed USB port (CN7 on the MAPS-56F84000 board).
5. Running/debugging loading the code:
 - a. Run -> Debug Configuration
 - b. Set the configuration for debug as download.
6. Click Debug

7. Start

Running the demo

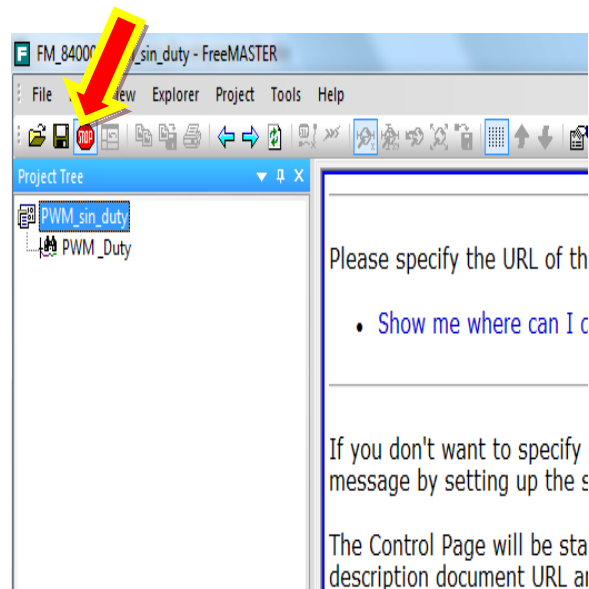
Demo is to be controlled using a FreeMASTER communication tool.

In order to control the application the following s/w is necessary:

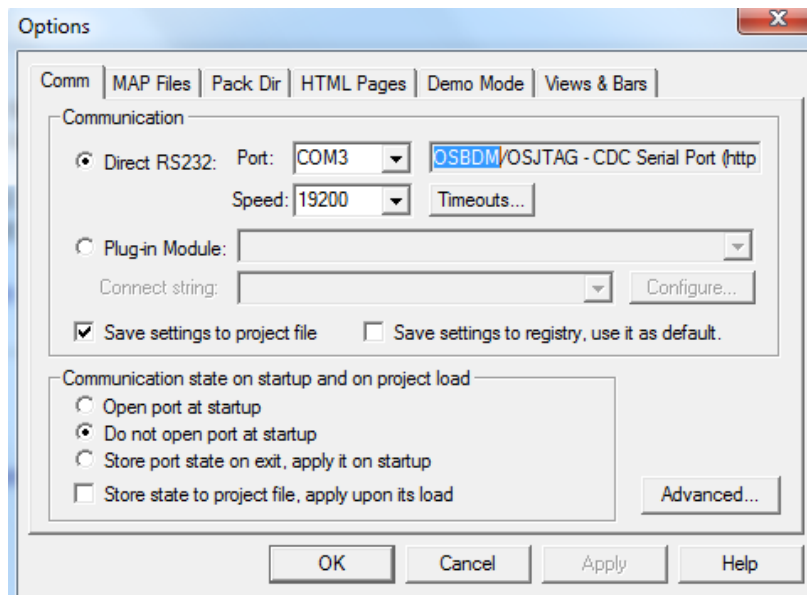
1. FreeMASTER Application Installation see:
http://www.freescale.com/webapp/sps/site/prod_summary.jsp?code=FREEMASTER&parentCode=null
2. CodeWarrior Connection Server
this is a part of Freescale CodeWarrior installation, located usually at C:\Freescale\CW MCU v10.6\MCU\ccs\bin
but the ccs_bld000_win.zip can also be obtained without the CodeWarrior installation

The following steps are necessary (if continuing from debug mode, goto step 4 and when freemaster is in run state, terminate the code from CodeWarrior using terminate button):

1. Connect Power Supply
2. Connect OSBDM for FreeMASTER control
3. If the application s/w is not programmed into the MAPS_84000 board, go to section Application SW
4. Install FreeMASTER Application
5. Start FM_84000_PWM_sine_duty.pmp (FreeMASTER Application must be installed before)
6. If the FreeMASTER is not connected (variables values are: ?), check:
 - a. Click at the STOP switch



- b. If an error message is generated after STOP switch click, go to Project/Options Communication slider and set the Direct RS232 Port and Speed

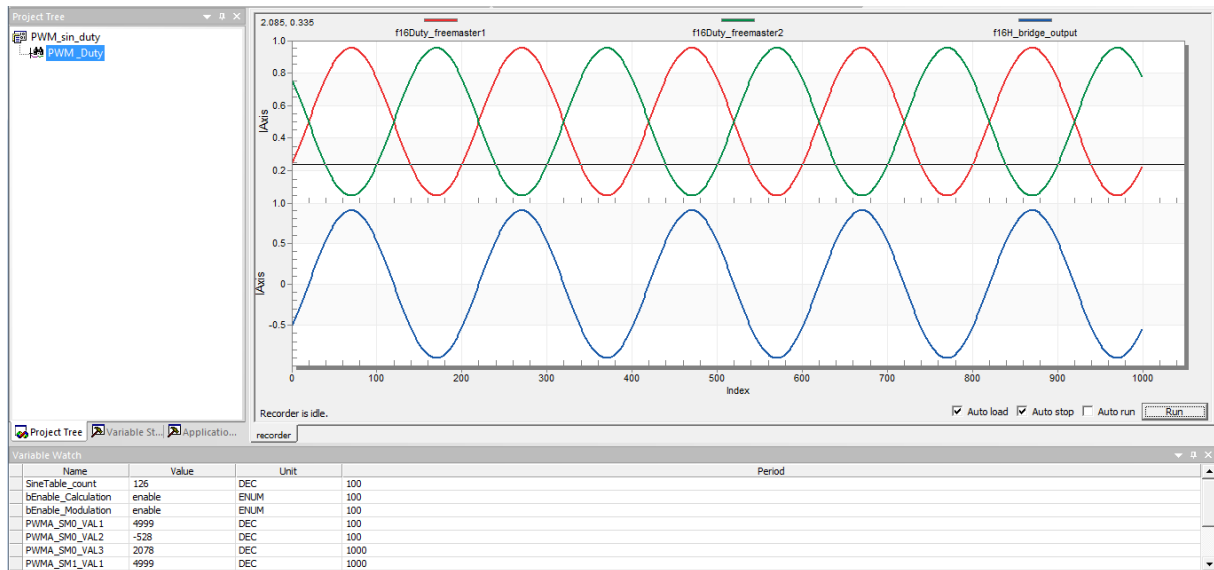


7. Application runs with FreeMASTER.

FreeMASTER Control

Modulated PWM signals

You can see and check the duty cycle and PWM value register variables which are modulated with sine modulation in the FreeMASTER:



SM0 duty cycle is shown by duty_freemaster1 variable = $(0.5+x)$

SM 1 duty cycle is shown by duty_freemaster2 variable = $(0.5-x)$

Here x is sine modulated, ie, $(0.5\sin\phi)$

H-Bridge output, which can be used for the inverters is also shown, which is,

$H_bridge_output = (duty_freemaster1 - duty_freemaster2) = \sin\phi$

The PWM outputs are available on the pins

PWMs with complementary center aligned PWM signals

SM0:

1. PWMA_0B – pin68
2. PWMA_0A – pin69

SM 1:

1. PWMA_1B – pin74
2. PWMA_1A – pin75

The PWMs modulation can be switched off with bEnable_Modulation – disable. Then the PWM values are constant.

Other possibility is to set all the PWM value registers manually. At that case, disable bEnable_Calculation – disable and all the PWM dutycycles are updated manually.

