**Date Submitted: October 5, 2019**

NOTE: At the time of submission, the TB6612FNG dual motor driver has yet to be provided. As such, tasks 3 and 4 are unable to be completed at this time.

**Task 00: Execute provided code**

**Youtube Link: https://youtu.be/D1zfiB-00Fs**

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**Task 01:**

Youtube Link: https://youtu.be/hfXg9JirIJs

**Modified Schematic (if applicable):**

**Modified Code:**

**#include** <stdint.h>

**#include** <stdbool.h>

**#include** "inc/hw\_memmap.h"

**#include** "inc/hw\_types.h"

**#include** "driverlib/sysctl.h"

**#include** "driverlib/gpio.h"

**#include** "driverlib/debug.h"

**#include** "driverlib/pwm.h"

**#include** "driverlib/pin\_map.h"

**#include** "inc/hw\_gpio.h"

**#include** "driverlib/rom.h"

**#define** PWM\_FREQUENCY 55

**int** **main**(**void**)

{

**volatile** uint32\_t ui32Load;

**volatile** uint32\_t ui32PWMClock;

**volatile** uint8\_t ui8Adjust;

ui8Adjust = 56; //Start at 0 deg. 56 gotten by dividing 1ms by period of 18.2us and rounding up

ROM\_SysCtlClockSet(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_OSC\_MAIN|SYSCTL\_XTAL\_16MHZ);

ROM\_SysCtlPWMClockSet(SYSCTL\_PWMDIV\_64);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_PWM1);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOD);

ROM\_GPIOPinTypePWM(GPIO\_PORTD\_BASE, GPIO\_PIN\_0);

ROM\_GPIOPinConfigure(GPIO\_PD0\_M1PWM0);

ui32PWMClock = **SysCtlClockGet**() / 64;

ui32Load = (ui32PWMClock / PWM\_FREQUENCY) - 1;

**PWMGenConfigure**(PWM1\_BASE, PWM\_GEN\_0, PWM\_GEN\_MODE\_DOWN);

**PWMGenPeriodSet**(PWM1\_BASE, PWM\_GEN\_0, ui32Load);

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

ROM\_PWMOutputState(PWM1\_BASE, PWM\_OUT\_0\_BIT, true);

ROM\_PWMGenEnable(PWM1\_BASE, PWM\_GEN\_0);

**while**(1)

{

ui8Adjust++;

**if**(ui8Adjust > 111) {

ui8Adjust = 56;

}

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

ROM\_SysCtlDelay(300000);

}

}

**------------------------------------------------------------------------------------**

**Task 02:**

Youtube Link: https://youtu.be/hfXg9JirIJs

**Modified Schematic (if applicable):**

**Modified Code:**

**#include** <stdint.h>

**#include** <stdbool.h>

**#include** "inc/hw\_memmap.h"

**#include** "inc/hw\_types.h"

**#include** "driverlib/sysctl.h"

**#include** "driverlib/gpio.h"

**#include** "driverlib/debug.h"

**#include** "driverlib/pwm.h"

**#include** "driverlib/pin\_map.h"

**#include** "inc/hw\_gpio.h"

**#include** "driverlib/rom.h"

**#define** PWM\_FREQUENCY 55

**int** **main**(**void**)

{

**volatile** uint32\_t ui32Load;

**volatile** uint32\_t ui32PWMClock;

**volatile** uint8\_t ui8Adjust;

ui8Adjust = 10;

ROM\_SysCtlClockSet(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_OSC\_MAIN|SYSCTL\_XTAL\_16MHZ);

ROM\_SysCtlPWMClockSet(SYSCTL\_PWMDIV\_64);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_PWM1); //Enable PWM Module 1,

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOF);

ROM\_GPIOPinTypeGPIOOutput(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3);

ROM\_GPIOPinTypePWM(GPIO\_PORTF\_BASE, GPIO\_PIN\_1);

ROM\_GPIOPinConfigure(GPIO\_PF1\_M1PWM5); //Configure GPIO PORTF.1, Module 1, PWM 5

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = GPIO\_LOCK\_KEY;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_CR) |= 0x01;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = 0;

ROM\_GPIODirModeSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_DIR\_MODE\_IN);

ROM\_GPIOPadConfigSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_STRENGTH\_2MA, GPIO\_PIN\_TYPE\_STD\_WPU);

ui32PWMClock = **SysCtlClockGet**() / 64;

ui32Load = (ui32PWMClock / PWM\_FREQUENCY) - 1;

**PWMGenConfigure**(PWM1\_BASE, PWM\_GEN\_2, PWM\_GEN\_MODE\_DOWN);

**PWMGenPeriodSet**(PWM1\_BASE, PWM\_GEN\_2, ui32Load);

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_5, ui8Adjust \* ui32Load / 100);

ROM\_PWMOutputState(PWM1\_BASE, PWM\_OUT\_5\_BIT, true);

ROM\_PWMGenEnable(PWM1\_BASE, PWM\_GEN\_2);

**while**(1)

{

**if**(ROM\_GPIOPinRead(GPIO\_PORTF\_BASE,GPIO\_PIN\_4)==0x00)

{

ui8Adjust--;

**if** (ui8Adjust < 10)

{

ui8Adjust = 10;

}

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_5, ui8Adjust \* ui32Load / 100);

}

**if**(ROM\_GPIOPinRead(GPIO\_PORTF\_BASE,GPIO\_PIN\_0)==0x00)

{

ui8Adjust++;

**if** (ui8Adjust > 90)

{

ui8Adjust = 90;

}

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_5, ui8Adjust \* ui32Load / 100);

}

**if**(**GPIOPinRead**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1))

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0);

}

**else**

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1, 2);

}

ROM\_SysCtlDelay(300000);

}

}

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