

	AN816
	MicroBolt
Pride Embedded Library for the MicroBolt	10/7/2005

Introduction:

This application note demonstrates the use of the Pride Embedded MicroBolt C library.

Background:

Pride Embedded has created a MicroBolt C library that sets up and demonstrates many of the MicroBolt features into one ImageCraft ICCARM project. Most of the MicroBolt demo projects are based off from this library, but this one project combines many features into one integrated project for demonstration purposes. The use of this library of C code drivers is free for MicroBolt users.

The project and library can be found in the ImageCraft ICCARM examples directory under the “pec.lib” folder (e.g., C:\iccv7arm\examples.arm\pec.lib)

Version 1.00 of the library contains the following functionality:

- Complete demo project for the MicroBolt using multiple C files
- Multiple C and header files to allow for ease of understanding
- PLL setup and initialization.
- GPIO pin function selection and I/O direction (inputs, outputs, and special function pin setup shown)
- ARM VIC (Vectored Interrupt Controller) setup and prioritization.
- Timer-0: Setup, initialization, ISR (Interrupt Service Routine)
- Timer-1: Setup, initialization, ISR
- PWM-0: Setup, initialization, ISR
- UART-0: Setup, initialization, baud rate selections, ISR on received character and string storage and parsing, Transmit routine
- External Interrupt-1: Setup, ISR, Code for converting level sensitive interrupt to edge sensitive (1 interrupt instead of many).
- Delay routines (measured for accuracy)

For up to date drivers and documentation, visit the ImageCraft web site: <http://www.imagecraft.com/software/ARMdevtools.html>

PecLpc210xMain.c

Contains the main() function and sets up the system via a call to SystemInit(). Once the system is setup, an endless loop occurs calling PwmDebugLed() and Delay10uS().

SystemInit.c

Provides system initialization functionality. All setup of the MicroBolt should occur in this file to keep things organized. Currently, the PLL, GPIO, pin functionality selection, and peripherals are setup. Also, the ARM's vector interrupt controller is setup and prioritized.

Current functions in this file:

SetupAndPrioritizeTheVic();

```
InitializeTimer0();
InitializeTimer1();
InitializeUart0();
InitializeUart1();
InitializePwm0();
```

Timer.c

Contains the Timer-0 and Timer-1 ISR's (Interrupt Service Routines)

Pwm.c

Contains the PWM-0 ISR and PWM LED function.

Uart.c

Contains UART-0 transmit and receive functionality and parses commands received over the serial port. There is also a string transmitting function which provides a faster and smaller alternative in comparison to the printf function.

ExtInts.c

Contains EINT1 ISR

Delays.c

Contains various delays for system use.

How it works:

This demo project demonstrates the Pride Embedded C library running on the MicroBolt ARM based controller when using ImageCraft ICCARM

To Test:

On the MicroBolt development board, setup the UART-0 configuration jumpers accordingly (see MicroBolt datasheet) and connect a serial cable from J1 to the PC.

Setup the terminal emulator in ICCARM via "Tools", "Environment Options", "Terminal". Select 115200 as the baud rate and select the correct PC COM port connected to the MicroBolt board. Now go to "Terminal" and select "Show Terminal Window". The terminal emulator window opens. Now hit "Open COM Port" and watch the serial data update on the screen from the MicroBolt.

Various serial data strings appear in the terminal window, which can be seen in the code. Other features of the demo project are a PWM output, various GPIO toggling, onboard MicroBolt LED blinking, timer interrupts firing off and sending serial data, external interrupts (EINT1 is activated by pressing the ISP* switch on the development board), etc.) Scan through the code in the various C files to see other features which are well commented for ease of understanding.

Program Listing:

```
/*
-----
| File Name      : PecLpc210Main.c
| Author         : Frida Embedded, LLC
| Copyright      : Copyright © 2005, Frida Embedded, LLC
| Creation Date  : 2/27/08
| Version        : 1.00
| Spaces per Tab : 2
| Description    : Main C file
| Revision       : Initial
-----
*/

/*
-----
| Includes
-----
*/

#include <ARM/philips/psa210s.h>
#include "arm_nccsr.h"

#include "PecLpc210Main.h"
#include "CommonHeader.h"
#include "SystemIntro.h"
#include "Pwm.h"
#include "Hart.h"
#include "Delays.h"

/*
-----
| Function      : main
| Inputs        : None
| Outputs       : None
| Purpose       : Main function for system
| Author        : Frida Embedded, LLC
-----
*/

void main(void)
{
    __DISABLE_INTERRUPT();           // Disable all interrupts

    SystemIntro();                  // Initialize the system

    __ENABLE_INTERRUPT();           // Enable all interrupts

    while(1)                        // Do this forever
    {
        PwmDebugLed();              // Turn a debug LED
        Delay0us();                  // Test delay
    }
}
```

38/37 | C:\ccv\arm\examples\arm\pec.lib\PecLpc210Main.c | C:\ccv\arm\examples\arm\pec.lib\PEC_LPC210s_Libray.pj | HDX