USB Host Mode
HID Instructions

Covers the following products:

uEZ

Future Designs, Inc.
Your Development Partner
996 A Cleaner Way, Huntsville, AL 35805

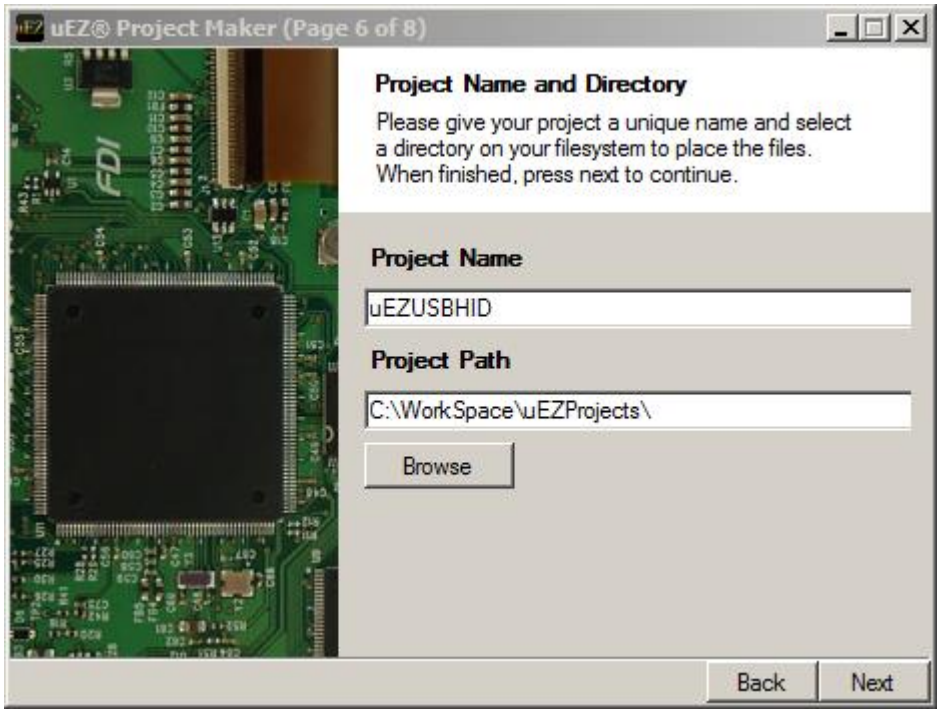
1. Introduction

This document outlines the steps required to add the USB Host Mode HID examples from uEZ samples into the project maker application. This document uses CrossWorks 3 as the example compiler but any of the supported LPC1788/LPC4088 compilers for uEZ v2.07 will work including CrossWorks 2, IAR, and KEIL.

Two examples are provided with uEZ; one for a USB Keyboard and one for a USB Mouse. Note: These drivers are basic and expect a simple keyboard and mouse. Devices with more than basic functionality may not work. This document assumes some knowledge of C programming and familiarity with the compiler being used.

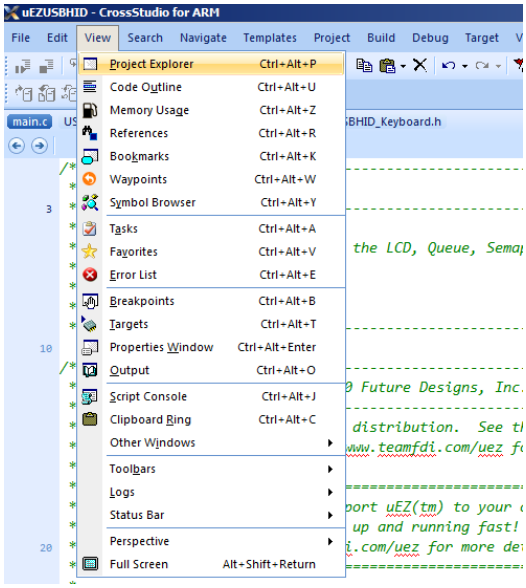
2. Adding Keyboard Functionality

1. Using uEZ 2.07 Project Maker, generate your program in its proper location.

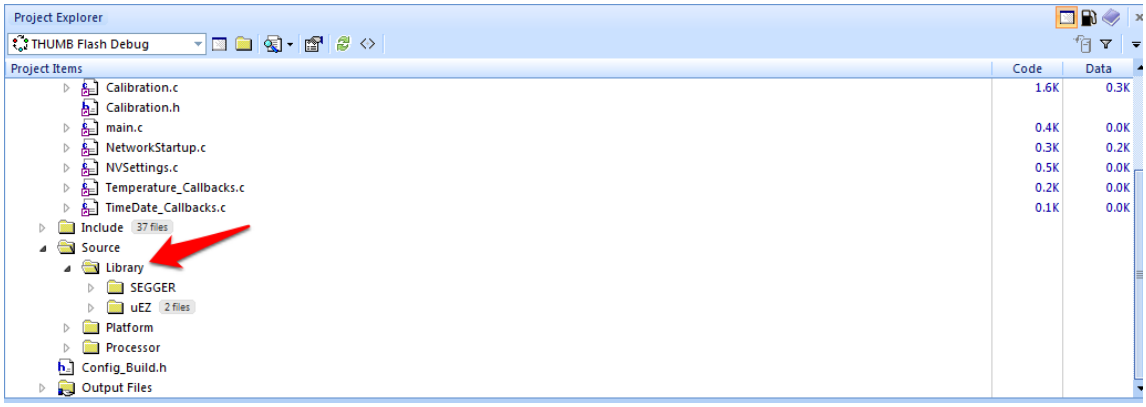


2. Open the solution file in Rowley CrossWorks.

3. In the top menu, click “View”, and then click “Project Explorer”.



4. Navigate to the location “Source→Library” within the Project Explorer.

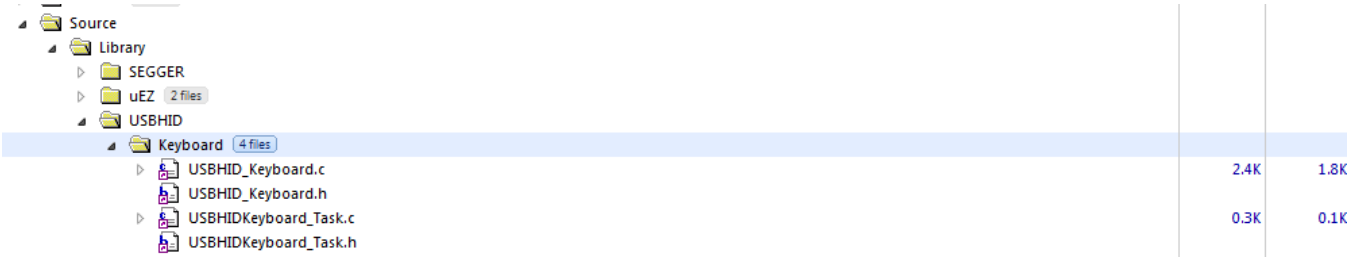


5. Right click on **Library** and click on **Add Folder**. Name the folder “USBHID”.

6. Right click on **USBHID** and click on **Add Folder**. Name the folder “Keyboard”.

7. Right click on **Keyboard** and select **Add Existing File**. Go to your uEZ folder and follow the path **uEZ\Source\Library\USBHID\Keyboard**, select all of the .c and .h files and click **open**.

Below is what the path should look like when you are done.



8. Open up your project's main.c file. This is located at ***Source/App/main.c***

9. Add the following code to the main.c file:

   #include <Source/Library/USBHID/Keyboard/USBHIDKeyboard_Task.h>

Below is the intended destination of the code:

```
#include <string.h>
#include <stdio.h>
#include <uEZ.h>
#include <HAL/EMAC.h>
#include <uEZPlatform.h>
#include "NVSettings.h"
#include "Audio.h"
#include <uEZGPIO.h>
#include <uEZProcessor.h>
#include <Source/Library/GUI/FDI/SimpleUI/SimpleUI_UtilityFunctions.h>
#include "emWin/WindowManager.h"
#include <DIALOG.h>
#include <Calibration.h>
#include <NetworkStartup.h>
#include "Temperature_Callbacks.h"
#include <uEZStream.h>
#include <Source/Library/Audio/DAC/uEZDACWAVFile.h>
#include <Source/ExpansionBoard/FDI/uEZGUI_EXP_DK/uEZGUI_EXP_DK.h>

#if COMPILE_OPTION_USB_SDCARD_DISK
#include <Source/Library/USBDevice/MassStorage/Generic/USBMSDrive.h>
#endif

#if FREERTOS_PLUS_TRACE //LPC1788 only as of uEZ v2.04
#include <trcUser.h>
#endif

#include <Source/Library/USBHID/Keyboard/USBHIDKeyboard_Task.h>
```

Added code's destination

10. While still in main.c, go to the task “MainTask”. Add the code USBHIDKeyboard_Start(); near the end of the task, but before the infinite loop.

Below is a picture of the code’s intended destination:

```
void MainTask(void)
{
#if COMPILE_OPTION_USB_SDCARD_DISK
    T_USBMSDriveCallbacks usbMSDiskCallbacks = {0};
#endif

    printf("\f" PROJECT_NAME " " VERSION_AS_TEXT "\n\n"); // clear serial screen and put up banner

    // Load the settings from non-volatile memory
    if (NVSettingsLoad() != UEZ_ERROR_NONE) {
        printf("EEPROM Settings\n");
        NVSettingsInit();
        NVSettingsSave();
    }

#if COMPILE_OPTION_USB_SDCARD_DISK
    // Setup the USB MassStorage device to connect to MS1 (the SD Card)
    if (UEZDeviceTableIsRegistered("USBDevice"))
        USBMSDriveInitialize(&usbMSDiskCallbacks, 0, "MS1");
#endif

    AudioStart();

    Calibrate(CalibrateTestIfTouchscreenHeld());

    // Start up the heart beat of the LED
    UEZTaskCreate(HeartbeatTask, "Heart", 64, (void *)0, UEZ_PRIORITY_NORMAL, 0);

#if UEZ_ENABLE_WIRELESS_NETWORK || UEZ_ENABLE_WIRED_NETWORK
    // Start the network task if needed
    UEZTaskCreate((T_uezTaskFunction)NetworkStartup, "NetStart",
        UEZ_TASK_STACK_BYTES(1024), (void *)0, UEZ_PRIORITY_NORMAL, 0);
#endif

    //Start emWin interface
    UEZTaskCreate(GUIInterfaceTask, "GUIInterface", (4 * 1024), (void *) 0, UEZ_PRIORITY_NORMAL, 0);

    USBHIDKeyboard_Start();

    // Loop forever
    while (1)
        UEZTaskDelay(10);
```

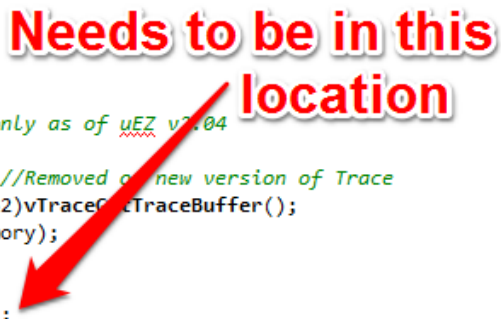
Location of added code

11. Add the following code to main.c, inside of the task “uEZPlatformStartup”

```
UEZPlatform_USBHost_PortA_Require();
HIDKeyboardRequire(PRIMARY_EXPANSION_USB_HOST);
```

Pictured below is the code’s intended destination:

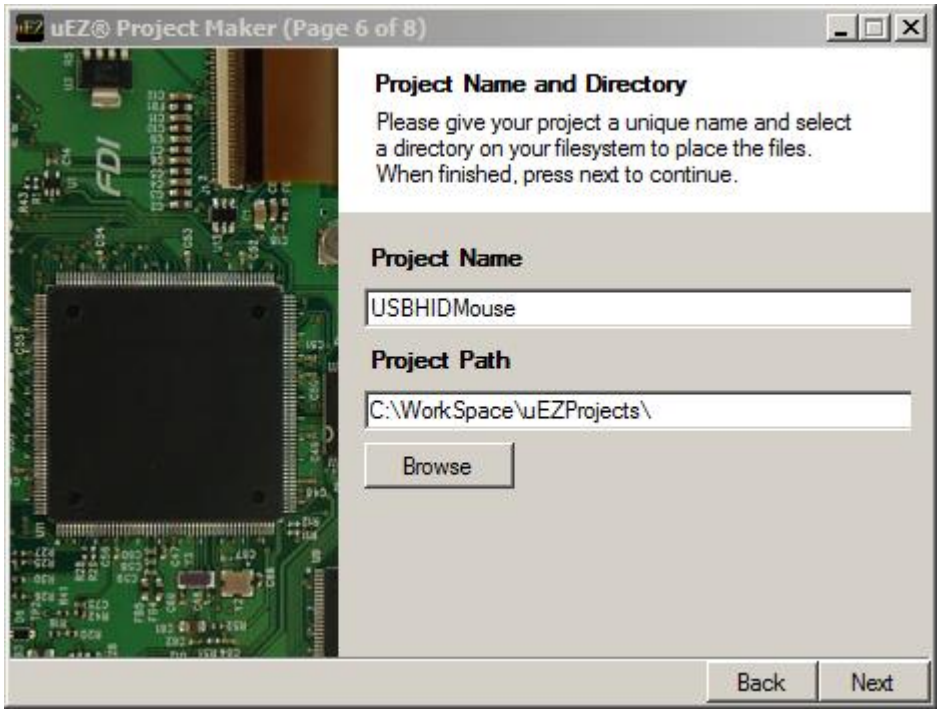
```
TUInt32 uEZPlatformStartup(T_uezTask aMyTask, void *aParameters)
{
    extern T_uezTask G_mainTask;

    #if FREERTOS_PLUS_TRACE //LPC1788 only as of uEZ v2.04
        TUInt32 traceAddressInMemory = 0;
    #endif

    UEZPlatform_Standard_Require();
    SUIInitialize(EFalse, EFalse, EFalse); // SWIM not flipped

    // Startup the desired platform configuration
    #if UEZGUI_EXPANSION_DEVKIT
        uEZPlatformStartup_EXP_DK();
    #else
        uEZPlatformStartup_NO_EXP();
    #endif

    #if FREERTOS_PLUS_TRACE //LPC1788 only as of uEZ v2.04
         uiTraceStart();
         //vTraceStartStatusMonitor(); //Removed on new version of Trace
         traceAddressInMemory = (TUInt32)vTraceGetTraceBuffer();
         printf("%x", traceAddressInMemory);
    #endif

    UEZPlatform_USBHost_PortA_Require();
    HIDKeyboardRequire(PRIMARY_EXPANSION_USB_HOST);

     // Create a main task (not running yet)
     UEZTaskCreate((T_uezTaskFunction)MainTask, "Main", MAIN_TASK_STACK_SIZE, 0,
                   UEZ_PRIORITY_NORMAL, &G_mainTask);

     // Done with this task, fall out
     return 0;
}
```



12. Compile your program to check that everything compiles and runs correctly.

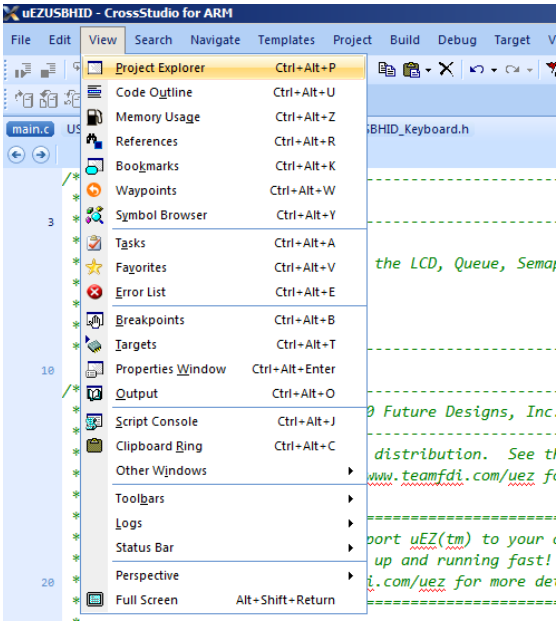
3. Adding Mouse Functionality

1. Using uEZ 2.07 Project Maker, generate your program in its proper location.

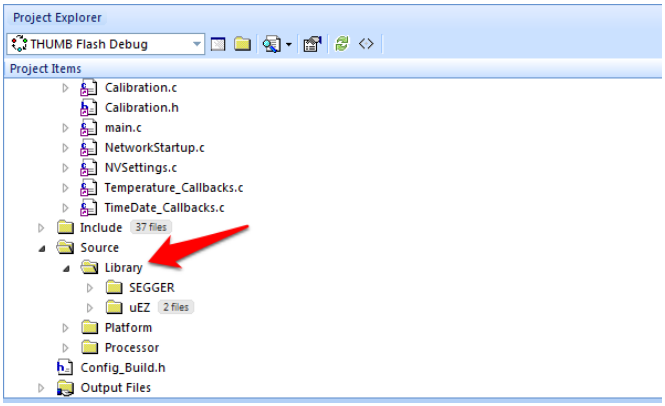


2. Open up the solution file in Rowley CrossWorks.

In the top menu, click “View”, then click “Project Explorer”.



3. Navigate to the location “Source→Library”

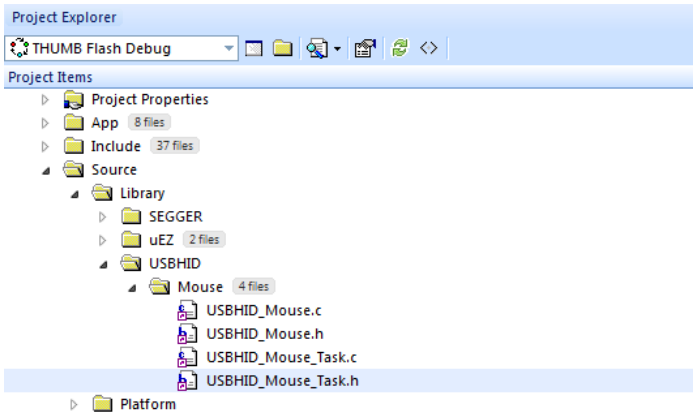


4. Right click on **Library** and click on **Add Folder**. Name the folder “USBHID”

5. Right click on **USBHID** and click on **Add Folder**. Name the folder “Mouse”

6. Right click on **Mouse** and click on **Add Existing File**. Go to your uEZ folder and follow the path **uEZ\Source\Library\USBHID\Mouse**, select all of the .c and .h files and select **open**.

Below is what the path should look like when you are done.



7. Open up your project's main.c file. This is located at ***Source/App/main.c***

8. Add the following code to the main.c file:

#include <Source/Library/USBHID/Mouse/USBHID_Mouse_Task.h>

Pictured below is the code's intended destination:

9. While still in main.c, go to the task “MainTask”. Add USBHID_Mouse_Start(); near the end of the task, but before the infinite loop.

Pictured below is the code’s intended destination:

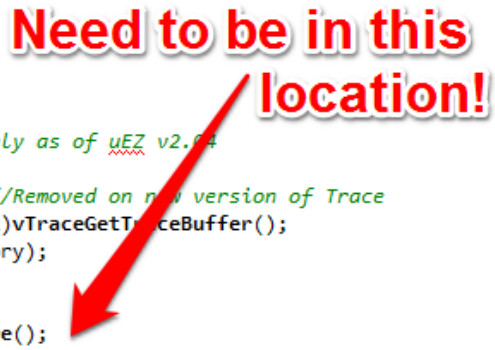
```
void MainTask(void)
{
#if COMPILE_OPTION_USB_SDCARD_DISK
    T_USBMSDriveCallbacks usbMSDiskCallbacks = {0};
#endif

    printf("\f" PROJECT_NAME " " VERSION_AS_TEXT "\n\n"); // clear serial screen and put up banner

    // Load the settings from non-volatile memory
    if (NVSettingsLoad() != UEZ_ERROR_NONE) {
        printf("EEPROM Settings\n");
        NVSettingsInit();
        NVSettingsSave();
    }

#if COMPILE_OPTION_USB_SDCARD_DISK
    // Setup the USB MassStorage device to connect to MS1 (the SD Card)
    if (UEZDeviceTableIsRegistered("USBDevice"))
        USBMSDriveInitialize(&usbMSDiskCallbacks, 0, "MS1");
#endif

    AudioStart();

    Calibrate(CalibrateTestIfTouchscreenHeld());

    // Start up the heart beat of the LED
    UEZTaskCreate(HeartbeatTask, "Heart", 64, (void *)0, UEZ_PRIORITY_NORMAL, 0);

#if UEZ_ENABLE_WIRELESS_NETWORK || UEZ_ENABLE_WIRED_NETWORK
    // Start the network task if needed
    UEZTaskCreate((T_uezTaskFunction)NetworkStartup, "NetStart",
        UEZ_TASK_STACK_BYTES(1024), (void *)0, UEZ_PRIORITY_NORMAL, 0);
#endif

    //Start emWin interface
    UEZTaskCreate(GUIInterfaceTask, "GUIInterface", (4 * 1024), (void *) 0, UEZ_PRIORITY_NORMAL, 0);

    USBHID_Mouse_Start();

    // Loop forever
    while (1)
        UEZTaskDelay(10);
```

10. Add the following code to main.c, inside of the task “uEZPlatformStartup”

```
UEZPlatform_USBHost_PortA_Require();
HIDMouseRequire(PRIMARY_EXPANSION_USB_HOST);
```

Pictured below is the code’s intended destination:

```
TUInt32 uEZPlatformStartup(T_uezTask aMyTask, void *aParameters)
{
    extern T_uezTask G_mainTask;

    #if FREERTOS_PLUS_TRACE //LPC1788 only as of uEZ v2.04
        TUInt32 traceAddressInMemory = 0;
    #endif

    UEZPlatform_Standard_Require();
    SUIInitialize(EFalse, EFalse, EFalse); // SWIM not flipped

    // Startup the desired platform configuration
    #if UEZGUI_EXPANSION_DEVKIT
        uEZPlatformStartup_EXP_DK();
    #else
        uEZPlatformStartup_NO_EXP();
    #endif

    #if FREERTOS_PLUS_TRACE //LPC1788 only as of uEZ v2.04
         uiTraceStart();
         //vTraceStartStatusMonitor(); //Removed on new version of Trace
         traceAddressInMemory = (TUInt32)vTraceGetTraceBuffer();
         printf("%x", traceAddressInMemory);
    #endif

        UEZPlatform_USBHost_PortA_Require();
        HIDMouseRequire(PRIMARY_EXPANSION_USB_HOST);

     // Create a main task (not running yet)
     UEZTaskCreate((T_uezTaskFunction)MainTask, "Main", MAIN_TASK_STACK_SIZE, 0,
                   UEZ_PRIORITY_NORMAL, &G_mainTask);

     // Done with this task, fall out
     return 0;
}
```



11. Compile your program to check that everything was done correctly.