Using ConfigTool to create USB Project From Start

TIC

Creating USB composite HID mouse + keyboard project.

Prequisities:

1. LPCXpresso55S69-EVK
2. MCUXPresso IDE 11.1.1
3. SDK package for LPCXpresso55S69 ,SDK_2.7.1_LPCXpresso55S69.The SDK has to be imported into MCUXPresso IDE (in Installed SDKs).

Step by step guide —— Steps:

1. Launch the MCUXpresso IDE and launch new project creation.

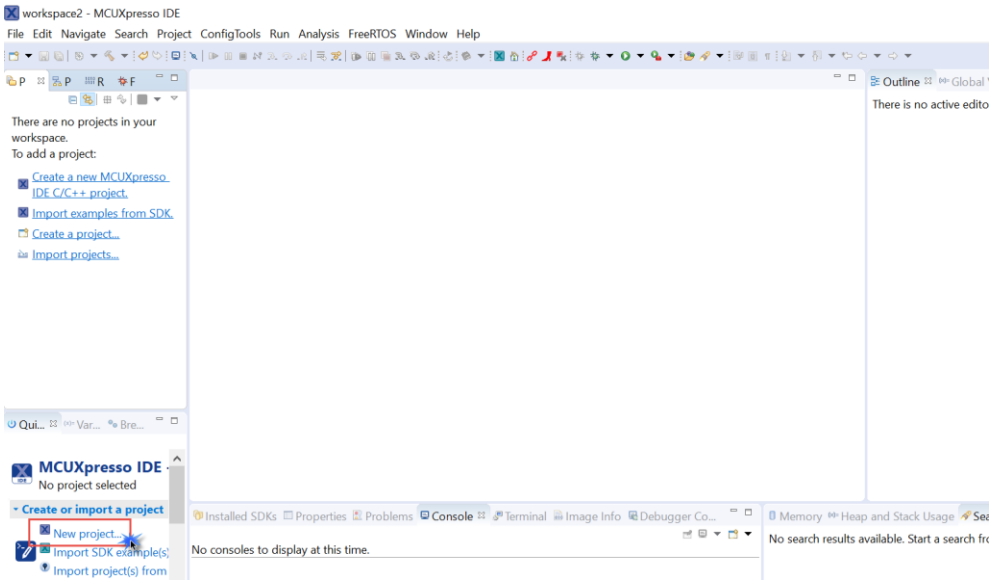

Figure 1

2. Select the LPCXpresso55S69 board under LPC55S69 processor folder. Click Next>

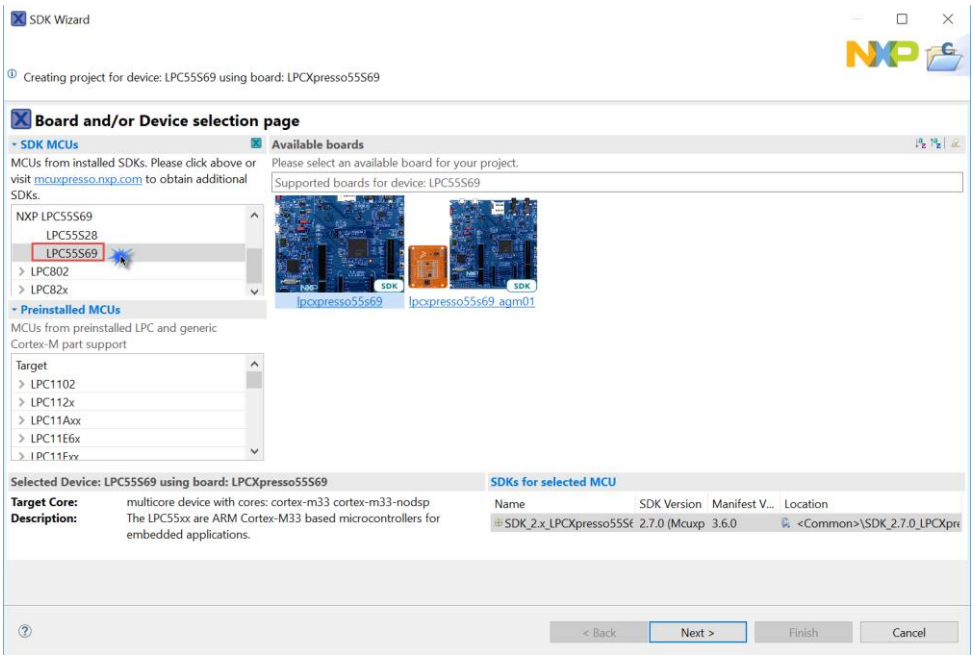

Figure 2

3. Specify the project name (e.g.LPC55S69_Project) and in the Middleware section select the "USB device", Click Finish.

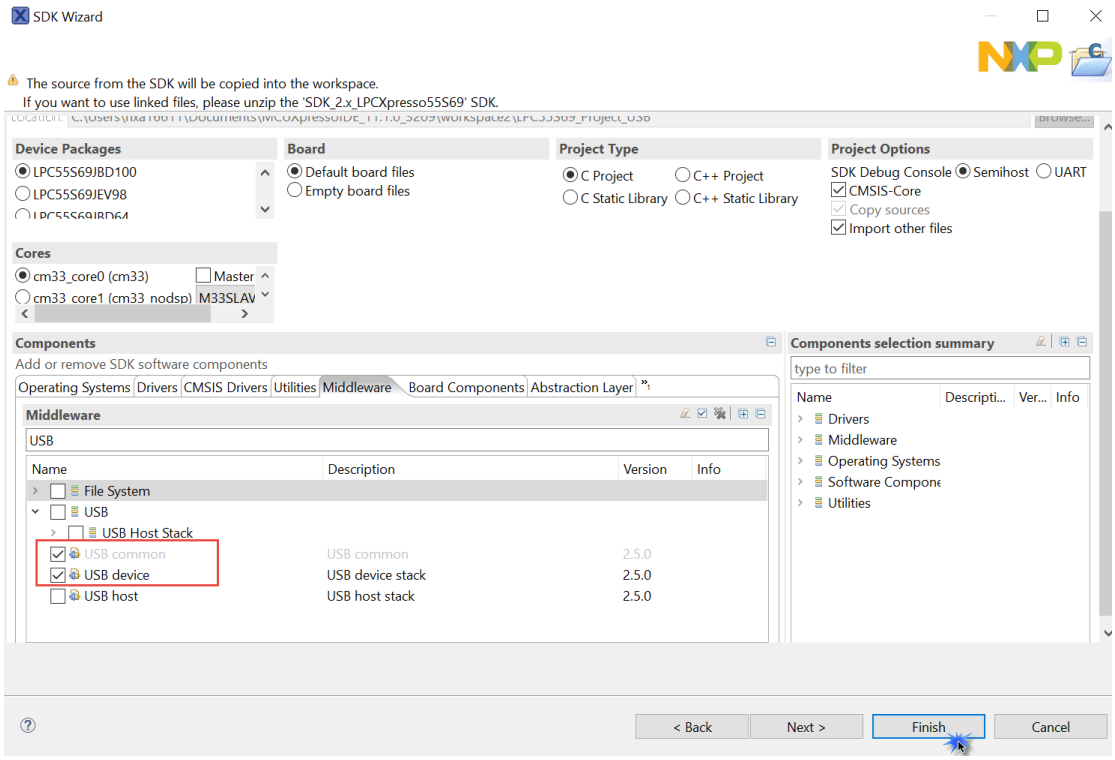

Figure 3

4. Figure 4 is the created project.

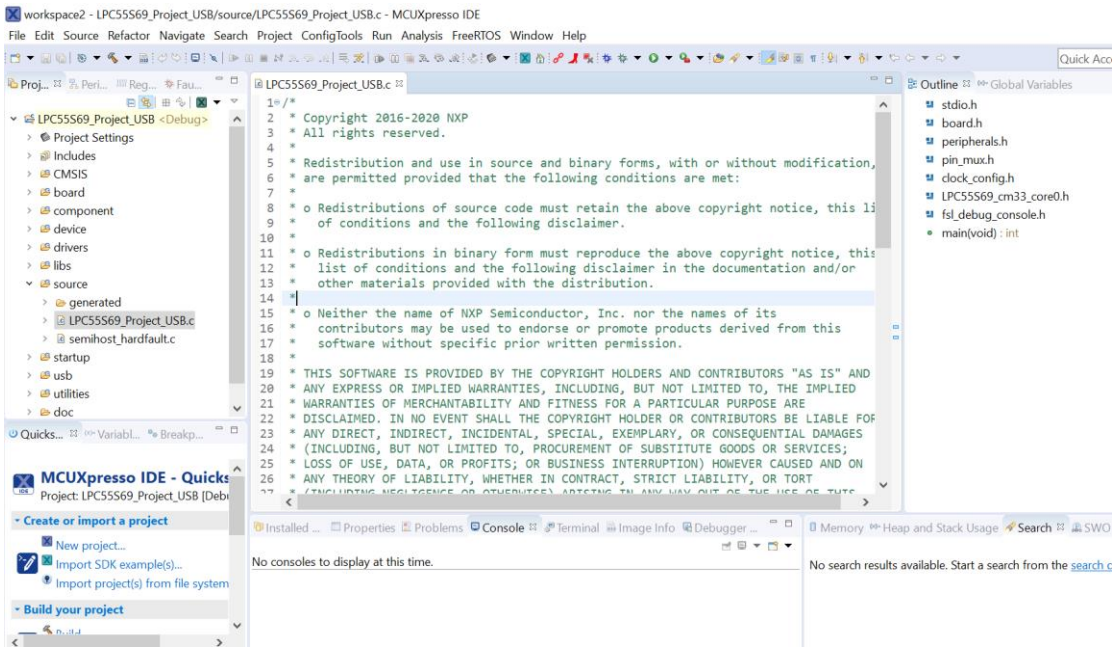

Figure 4

5. Unfold the drop-down menu (down arrow) for the Config tools **icon ('X')** and launch the **Peripherals tool**

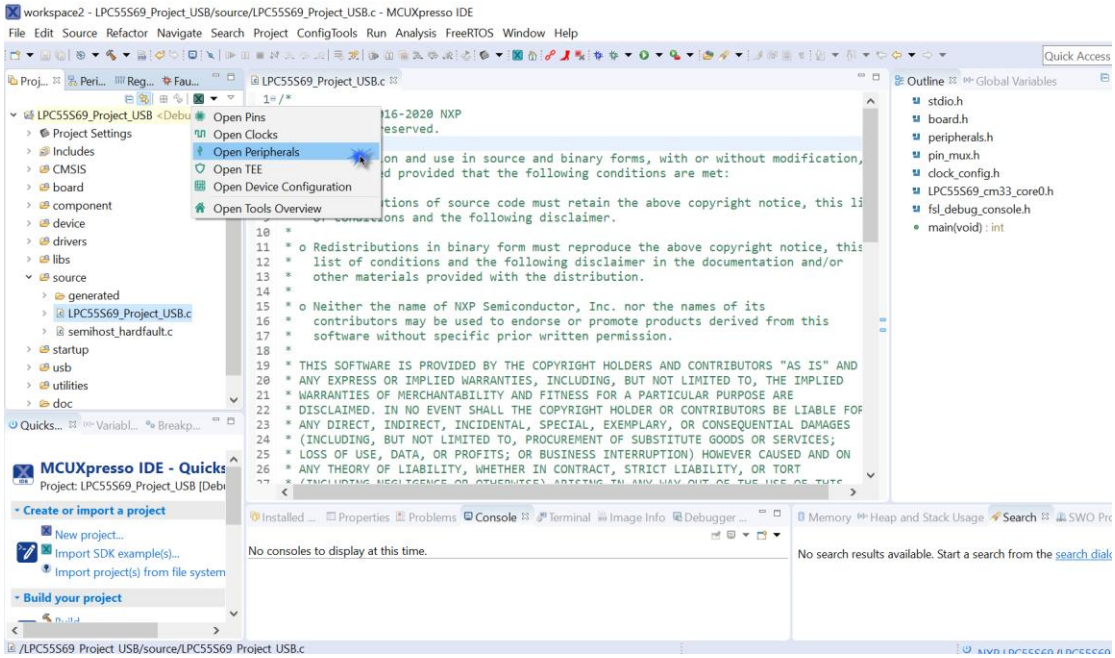

Figure 5

6. In the Peripherals view of the Peripherals tool, click on the USB0 peripheral checkbox

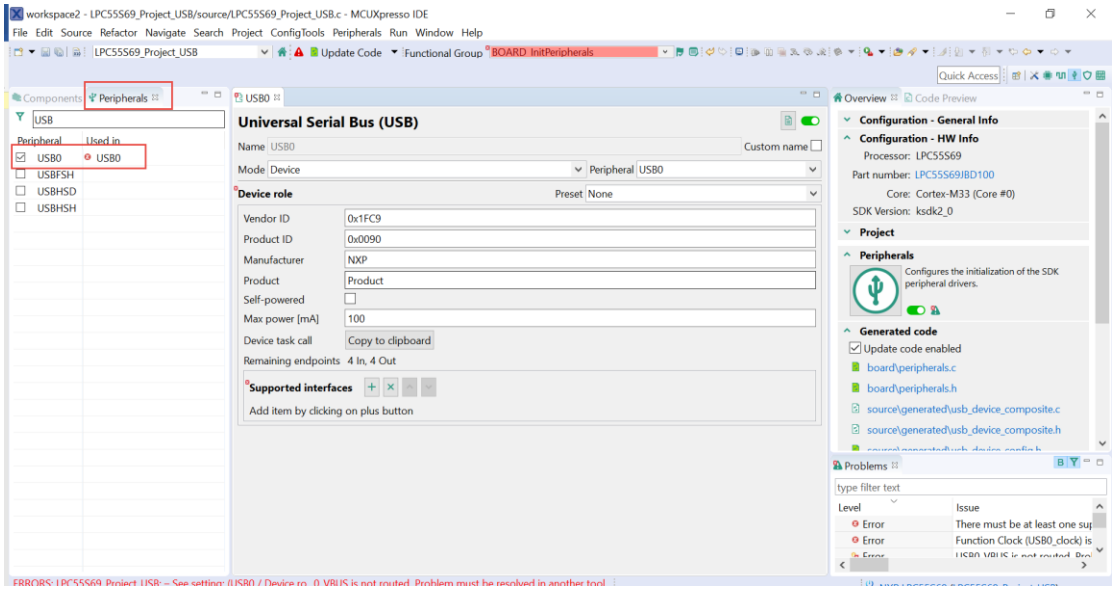

Figure 6

7. In the USB component settings editor that is automatically open, select the “HID Keyboard” in the preset drop-down list:

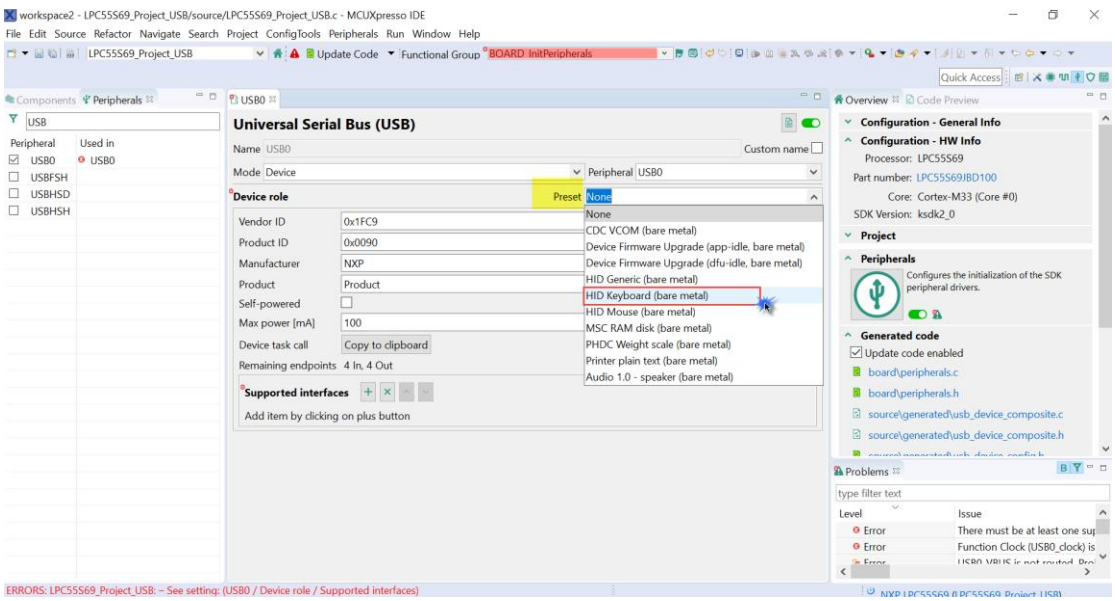

Figure 7

8. To add also Mouse interface, click on the ‘+’ in the Supported Interfaces section.

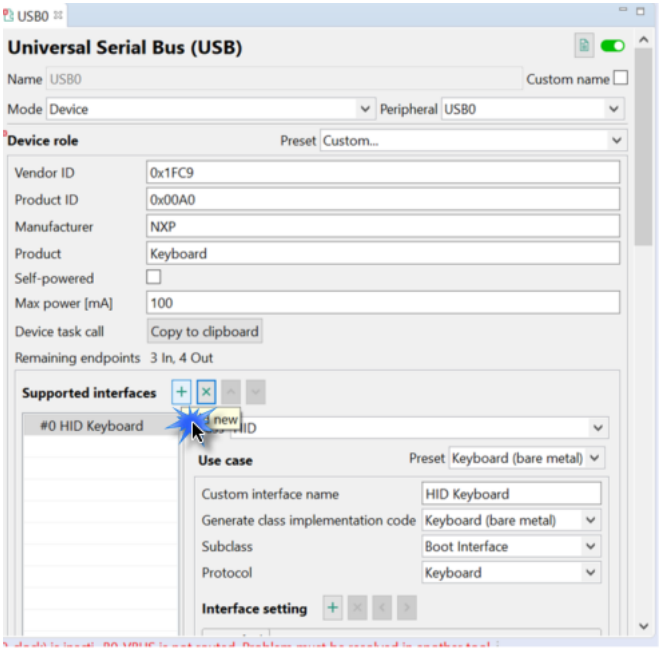

Figure 8

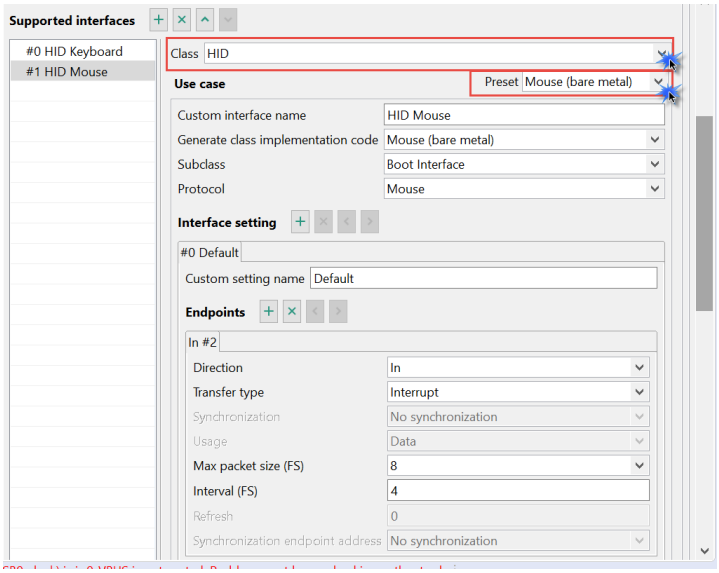

Figure 9

9. The Problems view shows error indicating that USB function clock is inactive . Right click on the warning (USB Function Clock (USB0_clock) is inactive···) and select “Show problem in BOARD_BootClockPLL150M), which opens the Clocks tool.

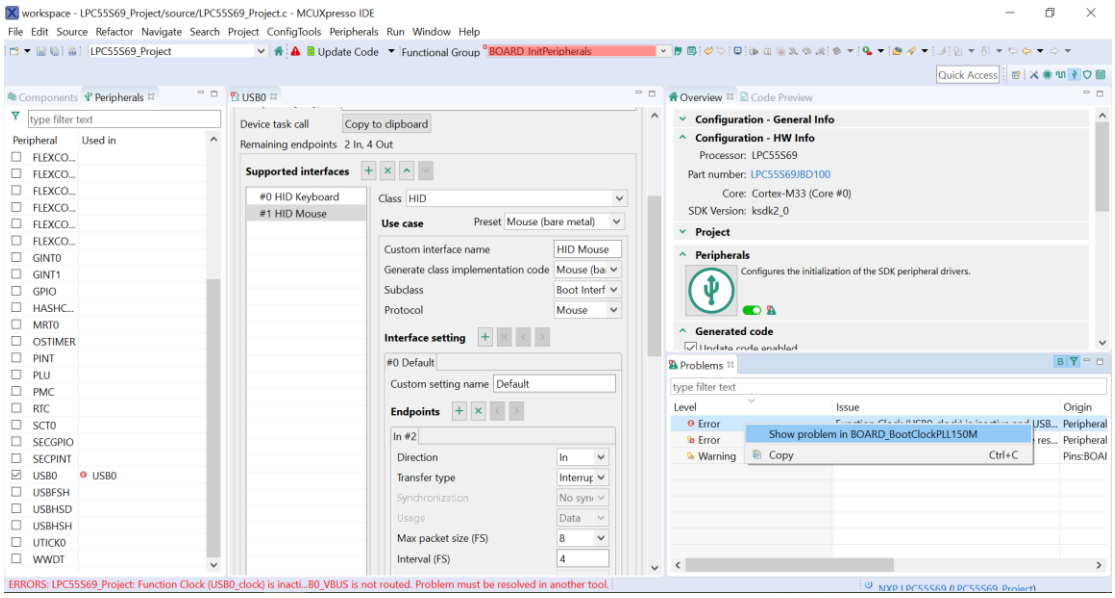

Figure 10

10. In the Clocks tool change the state of FRO_HF clock to “Enabled”, Double click the USB0CLKSEL,select the FRO_96MHz Clock. Change the USB0CLKDIV value to /2.

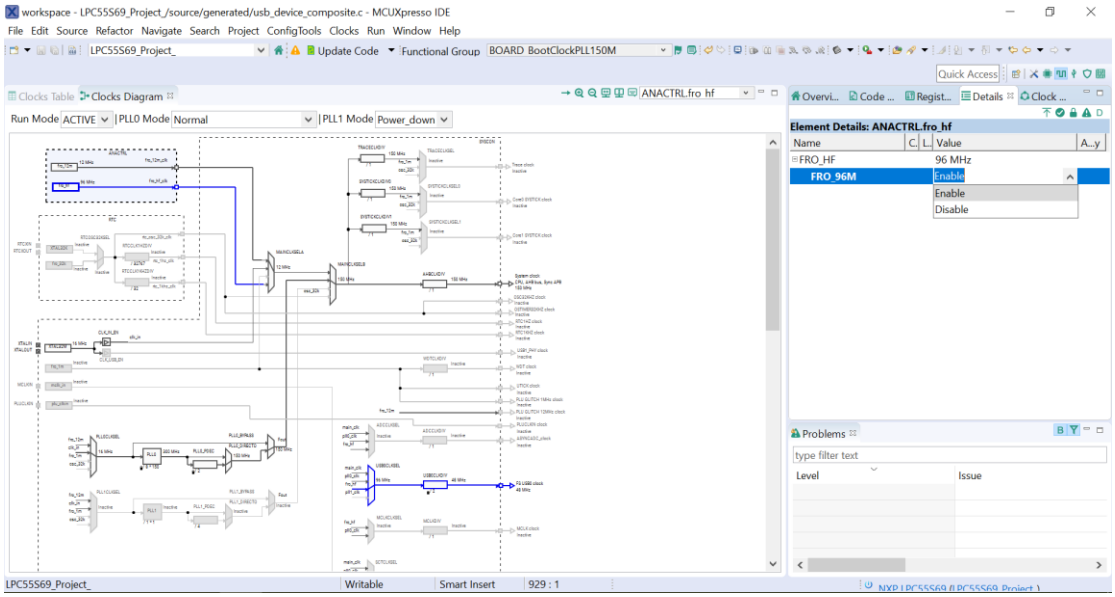

Figure 11

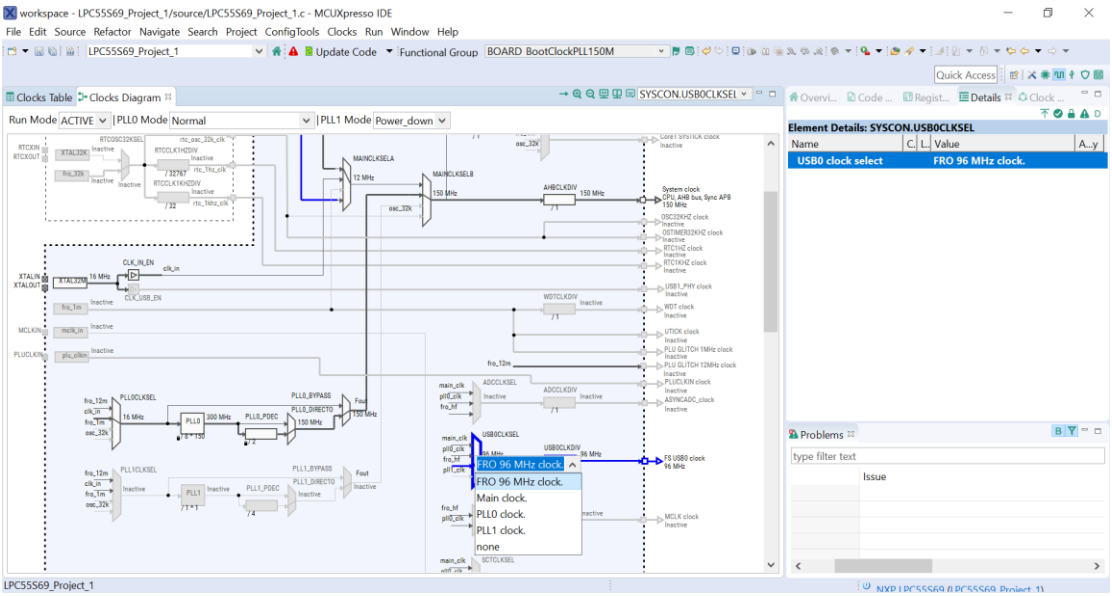

Figure 12

11. In the peripherals config tool, The Problems view shows the second error indicating that USB0_VBUS is not routed.Right click on the error and select “Route to[78]…”

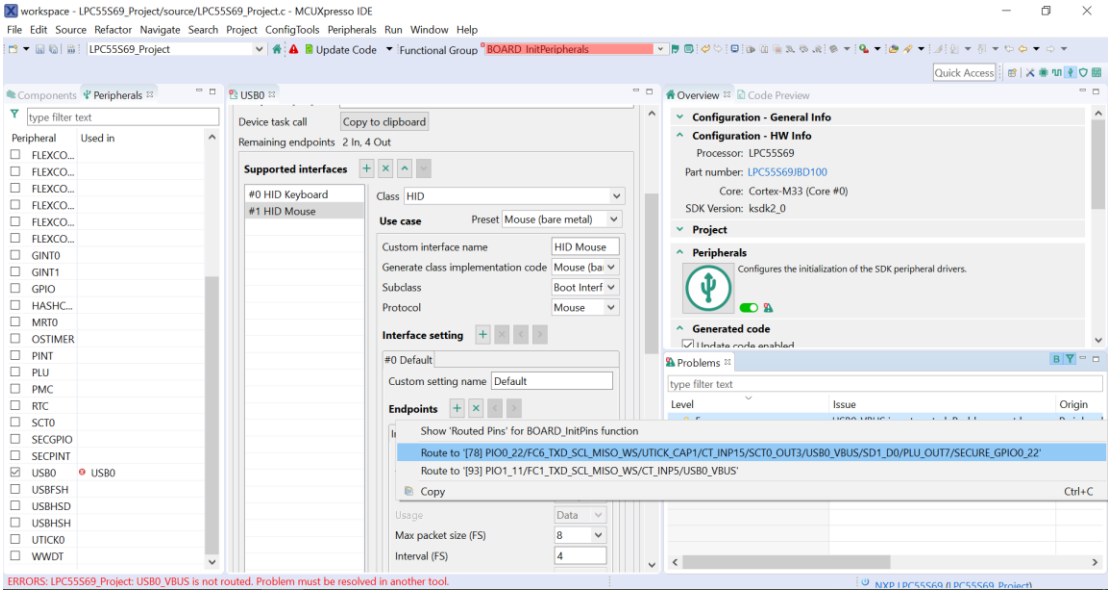

Figure 13

in the pins config tool, we can see the USB0 pins have been assigned

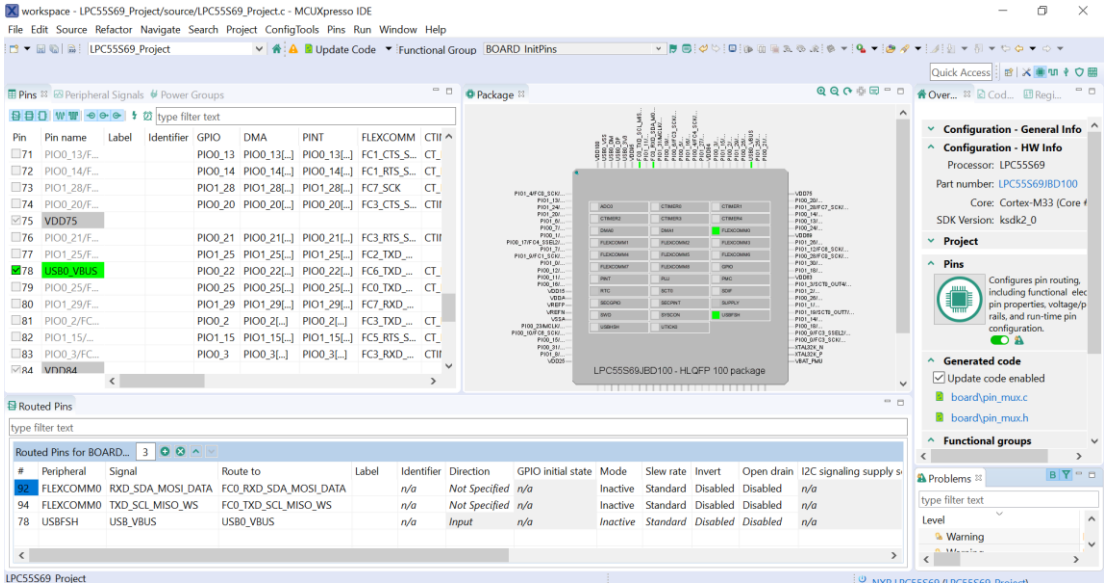

Figure 14

12. Click on the 'Update project' button at the main toolbar in order to show the project update dialog.

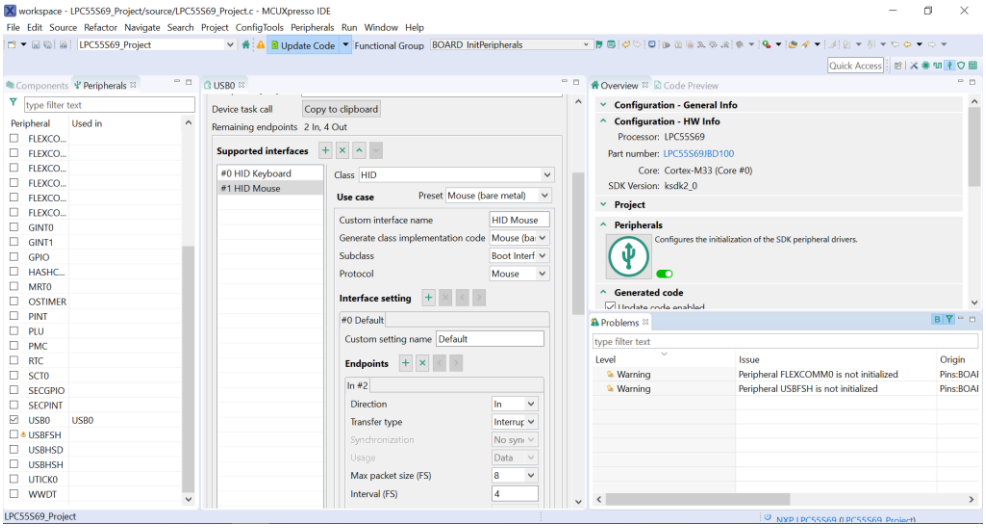

Figure 15

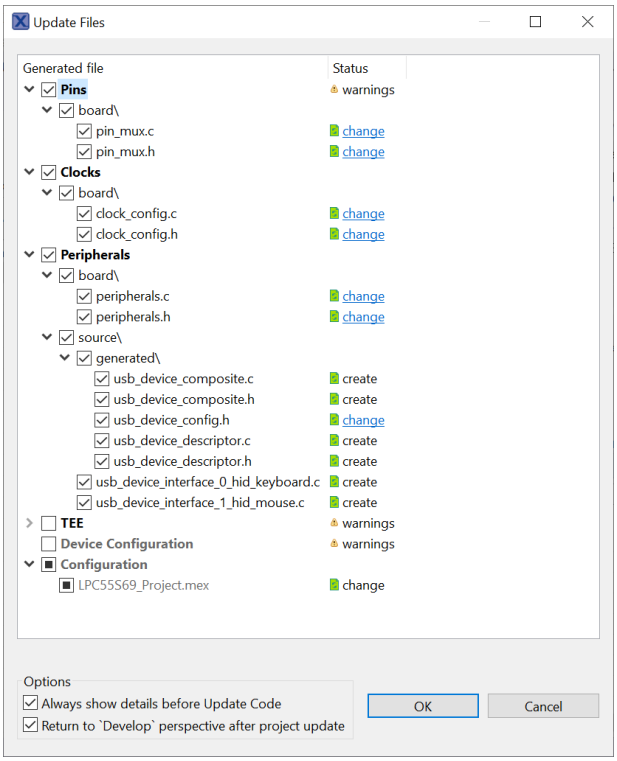

Figure 16

13. The generated files contain a sample code that moves mouse in a rectangle and scrolls screen. The code in main file is as below.

```
#include <stdio.h>
#include "board.h"
#include "peripherals.h"
#include "pin_mux.h"
#include "clock_config.h"
#include "LPC55S69_cm33_core0.h"
#include "fsl_debug_console.h"

#include "usb_device_composite.h"

#include "usb_device_config.h"
#include "usb.h"
#include "usb_device.h"

#include "usb_device_class.h"
#include "usb_device_hid.h"

#include "usb_device_ch9.h"
#include "usb_device_descriptor.h"

#if (defined(FSL_FEATURE_SOC_SYSMPU_COUNT) && (FSL_FEATURE_SOC_SYSMPU_COUNT > 0U))
#include "fsl_sysmpu.h"
#endif
#if defined(FSL_FEATURE_SOC_USBPHY_COUNT) && (FSL_FEATURE_SOC_USBPHY_COUNT > 0U)
#include "usb_phy.h"
#endif
#if (defined(USB_DEVICE_CONFIG_LPCIP3511FS) && (USB_DEVICE_CONFIG_LPCIP3511FS > 0U))
#include "fsl_power.h"
#endif
#if (defined(USB_DEVICE_CONFIG_LPCIP3511HS) && (USB_DEVICE_CONFIG_LPCIP3511HS > 0U))
#if !((defined FSL_FEATURE_SOC_USBPHY_COUNT) && (FSL_FEATURE_SOC_USBPHY_COUNT > 0U))
#include "fsl_mrt.h"
#endif
#include "fsl_power.h"
#endif
/* TODO: insert other include files here. */
```

```
/* TODO: insert other definitions and declarations here. */
#if defined (USB_DEVICE_CONFIG_LPCIP3511FS) && (USB_DEVICE_CONFIG_LPCIP3511FS > 0U)
static clock_usbfs_src_t USB0_GetClockSource(void);
#endif
#if defined (USB_DEVICE_CONFIG_LPCIP3511FS) && (USB_DEVICE_CONFIG_LPCIP3511FS > 0U)
/*!
 * @brief Function to retrieve clock source for USB0.
 *
 * @return Used clock source
 */
static clock_usbfs_src_t USB0_GetClockSource()
{
    clock_usbfs_src_t src;
    switch (SYSCON->USB0CLKSEL)
    {
        case 0U:
            src = kCLOCK_UsbfsSrcMainClock;
            break;
        case 1U:
            src = kCLOCK_UsbfsSrcPll0;
            break;
        case 3U:
            src = kCLOCK_UsbfsSrcFro;
            break;
        case 5U:
            src = kCLOCK_UsbfsSrcPll1;
            break;
        default:
            src = kCLOCK_UsbfsSrcNone;
            break;
    }
    return src;
}
#endif
/*
 * @brief   Application entry point.
 */
int main(void)
{

      /* attach 12 MHz clock to FLEXCOMM0 (debug console) */
        CLOCK_AttachClk(BOARD_DEBUG_UART_CLK_ATTACH);

        BOARD_InitPins();
        BOARD_BootClockPLL150M();
        BOARD_InitDebugConsole();

        NVIC_ClearPendingIRQ(USB0_IRQn);
        NVIC_ClearPendingIRQ(USB0_NEEDCLK_IRQn);
        NVIC_ClearPendingIRQ(USB1_IRQn);
        NVIC_ClearPendingIRQ(USB1_NEEDCLK_IRQn);

        POWER_DisablePD(kPDRUNCFG_PD_USB0_PHY); /*< Turn on USB0 Phy */
        POWER_DisablePD(kPDRUNCFG_PD_USB1_PHY); /*< Turn on USB1 Phy */

        /* reset the IP to make sure it's in reset state. */
        RESET_PeripheralReset(kUSB0D_RST_SHIFT_RSTn);
        RESET_PeripheralReset(kUSB0HSL_RST_SHIFT_RSTn);
        RESET_PeripheralReset(kUSB0HMR_RST_SHIFT_RSTn);
        RESET_PeripheralReset(kUSB1H_RST_SHIFT_RSTn);
        RESET_PeripheralReset(kUSB1D_RST_SHIFT_RSTn);
        RESET_PeripheralReset(kUSB1_RST_SHIFT_RSTn);
        RESET_PeripheralReset(kUSB1RAM_RST_SHIFT_RSTn);

    #if (defined USB_DEVICE_CONFIG_LPCIP3511HS) && (USB_DEVICE_CONFIG_LPCIP3511HS)
        CLOCK_EnableClock(kCLOCK_Usbh1);
        /* Put PHY powerdown under software control */
        *((uint32_t *)(USBHSH_BASE + 0x50)) = USBHSH_PORTMODE_SW_PDCOM_MASK;
        /* According to reference mannual, device mode setting has to be set by access usb host register */
        *((uint32_t *)(USBHSH_BASE + 0x50)) |= USBHSH_PORTMODE_DEV_ENABLE_MASK;
        /* enable usb1 host clock */
        CLOCK_DisableClock(kCLOCK_Usbh1);
    #endif
    #if defined (USB_DEVICE_CONFIG_LPCIP3511FS) && (USB_DEVICE_CONFIG_LPCIP3511FS > 0U)
    /* Turn on USB Phy */
    POWER_DisablePD(kPDRUNCFG_PD_USB0_PHY);
```

```
    /* enable usb0 host clock */
    CLOCK_EnableClock(kCLOCK_Usbhsl0);

    /*According to reference mannual, device mode setting has to be set by access usb host register */
    *((uint32_t *)(USBFSH_BASE + 0x5C)) |= USBFSH_PORTMODE_DEV_ENABLE_MASK;

    /* disable usb0 host clock */
    CLOCK_DisableClock(kCLOCK_Usbhsl0);

    if (USB0_GetClockSource() == kCLOCK_UsbfsSrcFro)
    {
        /* Turn ON FRO HF and let it adjust TRIM value based on USB SOF */
        ANACTRL->FRO192M_CTRL = (ANACTRL->FRO192M_CTRL &
~(ANACTRL_FRO192M_CTRL_USBCLKADJ_MASK)) | ANACTRL_FRO192M_CTRL_USBCLKADJ(1U);

    }

    CLOCK_EnableClock(kCLOCK_Usbd0);
    CLOCK_EnableClock(kCLOCK_UsbRam1);

#if defined(FSL_FEATURE_USB_USB_RAM) && (FSL_FEATURE_USB_USB_RAM)
    for (int i = 0; i < FSL_FEATURE_USB_USB_RAM; i++)
    {
        ((uint8_t *)FSL_FEATURE_USB_USB_RAM_BASE_ADDRESS)[i] = 0x00U;
    }
#endif
#endif
        USB_DeviceApplicationInit();

        while (1U)
        {
    #if USB_DEVICE_CONFIG_USE_TASK
            USB_DeviceTaskFn(g_UsbDeviceComposite.deviceHandle);
    #endif
        }
}
```

14. Connect the P6 to PC and download the code to EVK (Figure 19). Reconnect the P10(FULL SPEED USB) to PC(As shown in Figure 20). An HID-compliant mouse and a keyboard are enumerated in the Device Manager.

- For the HID mouse, the mouse arrow moving on the PC screen in the rectangular rotation.
- For the HID keyboard, see the screen while scrolling up and down

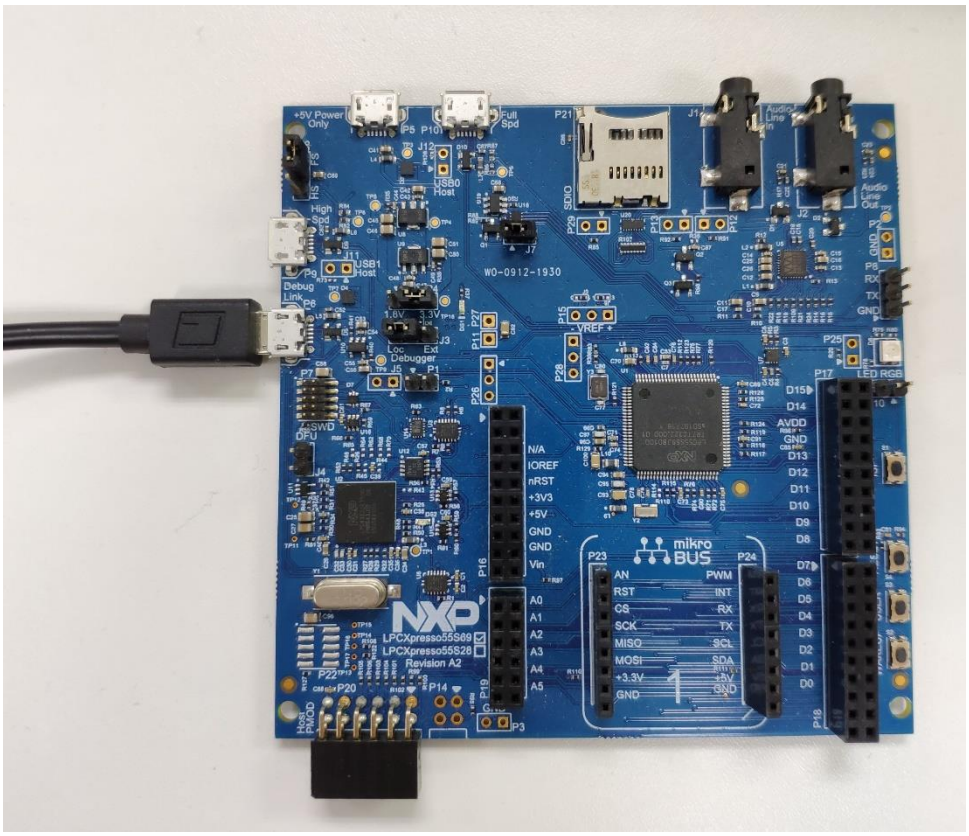

Figure 19

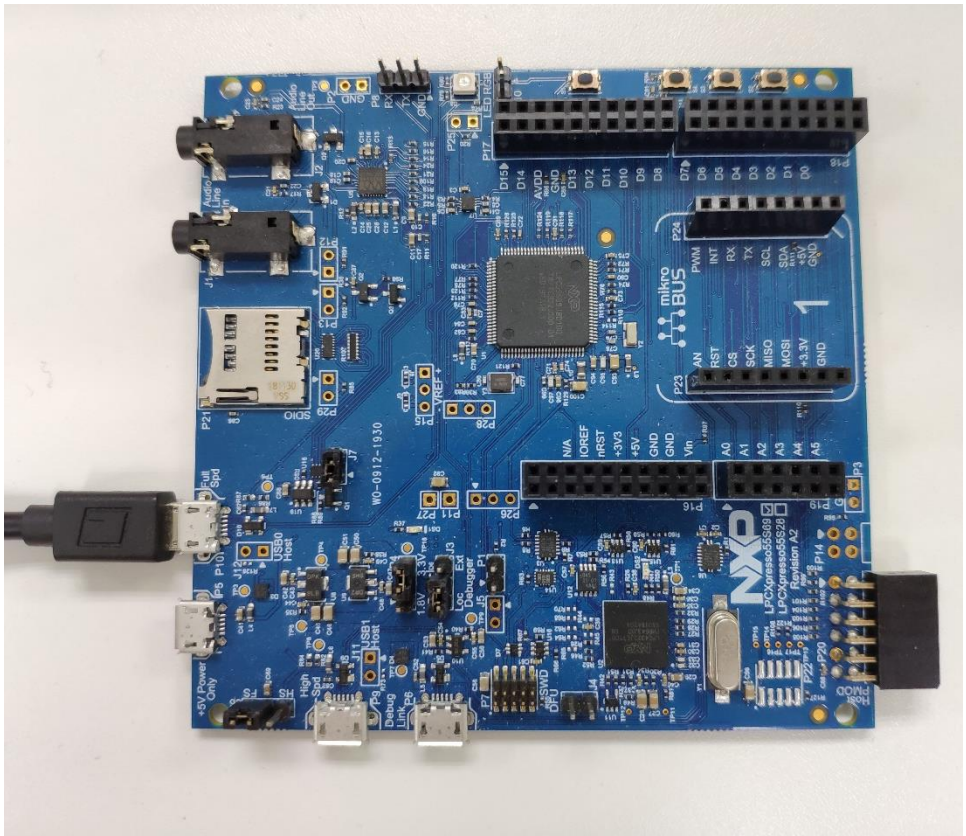

Figure 20