Overview

The LPM(Link Power Management) USB Host HID example is a simple demonstration program based on the MCU-Xpresso SDK. The host will send LPM token and enter into the low power mode when user needs to suspend the USB bus. The host can be waked up by a switch or the resume signal delivered by the device if the remote wake-up feature is enabled. The host will wake up the device by delivering the resume signal if it is waked up by a switch.
The application supports the mouse device.

System Requirement

Hardware requirements

- Mini/micro USB cable

- USB A to micro AB cable

- Hardware (Tower module/base board, and so on) for a specific device

- Personal Computer (PC)

Software requirements

- The project path is:

  <MCUXpresso_SDK_Install>/boards/<board>/usb_examples/usb_lpm_host_hid_mouse/<rtos>/<toolchain>.

  Note

     The <rtos> is Bare Metal or FreeRTOS OS.

Getting Started

Hardware Settings

Note

     Set the hardware jumpers (Tower system/base module) to default settings.

Prepare the example

1. Download the program to the target board.

2. Power off the target board and power on again.

3. Connect devices to the board.

Note

     For detailed instructions, see the appropriate board User's Guide.
     this example can only work with SDK_DEBUGCONSOLE = 1, setting this macro to 0 will lead to build error.
     Host hid example doesn't support HID report descriptor analysis, this example assume that the device data are sent by specific order.
     For more detail, please refer to the code. For the device list we tested,
     please refer to chapter "Peripheral devices tested with the USB Host stack" in "SDK Release Notes xxxx(board name)". this example, we only test with full speed and high speed device lpm example,"usb_lpm_device_hid_-mouse", have not verify this exampel with hub ,low speed device and so on. this example could be tested with the board that support "usb_lpm_device_hid_mouse"example,such as LPCXpresso54608.

Run the example

1. Connect the board UART to the PC and open the COM port in a terminal tool.

2. Plug in the mouse device to the board. The attached information prints out in the terminal.

3. The mouse operation information prints in the terminal when you operate the mouse.

   The application prints the mouse operation information in one line. Each line contains the following sequential string: "Left Click", "Middle Click", "Right Click" and "Wheel Down"/"Wheel Up" movement. For "Right"/"Left" movement and "UP"/"Down" movement, to print less log, the related log is printed after movement count reaches 100.

   For example, when the mouse moves right for some time,

   ```
   "                            Right move events: 100 times              "
   ```

   prints in the terminal.

4. Suspend

   Start to suspend the device by entering character 's'. And then select whether enable the remote wake-up feature and set/clear the feature if the device supports the feature. And then release the USB bus and enter into the low power mode. For example, if the name of wakeup switch is "SW3", the debug console output is as following.

   ```
   host init done, the host stack version is 1.0.0.
   Please Enter 's' to start suspend test
   hid mouse attached:pid=0x7cvid=0x1fc9 address=1
   mouse attached
                                     Right move events: 100 times
                                     Down move events: 100 times
   ...
                                     Left move events: 100 times
   Start suspend USB BUS...

   Please Enter:
       1. Enable remote wakeup feature.
       2. Disable remote wakeup feature.
                                     Up move events: 100 times
   ...
                                     Up move events: 100 times
                                     Right move events: 100 times
   1Device has been suspended.
   Please Press wakeup switch(SW3) to start resume test.
   Or, wait for device sends resume signal.
   ```

   Note

         The name of wakeup switch is showed in debug console.

5. Resume

   The host is waked up and starts to deliver the resume signal when the wake up source is the wakeup switch. For example, if the name of wakeup switch is "SW3", the debug console output is as following.

   ```
   Device has been suspended.
   Please Press wakeup switch(SW3) to start resume test.
   Start L1 resume the device.
   Device has been resumed.
                                     Up move events: 100 times
                                     Right move events: 100 times
   ```

   Or the host is waked up when the resume signal is detected on the bus.

   ```
   Device has been suspended.
   Please Press wakeup switch(SW3) to start resume test.
   Or, wait for device sends resume signal.
   Device has been resumed.
                                     Down move events: 100 times
                                     Left move events: 100 times
   ```

   Note

         The name of wakeup switch is showed in debug console.