

## Overview

This OTG HID example is a simple demonstration program based on the MCUXpresso SDK. User can test the OTG functions by using the menu that is printed in the vcom.

## System Requirement

### Hardware requirements

- Mini/micro USB cable
- USB A to micro AB cable
- Hardware (tower/base board, ...) for a specific device
- Personal Computer(PC)

### Software requirements

- The project path is:  
<MCUXpresso\_SDK\_Install>/boards/<board>/usb\_examples/usb\_otg\_hid\_mouse/<rtos>/<toolchain>.

Note

The <rtos> is Bare Metal or FreeRTOS OS.

## Getting Started

### Hardware Settings

- The Jumper settings for twrk65f180m:  
J9 7-8, Remove all jumpers from J23.
- The Jumper settings for twr-ser1:  
J16 5-6, J11 7-8.

Note

The jumpers of the hardware (tower system/base module) needs to be set to default setting at first.

### Prepare the example

1. Download the program to the target board.
2. Power off the target board and power on again.
3. Connect one board to another board.

Note

For detailed instructions, see the appropriate board User's Guide.

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)".

## Run the example

1. Use the menu to operate the OTG functions, the menu is different for different state, you can input 'p' to get the menu information. The menu is as follow:

- The state is a\_idle (A-device is idle):

```
1. bus request;
2. bus release (set bus request false);
3. set bus drop false;
4. set bus drop true.
```

- The state is a\_host (A-device works as host function):

```
2. bus release;
4. set bus drop true.
```

- The state is a\_peripheral (A-device works as device function):

```
1. bus request;
4. set bus drop true.
```

- The state is b\_idle (B-device is idle):

1. bus request (SRP).

- The state is b\_peripheral (B-device works as device function):

1. bus request (HNP).

- The state is b\_host (B-device works as host function):

2. bus release.

- The state is a\_vbus\_err (A-device works as error state):

5. clear error.

2. Connect the two boards UART to the PC and open the COM port in terminal tools.

3. You can do the following tests.

- Test1: Plug OTG cable to one board, the board works as A-device; plug out the cable, the board works as B-device.
- Test2: Plug one board to the PC. The PC recognizes it as an USB mouse device and the mouse moves around the screen.
- Test3 (bus request test):

1. Plug OTG cable to one board (board\_1);
2. plug another board (board\_2) to the board\_1;
3. On the com port of the board\_1, press "1" key to request bus; Or On the com port of the board\_2, press "1" key to request bus;
4. board\_1 will work as host, board\_2 work as device.

The logs are as follow if press "1" on the board 2.

On the com port of the board\_1 displays:

```
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success
```

Right  
Right  
Right  
Right  
Right  
Right  
Right  
Right  
Right  
Right

• • • • •

On the com port of the board\_2 displays:

```
1. bus request (SRP)
enter b_srp_init
enter b_idle
device init success
enter b_peripheral
```

- Test4 (SRP test):

1. Plug OTG cable to one board (board\_1);
2. plug another board (board\_2) to the board\_1;
3. reset board\_2, Or On the com port of the board\_2, press "1" key to do SRP;
4. board\_1 will work as host, board\_2 work as device as follow:

```
On the com port of the board_1 displays:
  enter a_host
  host init success
  hid mouse attached:pid=0x7cvid=0x1fc9 address=1
  mouse attached
  set device HNP feature enable success
```

Right  
Right  
Right  
Right  
Right  
Right  
Right  
Right  
Right  
Right

• • • • •

```
On the com port of the board_2 displays (reset the board_2):
usb otg stack init done
enter b_idle
enter b_srp_init
enter b_idle
device init success
enter b_peripheral
```

- Test5 (HNP test):

1. Do as test3, test4 or other ways, make sure: board\_1 work as A-device and host, board\_2 work as B-device and peripheral;
2. On the com port of the board\_2, press "1" key, the board\_2 requests the bus and would like to become host, the host and peripheral functions are swapped. board\_1 now becomes peripheral and board\_2 becomes host;

```
On the com port of the board_2 displays
1. bus request (HNP)
device deinit success
enter b_wait_acon
enter b_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
```

Right  
Right  
Right

```
On the com port of the board_1 displays
mouse detached
host deinit success
enter a_suspend
device init success
enter a_peripheral
```

3. On the com port of the board\_2, press "2" key, the board\_2 releases the bus and becomes peripheral and board\_1 becomes host;

```
On the com port of the board_1 displays
device deinit success
enter a_wait_bcon
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success
```

Left  
Left  
Left  
Left  
Left  
Left

On the com port of the board\_2 displays

```

2. bus release
mouse detached
host deinit success
device init success
enter b_peripheral

```

4. On the com port of the board\_2, press "1" key, the host and peripheral functions are swapped as step 2;
5. On the com port of the board\_1, press "1" key, the board\_1 requests the bus and would like to become host, the host and device functions are swapped.

On the com port of the board\_1 displays

```

1. bus request
device deinit success
enter a_wait_bcon
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success

```

```

UP
UP
UP
UP
UP
UP
UP
UP
UP
UP

```

On the com port of the board\_2 displays

```

mouse detached
host deinit success
device init success
enter b_peripheral

```

• Test6 (bus drop and bus request test):

1. Do as test3, test4 or other ways, make sure: board\_1 work as A-device and host, board\_2 work as B-device and peripheral;
2. On the com port of the board\_1, press "4" key, vbus is dropped; board\_1 becomes a\_idle and board\_2 becomes b\_idle;

On the com port of the board\_1 displays

```

4. set bus drop true
mouse detached
host deinit success
enter a_wait_vfall
enter a_idle
2. bus release (set bus request false)

```

On the com port of the board\_2 displays

```

device deinit success
enter b_idle

```

3. On the com port of the board\_1, press "3" key, vbus is controlled by board\_1; press "1" key, the board\_1 requests the bus and would like to become host, board\_1 becomes a\_host and board\_2 becomes b\_peripheral;

On the com port of the board\_1 displays

```

3. set bus drop false
1. bus request
enter a_wait_vrise
enter a_wait_bcon
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success

```

```

Right
Right
Right
Right

```

On the com port of the board\_2 displays

```

device init success
enter b_peripheral

```

4. On the com port of the board\_1, press "2" key, the board\_1 release the bus; board\_1 becomes a\_idle and board\_2 become b\_idle;

On the com port of the board\_1 displays

```

2. bus release

```

```

mouse detached
host deinit success
enter a_suspend
enter a_wait_vfall
enter a_idle
On the com port of the board_2 displays
device deinit success
enter b_idle

```

5. On the com port of the board\_1, press "1" key, the board\_1 request the bus; board\_1 becomes a\_host and board\_2 become b\_peripheral;

```

On the com port of the board_1 displays
1. bus request
enter a_wait_vrise
enter a_wait_bcon
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success
Right
Right
Right
Right
Right

```

```

On the com port of the board_2 displays
device init success
enter b_peripheral

```

6. On the com port of the board\_1, press "2" key, the board\_1 release the bus; board\_1 becomes a\_idle and board\_2 become b\_idle. the com port of the board\_2, press "1" key, the board\_2 request a session; board\_1 becomes a\_host and board\_2 become b\_peripheral.

```

On the com port of the board_1 displays
2. bus release
mouse detached
host deinit success
enter a_suspend
enter a_wait_vfall
enter a_idle
enter a_wait_vrise
enter a_wait_bcon
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success
Down
Down
Down
Down
Down

```

```

On the com port of the board_2 displays
device deinit success
enter b_idle
1. bus request (SRP)
enter b_srp_init
enter b_idle
device init success
enter b_peripheral

```

- Test7 (hotplug test):

1. Do as test3, test4 or other ways, make sure: board\_1 work as A-device and host, board\_2 work as B-device and peripheral;
2. Unplug the usb cable at the board\_2 side, wait until board\_1 becomes a\_idle and board\_2 becomes b\_idle;

```

On the com port of the board_1 displays
UP
UP
UP

mouse detached
host deinit success
enter a_wait_bcon
enter a_wait_vfall
enter a_idle
On the com port of the board_2 displays

```

```
device deinit success
enter b_idle
```

3. Plug the usb cable at board\_2, on the com port of the board\_2, press "1" key, the board\_2 requests a session; board\_1 becomes a\_host and board\_2 becomes b\_peripheral;

```
enter a_wait_vrise
enter a_wait_bcon
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success
```

```
UP
UP
UP
UP
UP
UP
UP
```

On the com port of the board\_2 displays

```
1. bus request (SRP)
enter b_srp_init
enter b_idle
device init success
enter b_peripheral
```

4. Unplug the USB cable at board\_2 side, wait until board\_1 becomes a\_idle and board\_2 becomes b\_idle. Plug the USB cable at board\_2 side, on the com port of the board\_1 press "1" key, the board\_1 requests the bus; board\_1 becomes a\_host and board\_2 becomes b\_peripheral.

```
UP
UP
```

```
mouse detached
host deinit success
enter a_wait_bcon
enter a_wait_vfall
enter a_idle
1. bus request
enter a_wait_vrise
enter a_wait_bcon
enter a_host
host init success
hid mouse attached:pid=0x7cvid=0x1fc9 address=1
mouse attached
set device HNP feature enable success
```

```
UP
UP
UP
```

```
Right
Right
Right
```

On the com port of the board\_2 displays

```
device deinit success
enter b_idle
device init success
enter b_peripheral
```