Overview

This PD example is a simple demonstration based on the MCUXpresso SDK PD stack.
The application use the board keys and debug console to test the PD functions.
The demo works as DRP. When connect, the board can be source or sink.

System Requirement

Hardware requirements

- Type-C shield board
- Type-C Cable
- Hardware (Tower module/base board, and so on) for a specific device
- Personal Computer

Software requirements

- The project files are in:
  <MCUXpresso_SDK_Install>/boards/<board>/usb_examples/usb_pd/<rtos>/<toolchain>.

  Note

  The <rtos> is Bare Metal or FreeRTOS OS.
- Terminal tool.

Getting Started

Hardware Settings

- The shield board jumper settings:
  J11 1-2, J12 1-2, J13 1-2, J14 1-2, J4 1-2 J5 1-2.

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

  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.

Run the example

1. Download this program to two boards, connect these two boards with Type-C cable.
2. Connect two boards' OpenSDA USB port to the PC and open terminal.
3. Request power from sink role.
   - Long press SW1 for about 3s on the frdm-kl27z board to make 9V request. After the request is completed successfully, the VBus voltage is 9V.
   - Short press SW1 on the frdm-kl27z board to make 5V request. After the request is completed successfully, the VBus voltage is 5V.
4. Power swap
   - Short press SW3 on the frdm-kl27z board to make PR_SWAP.

- The Voltage of the vbus will drop to 0V and then back to 5V.
- After success, the power roles are changed.

5. Hard reset
   - Long press SW3 on the frdm-kl27z board to make HARD_RESET.
   - The Voltage of the vbus will drop to 0V and then back to 5V.
   - Source and sink state machine will re-start and sink will request power again, you can see the logs in the debug console.
6. Test other commands
   - Input '0' in the debug console, the follow menu will print in the debug console (the menu is little different for source and sink):

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The menu is as follow for source:
0. print menu
a. source power change
b. goto min
e. soft reset
f. data role swap
g. vconn swap
h. get partner sink capabilities
i. standard structured VDM test (only DFP can send enter mode)
j. exit mode (only DFP)
k. send attention
l. test vendor structured VDM
m. test unstructured VDM
t. cable reset  (not supported yet)
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Figure 1: demo menu

   - Input the menu to test the corresponding command.
   - For example: you input 'f', "data role swap" command will start, the debug console will print the result.
7. The demo's default configuration is PD2.0. To test the PD3.0 command, PD_CONFIG_REVISION need be changed from PD_SPEC_REVISION_20 to PD_SPEC_REVISION_30 in usb_pd_config.h file. Then input '0' in the debug console, some PD3.0 related commands menu are added.
8. For compliance test, PD_CONFIG_COMPLIANCE_TEST_ENABLE, PD_CONFIG_TRY_SNK_SUPPORT and PD_CONFIG_TRY_SRC_SUPPORT need be enable in usb_pd_config.h. There are five compliance test configurations in this demo: PD_COMPLIANCE_TEST_DRP, PD_COMPLIANCE_TEST_DRP_TRY_SNK, PD_COMPLIANCE_TEST_DRP_TRY_SRC, PD_COMPLIANCE_TEST_CONSUMER_PROVIDER and PD_COMPLIANCE_TEST_PROVIDER_CONSUMER. There are five VIF files in the VIF directory corresponding to these five configurations.