Overview

The Composite CDC_MSC project is a simple demonstration program based on the MCUXpresso SDK. It is enumerated as a COM port and a U-disk. The COM port can be opened using terminal tools, such as TeraTerm. The demo echoes back any character it receives. The U-disk can be read and write as a standard SD card. The purpose of this demo is to show how to build a composite USB device and to provide a simple example for further development.

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

Software requirements

- The project files are in:
 - <MCUXpresso_SDK_Install>/boards/<board>/usb_examples/usb_device_composite_cdc_msc_sdcard/<rtos>/<toolchain>. For a lite version, the project files are in:

<MCUXpresso_SDK_Install>/boards/<board>/usb_examples/usb_device_composite_cdc_msc_sdcard_lite/<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. Connect the target board to the external power source (the example is self-powered).
- 3. Either press the reset button on your board or launch the debugger in your IDE to begin running the demo.
- 4. Connect a USB cable between the PC host and the USB device port on the board.

Note

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

Run the example in Windows

- 1. A COM port and a USB Mass Storage Device is enumerated in the Device Manager. If it prompts for CDC driver installation, see the next chapter to install the CDC driver.
- 2. Open the COM port in a terminal tool, such as the Tera Term.

3. Type some characters, which are echoed back from the COM port.

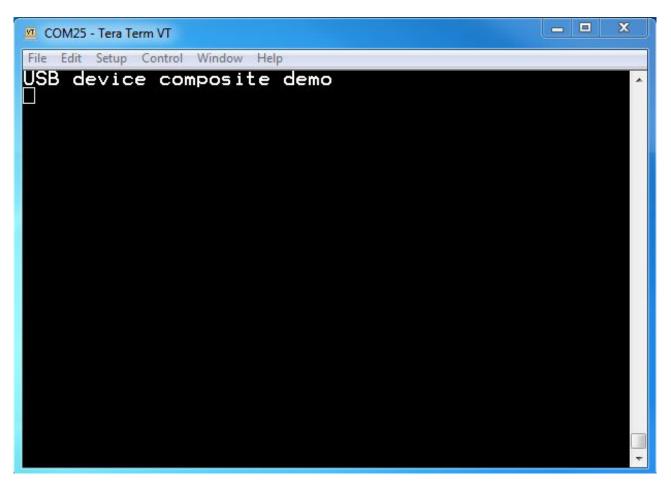


Figure 1: Run virtual com example

4. The Windows OS prompts to scan the U disk.

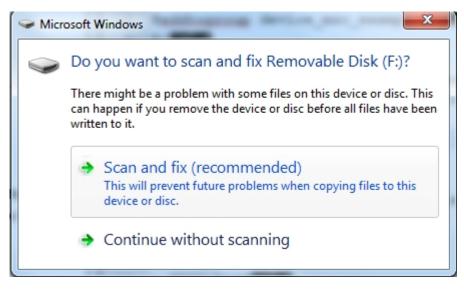


Figure 2: Sdcard scan

the computer will display the capacity of removable disk.



Figure 3: SD card

Note

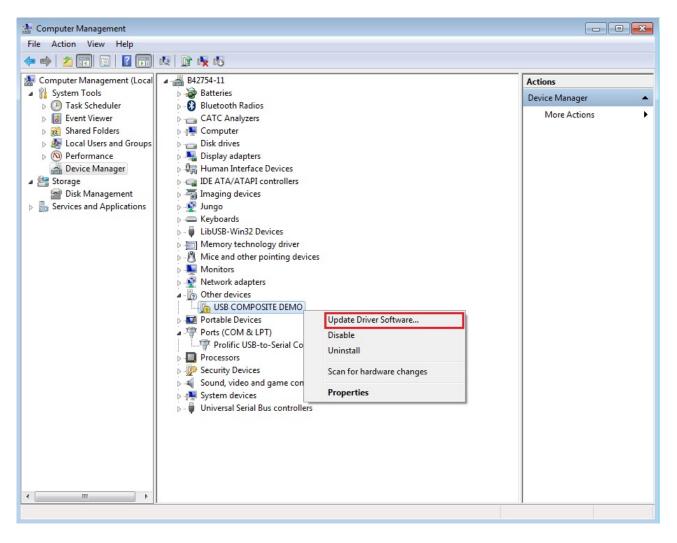
- Because there is no dynamic detection between the host and the device, the COM port must be closed from the terminal tool prior to unplugging the CDC device. Otherwise, the CDC device won't get recognized next time that it is plugged in with the COM port still opened.
- If no hardware FLOW CONTROL is needed, let the variable start_transactions always be TRUE.
- The RAM disk and SD disk function can't be enabled at the same time.
- The USB_DEVICE_MSC_READ_BUFF_SIZE and USB_DEVICE_MSC_WRITE_BUFF_SIZE macros limit the device identification and data transfer speed. The larger the buffer size, the faster the data transfer speed. The buffer size should be a multiple of 512 with the smallest value being 512.

The USB SD card example has the following work mode. Note that different modes have different throughputs:

- 1. The USB_DEVICE_CONFIG_USE_TASK is not enabled and the value is zero. The USB SD card example USB_DeviceMscCallback function works in the USB IRQ handle function.
- 2. The USB_DEVICE_CONFIG_USE_TASK is enabled. The USB SD card example code works in task mode. USB_DeviceMscCallback is called in the task. In this use case, the throughput is lower than the throughput in use case 1.
- 3. The USB_DEVICE_CONFIG_USE_TASK and USB_DEVICE_MSC_USE_WRITE_TASK are enabled. The write is used to optimize the throughput and the throughput is almost the same as in use case 1.
- 4. The USB_DEVICE_CONFIG_USE_TASK is not enabled and the USB_DEVICE_MSC_USE_WRITE_TA-SK is enabled. This use case is not allowed.

Installing the CDC driver for virtual_com and msd_cdc composite example

Below are the steps to install the CDC driver on Windows 7 OS. Similar process applies to Windows XP OS. Step 1. Click "Update Driver Software..."



Step 2. Choose "Browse..."

G I Update Driver Software - MSD_CDC DEVICE	×
How do you want to search for driver software?	
Search automatically for updated driver software Windows will search your computer and the Internet for the latest driver software for your device, unless you've disabled this feature in your device installation settings.	
Browse my computer for driver software Locate and install driver software manually.	
	Cancel

Step 3. Select "Let me pick..."

	×
Update Driver Software - MSD_CDC DEVICE	
Browse for driver software on your computer	
Search for driver software in this location:	
escale\Freescale_usbnew\Src\example\device\cdc\virtual_com\inf	
Include subfolders	
Let me pick from a list of device drivers on my computer This list will show installed driver software compatible with the device, and all driver	
software in the same category as the device.	
<u>N</u> ext Car	ncel

Step 4. Navigate to your CDC driver location.

<install_dir>\board>\usb_examples\usb_device_composite_cdc_msc_sdccard\inf or

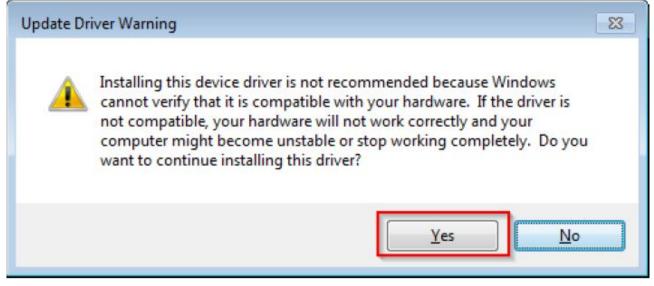
<install_dir>\boards\<board>\usb_examples\usb_device_composite_cdc_msc_sdcard_lite\inf

🕞 🛽 UF	odate Driver Software - MSD_CDC DEVICE	8
Selec	ct the device driver you want to install for Select the manufacturer and model of your hard disk that contains the driver you want to install,	dware device and then click Next. If you have a
	Insert the manufacturer's installation disk, and then make sure that the correct drive is selected below.	OK Cancel
	Copy manufacturer's files from: C:\Freescale\Freescale_usbnew\Src\example\dev 👻	Browse
		Next Cancel

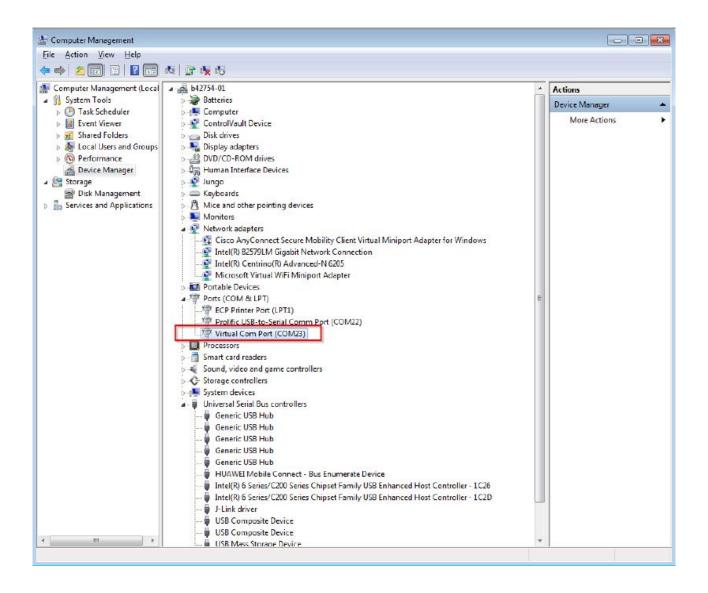
Step 5. Press "Next".

0	Update Driver Software - MSD_CDC DEVICE
	Select the device driver you want to install for this hardware. Select the manufacturer and model of your hardware device and then click Next. If you have a
	disk that contains the driver you want to install, click Have Disk.
	Model Virtual Com Port
	This driver is not digitally signed! Have Disk Have Disk
	<u>N</u> ext Cancel

Step 6. Ignore the warning and press "Yes".



Step 7. Now the CDC driver should be installed successfully.



• If the driver signature issue occurs on Windows 8 OS, see the link,

Disabling Driver Signature on Windows 8

- To enable driver signing on Windows OS, see the link,
 - Driver Signing
 - Practical Windows Code and Driver Signing