

Overview

The Composite CDC_MSC project is a simple demonstration program based on the KSDK. 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:
`<SDK_Install>/boards/<board>/usb_examples/usb_device_composite_cdc_msc_sdcard/<rtos>/<toolchain>`.
For a lite version, the project files are in:
`<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.

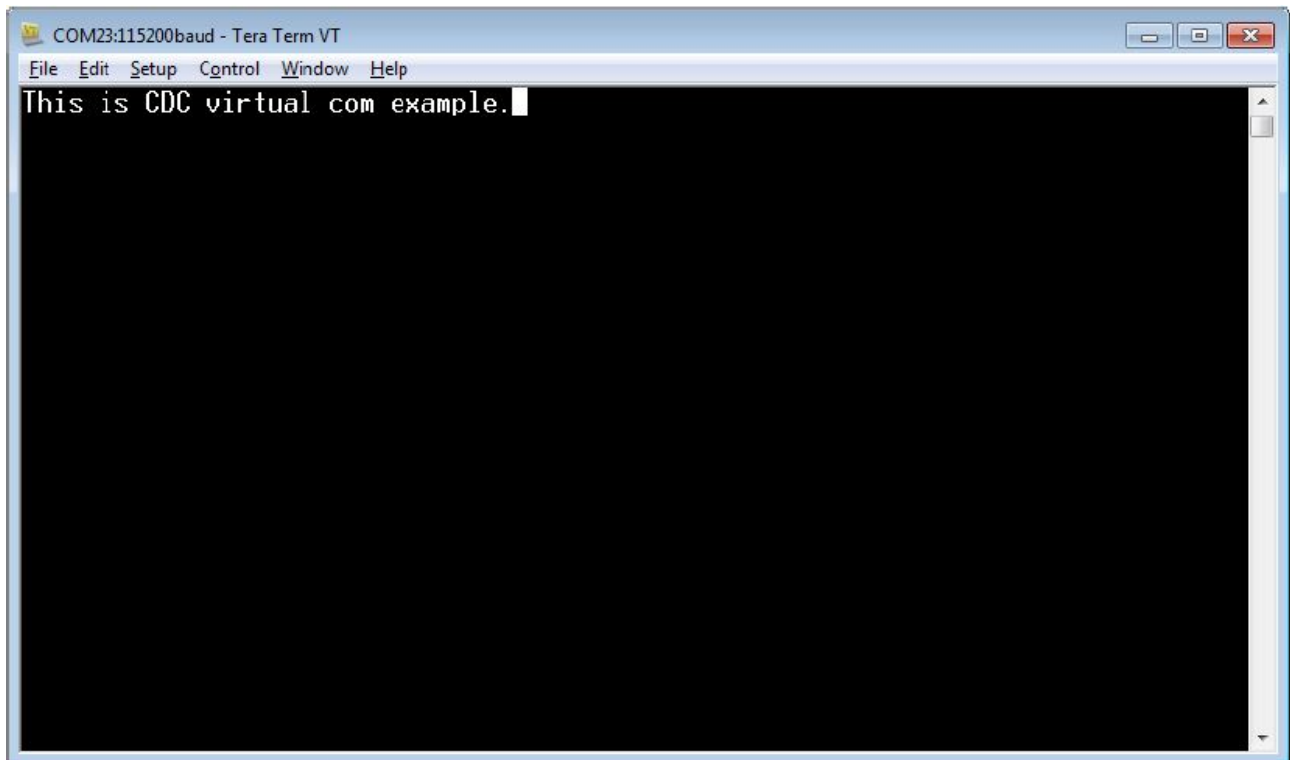


Figure 1: Run virtual com example

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

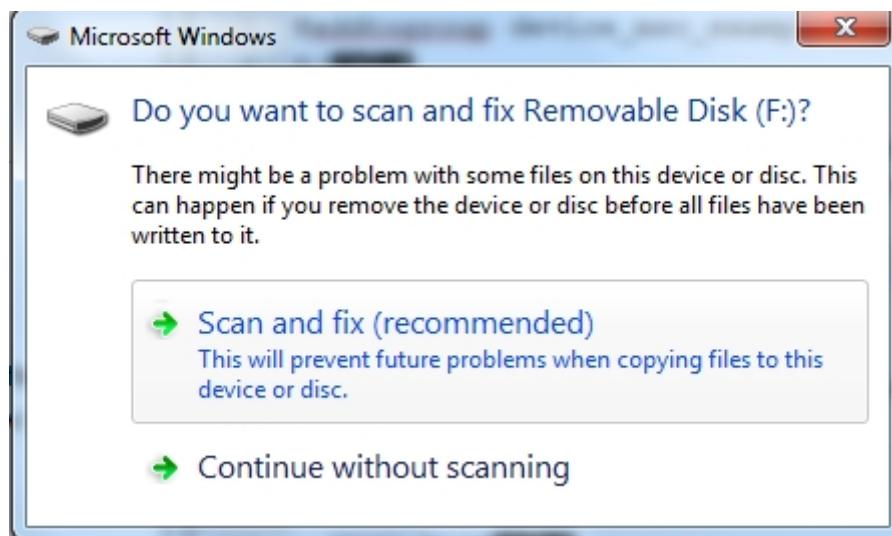


Figure 2: Sdcard scan

the computer will display the capacity of removable disk.

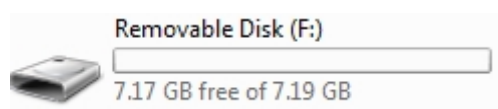


Figure 3: SD card

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.

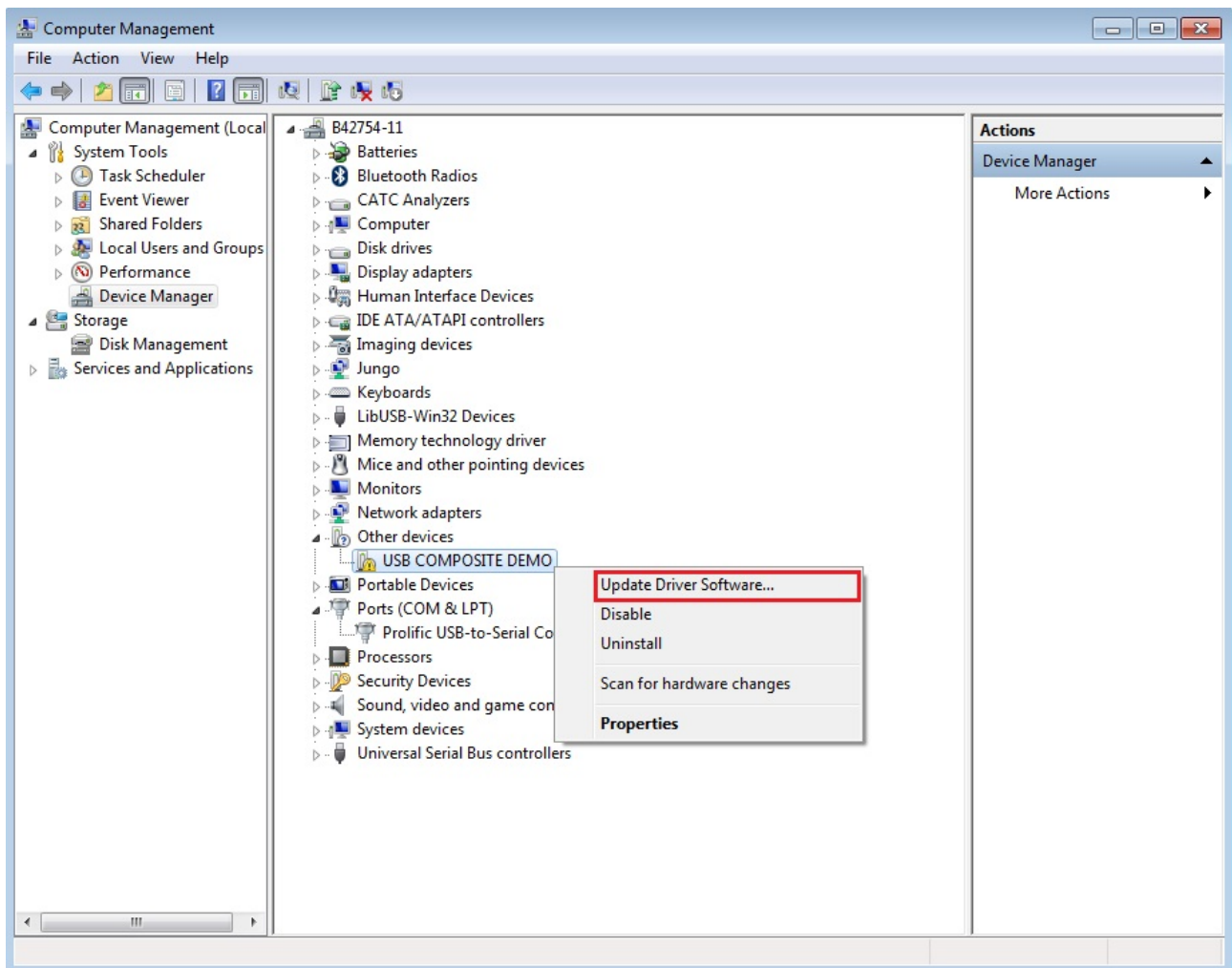
The USB SD card example has the following work mode. Note that different modes have different throughputs:

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_TASK` 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..."



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



Step 4. Navigate to your CDC driver location.

<install_dir>\boards\<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



Step 5. Press "Next".



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](#)