

2215R USB Quick-Start Guide

This Quick Start Guide will introduce the USB peripheral on the H8S/2215R via four example applications. The first is a Mass Storage class application where the device enumerates as a Mass Storage class device, the second is a Bulk Only application where the device enumerates as a “classless” device and transfers data solely using bulk transfers. The third example is the Communication Class application where a COM class driver is used to emulate an RS232 connection to transfer data. The last example demonstrates a HID class application.

1. System Overview

All of the introductory application notes and code was developed using an RSK H8S/2215R board. This board is fitted with a Mini-B USB connector. For code development and debugging purposes, an E10A-USB emulator was used. The emulator enables software development/debugging using the H8S/2215R. It is not included with the RSK H8S/2215R; please contact Renesas for purchase inquiries.

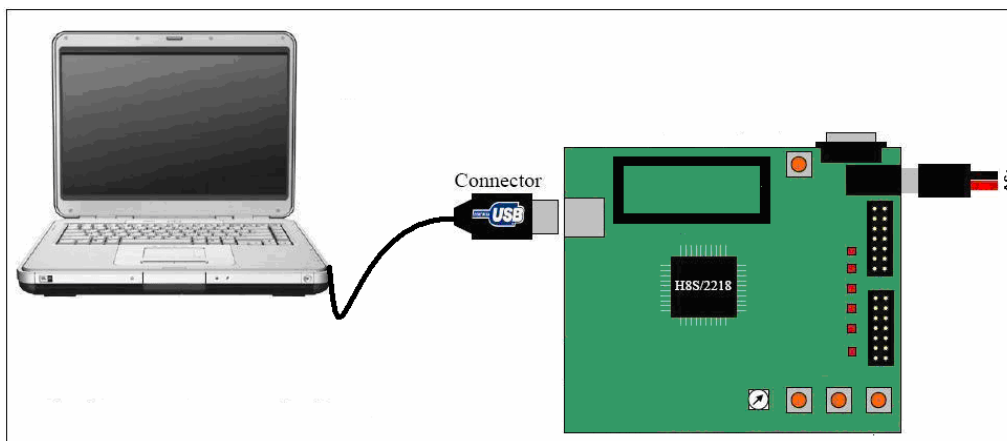


Figure 1: Setup and Connection scheme.

1.1 Initial Settings

Before running any of the provided sample applications, ensure that:

- A 5v power supply is connected.

Note: R14 can be connected with a 0 Ohm resistor if there is no external 5V power supply for self-powered mode.(R14 can also be left connected if an external 5V supply is used later, although this is not recommended)

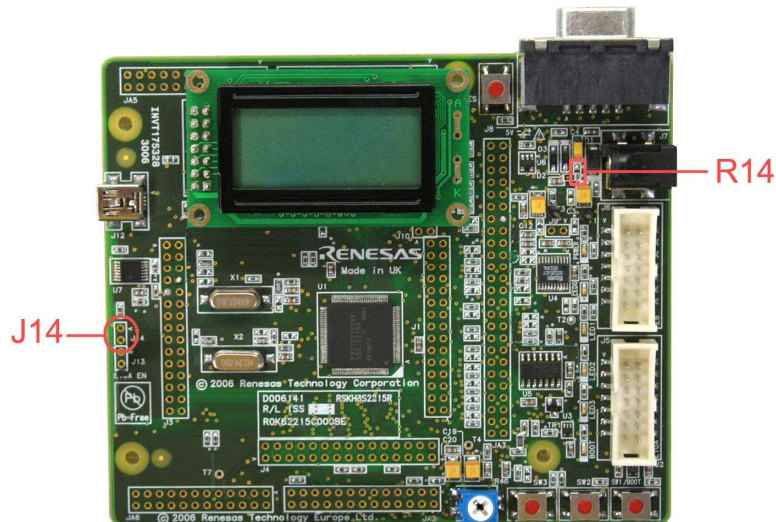


Figure 2: The RSK H8S/2215R board

2. The Mass Storage Class (MSC) application

The RSK H8S/2215R comes preprogrammed with the MSC application.

2.1 Running the sample application

- a) Connect the RSK H8S/2215R to the host PC via the USB cable.
- b) If this is the first time that the board is connected to the device, enumeration will occur with Windows displaying the “New hardware found” message and subsequently the “Your new hardware is installed and ready to use” message.
- c) Once the system is powered up and the program is running, the LEDs 2 and 3 will blink in a sequential fashion.
- d) Open My Computer in an Explorer window. The device will show up as a mass storage drive. The initial contents of the drive are Renesas-logo-red.png and Renesas-mass-storage.html as shown in Figure 3
- e) All standard operations like copying, moving etc... of data are supported by the firmware. Since this is a RAM disk, all data is copied to RAM and hence will not be available after a power cycle. After allowing for the file system, available storage capacity is 7.0 Kbytes.



Figure 3: RAMDisk contents on startup

A Mass Storage FDT project is included on the CD which can be used to reprogram the device with this example. Instructions are similar to the Programming using FDT section for the following applications.

3. The Bulk Only application




In order to run the Bulk-Only demo, the H8S/2215R has to be programmed with the corresponding .mot file.

3.1 Programming using FDT

This device can be programmed using FDT and the USB interface. Included is a preconfigured FDT v4.00 project for this device. Using this project, the required .mot file can be flashed to the device.

If FDT 4.00 is not installed on your PC, run the setup located in CD_Root\2215R_USB\Tools\FDT to install it.

To use the software:

- a) Open the Bulk_Demo FDT project (Bulk_Demo.AWS) by first copying the folder “CD_Root\2215R_USB\files\Sample_Code\Bulk\Bulk_Demo_FDTproject” to C:\Workspace and double clicking on Bulk_Demo.AWS.
- b) Connect the board to the PC using a USB cable.
- c) Put the device in boot mode by holding down the RESET and BOOT switches simultaneously and then releasing the RESET switch first. The orange ‘BOOT’ LED will be turned on if the device is in boot mode. If this is the first time the device has been connected in boot mode, Windows will start the “New Hardware Found” wizard; select the “automatically install driver” option to install the USB Direct device.
- d) Click on the FDT connect button  to connect to the H8S/2215R. A “Connection Complete” message will be displayed in the FDT dialogue window on successful connection.
- e) Right-click on Bulk_Demo.mot and select the “Download File” option or click on the Download Active File  button and select Bulk_Demo.mot from the project folder, to program the device.
- f) After the code has been successfully downloaded (look for an “Image successfully written to device” message in dialogue window), disconnect by clicking the disconnect  button.
- g) Reset the device by pressing the RESET switch.

3.2 Running the sample application

- a) Connect the RSK H8S/2215R to the host PC via the USB cable; if this is the first time that the board is connected to the device, Windows will start the Found New Hardware Wizard.
- b) Choose the “Install from a list or specific location (Advanced)” option.
- c) Choose the “Include this location in the search” option and browse to “CD_Root\2215R_USB\files\Sample_Code\Bulk\Driver\libusbwin32” and select the folder.
- d) If the Files Needed window is displayed asking for the file libusb0.sys, browse to “2215R_USB\files\Sample_Code\Bulk\Driver\libusbwin32” and select libusb0.sys.
- e) Select the “Continue Anyway” option if Windows displays a “This driver has not passed Windows Logo testing...” message.
- f) After installing the driver, run USB_Connect.exe from “CD_Root\2215R_USB\files\Sample_Code\Bulk\Bulk_Demo_VCproject\USB Control H8S2215R\Debug” and click on the Connect button.
- g) Press “Toggle LED 1” to toggle LED 1, and “Toggle LED 2” to toggle LED 2 on the RSK H8S/2215R board.
- h) Press “LCD Message” and enter data to display it on the LCD screen.
- i) Press “Read ADC” to get ADC values from the H8S/2215R and display it.

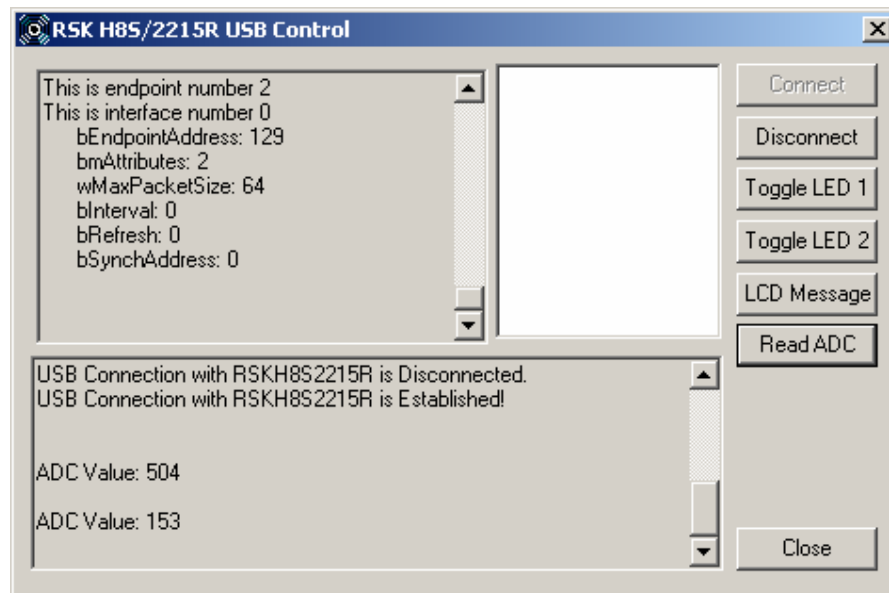


Figure 4: USB_Connect.

4. The Communication Device Class (CDC) application




In order to run the CDC class demo, the H8S/2215R has to be programmed with the corresponding .mot file.

4.1 Programming using FDT

Included is a preconfigured FDT v4.00 project for this device. Using this project, the required .mot file can be flashed to the device.

If FDT **4.00** is not installed on your PC, run the setup located in CD Root 2215R_USB\Tools\FDT to install it.

To use the software:

- a) Open the CDC_Demo FDT project (CDC_Demo.AWS) by first copying the folder "CD_Root\2215R_USB\files\Sample_Code\CDC\COMClass_Demo_FDTproject" to C:\Workspace and double clicking on CDC_Demo.AWS.
- b) Connect the board to the computer using a USB cable.
- c) Put the device in boot mode by holding down the RESET and BOOT switches simultaneously and then releasing the RESET switch first. The orange boot LED will be turned on if the device is in boot mode. If this is the first time the device has been connected in boot mode, Windows will start the "New Hardware Found" wizard; select the "automatically install driver" option to install the USB Direct device.
- d) Click on the FDT connect button  to connect to the H8S/2215R. A "Connection Complete" message will be displayed in the FDT dialogue window on successful connection.
- e) Right-click on CDC_Demo.mot and select the "Download File" option, option or click on the Download Active File  button and select CDC_Demo.mot from the project folder, to program the device.
- f) After the code has been successfully downloaded (look for an "Image successfully written to device" message in dialogue window), disconnect by clicking the disconnect  button.
- g) Reset the device by pressing the RESET switch.

4.2 Running the sample application

- a) Connect the RSK H8S/2215R to the host PC via the USB cable.
- b) If this is the first time that the board is connected to the device, Windows will start the Found New Hardware Wizard.
- c) Choose the “Install from a list or specific location (Advanced)” option.
- d) Choose the “Include this location in the search” option, browse to “CD_Root\2215R_USB\files\Sample_Code\CDC\Driver” and select the folder.
- e) Select the “Continue Anyway” option if Windows displays a “This driver has not passed Windows Logo testing...” message.
- f) After successful enumeration, the H8S/2215R USB will appear as a COM port on the PC and can be viewed in the device manager.

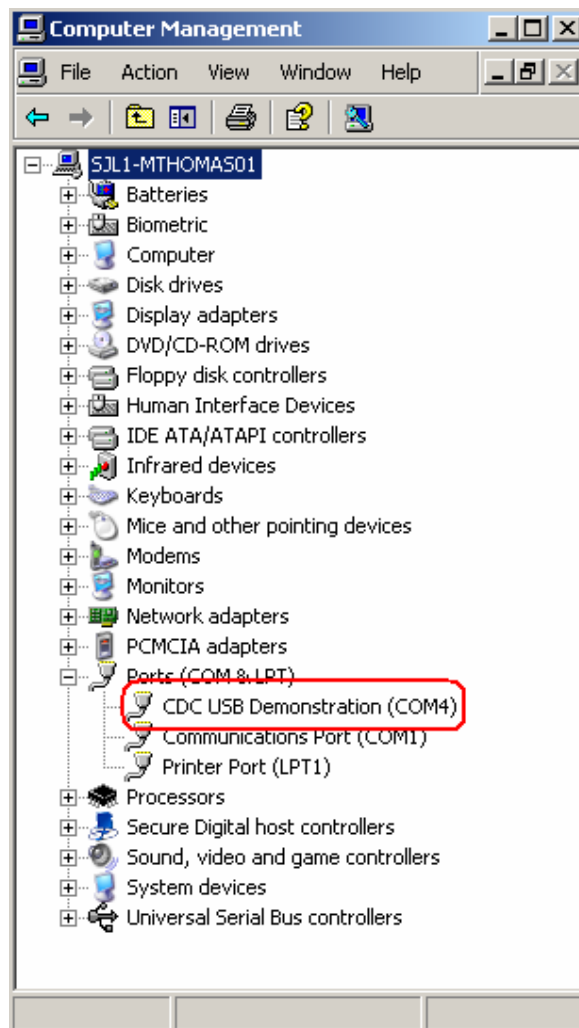


Figure 5: H8S/2215R USB as COM4 on Device Manager

- g) Configure a terminal emulator (HyperTerminal) with the appropriate COM port for 115200 Baud, 8-N-1.
- h) Typing any character on the terminal emulator results in it being transmitted to the H8S/2215R and displayed on the LCD screen. The typed in character is echoed back to the terminal emulator as well.
- i) When any of the three switches on the RSK H8S/2215R board are pressed they generate an Interrupt Request (IRQ): Switch 1 – IRQ2, Switch 2 – IRQ4, Switch 3 – IRQ7. The IRQ ISRs transmit a fixed text string to the host PC, which is displayed on the terminal emulator.

Switch	External Interrupt	Text String Transmitted
SW1	IRQ2	"Switch 1 has been pressed. This Data Packet is 58 bytes!"
SW2	IRQ4	"Switch 2 has been pressed. This Data Packet is larger than 'Switch 1', at 85 bytes!"
SW3	IRQ7	"Switch 3 has been pressed. This is an even bigger Data Packer than 'Switch 2'. This is to demonstrate that the process of transmitting larger data packets is a 'transparent' procedure!"

Table 1: Switch triggered events

5. The Human Interface Device (HID) class application




In order to run the HID class demo, the H8S/2215R has to be programmed with the corresponding .mot file.

5.1 Programming using FDT

Included is a preconfigured FDT v4.00 project for this device using which the required .mot file can be flashed to the device.

If FDT 4.00 is not installed on your PC, run the setup located in CD_Root\2215R_USB\Tools\FDT to install it.

To use the software:

- a) Open the HID_Demo FDT project (HID_Demo.AWS) by first copying the folder "CD_Root\2215R_USB\files\Sample_Code\HID\HID_Demo_FDTproject" to C:\Workspace, and double clicking on HID_Demo.AWS.
- b) Connect the board to the computer using a USB cable.
- c) Put the device in boot mode by holding down the RESET and BOOT switches simultaneously and then releasing the RESET switch first. The orange boot LED will be turned on if the device is in boot mode. If this is the first time the device has been connected in boot mode, Windows will start the "New Hardware Found" wizard; select the "automatically install driver" option to install the USB Direct device.
- d) Click on the FDT connect button  to connect to the H8S/2215R. A "Connection Complete" message will be displayed in the FDT dialogue window on successful connection.
- e) Right-click on HID_Demo.mot and select the "Download File" option, option or click on the Download Active File  button and select CDC_Demo.mot from the project folder, to program the device.
- f) After the code has been successfully downloaded (look for an "Image successfully written to device" message in dialogue window), disconnect by clicking the disconnect  button.
- g) Reset the device by pressing the RESET switch.

5.2 Running the demo



Figure 6: USBDemo.exe

- a) Connect the RSK H8S/2215R to the host PC via the USB cable.
- b) If this is the first time that the board is connected to the device, enumeration will occur with Windows displaying the standard “New hardware found” and subsequently the “Your new hardware is installed and ready to use” message.
- c) Run the USBDemo.exe Windows application from “CD_Root\2215R_USB\files\Sample_Code\HID\HID_Demo_HEWProject” on the PC. A GUI similar to [Figure 6](#) will be displayed on the screen.
- d) Press the “Connect” button on the GUI to connect to the board. The button will gray-out if the connection was successful. **(On Lenovo/IBM T43 and T60 series of laptops, the Windows GUI has been known to give problems and displays a “Communication Failure Error”. If you encounter this issue with Lenovo laptops, please use another make and model PC for the GUI application.)**
- e) LEDs 0-3 on the RSK H8S/2215R can be toggled by clicking the corresponding LED on the Windows application. The boot and power LEDs are not controlled through the application.
- f) The status of the switches (SW1-3) on the application is toggled by pressing the corresponding switches on the RSK H8S/2215R. The Reset button will reset the device and is thus not implemented as a toggle switch in the demo.

6. Next step

After you have completed this quick-start procedure, install the included software in the Tools folder (Including the H8 compiler and the HEW IDE; install the compiler prior to the HEW install, and follow default options). You can then open and edit the included HEW workspaces, for each of the above applications including firmware source code and Windows GUI source code from the Sample_Code folder. Copy the HEWProject folder for each application to C:\Workspace, and double-click on the .hws file to open the project. Simple changes can

be made to the source, compiled and the .mot file downloaded to the device via FDT; however for debugging purposes an E10A-USB emulator has to be used. Compiler and HEW manuals are included under the Tool_Manuals folder. Application notes for each of the above examples are included in the App_notes folder and board schematics along with a board User manual are located in the Docs folder.

Included in the kit is an evaluation version of the Renesas C/C++ compiler (version 6.01 Release 02) for the H8, H8S and the H8SX families. The limitations of the evaluation version are:

- No support or warranty without purchase of the full license
- After 60 days, link size is limited to 64 Kbytes.

For technical inquiries, email techsupport.rta@renesas.com

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