Quick-Connect IoT Wi-Fi Enabled Cloud Solution Kit

This quick start guide describes the setup and use of the Wi-Fi Enabled Cloud IoT Solution Kit. In this demo, the current temperature and humidity values of HS3001, and how many times a key on the EK-RA6M4 is pressed, are captured and displayed on the web using HTTP protocol. Also, the light on the LED for the EK-RA6M4 can be set up to be controlled by a UI button using HTTP protocol.

This guide can help kick-start your development on the DA16200 (a Wi-Fi module), and the EK-RA6M4 (an evaluation kit for the RA6M4 MCU group).

Target Device

▪ RA6M4 (R7FA6M4AF3CFB)

▪ DA16200 PMOD

▪ HS3001

Contents

1.   Kit Contents

To set up this demo, the following components are needed:

- Hardware
- Software

1.1   Hardware Components

- EK-RA6M4
- DA16200 PMOD (US159-DA16200MEVZ)
- HS3001 PMOD (US082-HS3001EVZ)
- US082-INTERPEVZ Board, a standard Pmod™ Type 6A (Extended I^2C) connector to compatible Renesas MCU kits
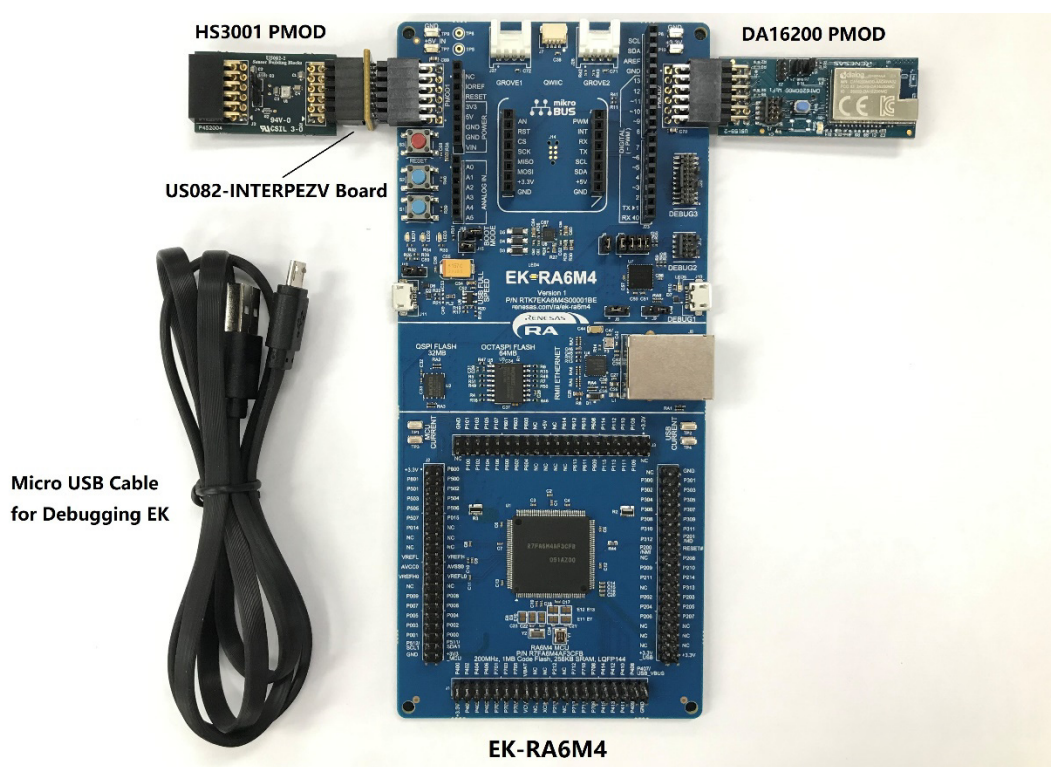- Micro USB cable

Figure 1. Hardware Components

1.2   Software Components

The following software components are needed:

| Category	Item	Remark
Firmware	Renesas_Wifi_DA16200_RA6M4_Demo.zip	Compressed project file
	Renesas_Wifi_DA16200_RA6M4_Demo.mot	Motorola S-record file for programming RA6M4 chip
Software	e2 studio 2021-04 or above, SSP v3.0.0 or above	A GUI and related software package for RA6M4 development
	SEGGER J-Link V7.52a	A flash programmer for downloading file to RA6M4, meanwhile a tool using J-Link RTT function to observe the state of the system.

2. Features

- Supply power to the kit by micro-USB cable
- Measure values including temperature and humidity of HS3001, how many time S1 key on EK-RA6M4 has been pressed, and display these on web
- Initialize and control Wi-Fi module DA16200 by AT command to realize HTTP protocol
- Control LED1 on EK-RA6M4 to on, off or blink by selecting related button on the specific webpage

3. Set Up the Demo

3.1 Download Code to EK-RA6M4

The EK-RA6M4 features a SEGGER J-Link On-Board debugger, using Renesas S124 Debug MCU and SEGGER J-Link® firmware to provide the on-board debug functionality, so all the customer needs for debugging is a Micro USB cable.

1. Insert the Micro USB cable into Debug USB Micro-B connector (J10), establishing a debug channel.
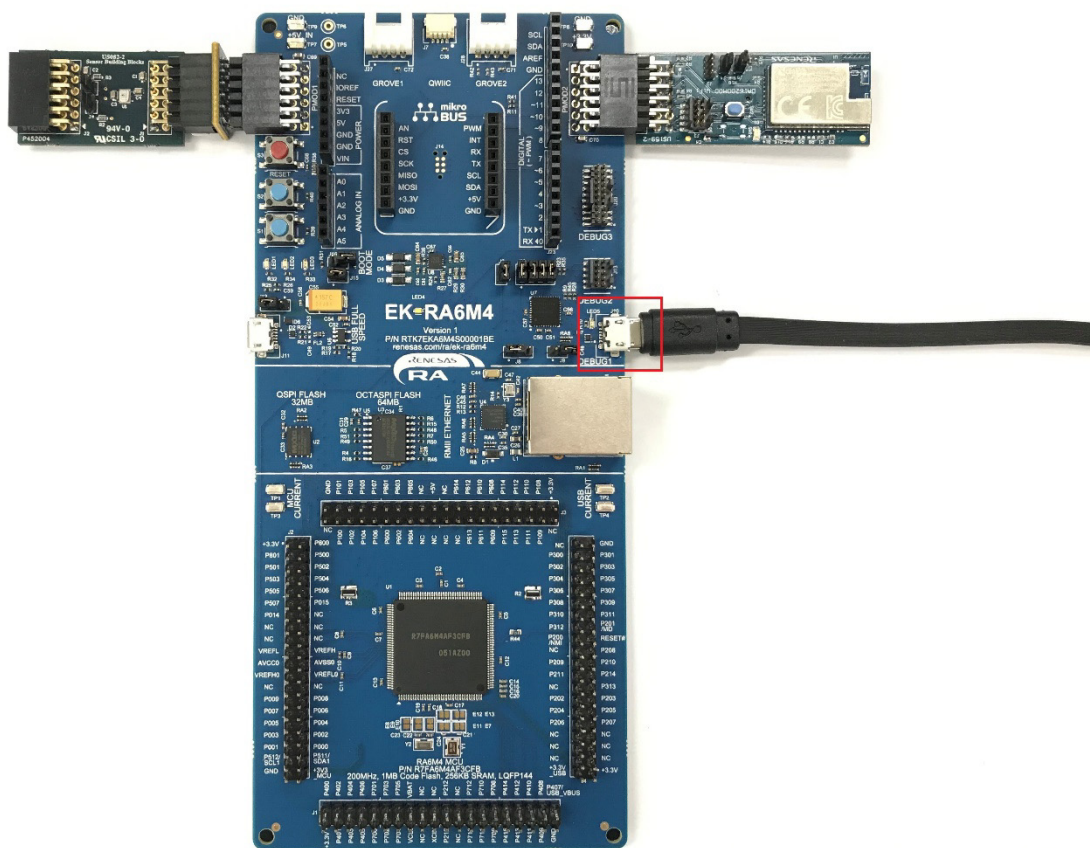
2. Unzip the **Download_Tool.zip** file and click the **bmp.bat** file in this folder, programming starts. This folder combines the version of J-Link v7.52a in JLink folder, involving all files at software installation and realizing all J-Link operations.
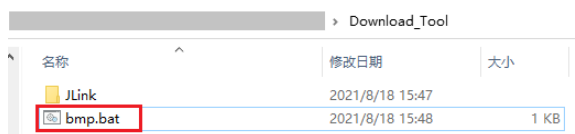
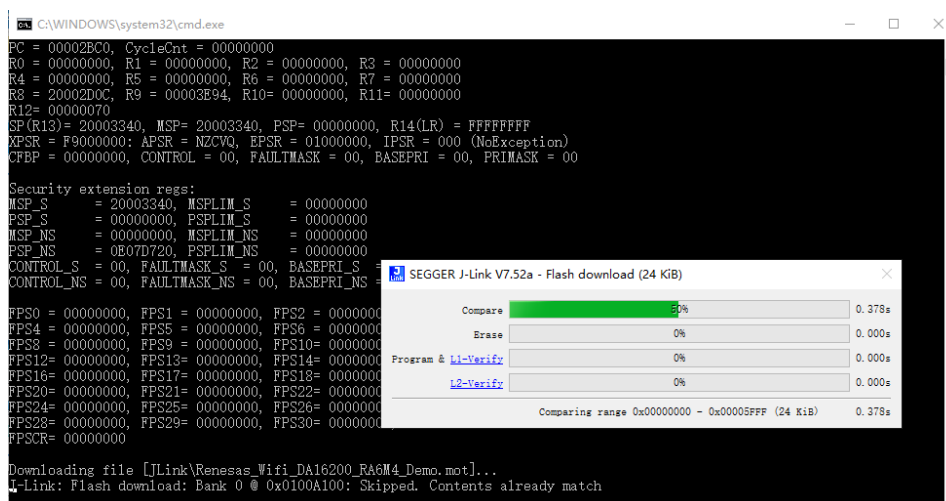When programming begins, the Flash download interface appears (Figure 2).

Figure 2. Flash Download Interface

After programming, the J-Link operation interface exits automatically.

(**Note:** If you want the latest SEGGER J-Link version, download from the website)

3.2 Connect the Solution Kit

Power off the solution kit, insert DA16200 PMOD board into J25 (PMOD2 on EK), and insert US082-INTERPEVZ board into J26 (PMOD1 on EK) with HS3001 PMOD, establishing the whole system as in Figure 1.

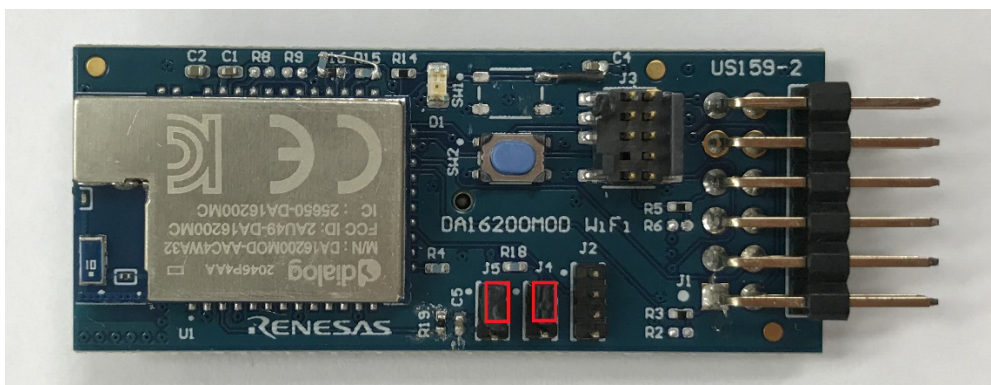**Note:** The pins 1-2 of jumper J4 and the pins 1-2 of jumper J5 must be set for the Wi-Fi to initializ normally.

Figure 3. DA16200 PMOD Board

If these two boards have already been plugged in at programming, after checking the correct set of jumpers, restart the system by pressing RESET button (E3) on EK-RA6M4 or powering off and on the system again, causing the program to run.

3.3   Run the Solution

1. Open **JLinkRTTViewer.exe** in the JLink folder, which is unzipped at Step 2, specify the target device as R7FA6M4AF, change RTT control block from **Auto Detection** to **Search Range** and input **0x20002c4c 0x1000** to the blank block shown below.
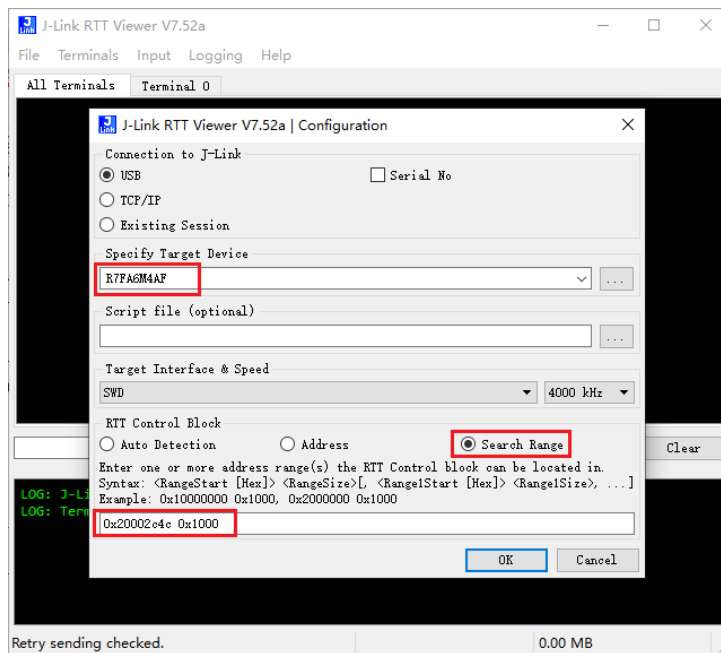

Figure 4. J-Link RTT Viewer

The J-Link RTT viewer serves as a tool to monitor the state of the system, especially the current stage of Wi-Fi operation.
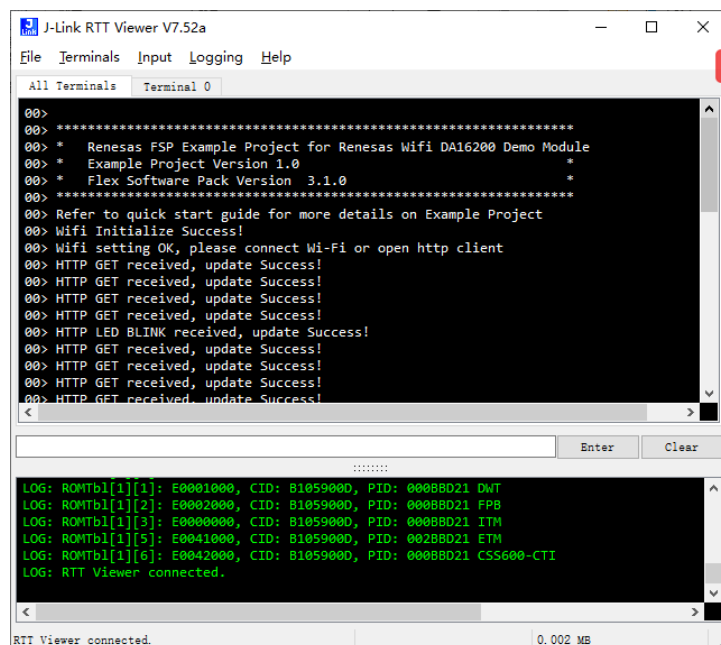

Figure 5. Wifi Operation View

2. After **Wifi setting OK, please connect Wi-Fi or open http client** appears in Figure 5, find **Renesas_Wifi** in the wireless network and enter the network security key of **12345678**, finishing the connection between PC or smartphone with this solution kit.

Figure 6. Wireless Network

Then, this system runs as an HTTP server and provides sampled values to an HTTP client while the PC or smartphone connecting with this kit plays a role of an HTTP client. All data sent from the solution kit can be reviewed in real-time on a specified web page.

Note: Do not use Proxy Servers when browsing the web.

The appearance of **HTTP GET received, update Success!** in the J-Link RTT Viewer means communication using HTTP has been established successfully.

Note: SSID and password can be customized by users using the project provided.

3. Open a browser such as Google Chrome or Microsoft Edge, input **http://192.168.10.2/index.html** and the customized interface opens (Figure 7).
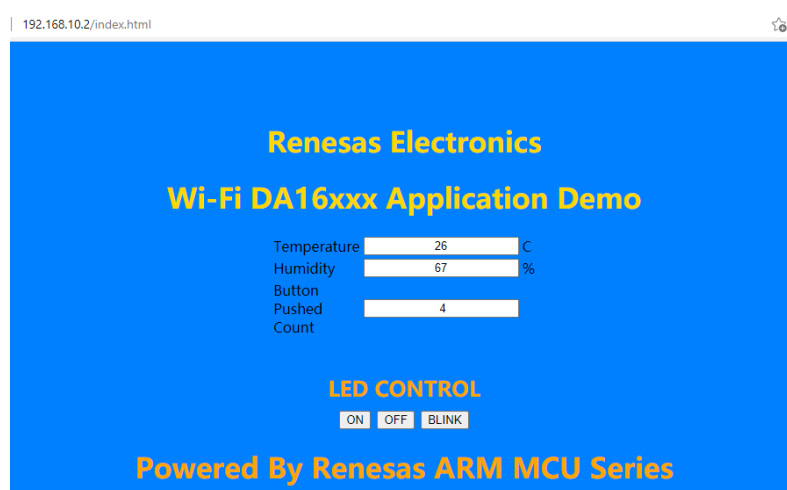

Figure 7. Customized Interface

The Temperature and humidity sampled by the HS3001 and button pushed count of the S1 transmit to website are displayed every 3 seconds. Covering the HS3001 with your finger causes the value of the temperature and humidity to increase; and pressing S1 leads to one addition to the Button Pushed counter.

On, off, or blink of LED1 depends on the button that is pressed on the web. If the blink button is clicked, LED1 blinks every 2 seconds.

In the meantime, the updated information sent by EK refreshes the J-Link RTT Viewer every 3 seconds.

Note: If the web page is frozen occasionally, please refresh it by manually.

3.4 Debug the Project

If you want to debug the project of this solution, download e2 studio 2021-04 or above and fsp v3.1.0 from the Renesas website, open the **Code** folder, and import the project into the e2 studio.

4. Revision History

Revision	Date	Description
1.01	Aug 29, 2022	Updated title to Quick-Connect IoT Wi-Fi Enabled Cloud Solution Kit.
1.00	Aug 27, 2021	Initial release.

Appendix

Additional Information

Product Reference	Company
RA6M4 MCU	Renesas
EK-RA6M4	Renesas
DA16200	Dialog
DA16200MOD	Dialog
HS3001	Renesas
US082-HS3001EVZ	Renesas
US082-INTERPEVZ	Renesas

Technical Updates/Technical News

(The latest information can be downloaded from the Renesas Electronics Website.)

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