DA16200/DA16600

SDK Update Guide

Introduction

This application note explains the process of updating the Software Development Kit (SDK) for the DA16200 and DA16600 Wi-Fi system-on-chip (SoC) devices, enabling users to start quickly and efficiently using the latest firmware for each device.

It describes the hardware, pin connections, and software required to update the SDK, and demonstrates the process of flashing the SDK firmware to the device.

Target Device

US159-DA16200EVZ DA16200 Pmod™ board

US159-DA16600EVZ DA16600 Pmod board

Contents

1. Required Hardware

The following hardware is required for updating the DA16200 and DA16600 SDK:

- EK-RA6M4 board (or any Renesas Evaluation Kit with Type 2A Pmod slot)
- US159-DA16200EVZ DA16200 Pmod board
- US159-DA16600EVZ DA16600 Pmod board
- USB-to-TTL adapter cable (DSD TECH SH-U09C5 used in this example)
- USB cable (Type A)
- User PC

2. DA16600 Pin Connections

In this example, the hardware connections are explained using the EK-RA6M4:

- Connect the Pmod board to the PMOD2 header of the EK-RA6M4.
- Connect the USB-to-TTL cable pins to header J3 of the Pmod board (Figure 1):
  — Pin 1 can be ignored (VCC not required).
  — Pin 2 – RXD (connect TXD).
  — Pin 3 – TXD (connect RXD).
  — Pin 4 – GND.
- Connect the USB side of the USB-to-TLL adapter to the PC.
- Connect the USB cable from the DEBUG1 header of the EK-RA6M4 to the PC.

Figure 1.   US159-DA16600EVZ Board

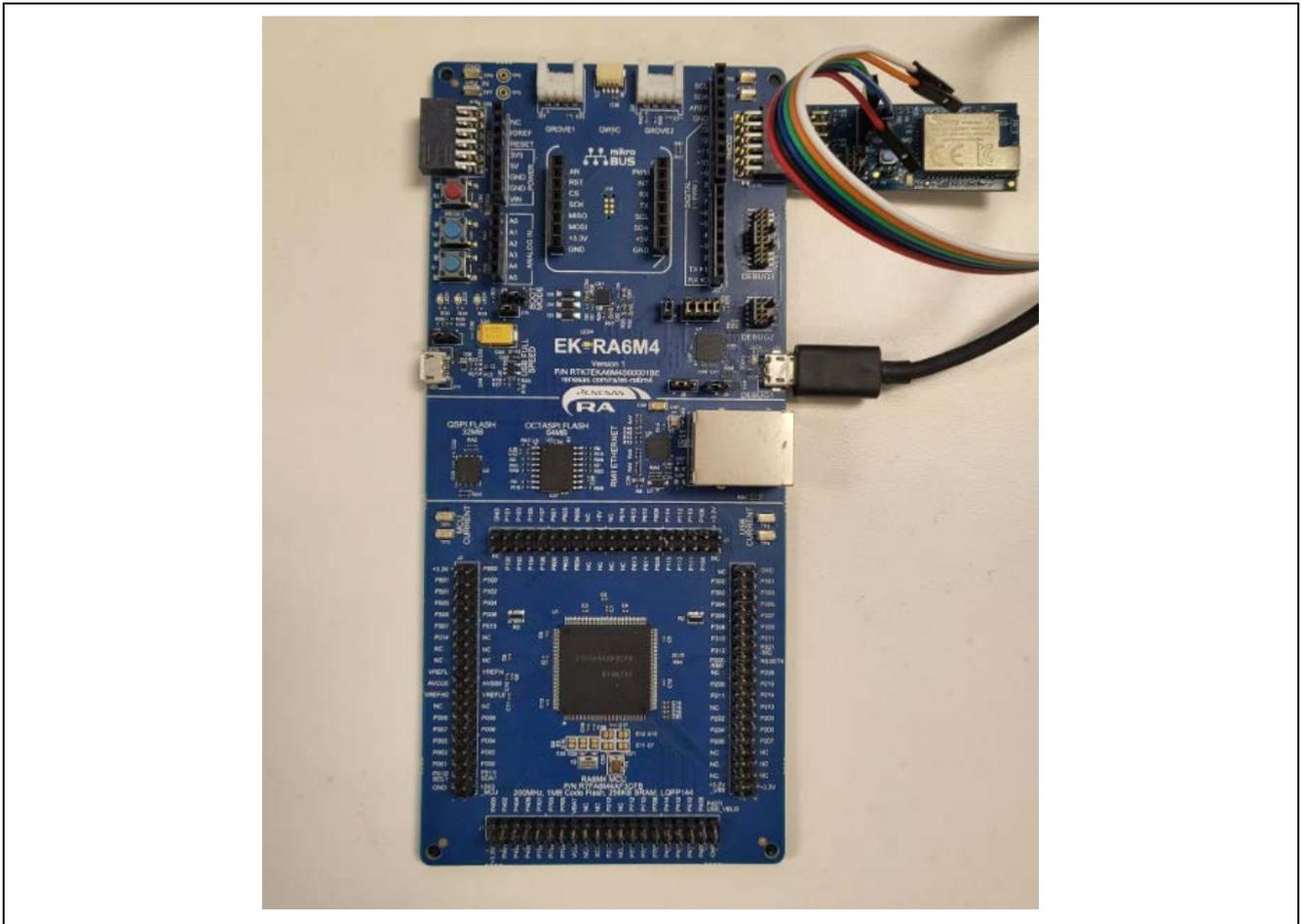The complete connections are shown in the following figures.

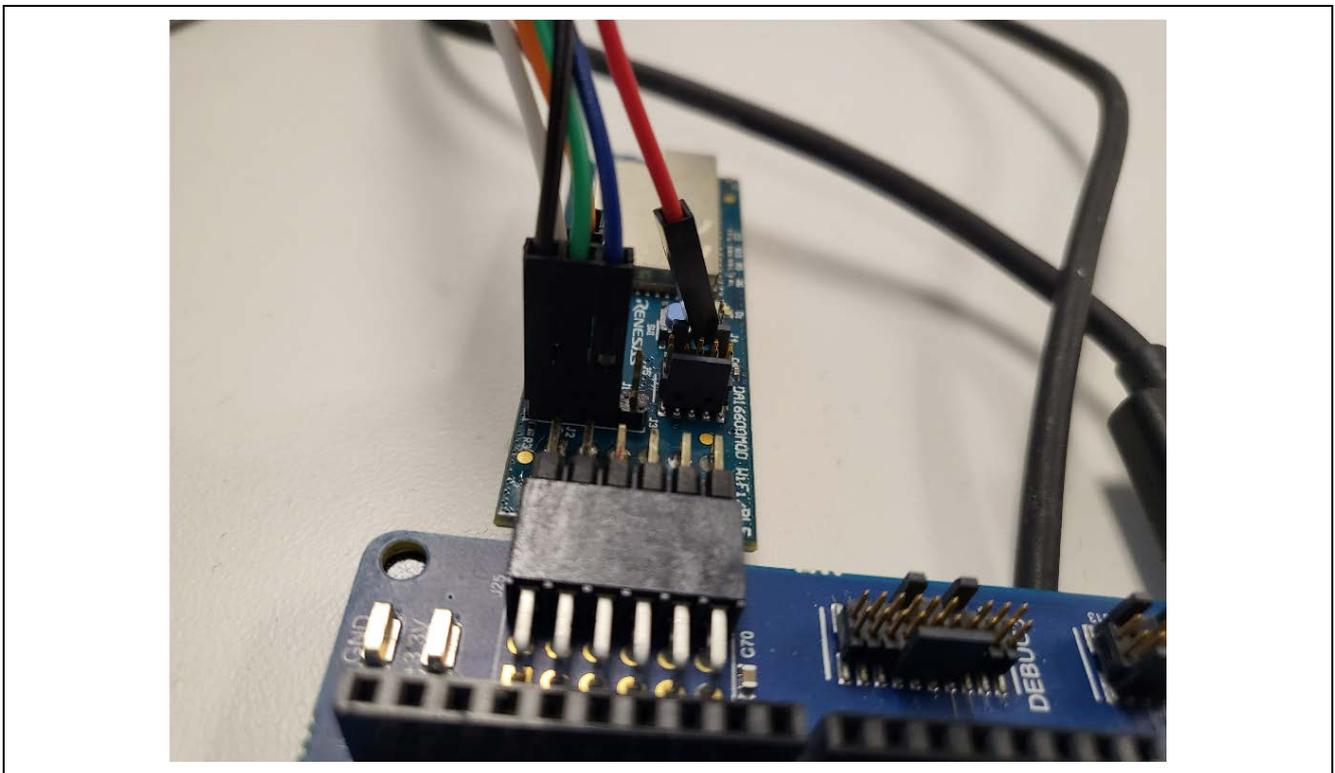**Figure 2.   Pin Connections**

Figure 3.   DA16600 Pin Connections

Figure 4.   USB-to-TTL Cable

3.   DA16600 Required Software

The following software is required for the firmware update:

1. Download and install serial emulator software (such as Tera Term) on the PC.
2. Go to the DA16600 product page, scroll down to "Software Downloads".
3. Download the "DA16200 DA16600 FreeRTOS SDK Image v3.2.8.0" shown in Figure 5.
   Note: Make sure the file selected says "Image". Do not download the SDK source.

Figure 5.   SDK Image

4.   DA16600 Implementation

Use the following process to update the SDK firmware:

1. Open Tera Term on the PC.
2. Select the port number corresponding to the USB-to-TTL cable.
3. Go to **Setup > Serial Port** and set Speed (baud rate) to 230400 (default).
4. Power cycle the EK-RA6M4 board. There should be messages displayed in Tera Term.

Note: Information may not be displayed in the serial emulator after power cycling, and it may be required to press and hold the reset button during command input to proceed with the update.

Note: Also ensure that the module reset pin (P708) is not being held low in the EK-RA6M4 firmware. The FSP default pin configuration will prevent the DA16600 module from being updated. You can avoid this issue by erasing the EK-RA6M4 firmware or changing the P708 to input or output high.

5. Type the 'reset' command into the terminal and wait for bootloader splash screen (Figure 6).
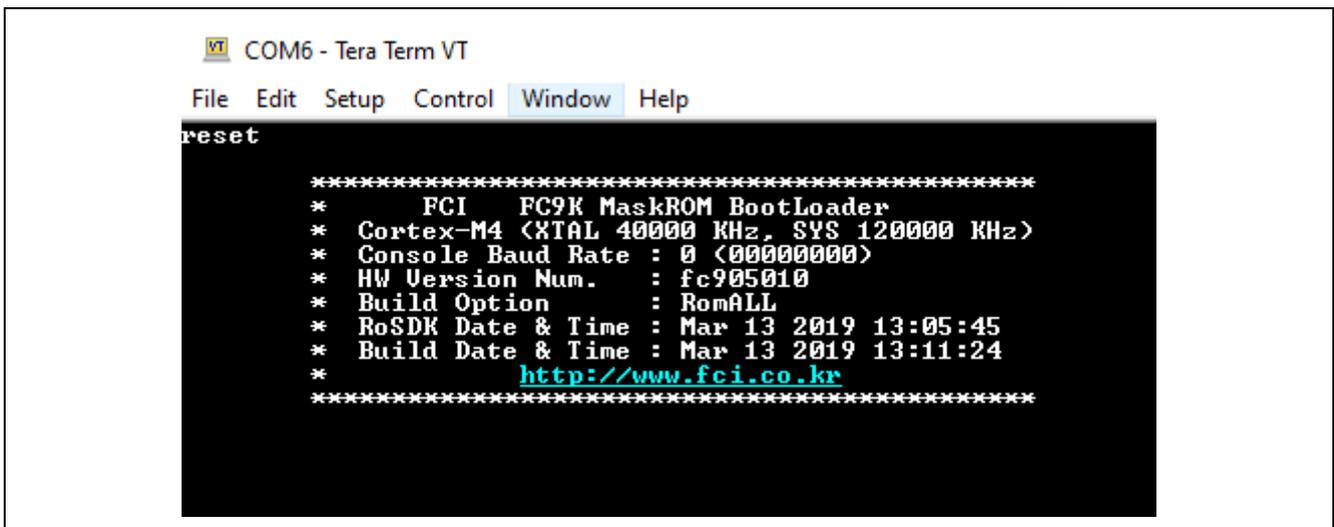

Figure 6.   Bootloader Splash Screen

6. Enter the 'sflash info' command to check the type of flash (DA16600 has 2 types of flash).
7. Make note of the result:
    — In the case of W25Q32JW, the output is:
        • [MROM] sflash info
        • SFLASH:ef601615
        • Density:01ffffff
        • [MROM]
    — In the case of AT25SL321, the output is:
        • [MROM] sflash info
        • SFLASH:1f421615
        • Density:01ffffff
        • [MROM]
8. Unzip the downloaded image file, then unzip the "DA16600_IMG_FreeRTOS_ATCMD_UART2_EVK_v3.2.8.0_4MB" folder.
9. Go back to Tera Term, then go to **Control > Macro** and select the following file from within the previously unzipped folder:
    — da16600_da14531_1_download.ttl
10. When prompted select the flash memory type discovered in the step above.
11. Wait for execution to finish with the new SDK version (takes approximately two minutes).
12. Confirm that v3.2.8.0 is shown as the version on the splash screen (Figure 7).

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Figure 7.   SDK Information

5.   DA16200 Pin Connections

In this example, the hardware connections are explained using the EK-RA6M4:

- Connect the Pmod board to the PMOD2 header of the EK-RA6M4.
- Connect the USB-to-TTL cable pins to header J3 of the Pmod board (Figure 8Figure 1):
  — Pin 1 can be ignored (VCC not required).
  — Pin 2 – RXD (connect TXD).
  — Pin 3 – TXD (connect RXD).
  — Pin 4 – GND.
- Connect the USB side of the USB-to-TLL adapter to the PC.
- Connect the USB cable from the DEBUG1 header of the EK-RA6M4 to the PC.
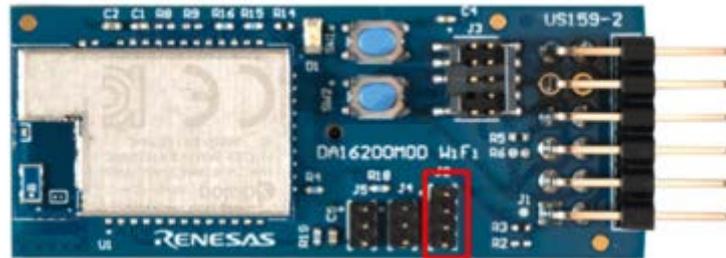
Figure 8.   US159-DA16200EVZ Board

The complete connections are shown in the following figures.
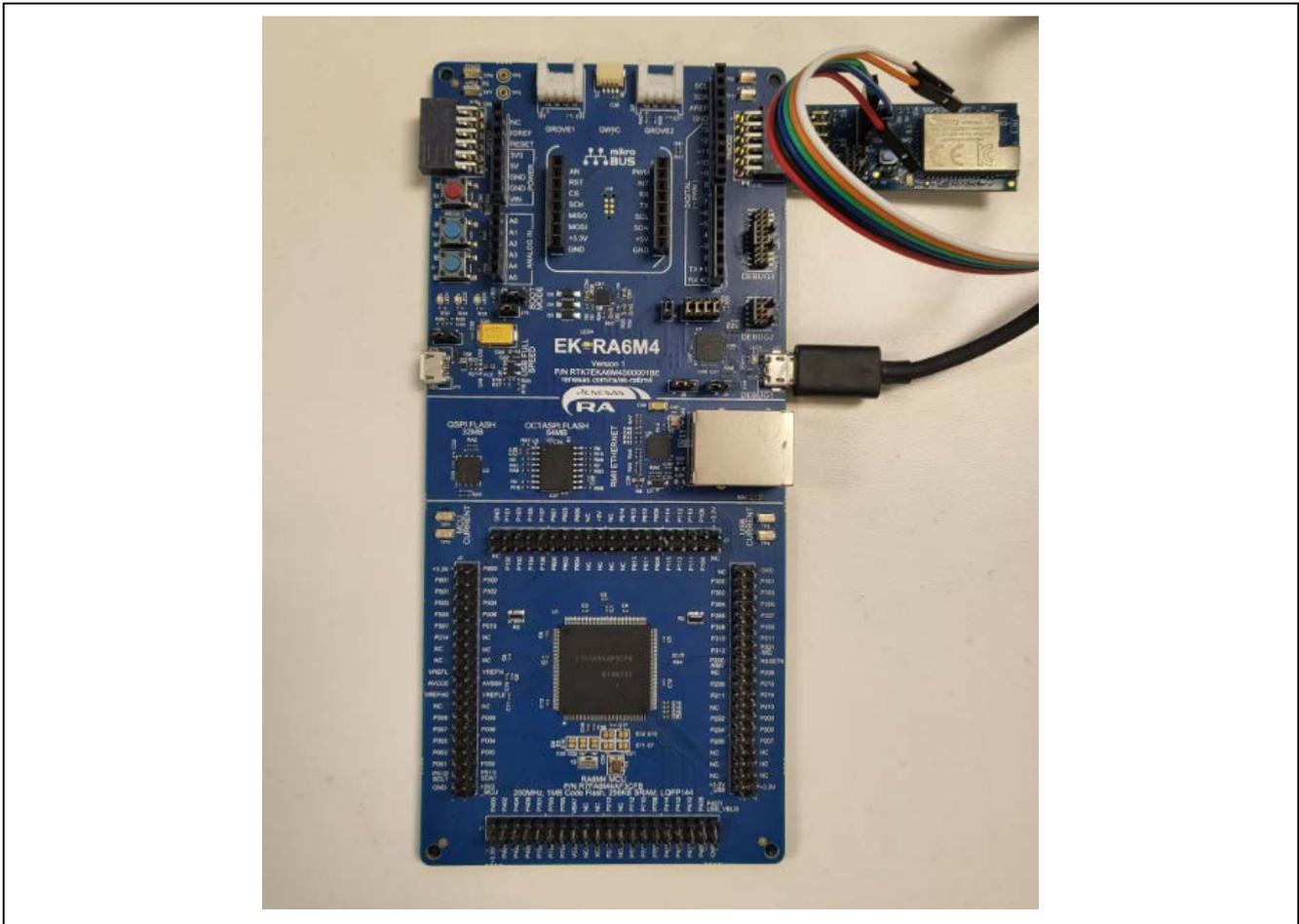
Figure 9.　Pin Connections

Figure 10.　DA16200 Pin Connections

Figure 11. USB-to-TTL Cable

6. DA16200 Required Software

The following software is required for the firmware update:

1. Download and install serial emulator software (such as Tera Term) on the PC.
2. Go to the DA16200 product page, scroll down to "Software Downloads".
3. Download the "DA16200 DA16600 FreeRTOS SDK Image v3.2.8.0" shown in Figure 12.
   Note: Make sure the file selected says "Image". Do not download the SDK source.

Figure 12. SDK Image

7. DA16200 Implementation

Use the following process to update the SDK firmware:

1. Open Tera Term on the PC.
2. Select the port number corresponding to the USB-to-TTL cable.
3. Go to **Setup > Serial Port** and set Speed (baud rate) to 230400 (default).
4. Press the reset button on the Pmod/RA boards, there should be messages displayed in Tera Term.

Note: Information may not be displayed in the serial emulator after power cycling, and it may be required to press and hold the reset button during command input to proceed with the update.
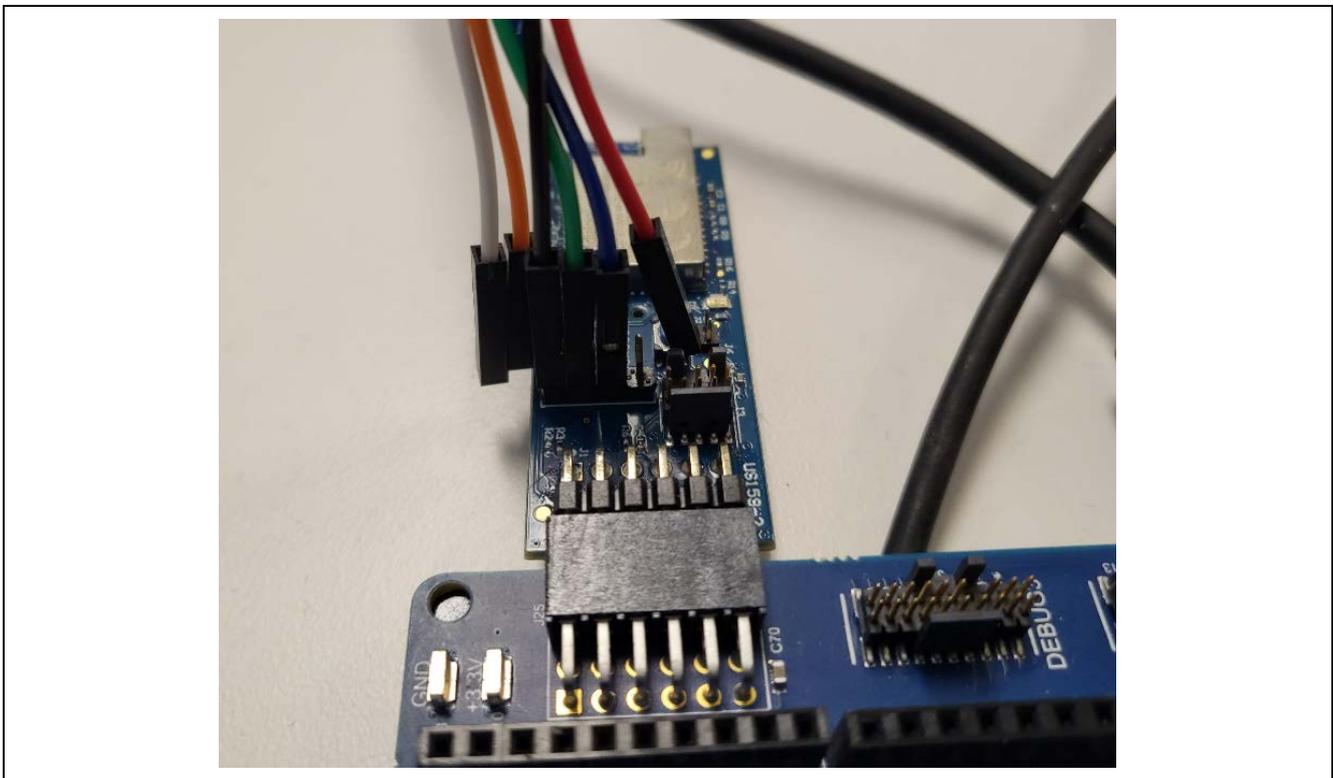
Note: Also ensure that the module reset pin (P708) is not being held low in the EK-RA6M4 firmware. The FSP default pin configuration will prevent the DA16200 module from being updated. You can avoid this issue by erasing the EK-RA6M4 firmware or changing the P708 to input or output high.

5. Type the 'reset' command into the terminal and wait for bootloader splash screen (Figure 13).
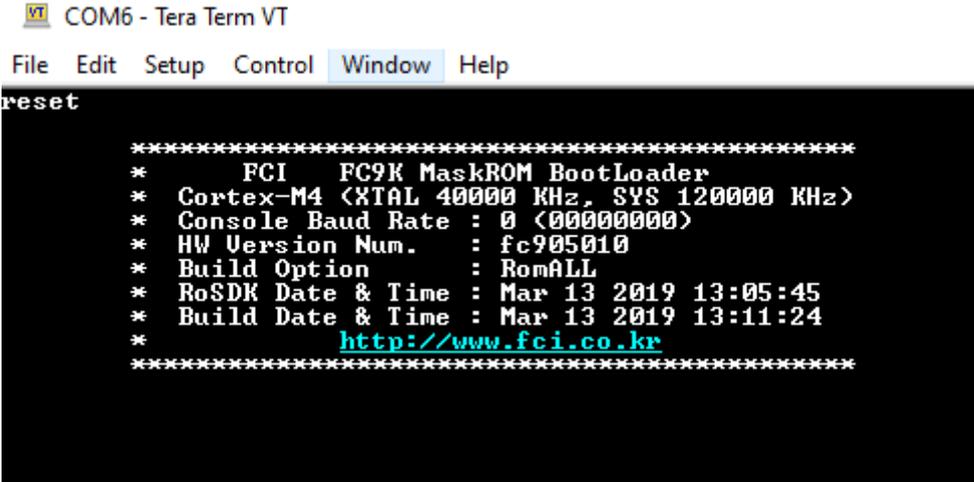
Figure 13. Bootloader Splash Screen

6. Unzip the downloaded image file, then unzip the "DA16200_IMG_FreeRTOS_ATCMD_UART1_EVK_v3.2.8.0_4MB" folder.
7. Go back to Tera Term, then go to **Control > Macro** and select the following file from within the previously unzipped folder:
    — Download_W25Q32JW_FreeRTOS.ttl
8. Wait for execution to finish with the new SDK version (takes approximately two minutes).
9. Confirm that v3.2.8.0 is shown as the version on the splash screen (Figure 14).
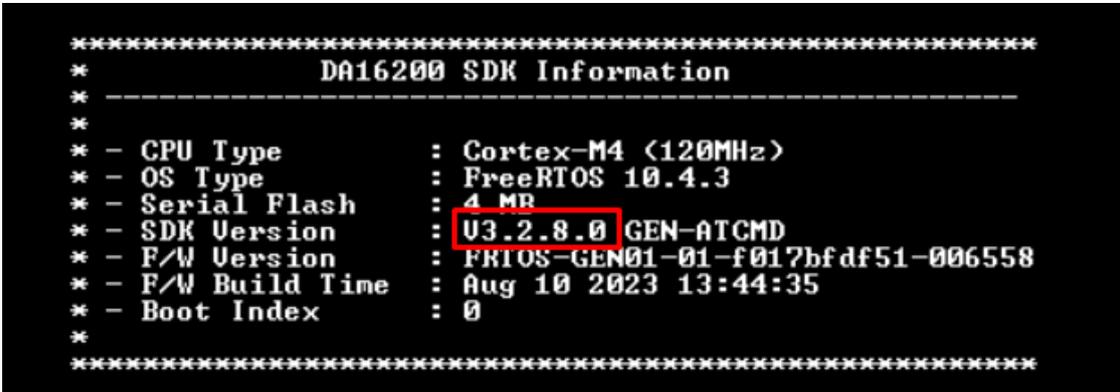
Figure 14. SDK Information

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Revision History

Rev.	Date	Description	
		Page	**Summary**
1.00	Aug.23.23	—	First release document.
1.01	Sep.14.23	4-9	Updated instructions for latest SDK version (3.2.8.0). Added DA16200 sections. Added note for module reset pin settings.

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Precaution against Electrostatic Discharge (ESD)
   A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity. Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on
   The state of the product is undefined at the time when power is supplied. The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the time when power is supplied. In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the time when power is supplied until the reset process is completed. In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state
   Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. Handling of unused pins
   Handle unused pins in accordance with the directions given under handling of unused pins in the manual. The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of the LSI, an associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible.

5. Clock signals
   After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is stabilized. When the clock signal is generated with an external resonator or from an external oscillator during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Additionally, when switching to a clock signal produced with an external resonator or by an external oscillator while program execution is in progress, wait until the target clock signal is stable.

6. Voltage application waveform at input pin
   Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses
   Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products
   Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems. The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

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(Rev.5.0-1 October 2020)

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