

Renesas RA Family

# RA AWS Cloud Connectivity on CK-RA6M5 v2 with Cellular RYZ024A – Getting Started Guide

## Introduction

This document provides instructions for running the AWS cloud connectivity Application Project on CK-RA6M5 v2 using Cellular interface.

#### Applies to:

• RA6M5 MCU Group

#### **Required Resources**

The following resources are needed to build and run the MQTT/TLS application example.

#### **Development tools and software**

Flexible Software Package (FSP) v5.3.0 and required tools (<u>renesas.com/us/en/software-tool/flexible-software-package-fsp</u>)

#### Hardware

- Renesas CK-RA6M5 v2 kit (<u>renesas.com/ra/ck-ra6m5</u>)
- PC running Windows<sup>®</sup> 10 and an installed web browser (Google Chrome, Internet Explorer, Microsoft Edge, Mozilla Firefox, or Safari)
- Micro USB cable (included as part of the kit. See *CK-RA6M5 v2 User's Manual*).
- USB-C cable for Power supply (included as part of the kit. See *CK-RA6M5 v2 User's Manual*)
- Renesas LTE Cat-M1 Cellular IoT Module (<u>RYZ024A LTE Cat-M1 Cellular IoT Module for Global</u> <u>Deployment | Renesas</u>)

Note: Renesas has discontinued the existing Sequans-sourced LTE module, part number RYZ024A, and will no longer ship this product. If you have one of these in a current design or in production, the Sequans part number GM02S is a pin and functionally compatible replacement for RYZ024A. The **FSP** Cellular driver works for the GM02S alternate cellular product. - The RYZ024A Cellular control module is compatible with Sequans GM02S, which is the compatible module.

Regarding EOL notice of the RYZ024A, please see:

[The link] https://www.renesas.com/document/eln/plc-240004-end-life-eol-process-select-part-numbers?r=1503996

[The product page] https://www.renesas.com/us/en/products/wireless-connectivity/cellular-iot-modules/ryz024a-lte-cat-m1-cellular-iot-module-global-deployment

## **Prerequisites and Intended Audience**

This application note assumes the user can operate the Renesas e<sup>2</sup> studio IDE with Flexible Software Package (FSP). If not, we recommend reading and following the procedures in the *FSP User's Manual* sections for 'Starting Development,' including 'Debug the Blinky Project.' Doing so enables familiarization with e<sup>2</sup> studio and FSP and validates proper debug connection to the target board. In addition, this application note assumes prior knowledge of MQTT/TLS and its communication protocols and knowledge of Cellular modems.

The intended audience is users who want to develop applications with MQTT/TLS modules using Cellular modules on Renesas RA6 MCU Series.

- Note: If you are a first-time user of e<sup>2</sup> studio and FSP, we highly recommend installing them on your system to run the Blinky Project and familiarize yourself with the development environment before proceeding to the following sections.
- Note: This Application Project and Application Note are guaranteed to work only with FSP v5.3.0



#### Prerequisites

- 1. Access to online documentation is available in the Cloud Connectivity References section.
- 2. Access the latest documentation for the Renesas Flexible Software Package.
- 3. Prior knowledge of operating e<sup>2</sup> studio and built-in (or standalone) RA Configurator.
- 4. Access to associated hardware documentation such as User Manuals, Schematics, and other relevant kit information (<u>renesas.com/ra/ck-ra6m5</u>).

## Contents

1.	Importing, Building, and Loading the Project	4
1.1	Importing	4
1.2	Building the Latest Executable Binary	4
1.3	Loading the Executable Binary into the Target MCU	4
1.3.1	1 Using a Debugging Interface with e <sup>2</sup> studio	4
1.3.2	2 Using J-Link Tools	4
1.3.3	3 Using Renesas Flash Programmer	4
1.4	Connection Settings and Deviation	4
1.5	Powering up the Board	4
2.	Running the Application Project	5
2.1	Connecting the Board to the Serial port Console of the PC	5
2.2	Setting the SIM and Modem Information for Activation	8
2.3	Activating a SIM card	8
2.4	Getting the UUID Information of the Board	10
2.5	Registering to Renesas AWS Cloud Dashboard	11
2.5.1	1 Sign up	11
2.5.2	2 Sign in	14
2.5.3	3 Forgot Password	14
2.5.4	4 Profile page	15
2.5.5	5 Support Page	17
2.5.6	6 Downloading the Certificate	17
2.6	Storing the Device Certificate, Key, MQTT Broker Endpoint, and IoT Thing Name	18
2.7	IoT Cloud Configuration and Connecting to AWS IoT	21
2.8	Starting the Application	21
2.9	Verifying the Application Project from the Renesas Dashboard	22
3.	Dashboard Types	24
4.	Sensor Data for Cloud Kits	26
5.	Alerting and Anomaly Detection	26
6.	AWS Account Sign-up and Payment Preference Updates	27



6.1	Update payment options	28
7. 7.1	Renesas AWS Dashboard account credits and quarantine Disable EC2 Instance to Save Credits	29 30
8.	Sensor Stabilization Time	32
9.	Known Issues and Troubleshooting	32
10. 10.1	Debugging SIM Card Activation Problem	33 33
Rev	ision History	36



## 1. Importing, Building, and Loading the Project

## 1.1 Importing

This project, "aws\_ck\_ra6m5\_v2\_cellular\_ryz024a\_app", can be imported into the e<sup>2</sup> studio using the instructions provided in the RA *FSP User's Manual*. See section *Starting Development* > e<sup>2</sup> *studio ISDE User Guide* > *Importing an Existing Project into* e<sup>2</sup> *studio ISDE*.

## 1.2 Building the Latest Executable Binary

Upon successfully importing and/or modifying the project into  $e^2$  studio IDE, follow the instructions provided in the RA *FSP User's Manual* to build an executable binary/hex/mot/elf file. See Section *Starting Development* >  $e^2$  studio *ISDE User Guide* > *Tutorial: Your First RA MCU Project* > *Build the Blinky Project.* 

## **1.3 Loading the Executable Binary into the Target MCU**

The executable file may be programmed into the target MCU through any one of three means.

#### **1.3.1** Using a Debugging Interface with e<sup>2</sup> studio

Instructions on how to program the executable binary are found in the latest RA FSP User Manual. See Section Starting Development >  $e^2$  studio ISDE User Guide > Tutorial: Your First RA MCU Project > Debug the Blinky Project.

This is the preferred method for programming as it allows additional debugging functionality to be available through the on-chip debugger.

Follow the instructions for programming the board and proceed to section 1.4.

#### 1.3.2 Using J-Link Tools

SEGGER J-Link Tools such as J-Flash, J-Flash Lite, and J-Link Commander can be used to program the executable binary into the target MCU. Refer to User Manuals UM08001 and UM08003 on <u>www.segger.com</u>. Use the .srec or .hex file in the Application Project to program the board and proceed to section 1.4.

#### 1.3.3 Using Renesas Flash Programmer

<u>Renesas Flash Programmer</u> provides usable and functional support for programming the on-chip flash memory of Renesas microcontrollers in each phase of development and mass production. Use the .srec or .hex file in the Application Project folder to program the board and proceed to section 1.4.

## 1.4 Connection Settings and Deviation

Reset the board assembly associated with this application note to the default electrical jumper settings as specified in the *CK-RA6M5 v2 User's Manual* and refer to the note for PMOD2 settings below before proceeding with the next set of instructions.

Note: For this cellular-based cloud connectivity application project and application note, the user must connect the RYZ024A PMOD module to the connector (J25 – PMOD2) on the board. And we need to use the configuration below for PMOD2 to work with RYZ024A PMOD:

- Open J21 1-2 and 3-4
- Close E20
- Close E8

## **1.5** Powering up the Board

To power the board, connect the USB-C cable to the CK-RA6M5 v2 board's J28 connector and the other end to the PC USB port. Connect the micro-USB Cable to the J10 (USB\_DBG) connector of the CK-RA6M5 v2 board and the other end to the second USB Port of the PC (this will be the Console Port for the Application). Users are required to use the Command Line Interface (CLI) to configure and run the Application.

Then, run the debug application using the instructions in the following sections.



## 2. Running the Application Project

Note: The steps indicated below are tested on Window® OS only.

#### 2.1 Connecting the Board to the Serial port Console of the PC

1. On the host PC, open Windows Device Manager. Expand **Ports (COM & LPT)**, locate **JLink CDC UART Port (COMxx)**, and note the COM port number for reference in the next step.

Note: JLink CDC UART drivers are required to communicate between the CK-RA6M5v2 board and the terminal application on the host PC.



Figure 1. JLink CDC UART Port in Windows Device Manager

2. Open Tera Term, select **New connection**, and select **Serial** and **COMxx: JLink CDC UART Port** (COMxx), and click OK.

⊖ TCP/IP	Host:	myhost.exar	nple.com	$\sim$
	Service:	⊻ History ○ Telnet	TCP port#: 22	
		SSH	SSH version: SSH2	$\sim$
		Other	IP version: AUTO	~
Serial	Port:	COM8: JLink	CDC UART Port (COM8)	~

Figure 2. Selecting the UART Port on Tera Term



3. Make sure Tera Term selects the black background; if not, configure it from **Setup > Window** and make the following selections.

Title: Tera Term				OK
Cursor shape		lide title bar lide menu bar	(	ancel
○ Vertical line	⊠1	6 Colors (PC style)		Help
$\bigcirc$ Horizontal line	⊠ 1 ⊠ 2	6 Colors (aixterm sty 256 Colors (xterm styl	rle) le)	
🗹 Enable bold font	⊠ s	Scroll buffer:	10000	lines
Color				
● Te×t Attr	ribute	Normal ~		
○ Background	Re	everse		
R: 255 <		>	ABC	
G: 255 <		>		
B: 255 <		>		
Always use Norma	I text's	BG		

Figure 3. Configuring the Black Background for JLink CDC UART on Tera Term

4. Configure for the terminal from **Setup > Terminal...**, select **New-line Receive** as **AUTO**.

Term size = win size       Transmit: CR       Cancel         Auto window resize       Help         Terminal ID:       VT100 ~       Local echo         Answerback:       Auto switch (VT<->TEK)         Coding (receive)       Coding (transmit)         UTF-8 ~       UTF-8 ~	Tera Term: Terminal setup           Terminal size           80         X         24	New-line Receive: AUT0 ~	ОК
Answerback: Auto switch (VT<->TEK) Coding (receive) UTF-8  UTF-8	Term size = win size Auto window resize Terminal ID: VT100 ~	Transmit: CR v	Cancel Help
Coding (receive) UTF-8 UTF-8	Answerback:	□ Auto switch (VT<->TE	EK)
	Coding (receive)	Coding (transmit) UTF-8 ~	

#### Figure 4. Configuring Terminal

5. Use the Setup > Serial port... and ensure the speed is set to **115200**, as shown below.

Tera Term: Serial port setu	tup and connection X
Port:	COM8 ~ New setting
Speed:	115200 ~
Data:	8 bit ~ Cancel
Parity:	none v
Stop bits:	1 bit v Help
Flow control:	none v
Device Friendly N Device Friendly N Device Instance II Device Manufactu Provider Name: S Driver Date: 6-6-21 Driver Version: 1.3	mit delay msec/char 0 msec/line Name: JLink CDC UART Port (COM8) ID: USB\VID_1366&PID_1024&MI_00\7&16ED turer: SEGGER SEGGER SEGGER 2019 1.34.0.44950

Figure 5. Select 115200 on the Speed Pulldown Menu



6. Complete the connection. The Configuration CLI Menu will be displayed on the console as shown below.

Note: If the menu is not displayed, please reset the board by pressing the S1 user switch.

COM8-Tera Term VT File Edit Setup Control Window Help Select from the options in the menu below: MENU 1. Get FSP version 2. Data flash 3. Get UUID 4. Get CAIM Info 5. Validate SIM activation 6. Start Application 7. Help > Enter (1-7) to select options		×
7. Help > Enter (1-7) to select options		

#### Figure 6. Main Menu

7. In the CLI shown in the preceding screenshot, choose the number to select the commands. For example, when you press **1**, the FSP version of the application is displayed as shown below. At any point of time, press the space bar to return to the previous menu.



Figure 7. FSP Version Information



## 2.2 Setting the SIM and Modem Information for Activation

 Press 4 to display CAT-M Information. This menu will communicate with the RYZ024A PMOD module to obtain the ICCID value needed for activating the SIM card. Upon success, the IMEI and ICCID values will be displayed on the terminal screen. The program will continue to attempt to communicate with the RYZ024A PMOD module until it has successfully connected or timed out. After obtaining the ICCID value, go to Truphone <u>https://www.truphone.com/connectit/</u> to activate the SIM card (see section 2.3 Activating a SIM card).



Figure 8. CAT-M Information

## 2.3 Activating a SIM card

To activate the included SIM card, please visit the Truphone SIM Activation platform at <u>truphone.com/connectit</u> and use the following steps:

1. On the opened webpage (snapshot shown in the Figure 9), click the **Start activation** button under **IoT SIM Activation**.



## Figure 9. Activating the SIM card

- 2. Create a new Truphone Account by selecting **Sign up** (next to **Don't have an account yet?**) and filling in your full name, email, and password. Then Click **Sign up** to create a new account.
- 3. After signing up, on the welcome page, Select **Personal** as the account type.
- 4. Select Get Started.
- 5. Verify your email by entering the activation code sent to your email account (Note: check your Junk folder if the email is not received in your Inbox).
- 6. Complete the Profile information form then select Create account.



- Select Activate SIMS to Activate your individual SIM by ICCID and PUK found on the SIM Card packaging. Note: The ICCID value can also be obtained from the Running the RYZ024A PMOD example project section. See the ICCID value in Figure 8. CAT-M Information. Fill in other fields as needed.
- You can open the page using the link <u>https://account.truphone.com/login</u> and select Home > SIM Cards > ICCID#xxx", and "Activate" the SIM from the status page as shown in the Figure 10. After activating the SIM, the status changes from Pre-Active to Active.

iacus		
Service Status		
	Status	Available Actions
SIM Card	Pre-Active	Provision Activate Retire
SMS MO Service	Active	Suspend
SMS MT Service	Active	Suspend
Current Device	Unavailable	N/A
Last Location		N/A
Ongoing Data Session		
Status	Offline	
Start Date	N/A	

Figure 10. Activating the SIM card

9. Ensure the SIM card is inserted in the RYZ024A PMOD. From the Console **Main Menu 5 Validate SIM activation** to verify that the SIM card is activated.

Note: The SIM card should be activated on the Truphone SIM Activation platform after 15 minutes and can be validated on the Tera Term terminal as shown in. The time for the SIM Card to be activated by Truphone can vary depending on their system demand. In most cases, if PING Response fails, wait a few more minutes and repeat **Menu 5 Validate SIM activation**.

#### Disclaimer

The activation steps above are provided by SIM Provider Truphone. They are the most current at the time of publishing this application note. If you need help activating your SIM Card, contact Truphone support <u>iot.truphone.com</u> or <u>Contact Support | Truphone</u>.

If you have a SIM card from any other provider, contact the technical support for that provider.

For any other issue that cannot be resolved, please contact Renesas Support at Technical Support.

Note: The SIM card Provider for the Application project is Truphone. If you use any other SIM Card provider, you must change the Access Point Name required for the SIM Card Provider in your global region. Failure to do so could result in the RYZ024A not connecting to the Cellular network.



To set the Access Point Name (APN) for SIM Card providers other than Truphone The APN is set in the Application project in <code>/src/cellular\_setup.c</code>

See #define CELLULAR\_APN "iot.truphone.com" /\* APN : <u>Truphone</u> SIM Card \*/



Figure 11. Validating SIM Activation – SIM Card Active

## 2.4 Getting the UUID Information of the Board

1. Press **3** from the **Main Menu** to display the board UUID. This command obtains the UUID information of the board and displays it on the console, as shown in the screenshot below. You will need this information to register for the <u>Renesas AWS Cloud Dashboard</u>.



Figure 12. Getting Board UUID Information



## 2.5 Registering to Renesas AWS Cloud Dashboard

AWS dashboard for Renesas CK-RA6M5 v2 cloud kit is custom designed to visualize the data of all the sensors on the cloud kits. The dashboard connects to AWS IoT services through AWS IoT core and enables users to utilize the cloud services to full potential.

To allow users to experience a hassle-free first experience with the cloud kits, every cloud kit is credited with USD 10 AWS credits upon registration.

The dashboard can be accessed at https://renesas.cloud-ra-rx.com/

#### 2.5.1 Sign up

After establishing access to the RA and RX kit to the kit-associated AWS sub-account, where all necessary infrastructure will be provisioned, each user should sign up:

- 1. Go to the https://renesas.cloud-ra-rx.com/
- 2. If you don't have an account, click on the **Sign up** button. You are directed to the **Sign up** page.

Renes	SAS	
	RENESAS RA DID	Don't have an account? Sign up
	Sign in to Dashboard Enter your details below.	
	Email address	
	Password	<i>S</i>
	Fo	rgot password?
	Login	

#### Figure 13. Creating Account

3. Enter your first name, last name, email address and password and click Register.

RENESAS		
	RA NO	Already have an account? Login
	Sign up Enter your details below.	
	First name         Last name	
	Email address	
	Password	
	Register	

Figure 14. Registering Information



#### The rules for a valid first name and last name:

- Length Constraints: Minimum length of 2. Maximum length of 24.
- Information must be entered in English or another Latin character-based language.

#### The rules for a valid email address:

- The address must be a minimum of 6 and a maximum of 64 characters long.
- Use the email address that has not been used previously for signup.
- All characters must be 7-bit ASCII characters.
- There must be one and only one @ symbol, which separates the local name from the domain name.
- The local name cannot contain any of the following characters: whitespace, " ' () < > []:;, \ | % &
- The local name cannot begin with a dot (.)
- The local name cannot contain double Plus, for example: <a href="mailto:account+rnss+alpha@domain.com">account+rnss+alpha@domain.com</a>
- The domain name can consist of only the characters [a-z],[A-Z],[0-9], hyphen (-), or dot (.)
- The domain name cannot begin or end with a hyphen (-) or dot (.)
- The domain name must contain at least one dot.

#### The rules for a valid password:

- The password must be a minimum of 8 and a maximum of 64 characters long.
- Password must contain at least one uppercase character, one lowercase character, one number, and one special character: ! # \$ % & \* ? @.
- 4. Verification code will be sent to your email. Enter the code and press on the **Send** button. You are redirected to the **Register Device** page.

RENESAS		
	RA RX	Already have an account? Login
	Confirm your email	
	The verification code has been sent to you, please check your email.	
	Verification code	
	Resend Code	
	Send	

Figure 15. Confirming Email

If you do not receive an email with the code, please click on Resend Code.

 Enter the UUID of the kit to complete the registration process. UUID is the unique ID of your board. Refer to "CK-RA6M5 v2 AWS Application Project" for steps for obtaining the UUID of the kit. Note: Only 1 device will be assigned to an account.



RENESAS							
	RA	200	RX	9			
Register Device							
Email							
UUID							
			Submit				
	Register Device	Register Device	Ensid         UUID	Ensi     UUID     Submit			

#### Figure 16. Registering Device

6. The registration page indicates that the device registration is in progress.

RENES	<u>s</u>			
My Devices	RA	A CON	RX	9
	Device 1			Status: In Progress
	Account name:			
	Email:			Go To Dashboard $\rightarrow$
	UUID:			

Figure 17. Device Registration in Progress

7. After the sub-account is registered, it is provisioned.

My Devices		RA	and the	RX		0
	Device 1				Status: Provisioned	~

Figure 18. Sub-Account Registration



8. Refresh the page and wait for the buttons **Download Certificate** and **Go To Dashboard** turn available on the registration page. This process may take up to **1 hour** for device provisioning to complete.

Renesas					
My Devices		RA		RX	θ
	Device 1				Status: Provisioned
	Account name:				🛓 Download Certificate
	Email:				Go To Dashboard →
	UUID:				

Figure 19. Completing Device Provisioning

## 2.5.2 Sign in

If you have already registered on our web portal, you need to Sign in entering your email and password.

#### 2.5.3 Forgot Password

1. Click **Forgot password** on **Sign into Dashboard** page. You are directed to the **Restore Password** page.

RENESAS	
	RA REX
	Restore Password
	Enter your email.
	Email address
	Send

Figure 20. Restoring Password 1



2. Enter your email and click on the button **Send**.

RENESAS	
	RA DD RX
	Restore Password
	Verification code
	New Password
	Confirm Password

Figure 21. Restoring Password 2

- 3. You should receive a verification code in your email.
- 4. Enter the code and your new password and confirm it.
- 5. To end the process, press the button Send.

#### 2.5.4 Profile page

To see your profile page:

1. Click on your profile picture on the top right. Select Profile.

My Devices				
	RA	nn,	RX	9
	Device 1			Status: Pro
	Account name:			Support Page
	Email:			Logout
	UUID:			

Figure 22. Selecting Profile

You are redirected to the Profile page:

RENESA	S	
B My Devices	RA INTERES	9
	Profile Page	
	First name:	
	Last name:	
	Edit Profile	
	Change Password	
	Payment Preference Update Confirmation O Yes  No	

Figure 23. Profile Page



On the page, you can edit your profile:

- A. Press on the button Edit Profile.
- B. Change your first and last name.
- C. Press on the button Send.
- D. Your Account Name is updated.

RENES	SAS	
My Devices	RA RX	9
	Profile Page	
	First name	
	Last name	
	Cancel	Send

#### Figure 24. Updated Profile Page

Also, you can change your password; the rules for a valid password have been mentioned above:

- A. Press on the button Change Password.
- B. Enter your Old Password.
- C. Enter your New Password.
- D. Confirm your New Password and press the button Send.
- E. Your password is updated.

RENESA	S	
My Devices	RA REAS	9
	Profile Page	
	First name:	
	Last name:	
	Old Password	S.
	New Password	ŝ
	Confirm Password	R.
	Cancel Send	
	Payment Preference Update Confirmation Ves  No	

Figure 25. Changing Password on Profile Page



## 2.5.5 Support Page

To see your support page:

Click on your profile picture on the top right. Select the **Support page**.

RENESA	5	
My Devices		9
	Device 1	Status: Provision
	Account name:	Profile Support Page
	Email:	Reset Grafana's password
	UUID:	Logout

Figure 26. Selecting Support Page

RENESA	S	
My Devices	RA DID RX	9
	Support Page	
	CK-RA6M5 Kit Information CK-RX65N Kit Information Renesas RA RX cloud solutions RA Product Information RX Product Information	
	RA Froduct Support Forum RX Product Support Forum Renesas Support	

Figure 27. Support Page

#### 2.5.6 Downloading the Certificate

Click on the **Download Certificate** button to download the credentials, **certs.zip** file, and unzip this file.



RENES	ΔS		
B My Devices	RA	RX	9
	Device 1		Status: Provisioned
	Account name:		<u>↓</u> Download Certificate
	Email:		Go To Dashboard →
	UUID:		

Figure 28. Downloading the Certificate

# 2.6 Storing the Device Certificate, Key, MQTT Broker Endpoint, and IoT Thing Name

For the application to work, the Device Certificate, Device Private Key, MQTT Broker Endpoint, and IOT Thing name need to be stored in the data flash.

1. Press **2** on the **Main Menu** to display **Data Flash-related commands, as shown in the following screenshots. This submenu** has commands to store, read, and validate the data.



Figure 29. Data Flash-related Menu and Commands



2. To store the **Device Certificate**, press the option **b** and Click the **File** tab of the Tera Term and **Send File** option and choose the device certificate file 'xxxxcertificate.pem.crt' from the downloaded certs.zip file in section 2.5.6.







Figure 31. Downloading the Device Certificate into the Data Flash





Figure 32. Status of the Downloaded Device Certificate into the Data Flash

- 3. To store the **Device Private Key**, press option **c** and click the **File** tab of the Tera Term. Select the **Send File** option and choose the Device Private Key "xxxxxxprivate.pem.key" from the downloaded **certs.zip** file in section <u>2.5.6</u>.
- 4. To store the MQTT Broker end-point, copy the end-point string xxxxxx3ku-ats.iot.us-east-1.amazonaws.com from the iot-data.json file in certs.zip file. Press option d and click the Edit tab of the Tera Term and Paste<CR>. Verify and confirm the valid string and press OK. Note: Do NOT copy the double quotes when copying the MQTT Broker end-point.

File Edi	Setup Control Window Help	
DATA FL Type o D	ASH WRITE MQTI END POINT r Paste credential and press enter to save cred	entials in flash
	Tera Term: Clipboard confirmation	X OK Cancel

Figure 33. Storing the MQTT Endpoint into the Data Flash

 To store the IOT Thing Name, copy the Thing Name string xxxxxxx-5736xxxx-xxxxxx-4e4bxxxx from the iot-data.json file in certs.zip file in section 2.5.6. Press option e and click the Edit" tab of the Tera Term and Paste<CR>. Verify and confirm the valid string and press OK. Note: Do NOT copy the double quotes when copying the Thing Name.





Figure 34. Storing the MQTT Endpoint into the Data Flash

6. Press options **f** and **g** to read and validate the stored information in the data flash. Press the space bar to go to the previous menu.

Note: Validation of the stored data is very limited and validates a minimum set of data points. Users are required to input the valid data to the flash obtained from the Dashboard for the application to work properly.

## 2.7 IoT Cloud Configuration and Connecting to AWS IoT

You can sign in to the Renesas AWS dashboard at https://renesas.cloud-ra-rx.com/login using an email account that you previously used to sign up for an AWS account.

- Note: It is important to sign up with an email that has not been used previously to open an AWS account since the dashboard creates a new AWS account linked to the email address.
- Note: Store the invitation email for the future; it may be required to access the AWS account.

## 2.8 Starting the Application

The application is ready to run after activating the SIM card, registering to the Dashboard, and configuring the required Cloud credentials through the CLI. Press option "**6. Start Application**" to start the application. The application prints a Welcome screen along with the status of validating the Cloud credentials data present in the data flash, as shown below.



Figure 35. Welcome Screen on the Console





Figure 36. Connecting to the Network and AWS IoT

## 2.9 Verifying the Application Project from the Renesas Dashboard

Renesas AWS dashboard can be accessed from renesas.cloud-ra-rx.com by clicking on Go to Dashboard.

Note: Users will have access to the Grafana dashboard only when the device is provisioned and its status is "Active."

RENESA	ENESAS				
My Devices	RENESAS		RX	9	
	Device 1			Status: Provisioned	
	Account name:			∠ Download Certificate	
	Email:			Go To Dashboard →	
	UUID:				

#### Figure 37. Accessing Renesas AWS Cloud Dashboard

First-time users will access the dashboard with the credentials "admin" for both username and password and will be directed to change the password.



	Welcome to Grafana
	Email or username email or username
	Lenait or usemame is required
	Password  password
	A Password is required
	Forgot your password?
Documentation   🛇	Support   R2 Community   Enterprise (Free & unicensed)   v6.4.4 ((ch011se)   🔥 New version available)

Figure 38. Welcome to Grafana Screen

Click Skip to access the dashboard.

Welcome to Grafana
New password
Confirm new password
Submit
Skip
Documentation   🕐 Support   🛱 Community   Enterprise (Free & unlicensed)   v8.4.4 (Icfb01fae)   🕁 New version available!

Figure 39. Skipping Grafana Screen to Access Dashboard

On the Renesas dashboard page, the sensor data can be viewed by clicking on the "arrow" next to each of the sensor data tabs. Allow up to 60 seconds for the data to be displayed on the dashboard. If the data is not updated as expected, refresh the page.





Figure 40. Renesas AWS Cloud Dashboard

# 3. Dashboard Types

Depending on the sensors, you can choose one of the dashboard types: Renesas 9-Axis sensor or Renesas. Click on the **Renesas** option.



Figure 41. Renesas AWS Cloud Dashboard Types

Choose the Renesas 9-Axis sensor.









Figure 43. Renesas Dashboard displays 9-Axis Sensor

CK-RA6M5 v2 only supports 6-Axis sensors (Gyroscope, Accelerometer), and the Magnetometer will always be zero.



## 4. Sensor Data for Cloud Kits

The Grafana dashboard displays the following Data from sensors. **Table 1. Sensor Data from Grafana Dashboard** 

Sensor	Data	
HS3001- Humidity and Temperature Sensor	Temperature, F	
	Humidity, %	
ZMOD4410- Indoor Air Quality Sensor	Etoh, ppm	
	ECO2- Estimated Carbon dioxide, ppm	
	TVOC - Total Organic Compounds, mg/m^3	
OB1203 - Heart Rate, Blood Oxygen Concentration,	SPO2, %	
Pulse Oximetry, Proximity, Light and Color Sensor	HR (Heart Rate), bpm (beats per minute)	
	RR (Respiration Rate), breaths per minute	
	P2P	
ICP-20100 - Barometric Pressure and Temperature	Temperature, F	
Sensor	Barometric Pressure, mbar	
ICM-42605 Motion Tracking Sensor	Acc values, unit: g	
	Gyro Data, unit: dps (degrees per sec)	
OAQ – Outdoor Air Quality	OAQ, ppm	

## 5. Alerting and Anomaly Detection

Grafana alerts are a way to send notifications when a metric crosses a threshold that has been configured. By default, the dashboard has thresholds for the following sensors:

- OB1203-SPO2: SPO2 above 90, SPO2 below 90
- HS3001 Temperature, F:
  - Temperature Cold: below 65
  - Temperature Warm: within a range from 65 to 85
  - Temperature Hot: above 85



Figure 44. Sensor Status Feedback

Sensor status feedback is sent to the device which is indicated by the LEDs.



## 6. AWS Account Sign-up and Payment Preference Updates

Access the AWS account by clicking here.

1. Use the same email address that was provided at the registration in section 2.5.1 Step 3.

aws	
Sign in to cloud-ra-rx	
Username Id <b>a and Social Control</b> @renesas.com	
Next	~
By continuing, you agree to the <b>AWS Customer Agreement</b> or other agreement for AWS services, and the <b>Privacy Notice</b> . This site uses essential cookies. See our <b>Cookie Notice</b> for more information	

Figure 45. AWS Sign-up Page

2. To access your AWS account, you will need to reset your password. Click the "Forgot Password" button to initiate the password reset process. Expect to receive password reset instructions via email.

aws	
Sign in to cloud-ra-rx	
Username: .com (not you?)	
Password	
Show password Forgot	password Reset password
Sign in	
Cancel	

Figure 46. Reset Password



1

- 3. After login, you will be redirected to the AWS access portal page. The AWS sub-account
- 4. can be accessed from the AWSAdministratorAccess link.

aws		I	MFA devices	Sign out
AWS access portal				
Accounts Applications				
AWS accounts (1)		C	reate shortcut	
Q Filter accounts by name, ID, or email address				
v 📦 ra-rx-	com			
AWSAdministratorAccess   Access keys 🥜				
Feedback	©2024, Amazon Web Services, Inc. or its af	filiates. All rights reserved.	Privacy Terms	Cookie Preferences

Figure 47. AWS access portal Page

## 6.1 Update payment options

Note: Payment options must be updated to prevent the account from being quarantined after using \$10 AWS credits.

1. Payment options can be accessed from the 'Billing and Cost Management' section of the console.

aws 🛛 🎞	Services Q Search		[Alt+S]	D 👃 🕐 🎯 N. Virginia ▼ AWSAdministratorAccess. 🛛 an 🔺			
=		Console Home Info		Reset to default layout + Add widgets Account ID Federated user: AWSReservedSSD_AWSAd			
		:: Recently visited Info	÷	# Applications (0) Info         Create application         :           Region: US East (N. Vegina)         Account			
		Systems Manager	+ Control Tower	Organization			
		CloudWatch	0 EC2	us-east-1 (Current Region)  V. Find applications Service Quotas			
		🔶 Step Functions	AWS Organizations	< 1 > Billing and Cost Management			
		GodePipeline	DynamoDB	Name ▲   Description ▼   Region ▼   Originating account			
		API Gateway	<b>5</b> 3				
		MAI 18		Access denied			
		🚴 Lambda					
				Go to 'Billing' to add payment options			
		View a	Il services /	Go to myApplications			
		:: Welcome to AWS :	:: AWS Health Info :	# Cost and usage Info E			
		Getting started with AWS C Learn the fundamentals and find valuable information to get the most out of AWS.	<u>.</u>				
		Training and certification [2] EO Learn from AWS experts and advance your skills and knowledge.	No health data You don't have permissions to access AWS Health.				

Figure 48. Billing and Cost Management



#### 2. Scroll to the 'Payment Preferences'

Services Q Search	[Alt+S]		🗘 💿 🎯 Global 🕶 AWSAdministratorAccess
st Anomaly Detection	We combined the Billing console and the Cost Management console		Provide feedback
ree Tier	The combined console has a new home page to help you make faster, better-informed cloud	financial management decisions, and a more intuitive side naviga	ation that provides quick access to familiar pages
ata Exports New	like <u>Bills</u> , <u>Payments</u> , and <u>Cost Explorer</u> . You can access legacy pages via the "legacy pages" see	tion of the navigation bar. To learn more, refer to the user guide.	<u>.</u>
ost Organization	Pilling and Cost Management home		
ost Categories	bitting and cost Management nome info		Reset layout
ost Allocation Tags			
illing Conductor 🗳	E Cost summary Info		:: Cost monitor Info
udgets and Planning			
udgets	Month-to-date cost	ast month's cost for same time period	Budgets status  Access denied
udgets Reports	↓ 0% compared to last month for same period	iov 1 – 6	
ricing Calculator 🗹			Cost anomalies status (MTD)
avings and commitments	Total forecasted cost for current month <ul></ul>	ast month's total cost	
ost Optimization Hub New			
Savings Plans	View bil		4
Reservations			
	E Cost breakdown Info	# Recommended actions	(0) Info
references and Settings			
ayment Preferences	Go to 'Payment Preferences'		
illing Preferences	Service 🔻		2
ost Management Preferences	Costs (\$)		C <sup>Q</sup>
ax Settings			
egacy Pages	0.00		No recommended actions
lling Home			Try again later.
ost Management Home	Jul 2023 Aug 2023 Sep 2023 Oct 2023 Nov 2023	Dec 2023	

Figure 49. Payment Preferences

#### 3. Add payment method.

Services Q Search	[Alt*5]
illing and Cost X	Billing and Cost Management > Payment Preferences
lanagement	Description of the second seco
	Payment preferences Info
Home New	
Getting Started New	Default payment preferences into
Billing and Payments	
Bills	O Default payment method does not exist. Add a default payment method and reload.
Payments	
Credits	
Purchase Orders	Payment methods Payment profiles
Cost Analysis	
Cost Explorer New	
Cost Explorer Saved Reports	Payment methods (U) Info
Cost Anomaly Detection	Q Find payment method
Free Tier	
Data Exports New	No payment methods
Cost Organization	There are no payment methods on file. Add a new payment method.
Cost Categories	
Cost Allocation Tags	
Billing Conductor 🗹	
Budgets and Planning	
Budgets	
Budgets Reports	
Pricing Calculator 🔀	
Savings and Commitments	
Cost Optimization Hub, New	

Figure 50. Add Payment Method

#### 7. Renesas AWS Dashboard account credits and quarantine

Every kit registered to the dashboard will include a \$10 AWS credit. When the credit is exhausted, the account is quarantined.

To avoid the account from being quarantined,

- 1. Update the payment method in the AWS account as shown in section 6.1.
- 2. The dashboard must also be updated with the payment preference from the user profile on the dashboard page.



A. Go to the user profile.

RENESA	S					
My Devices			RA	ann i	RX	
		Device 1			Status: Provisioned	
					Go to the user profile on dashboard	Profile
						Reset Grafana's password
						Logout

#### Figure 51. User Profile on Dashboard

B. Confirm the payment preference updates.

RENESA	2	
My Devices		0
	Profile Page	
	First name:	
	Last name:	
	Edit Protile	
	Change Password Payment Preference Update Confirmation Yes No	



Note: Failure to complete either step 1 or 2 will result in the account being quarantined. For access to quarantined accounts, please contact the Renesas Support team.

## 7.1 Disable EC2 Instance to Save Credits.

To avoid account credit usage when the device is not in use, disable the EC2 instance.



1. Access EC2 from the AWS account by logging into the account as mentioned in section 6 and following the below steps.

aws	Services Q Search	[Alt+S]	A Ø Ø Global • AWSAdministratorAccess/
	I	υ κεсептіу visited	^ 0
Man	Recently visited	×	
	Favorites	Billing and Cost Management	Contact us 🖸
Home	All services	Them and pay only, analyze and govern your spectrum g and optimize your costs	
Getti		Console Home	
Billir	P Analytics	View resource insights, service shortcuts, and feature updates	
Bills	Application Integration	Systems Manager	
Paym	Blockchain	AWS Systems Manager is a Central Place to View and Manage AWS Resources	
Credit	Business Applications	CloudWatch	
Furch	A Cloud Financial	Monitor Resources and Applications	
Cost	Management	Step Functions	
Cost	Compute	Coordinate Distributed Applications	Set as default Edit Delete Add payment method
Cost	🚔 Containers	CodePipeline	
Free 1	③ Customer Enablement	Release Software using Continuous Delivery	
Data	Database	API Gateway	No payment methods
Cost	💥 Developer Tools	Build, Deploy and Manage APIs	pent methods on file. Add a new navment method
Cost	End User Computing	IAM	nen mennoù or nei poù o nen pajment mennoù.
Cost	Front-end Web & Mobile	Manage access to AWS resources	
Billing	🕅 Game Development	Lambda	
Budg	Internet of Things	Run code without thinking about servers	
Budo	Machine Learning	Control Tower	
Pricin	Management & Governance	The easiest way to set up and govern a secure, compliant multi-account	
Savir	Da Media Services	environment	
Com	Migration & Transfer	EC2	Go to 'Services' -> 'EC2'
Cost (	Networking & Content	Virtual Servers in the Cloud	
► Sav	Delivery	AM/C Organizations	
Clouds	ihell Feedback		© 2023, Amazon Web Services, Inc. or its affiliates. Privacy Terms Cookie preferences

Figure 53. Go to EC2 Services

2. Go to the instances.

EC2 Dashbaard       Instances (1) info       Instance type       Connect       Instance state *       Actions *       Law         EC2 Global View       Reserved Instance B       Instances Instance B       Instances V       Status check       Alarm status       Availability Zone *       Public IPv4 DNS *       P	thinstances     V       < 1 >     S       Elastic IP
EC2 Global View       Q. Find Instance log Case-sensitive         Events       Name Z       v       Instance log       Instance type v       Status check       Alarm status       Availability Zone v       Public IPv4 DNS	< 1 > ©
Events       Instance U       Instance U       Instance type V       Status check       Alarm status       Availability Zone V       Public IPv4 DNS       V	Elastic IP
Console-to-Code       Grafana       i-091a13b1a6e54136c       Running Q Q       t2.micro       Q 2/2 checks passed No alarms + us-easts1a       ec23-80-10-41.cemput       3.80.10.41         • Instances       Instance       Instance       Instance       Instance       Instance         Spot Requests       Savings Plans       Reserved Instances       Instance       Instance       Instance         Dedicated Hosts       Capacity Reservations       Instance       Instance       Instance       Instance         Y Images       Select an instance       Instance       Instance       Instance       Instance	
Instances       Instances       Instances       Spot Requests       Skings Plans       Reserved Instances       Decidated Hosts       Capacity Reservations       New       Select an instance	
▼ Instances           Instance Types           Instance Types           Launch Templates           Spot Requests           Swings Plans           Reserved Instances           Dedicated Hosts           Capacity Reservations           Net           Select an instance	
Instances           Instance Types           Launch Templates           Spot Requests           Spot Requests           Savings Plans           Reserved Instances           Delicated Hosts           Capacity Reservations           Nime           Select an instance	
Instance Types       Lauch Templates       Spot Requests       Savings Plans       Reserved Instances       Dedicated Hosts       Capacity Reservations       New       Select an instance	
Lanch Templates       Spot Requests       Spot Requests       Savings Flans       Reserved Instances       Dedicated Hosts       Capacity Reservations       New       Select an instance	
Spot Requests       Synings Plans       Reserved Instances       Dedicated Hosts       Capacity Reservations       Nor       Select an instance	
Savings Plans     Savings Plans       Reserved Instances     Dedicated Hosts       Capacity Reservations     Saving Plans       Note     Select an instance	
Reserved Instances       Dedicated Hosts       Capacity Reservations       Nmm       Select an instance	
Dedicated Hosts       Capacity Reservations       Nerr       Y Images	
Capacity Reservations Net Images	
Min = ▼ Images =	
▼ Images	Θ×
AMIs	
AMI Catalog	
▼ Elastic Block Store	
Volumes	
Snapshots	
Lifecycle Manager	
V Network & Security	
Security Groups	
Eastic PP	
Placement Groups	
Key Pairs	
Network Interfaces	

#### Figure 54. Go to EC2 Instances

3. Select the instance to be disabled and change the 'Instance State' to 'Stop instance'.



aws iii Services Q Sea	rch	[Alt+5]	▶ 🗘 ⑦ ⑧ N. Virginia ▼ AWSAdministratorAccess
EC2 Dashboard X	Instances (1/1) Info		C Connect Instance state ▲ Actions ▼ Launch instances
EC2 Global View	Q Find Instance by attribute or tag (case-sensitive)		Stop instance < 1 >
Events	Name ∠ ▼ Instance ID In	Instance state V Instance type V Status check Alarm statu	Start instance
Console-to-Code	Grafana i-091a13b1a6e54136c	Running @ Q t2 mirro Q 2/2 checks passed No alarms	+ useast-1a ec 380.10.41 -
Preview	(		Hibernate instance
▼ Instances			Terminate instance
Instances	1. Choose the Instance		
Instance Types			2. Change the 'instance State' to 'Stop Instance'
Launch Templates			
Spot Requests			
Savings Plans			
Reserved Instances			
Dedicated Hosts			
Dedicated Hosts Capacity Reservations			
Dedicated Hosts Capacity Reservations	Instance i 001017b1	=	
Dedicated Hosts Capacity Reservations New Images	Instance: i-091a13b1ave241301 (Grafana)	=	۰ (
Dedicated Hosts Capacity Reservations New Images AMIs	Instance: i-091a13b1ave34130v (Grafana) Details Security L	= Status checks Monitoring Tags	۵ >
Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog	Instance: i-091a13b1ave341304 (Grafana) Details Security L	= Status checks   Monitoring   Tags	© >
Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog Flastic Rinck Store	Instance: i-091a13b1ave34 r30v (Grafana) Details Security L, Storage	= Status checks Monitoring Tags	۵.>
Dedicated Hosts Capacity Reservations New Mages AMIs AMI Catalog Elastic Block Store Volumes	Instance: i-091a13b1aueaw raux (Grafana) Details Security L, Storage	Status checks Monitoring Tags Public (Pv4 address	Private IPv4 addresses
Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog Elastic Block Store Volumes Snarebrots	Instance: i-091a13b1ave=>++>v. (Grafana)         Details       Security         V       Instance summary Info         Instance ID       ①         IO1+091a13b1a6e54136c (Grafana)	= Status checks Monitoring Tags Public (Pv4 address 0 3.8.0.10.41 (open address 2)	Private IPv4 addresses I 10.00.194
Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog Elastic Block Store Volumes Snapshots Lifecycle Manager	Instance: i-091a13b1aueau iaux (Grafana) Details Security L, Storage ▼ Instance summary lefo Instance ID □ I-091a13b1a6e54136c (Grafana) IPv6 address -	Status checks Monitoring Tags Public IPv4 address Public IPv4 address Instance state O Running	Private IPv4 addresses 10.00.194 Public IPv4 DNS 10.2-3-40-10-41.compute-1.amazonavs.com Jopen address [2]
Dedicated Hosts Capacity Reservations New Images AMIs AMIs Catalog Elastic Block Store Volumes Snapshots Lifecycle Manager V Network & Security	Instance: i-091a13b1aves+ rsoc (Grafana) Details Security I, , Storage ▼ Instance summary info Instance ID ☐ i-091a13b1a6c54136c (Grafana) IPv6 address - Hostname type	= Status checks Monitoring Tags Public IPV4 address 3 3.80.10.41 (open address 1 Instance state 3 Amoning Private IP DV5 name (IPv4 only)	<ul> <li>Private IPv4 addresses</li> <li>I 10.0.0.194</li> <li>Public IPv4 DNS</li> <li>I e2-3-80-10-41.compute-1.amazonaws.com [open address [2]]</li> </ul>
Dedicated Hosts Capacity Reservations New Manuel Antis Antis Anti Catalog Elastic Block Store Volumes Snapshots Lifecycle Manager Network & Security Security Groups	Instance: i-091a13b1ave3+++3vx (Grafana) Details Security L, Storage V Instance summary Info Instance ID 0 -091a13b16e54136c (Grafana) IPv6 address - Hostnume type IP name: ip-10-0-0-194.ec2.internal	= Status checks Monitoring Tags Public IPv4 address Status checks Status checks Status checks Public IPv4 address Status Public IPv1 address Status Public IPv1 address Status Public IPv1 address Status Sta	Private IPv4 addresses 1 10.0.194 Public IPv4 DNS 1 ec2-3-80-10-41.compute-1.amazonaws.com Jopen address [2]
Dedicated Hosts Capacity Reservations New Images AMIs AMI Catalog Elastic Block Store Volumes Snapshots Lifecycle Manager Network & Security Security Groups Elastic IPs	Instance: i-091a13b1ave3+++30v (Grafana) Details Security L, Storage ▼ Instance summary Info Instance ID ① I-091a13b1a654136c (Grafana) IPv6 address - Hostname type IP name: ip-10-00-194.ec2.internal Answer private resource DNS name	= Status checks Monitoring Tags Public IPv4 address Instance state Running Private IP DNS name (IPv4 only) Imstance type	Private IPv4 addresses 1 10.0.194 Public IPv4 DNS 1 ec2-3-80-10-41.compute-1.amazonaws.com (open address [2]) Elastic IP addresses
Dedicated Hosts Capacity Reservations New Images Ablis Ablis Abli Catalog Elastic Block Store Volumes Smapshots Lifecycle Manager Network & Security Security Groups Elastic IPs Placement Groups	Instance: i-091a13b1ave∋+ r∋vx (Grafana) Details Security L, Storage ▼ Instance summary info Instance ID □ Ho91a13b1a6e54136c (Grafana) IPv6 address - Hostname type IP name: ip-10-0-0-194.ec2.internal Answer private resource DNS name -	= Status checks Monitoring Tags Public (PV4 address	Private IPv4 addresses 1 10.0.194 Public IPv4 DNS 1 ec2-3-80-10-41.compute-1.amazonaws.com jopen address [2] Elastic IP addresses -
Dedicated Hosts Capacity Reservations New Images AMIs AMIs Catalog Elastic Block Store Volumes Snapshots Lifecycle Manager Network & Security Security Groups Elastic IPs Placement Groups Kay Pairs	Instance: i-091a13b1aves-+ r.sov. (Grafana) Details Security L, Storage V Instance summary Info Instance D O I-091a13b1a6e54136c (Grafana) IP-6 address - Hostname type IP name: ip-10-0-0-194.ec2.internal Answer private resource DNS name - Auto-assigned IP address	= Status checks Monitoring Tags Public IPv4 address	Private IPv4 addresses D 10.0.0.194 Public IPv4 DNS D ec2-3-80-10-41.compute-1.amazonaws.com  open address [2] Elastic IP addresses - AWS Compute Optimizer finding

Figure 55. Change the EC2 Instance State

Note: For further details on Renesas AWS dashboard types, dashboard quarantine, activation, and dashboard customization, refer to "AWS Dashboard for CK-RA6M5 and CK-RX65N Application Note" (R11AN0609EU0101).

## 8. Sensor Stabilization Time

Table 2 gives the time required for the sensors to sense and provide valid data to the users. Here, you will see two columns: column 1 - when powered up for the first time and column 2 - after soft or hard reset. If the system boots up from a cold start, the time for the sensors to provide the valid data is up to (1 min - 4 hours), whereas if the system boots up from a warm start, the time for the sensors to provide the valid data is up to (10 sec - 2 hours). For more details, refer to the specific sensor datasheet.

Sensor Name	When Powered Up First Time	After Soft or Hard Reset	
ZMOD4410 IAQ Up to 1 minute		Up to 1 minute	
ZMOD4510 OAQ Up to 1.5 hours		Up to 1 hours	
OB1203 Up to 20 minutes		Up to 20 seconds	
	(After placing a finger on the sensor, it may take up to 60 seconds to sense data)	(After placing a finger on the sensor, it may take up to 60 seconds to sense data)	
HS3001	Up to 30 seconds	Up to 10 seconds	
ICP Up to 30 seconds		Up to 10 seconds	
ICM	Up to 30 seconds	Up to 10 seconds	

Table 2. Sensor Stabilization Time

Note: Stabilization time of the sensor provided above is from the point of sensor initialization.

## 9. Known Issues and Troubleshooting

- This section talks about the known FSP and tool-related issues. More details can be found at the link: <u>https://github.com/renesas/fsp/issues</u>.
- It is recommended that the dashboard be used with the Microsoft Edge browser; it does not work properly with the Google Chrome browser.
- When running debug on e<sup>2</sup> studio, if the application is rerun multiple times, an issue with the OB1203 sensor's i2c communication might randomly occur. Users need to reconnect the USB cable (J10) and USB-C cable (J28) to reset the OB1203 sensor and run the application again.



• After activating SIM Card, when running the application with option "6. Start Application" (section 2.8), if a user encounters the "CELLULAR\_TIMEOUT Failure 7" issue (Figure 56), although user can get CATM Info via option 4 (Figure 8) and validate SIM activation via option 5 (Figure 11), please check the PMOD2 jumper settings in the section 1.4.

File Edit Setup Control Window Help						
HECK CREDENTIALS STORED IN DATA FLASH	~					
Certificate saved in data flash is verified and successful						
Private key saved in data flash is verified and successful						
MQIT end point saved in data flash is verified and successful						
IOT thing name saved in data flash is verified and successful						
tanting AMS cloud Annlication						
Application Project Version 1.0 *						
Flex Software Pack Version 5.3.0 *						
**************************************						
erer to Application Note for more uterals on Application reject and SP liser's Manual for more information about AVS fore MOTT						
***************************************						
ERR] In Function: setupCellular(), >>> Cellular_Init failure 7 <<<<						
EXRI In Function: setupCellular(), >>> Cellular GetServiceStatus failed ?, ps registration status Ø <<<						
EXXI IN FUNCTION: SetupCellular(), /// Cellular GetServiceStatus failed /, ps registration status 0 <<<						
EMPLIE Reportion: setup.cellular(), /// cellular detservicestatus failed 7, ps registration status 0 ///						
Engl in function, setupoliticar(), // cellular detervicestatus failed 7 ne vegistration status 0 (//						
ERRI In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, hs registration status $\beta$ <<<						
ERRI In Function: setupCellular(). >>> Cellular GetServiceStatus failed 7. vs registration status $\theta <<<$						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status 0 <<<						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status Ø <<<						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status 0 <<<						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status 0 <<<						
ERRI In Function: setupCellular(), >>> Cellular GetServiceStatus failed 2, ps registration status Ø $\langle\langle\langle$						
EXEN In Function: setupGellular $()$ , >>> Gellular GetServiceStatus failed ?, ps registration status Ø <<<						
EXAMPLE 1 n Function: setupCellular $\langle , \rangle \rangle >$ Cellular GetServiceStatus failed 7, ps registration status 0 <(<						
ERRI in runction: setupcellular(), /// Cellular Getservicestatus failed 7, ps registration status 0 (()						
End in function, setupolitication $\lambda > 0$ cellular decorrected to failed 7, ps registration status 0 (((						
ERBI In Function: setupolitation $\mathcal{S}$ ( $\mathcal{S}$ ) definition detorvice status failed 7, as registration status 0 ( $\mathcal{S}$ )						
ERRI In Function: setupCellular(). >>> Cellular GetServiceStatus failed 7. ps registration status 0 <<<						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status Ø <<<						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status Ø <<<						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 2, ps registration status Ø <<<						
ERRI In Function: setupCellular(), >>> Cellular GetServiceStatus failed ?, ps registration status Ø <<<						
EXAMPLE 1 In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status () <<<						
EMBLIN Function: setupcellular(), // cellular GetServicestatus failed 7, ps registration status 0 (((						
FREI In Function: setuportation(), // cellular detservicestatus failed 7, ps registration status 0 (((						
ER81 In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status 6						
ERR] In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status Ø <<<	6					
ERRI In Function: setupCellular(), >>> Cellular GetServiceStatus failed 7, ps registration status 0 <<<						

Figure 56 Cellular\_Init failure issue

# 10. Debugging

Enable the USR\_LOG\_LVL (LOG\_DEBUG) macro in the application project to obtain additional information about the error during debugging.

## **10.1 SIM Card Activation Problem**

- If the SIM activation fails, verify that the ICCID number and PUK numbers are correctly entered when activating the SIM card on Truphone IoT SIM activation platform <u>truphone.com/connectit</u>
- If **Menu 5 Validate SIM activation** PING response returns a Ping Failed condition, it can take up to 15 minutes or longer for the card to be activated after performing **Activating the SIM Card** to obtain LTE Network access. In this case, wait at least 15 minutes (or longer) and repeat **Menu 5 Validate SIM activation**.
- SIM cards cannot be activated more than once. To verify whether the SIM card has already been activated, please monitor and manage your SIMs on the Truphone IoT Connectivity Management Platform or contact Truphone support through <u>iot.truphone.com</u> by logging into your account.
- If Menu 5 Validate SIM activation PING response continues to return Ping Failed condition, first check the external antenna is connected securely to the RYZ024A PMOD and try again. The CSQ Network Signal Quality (RSSI) could be too low to connect. If the RSSI is 99 then check external antenna is connected. It may be possible that no Cell Network Signal could be detected in your area. An RSSI reading with RSSI = 15 or less indicates marginal or poor reception.
   CSQ Network Signal Quality (RSSI) [99 = No Cell Signal] = 15, Marginal Signal Quality It may be necessary to move the CK-RA6M5 v2 with PMOD to a different location to improve the

It may be necessary to move the CK-RA6M5 v2 with PMOD to a different location to improve to Network Signal Quality (RSSI) to get an RSSI value in the range of 16 to 98.



• If **Menu 5 Validate SIM activation** continues to fail, verify that the APN is set for the Global Region where the RYZ024A PMOD is trying to connect. The APN setting and LTE Band List depend on your Global Region and the SIM card provider.

To set the Access Point Name (APN) for SIM Card providers other than Truphone The APN is set in the Application project in /src/cellular\_setup.c

See #define CELLULAR\_APN "iot.truphone.com" /\* APN : <u>Truphone</u> SIM Card \*/

• For all other SIM card issues that cannot be resolved with these troubleshooting steps, contact Truphone support through <u>iot.truphone.com</u> by logging into your account.



## Website and Support

Visit the following vanity URLs to learn about key elements of the RA family, download components and related documentation, and get support.

CK-RA6M5 v2 Kit Information RA Cloud Solutions RA Product Information RA Product Support Forum RA Flexible Software Package Renesas Support renesas.com/ra/ck-ra6m5 renesas.com/cloudsolutions renesas.com/ra renesas.com/ra/forum renesas.com/FSP renesas.com/support



# **Revision History**

		Description	
Rev.	Date	Page	Summary
1.00	Jul.15.24	—	Initial release



# 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 is supplied until the 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 systemevaluation test for the given product.

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