

SIMPLE DEMO

Wi-Fi MQTT Client Simple Demo

Quick Start Guide of MQTT Client Simple Demo

Rev.1.00 Mar, 2022

Introduction

This quick start guide describes the setup and use of MQTT client running on DA16200 Wi-Fi module. This guide mainly focuses on describing how to make Wi-Fi module as MQTT client by AT command for connecting MQTT broker, and how to publish a message to MQTT server. Meanwhile, a simplest button pressed operation will be recorded by MQTT server through publishing a message by MQTT client.

Through this guide and related demo, you can easily start your development on DA16200, a Wi-Fi module, using AT command and EK-RA6M4, an evaluation kit for RA6M4 MCU group.

Target Device

EK-RA6M4 (R7FA6M4AF3CFB) DA16200 PMOD

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1. Kit Contents

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

1.1 Hardware components

- EK-RA6M4
- DA16200 PMOD (US159-DA16200MEVZ)
- Micro USB cable
- A UART-USB bridge cable (if possible and optional for AT command observation)



1.2 Software components

Below software components are needed:

Category	Item	Remark
Firmware	RA6M4_DA16200_MQTT_CLIENT.zip	Compressed project file
	RA6M4_DA16200_MQTT_CLIENT.mot	Motorola S-record file for programming RA6M4 chip
Software	e2 studio 2021-10, SSP v3.5.0	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.
	mosquitto-2.0.14-install-windows-x64.exe	An open source (EPL/EDL licensed) message broker that implements the MQTT protocol versions 5.0, 3.1.1 and 3.1.



2. Features

- Supply power to the kit by micro-USB cable
- Set the necessary modules of RA6M4 to establish connection between EK and DA16200 PMOD
- Use Mosquitto software, a message broker implementing the MQTT protocol on PC, to make a laptop a MQTT Server
- Initialize and control Wi-Fi module (DA16200) by AT command to act as a MQTT client
- The topic of button with message is published to MQTT Server when the button (S1) on EK board is pressed
- Make a smartphone a MQTT client subscribing button topic, getting the status of button from MQTT Server.

3. Set Up the Demo

3.1 Prerequisite

Step 1. Connect your PC (set as a MQTT Server later) to a Wi-Fi Router.

Open Windows Settings, click Network & Internet, go to WLAN. Set it to ON, click "show available networks" and select "Renesas Test Router" as an example. Here a password of "12345678" is assigned to this router.



Step 2. Confirm the IP address of PC which is distributed by Wi-Fi Router.





DA16200

Step 3. Setup a MQTT Server on PC.

Download Eclipse Mosquitto software that can run on your PC system and install it. The URL of Mosquitto downloading is show below. https://mosquitto.org/download/

Here use Mosquitto installed on windows 64-bit system as an example. G mosquitto-2.0.14-install-windows-x64.exe

Then modify some information in the configuration file.

Find out file of mosquitto.conf and open it.



Search "# listener port-number [ip address/host name/unix socket path]", add line of "listener 1883" below it, signifying that the listening port number is 1883.

Search "# allow_anonymous false", delete "#" to not allow anonymous logins.

Search "# password_file", change it to "password_file pwfile.example", setting the file location which involving account name and log in password.

Then set users name and password. In the installation path, right click mouse when holding down "Shift", select "Open PowerShell window here" from the pop-up menu.



Input "./mosquitto_passwd -c pwfile.example admin". This command is to add an account named admin. Input password twice to confirm this setting, then the count is created successfully. Here use "Renesas" as the password.





File of "pwfile.example" can be opened for confirming this setting. Close this PowerShell window means the setting has been finished.

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Reopen a PowerShell window following the previous step, input command ".\mosquitto -c .\mosquitto.conf -v" to run this tool using mosquitto.conf as a configuration file, while enabling detailed log mode.



At this point, the MQTT broker (MQTT server) setup on PC is running.

Note: The MQTT message send by client cannot be displayed on the MQTT Server entirely, so a smartphone is necessary to subscribe this message for monitoring the entire information.

Step 4. Download MQTTool from App Store, which is a MQTT client software on Iphone, or something like this from Google Shop. Here use MQTTool running on Iphone as an example.



Firstly, open "settings" in Iphone, select "WLAN" and choose the name of AP which is projected a Wi-Fi signal by Wi-Fi Router. After connecting successfully, the bridge between PC and the smartphone is established.

Then open MQTTool, input IP address of MQTT Server (Host) and select Port number 1883, define a Client Id, input Username and Password to log in MQTT Server. The username and password for logging in MQTT Server has been set by step3 through mosquitto.conf file. Click "Connect" to realize connection with MQTT Server.





After click "Connect" button, Mosquitto receives connecting command and displays that a new connection from smartphone has been established.



Click "Subscribe" tab, input "button" in topic blank, which is designed by sample code, click "subscribe" to subscribe to message based on this topic. All message based on this topic sent by MQTT server will be received by MQTTool.

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MQTTool
Topic: button
QOS: 0 1 2
Subscribe Clear
Status: Unsubscribed
((◦)) ↓ ↑



3.2 Connect the solution kit

Power off the solution kit, insert DA16200 PMOD board into J25 (PMOD2 on EK), establishing the whole system just as the picture at chapter 1.1.

3.3 Debug and 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.

Step 1. Insert Micro USB cable into Debug USB Micro-B connector (J10), establishing a debug channel.



Step 2. Modify the project according to the actual internet environment.

Import project into e2 studio, open project->src->da16200_AT.c, find the array variables associated with the internet environment, such as the current country, ssid and password of Wi-Fi Router, IP address of MQTT Broker and ssid and password for logging in.



DA16200

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DA16200_AWS_IoT_AT_CMD_Sparkfu	in_RA2L1	2 * Cor	yright [2020-2021] <u>Renesas</u> Electronics Corporation and/or its affiliates. All Rights Reserved.
EK_RA6M4_HS3001_PMOD1_T		20 #incl u	de "hal data.h"
HS300x_RA6M4_NonOS		21 #inclu	de "da16200 AT.h"
RA6M4_DA16200_MQTT_CLIENT [I > 3 Binaries	Debugj	22 #inclu	de "dialog wifi demo.h"
> Includes			de "common utils.h"
> 🐸 ra		24	
> 😂 ra_gen			
V 🐸 stc			r_t AT_cmd_send_ok(da16200_at_cmd_index_t cmd_index);
> 🗁 SEGGER_RTT			r_t AT_cmd_send_data (da16200_at_cmd_index_t cmd_index, uint16_t wait_time_ms);
> h common_utils.h			r_t AT_cmd_set_confirm(da16200_at_cmd_index_t cmd_index);
> c da16200_AT.c		28 fsp_er	r t wifi_con_init(void);
> 🖻 da16200_AT.h		29 fsp er	r t wifi con routine(void);
> & dialog_wifi_demo.c			r t mgtt con routine(void);
> h dialog_wifi_demo.h		31	
> 🖻 hal_entry.c > 👝 Debug			ountry[] = "CH":
o 👝 Debug o 🗁 demo			
> 🇀 ra_cfg			<pre>p_ssid[] = "'Renesas Test Router',";</pre>
> > script			p_pw[] = "12345678";
@ configuration.xml		35 char r	<pre>qtt_broker_ip[] = "192.168.1.102,";</pre>
R7FA6M4AF3CFB.pincfg		36 char r	<pre>gtt port[] = "1883";</pre>
📄 ra_cfg.txt		37 char i	<pre>qtt broker ssid[] = "admin,";</pre>
RA6M4_DA16200_MQTT_CLIENT.e			<pre>gtt broker pw[] = "Renesas";</pre>
RA6M4_DA16200_MQTT_CLIENT.e	elf.launch		att client id[] = "DA16200-client";
> ⑦ Developer Assistance			
RA6M4_ZMOD4410_DA16200_MQTT_			t_cmd_end[] = "\r\n";
RA6M4_ZMOD4410_DA16200_SPARK RA6M4_ZMOD4410_HS3001_DA1620		41	
RA0M4_ZMOD4410_HS3001_DA1620 Renesas_Wifi_DA16200_RA6M4_Dem		42 uint8	
ZMOD4410 RA6M4 NonOS	10	43 uint32	_t part_array[3];
200000000000000000000000000000000000000		44 char	ip_addr[20];
		45	
		46 ⊕ /** A1	Command sets */
			INSPECTED 27 D This structure must be accessible in user code. It cannot be static. */
			at cmd set t g da16200 cmd set[] =
		40 Ga1020	o_ar_cmu_ser_r B_datozoo_cmu_ser[] =
		(
Properties 🕄 🖹 Problems 🌒 Smar		🖬 🖬 🏹 🗔 🕴 '	° □ [20 pin Conficts [2] Conside 27] [20 Memory // Search [20 + 15] · · · · · · ·
perty	Value		RABMA_DATASOS_MCTT_CLIENT.etf [Recessar GDB Hardware Debugging]
info			- Code Flash Secure (kB) : 20
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linked		5M4_DA16200_MQTT_CLIENT\src\da162	
name	da16200_AT.c	anne_bra rousse_inter I_CEIEI41/sre/da loz	
path	/RA6M4 DA16200 MQTT CLIEN	T/src/da16200 AT.c	
size	26,432 bytes		Finished target connection
			GDB: 63733
			Tonant connection status OV

Compile the project to get the object file which can be downloaded to the chip. Then use debug function to test the sample code.

2 v2021_10 - RA6M4_DA16200_MQTT_CLIENT/	/src/da16200_AT.c - e ² studio			- 0 X
Eile Edit Source Refactor Navigate Se	earch <u>P</u> roject Renesas⊻iews <u>B</u>	un <u>W</u> indow <u>H</u> elp		
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Project Explorer 💠	🖻 💱 🍸 🕴 🗖 🖬			
DA16200_AWS_IoT_AT_CMD_Sparkfun_R	A2L1	2	* Copyrig	ight [2020-2021] <u>Renesas</u> Electronics Corporation and/or its affiliates. All Rights Reserved.
EK_RA6M4_HS3001_PMOD1_T		20	#include "	"hal data.h"
HS300x_RA6M4_NonOS		21		"da16200 AT.h"
V SRA6M4_DA16200_MQTT_CLIENT [Deb	iug]	22		"dialog wifi demo.h"
> 💒 Binaries				
> j Includes		23	#include	"common_utils.h"
> 🐸 ra > 😕 ra_gen		24		
> 🗁 ra_gen		25	fsp err t	t AT_cmd_send_ok(da16200 at cmd index t cmd index);
> C SEGGER_RTT		26	fsp err t	t AT cmd send data(da16200 at cmd index t cmd index, uint16 t wait time ms);
> is common_utils.h		27		t AT cmd set confirm(da16200 at cmd index t cmd index);
> c da16200_AT.c		28		twifi con init(void):
> a16200_AT.h				
> dialog_wifi_demo.c		29		<pre>t wifi_con_routine(void);</pre>
> i dialog_win_demo.c		30	fsp_err_t	t mqtt_con_routine(void);
> [c] hal_entry.c		31		
> 🕞 Debug		32	char count	ntrv[] = "CH":
> 🗁 demo		33	char ap ss	
> 🗁 ra_cfg		34		
> 🧁 script			char ap_pw	
configuration.xml		35		t_broker_ip[] = "192.168.1.102,";
R7FA6M4AF3CFB.pincfg		36	char mqtt_	t_port[] = "1883";
ra_cfg.txt		37	char mott	t broker ssid[] = "admin,";
RA6M4_DA16200_MQTT_CLIENT.elf.jli		38		t broker pw[] = "Renesas";
RA6M4_DA16200_MQTT_CLIENT.elf.la	aunch	39		client [d] = "DA16200-client";
> ⑦ Developer Assistance				
RA6M4_ZMOD4410_DA16200_MQTT_CLI		40	char at_cm	<pre>cmd_end[] = "\r\n";</pre>
RA6M4_ZMOD4410_DA16200_SPARKFUN		41		
RA6M4_ZMOD4410_HS3001_DA16200_M	IQTT_CLIENT	42	uint8 t	at cmd data[AT CMD LENGTH];
Renesas_Wifi_DA16200_RA6M4_Demo		43	uint32 t	part array[3];
ZMOD4410_RA6M4_NonOS		44	char	ip addr[20];
			Char	th_ann [zo],
		45		
				ommand sets */
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		48	da16200 at	at cmd set t g da16200 cmd set[] =
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location	F:\SST\Dialog\MQTT_Client\J	A6M4 DA16200 MOTT CLIER	There\da16200 A	
name	da16200_AT.c	and a factor of the second sec	the case of the second plan	
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Note: about how to use e2studio and import the project, you can refer to "5. Customizing the Quick Start Example Project" chapter of EK-RA6M4 Quick Start Guide.

https://www.renesas.com/jp/zh/document/qsg/ek-ra6m4-quick-start-guide?language=en

If the project doesn't need to be modified, or it has been updated and only needs to be downloaded to the target MCU, please find the "*.srec" file in the debug folder under the project and modify the suffix to "mot" to get the type of file that can be downloaded to target MCU by SEGGER J-Link.



^			
Name	Date modified	Туре	Size
a ra	2/10/2022 9:41 AM	File folder	
ra_gen	2/22/2022 2:55 PM	File folder	
src	3/9/2022 3:03 PM	File folder	
📄 makefile	3/9/2022 3:03 PM	File	6 KB
🗋 makefile.init	3/9/2022 2:59 PM	INIT File	3 KB
bjects.mk	3/9/2022 2:59 PM	MK File	1 KB
RA6M4_DA16200_MQTT_CLIENT.elf	3/9/2022 3:03 PM	ELF File	608 KB
RA6M4_DA16200_MQTT_CLIENT.elf.in	3/9/2022 3:03 PM	IN File	2 KB
RA6M4_DA16200_MQTT_CLIENT.map	3/9/2022 3:03 PM	MAP File	166 KB
RA6M4_DA16200_MQTT_CLIENT.rpd	3/9/2022 3:03 PM	RPD File	1 KB
RA6M4_DA16200_MQTT_CLIENT.sbd	3/9/2022 3:03 PM	SBD File	4 KB
RA6M4_DA16200_MQTT_CLIENT.srec	3/9/2022 3:03 PM	SREC File	61 KB

Unzip "Download_Tool.zip" file, replace the file of the same name under JLink folder with this file. Back to Download_Tool folder and click "bmp.bat" file to program MCU. 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.

Name	Date modified	Туре	Size
JLinkGDBServer.exe	7/28/2021 5:17 PM	Application	473 KB
JLinkGDBServerCL.exe	7/28/2021 5:17 PM	Application	386 KB
🔜 JLinkGUIServer.exe	7/28/2021 5:17 PM	Application	288 KB
🔜 JLinkLicenseManager.exe	7/28/2021 5:17 PM	Application	183 KB
JLinkRDI.dll	7/28/2021 5:17 PM	Application exten	376 KB
🛃 JLinkRDIConfig.exe	7/28/2021 5:17 PM	Application	121 KB
🔜 JLinkRegistration.exe	7/28/2021 5:17 PM	Application	491 KB
🔜 JLinkRemoteServer.exe	7/28/2021 5:17 PM	Application	453 KB
🔜 JLinkRemoteServerCL.exe	7/28/2021 5:18 PM	Application	365 KB
🔜 JLinkRTTClient.exe	7/28/2021 5:18 PM	Application	140 KB
🔜 JLinkRTTLogger.exe	7/28/2021 5:18 PM	Application	167 KB
🔜 JLinkRTTViewer.exe	7/28/2021 5:18 PM	Application	320 KB
🔜 JLinkSTM32.exe	7/28/2021 5:18 PM	Application	146 KB
🔜 JLinkSTR91x.exe	7/28/2021 5:18 PM	Application	154 KB
🔜 JLinkSWOViewer.exe	7/28/2021 5:18 PM	Application	235 KB
🔜 JLinkSWOViewerCL.exe	7/28/2021 5:18 PM	Application	151 KB
🔜 JMem.exe	7/28/2021 5:18 PM	Application	387 KB
🔜 JRun.exe	7/28/2021 5:18 PM	Application	257 KB
🛃 JScope.exe	7/28/2021 5:18 PM	Application	401 KB
🔜 JTAGLoad.exe	7/28/2021 5:18 PM	Application	173 KB
🚳 msvcp100.dll	7/27/2021 8:38 PM	Application exten	412 KB
🚳 msvcr100.dll	7/27/2021 8:38 PM	Application exten	756 KB
QtCore4.dll	7/27/2021 8:52 PM	Application exten	2,498 KB
🗟 QtGui4.dll	7/27/2021 8:52 PM	Application exten	7,814 KB
RA6M4_DA16200_MQTT_CLIENT.mot	2/22/2022 2:55 PM	MOT File	58 KB
📧 SWOAnalyzer.exe	7/28/2021 5:18 PM	Application	74 KB
🛃 Uninstall.exe	8/2/2021 7:28 PM	Application	182 KB

	> Download_Tool	
^ 名称 ^	修改日期 大	小
JLink	2021/8/18 15:47	
log bmp.bat	2021/8/18 15:48	1 KB

Once programming begins, "Flash download" interface appears, like the picture below.



C:\WINDOWS\system32\cmd.exe			_	×	
PC = 00003C28, CycleCnt = 00000000 R0 = 00000000, R1 = 00000000, R2 = 0000 R4 = 00000000, R5 = 00000000, R6 = 0000 R2 = 20030830 SP(R13) = 20000C80, MSP= 20000C80, PSP= VFSR = F9000000. MSP= 20000C80, PSPR = 1 CFEP = 00000000, CONTROL = 00, FAULTMA:	00000, R7 = 0000000 07FDE, R11= 0000000 000000000, R14(LR) 01000000, IPSR = 00	00 11 = FFFFFFF 00 (NoException)		^	
Security extension regs: MSP_S = 20000C80, MSPLIM_S = PSP_S = 00000000, PSPLIM_S =	SEGGER J-Link V7.52a -	Flash download (24 KiB)	×		
MSP_NS = 000000000, MSPLIM_NS =	Compare	5 <mark>0%</mark>	0.367s		
PSP_NS = 3D5C5ED4, PSPLIM_NS =	Erase	0%	0.000s		
CONTROL_S = 00, FAULTMASK_S = 00, BA CONTROL_NS = 00, FAULTMASK_NS = 00, BA	Program & <u>L1-Verify</u>	0%	0.000s		
	10.11-11.01	0%	0.000=		
<pre>FPS0 = 00000000, FPS1 = 00000000, FPS2 FPS4 = 00000000, FPS5 = 00000000, FPS6 FPS8 = 00000000, FPS9 = 00000000, FPS1</pre>		Comparing range 0x00000000 - 0x00005FFF (24 KiB)	0.367s		
FPS12= 00000000, FPS13= 00000000, FPS1 FPS16= 00000000, FPS17= 00000000, FPS13					
FPS20= 00000000, FPS21= 00000000, FPS2 FPS24= 00000000, FPS25= 00000000, FPS2 FPS28= 00000000, FPS29= 00000000, FPS3 FPSCR= 00000000, FPS39= 00000000, FPS39	2= 00000000, FPS23= 6= 00000000, FPS27=	= 00000000 = 00000000			
Downloading file [JLink\RA6M4_DA16200_ I-Link: Flash download: Bank 0 @ 0x010				~	

After programming, J-Link operation interface will exit automatically.

(Note: If you want the latest SEGGER J-Link version, please download from link below: https://www.segger.com/downloads/jlink)

3.4 Run the solution

Step 1. Restart the system by pressing RESET button (S3) on EK-RA6M4 or powering off and on the system, causing the program to run again. While under debugging, restart the program is necessary.

Step 2. Open "JLinkRTTViewer.exe" in JLink folder, which is unzipped at chapter 3.3 step 2, specify target device as R7FA6M4AF, change RTT Control Block from "Auto Detection" to "Search Range" and input "0x20000604 0x1000" to the blank block shown below.

🔜 J-Link RTT Viewer	V7.52a
File Terminals Inp	🔜 J-Link RTT Viewer V7.52a Configuration
All Terminals T	Connection to J-Link
	● USB Serial No
	○ ICP/IP
	O Existing Session
	Specify Target Device
	R7FA6M4AF · · ·
	Script file (optional)
	Target Interface & Speed
	SWD • 4000 kHz
	RTT Control Block
	Auto Detection Address Search Range Enter one or more address range(s) the RIT Control block can
	<pre>syntax: (RangeStart [Hex]) (RangeStark), (RangeIstart [Hex]) Example: 0x10000000 0x1000, 0x2000000 0x1000</pre>
LOG: All Termina LOG: All Termina	0x20000604 0x1000
<	OK Cancel

The first address of "Search Range" can be found in "*.map" file after the demo code is built. Please open "*.map" file and search "_SEGGER_RTT", then copy the address assigned by compiler to this place.



DA16200

Wi-Fi MQTT Client Simple Demo

🛊 📕 🔅 Debug 🔻	RA6M4_DA1620	0_MQTT_CLIENT.eF 🗸 🌼	📑 • 🔛 🐚 🛛 🖷 • 🍕 •	■ [% * * 0 = M 3. + .e H 电 .e Ø % * • 9	• 05 • 🐐 🖙 🚥 💱 🖏 🍪 🖋	🔊 🛷 🕶 🐻 🖬 🖷 🖗	• ∦ • ♥ ♥ ♥ • ○ • Ħ
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Debug 🛛 📄 🦮 🛔 🖶 🗇 🗖	da16200_AT.c	RA6M4_DA16200_MQTT_C	LIENT.map 🕜 main.c	BRA6M4_DA16200_MQTT_CLIENT.map ×		- 8 ((x)+V 🎭 B 🛋 M 🔁 P 🖾 🕂 E 🥐 E 🐾 🦷
RA6M4_DA16200_MQTT_CLIENT.elf [Rene	1524	.bss.button	push			<u>^</u>	8 %
RA6M4_DA16200_MQTT_CLIENT.elf [1] Thread #1 1 (single core) [core: 0] (I	1525		0x200005e8	<pre>0x1 ./src/dialog_wifi_demo.o</pre>			KA6M4_DA16200_MQTT_CLIENT [Debug]
arm-none-eabi-gdb (7.8.2)	1526		0x200005e8	button_push			> 🖗 Binaries
Renesas GDB server (Host)	1527	.bss.button					> 🖾 ra
	1528 1529		0x200005e9	0x1 ./src/dialog_wifi_demo.o			> 🥴 ra_gen
	1529	*fill*	0x200005e9 0x200005ea	button_status 0x2			> C SEGGER RTT
	1530		agt periods	0XZ			> 🖹 common_utils.h
	1532	.uss.gp_prv	_agc_perious 0x200005ec	0x18 ./ra/fsp/src/r agt/r agt.o			> 🛃 da16200_AT.c
	1533	*(COMMON)	OX200005EC	oxid that share the agent agend			> ada16200_AT.h > 2 dialog wifi demo.c
	1534	COMMON	0x20000604	0xa8 ./src/SEGGER RTT/SEGGER RTT.o			> A dialog_wifi_demo.h
	1535		0x20000604	SEGGER RTT			> in hal_entry.c
	1536	COMMON	0x200006ac	0xa0 ./src/da16200_AT.o			✓ 200 Debug > 200 ra
	1537		0x200006ac	part_array			> 👜 ra_gen
	1538		0x200006b8	ip_addr			> 😂 src
	1539		0x200006cc	at_cmd_data			> State RA6M4_DA16200_MQTT_CLIENT.elf - [arm/le arm/le makefile
	1540	COMMON	0x2000074c	0x8 ./ra_gen/common_data.o			makefile.init
	1541		0x2000074c	g_ioport_ctrl			🕞 objects.mk
	1542	COMMON	0x20000754	0x5c ./ra_gen/hal_data.o			RA6M4_DA16200_MQTT_CLIENT.elf.in RA6M4_DA16200_MQTT_CLIENT.map
	1543 1544		0x20000754 0x20000784	g_wifi_uart_ctrl g_timer_ctrl			RA6M4_DA16200_MQTT_CLIENT.map
	1544		0x200007a0	g_cimer_ctri g_external_sw1_ctrl			# RA6M4_DA16200_MQTT_CLIENT.sbd
	1545	COMMON	0x200007b0	0x40 ./ra/fsp/src/bsp/mcu/all/bsp group	ing o		RA6M4_DA16200_MQTT_CLIENT.srec sources.mk
	1547	COPPON	0x200007b0	g bsp group irq sources	114.0		> 😂 demo
	1548	COMMON	0x200007f0	0x4 ./ra/fsp/src/bsp/mcu/all/bsp io.o			> 😂 ra_cfg
	1549		0x200007f0	g protect pfswe counter			> 👝 script
	1550	COMMON	0x200007f4	0x180 ./ra/fsp/src/bsp/mcu/all/bsp irg.o			configuration.xml R7FA6M4AF3CF8.pincfa
	1551		0x200007f4	gp_renesas_isr_context			i ra_cfg.txt
	1552	COMMON	0x20000974	0x8 ./ra/fsp/src/bsp/mcu/all/bsp_regist	er_protection.o		RA6M4_DA16200_MQTT_CLIENT.elf.jlink
	1553		0x20000974	g_protect_counters			RA6M4_DA16200_MQTT_CLIENT.elf.launch (7) Developer Assistance
	1554	COMMON	0x2000097c	<pre>0x4 ./ra/fsp/src/bsp/cmsis/Device/RENES</pre>	AS/Source/system.o		RA6M4 ZMOD4410 DA16200 MQTT CLIENT
	1555		0x2000097c	SystemCoreClock			RA6M4_ZMOD4410_DA16200_SPARKFUN_MQTT_CI
	1556		0x20000980	. = ALIGN (0x4)			RA6M4_ZMOD4410_HS3001_DA16200_MQTT_CLIEN Renesas_Wifi_DA16200_RA6M4_Demo
	1557 1558		0x20000980	bss_end = .			ZMOD4410_RA6M4_NonOS
	1928					× .	<
			Contraction To	A CONTRACTOR OF A CONTRACTOR			■ X % % 5 % (2 0 - 1 • • • • • •
		egisters 👔 Debug Shell 🛷 _CLIENT.elf [Renesas GDB Har		xugger Console 👒 Smart Browser 📋 Memory 🍃 Call Hierarchy			
		akpoint set at a					
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>	<						

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

After MQTT connection finished, Green Led on EK-RA6M4 lights.

Press S1 on EK-RA6M4 publishes a message of "button is pressed" with topic of button to MQTT Server, any subscribers subscribing this topic will receive this information, smartphones are no exception.

Mosquitto software updates the current Wi-Fi and MQTT connection state and message received from MQTT client.





The subscribed message from MQTT Server displays on MQTTool on smartphone.

.III 中国联通 🗢	09:22	53%	6	
МС	MQTTool			
Topic: button				
QOS: 0 1 :				
Unsubsc	cribe	Clear		
Status: Subscribed to: b	outton			
button button is pressed		;	>	
button button is pressed		>	>	
button button is pressed)	>	
button button is pressed)	>	
		Stats Abo		
Connect Subscribe	Publish	Stats Abo	out	

Meanwhile, the Blue Led on EK-RA6M4 turns on and off by turns when button is pressed.

If you want to observe AT Command, use a UART to USB bridge and connect RXD of UART part to P410 pin on EK-RA6M4 board, open serial tool such as Tera Term, and set the baud rate to 115200. Then AT command will pop up. It's an auxiliary way to debug the program and of course as an option.

Summarize: All described above is a simplest demo for a beginner. If you want a more complex example, please refer to other samples.



4. Reference Documents

Renesas RA6M4 MCU

RA6M4 - 200MHz Arm® Cortex®-M33 TrustZone®, High Integration with Ethernet and OctaSPI | Renesas

EK-RA6M4

EK-RA6M4 - Evaluation Kit for RA6M4 MCU Group | Renesas

DA16200

DA16200 | Dialog (dialog-semiconductor.com)

DA16200MOD

DA16200 Modules | Dialog (dialog-semiconductor.com)

Technical Updates/Technical News

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

Website and Support

Renesas Electronics Website <u>http://www.renesas.com/</u>

Inquiries http://www.renesas.com/contact/



Revision History

	Date	Description				
Rev.		Page	Summary			
1.00	Feb. 22, 2022	_	First edition issued			

General Precautions in the Handling of Micro processing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Micro processing 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 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 highimpedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced near 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 micro processing 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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