

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

Contents

1. I	Kit Contents	2
1.1	Hardware components	2
1.2	Software components	2
2. F	Features	3
3. 3	Set Up the Demo	3
3.1	Prerequisite	3
3.2	Connect the solution kit	7
3.3	Debug and download code to EK-RA6M4	7
3.4	Run the solution	
4. F	Reference Documents	13



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.

× Ei	le <u>E</u> d	lit <u>S</u> election	<u>V</u> iew	<u>G</u> o	<u>D</u> ebug		pwfile.exa	ample - Vis	ual St	— I		×
С)	≣ pv	wfile.example >	<							ដ្រ		
	E: > I	Program Files 🕽	mosqu	iitto >	∍ ≣ pwfile	e.exan	nple					
	1	admin:\$7	\$101\$7	7rKfv	WXVaKuH	JVGM	\$NzUygjlt	oKJhJiIG	wlgJwa	1teRUH5>	by	
<u>دت</u> بک												
<u> २०</u>												
	0				In 1 C	ol 1	Spacos: A	CR 2312	CDLE	Plain Toyt	0	\cap
	2.0				En I, C	.01-1	spaces. 4	00 2312	CKLF	Fiain lext	0	4

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.

atil 中国联通 🗢 15:43 100% 🖛
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

<pre>i</pre>	<pre>int return group area prop mean prop the mean property of the set of the</pre>	v2021_10 - RA6M4_DA16200_MQT	T_CLIENT/src/da16200_AT.c - e ² studio	Rus Mindau Hala	-
Control Control <t< td=""><td>Image: State of the state</td><td>Keractor Nav</td><td>v RA6M4_DA16200_MQT</td><td>Kun Window Help</td><td>9 × 低 × 品 1 触 () () 2 物 × 低 × 物 m m) 2 図 よ () 2 か タ × 3 9 × 約 × ひ ヴ ウ × ウ × 1* Q, () 18 図 C/C++ な Debug () FSP Configuratio</td></t<>	Image: State of the state	Keractor Nav	v RA6M4_DA16200_MQT	Kun Window Help	9 × 低 × 品 1 触 () () 2 物 × 低 × 物 m m) 2 図 よ () 2 か タ × 3 9 × 約 × ひ ヴ ウ × ウ × 1* Q, () 18 図 C/C++ な Debug () FSP Configuratio
<pre> the second set of Constant, Se</pre>	<pre> the second se</pre>	Project Evoloper 52		D 4416200 AT c X	
We down we work of the set of the s	Bit Class (construction) interlates in the last of the l	DA16200 AWS INT AT CMD Se	narkfun RA2L1		anumight [2020-2021] Response Electropics Componition and/on its affiliates. All Rights Recommed
Bit Dots, Max Nuess 01 Finite data	Bit Mark Junits 0 Final Late Final Late Final Late 0 Final Late 0 Final Late Final Final Late Final Late	EK RA6M4 HS3001 PMOD1 T	and all and a lot at	20 #4-	opyright [2020-2021] <u>Relesas</u> Electronics corporation and/or its artifiates. All kights keserved.
Bit Allowies MDT.CLEMT [Delay] 21 # Include "alabz@g.Al.h" # Enclude "alabz@g.Al.h" # Include "alabz@g.Al.h" # Include T	<pre>S Mail Andrew MUT, CLEMT proval S Mail Andrew MUT, CLEMT proval S main the set of the set of</pre>	HS300x RA6M4 NonOS		20 #10	uude hal data.h
20 maximum 22 minclude "claip(g,uiff, dees,h" 20 minclude "claip(g,uiff,	Person 22 Winclude "Composition (His.h" Person 24 Space (His.Her.) Person 24 Space (His.Her.) Person 24 Space (His.Her.) Person 25 Space (His.Her.) 25 Person 25 Space (His.Her.) 25 Person 25 Space (His.Her.) 26 Person 25 Space (His.Her.) 27 Person 25 Space (His.Her.) 27 Person 25 Space (His.Her.) 26	SRA6M4 DA16200 MQTT CLI	ENT [Debug]	21 #in	lude "da16200_AT.h"
<pre>spleture spleture spletur</pre>	<pre>is taken is include 'common_utils.h'' fsp_err_t AT_end_sed _common_utils.h'' fsp_err_t AT_end_sed _sed _common_utils.h''' fsp_err_t AT_end_sed _sed _common_utils.h''' fsp_err_t AT_end_sed _sed _common_utils.h''''''''''''''''''''''''''''''''''''</pre>	> 🖑 Binaries		22 #in	lude "dialog wifi demo.h"
<pre>3 0 * * * * * * * * * * * * * * * * * *</pre>	<pre>id the interval is a set in the interval is a set interval is a set in the interval is a set interval</pre>	> 🔊 Includes		23 #in	lude "common utils.h"
10 Top entry if fpg err if AT_end send obt(dat2000 at_end_index); findex_t end_index); 10 Top entry if fpg err if AT_end send obt(dat2000 at_end_index); findex_t end_index); 10 Top entry if fpg err if AT_end send confict(dat2000 at_end_index); findex_t end_index); 10 Top entry if fpg err if AT_end send confict(dat2000 at_end_index); findex_t end_index); 10 Top entry if fpg err if AT_end send confict(dat2000 at_end_index_t end_index); findex_t end_index_t end_index_t end_index_t end_index,t 10 Top entry if fpg err if AT_end send confirt(dat2000 at_end_index_t end_index_t	10 The series of the serie	> 🤒 ra		24	
Image: Second	Image: State in the state	> 😂 ra_gen		25	and the and she (d-16200 st and index t and index).
B Community 20 fsperrt 1/ Cod_set_Goldson_t_Cdd_index_t cdd_index_t cdd_index_t cdd_index; B Community 20 fsperrt 1/ Cod_set_Goldson_t_Cdd_index_t cdd_index; B Community 20 fsperrt 1/ Cod_set_Goldson_t_Cdd_index; B Coddson_t_Cdd_son_t_Cdd_index; 20 fsperrt 1/ Cod_set_Goldson_t_Cdd_index; B Coddson_t_Cdd_son_t_Cdd_son_t_Cdd_index; 20 fsperrt 1/ Cod_set_Goldson_t_Cdd_index; B Coddson_t_Cdd_son_t_Cdd_son_t_Cdd_index; 20	• B control intervent 20 fsp.err.t AT_cond_setd(ala2000_at_cod_index_t cod_index_t cod_index_t cod_index_t cod_index_t cod_index_t cod_index); • B control intervent 20 fsp.err.t AT_cond_setd(ala2000_at_cod_index_t cod_index_t cod	V 🐸 stc		25 TSP	err_t Al_cmd_send_ok(da16200_at_cmd_index_t cmd_index);
Bit General with Command w	Bit Command Alt (1) 22 fsp.err_t AT_cod_set_confin(da1200_at_cod_index_t cnd_index); Fig. err_t AT_cod_set_confin(da1200_at_cod_index_t cnd_index); 55 55 55 Fig. err_t AT_cod_set_confin(da1200_at_cod_index_t); 55 55	> 🗁 SEGGER_RTT		26 fsp	err_t AT_cmd_send_data(da16200_at_cmd_index_t cmd_index, uint16_t wait_time_ms);
10 disbased and and a set of	Image: State in the state	> 🕞 common_utils.h		27 fsp	err_t AT_cmd_set_confirm(da16200_at_cmd_index_t_cmd_index);
0 desc. 0 fsp.err.t wific.com_routine(void); 0 desc. desc. 0 fsp.err.t wific.com_routine(void); 0 desc. desc. 0 fsp.err.t wific.com_routine(void); 0 desc. desc. desc. desc. desc. 0 desc. desc. desc. desc. desc. desc. 0 desc. desc. desc. desc. desc. desc. desc. 0 desc.	Image: State Stat	> c da16200_AT.c		28 fsp	err t wifi con init(void):
• ■ delag_wit_dence :	<pre> Bit dist, with ence is bit dist, with ence is between the static. */ Bit dist, with ence is between the static. */ Bit dist, with a dist, DANDA MAND, DAND, CLEMPT CLEMPT CLEMPT And T_CLEMPT AND T</pre>	> h da16200_AT.h		20 fep	and twifi con routing (wid):
• B Metgy SML demok • B Metgy SML	<pre> Budgetand.emcA Budgetand Budgetan</pre>	> a dialog_wifi_demo.c		25 TSP	the will control with (wath)
• 0 Muse 10 min • 0 Muse 12 <	<pre>> @ Indexists</pre>	> 🖹 dialog_wifi_demo.h		30 fsp	err_t mqtt_con_routine(void);
3 Define 32 Define 0 Arrow Signified 32 Center Country[] * "(Pris) 3 Status 33 Sector * "Sector 33 Sector * "Sector 3 Status 33 Sector * "Sector * "Sector * "Sector 3 Status Sector 33 Sector * "Sector * "Sector * "Sector 3 Status Sector Sector * "Sector * "Sector * "Sector 3 Status Sector * "Sector * "Sector * "Sector * "Sector 3 Status Sector * "Sector * "Sector * "Sector * * "Sector 3 Status Sector * Sector * * * * * * * * * * * * * * * * * * *	> Order Output: 32 > Arrow 33 > Order Status Status Status	> a hal_entry.c		31	
<pre>spaces to the space of the</pre>	<pre> two set to set the set to s</pre>	> 🕞 Debug		32 cha	country[] = "CH":
> bring	<pre>> inter ap_study is and interport interpo</pre>	> 🗁 demo		33 cha	an scill - "'Ranasas Tost Router' ".
<pre>> print control = 0.45 mit for ap_pw[] = 12493078; control = 0.45 mit for ap_pw[] = 12493078; char mqtt_protes_isid] = 12493078; char mqtt_protes_isid = 1249307; char mqtt_p</pre>	<pre>ide identification in the intermet intermet</pre>	> 🗁 ra_cfg		33 Clia	ap_ssu[] - <u>Refess</u> test houser,
absolution absolution <td>Standard Lines 35 Standard Databox Marg CLUBT # Jinks BAMA Databox Marg CLUBT # Jink</td> <td>> Co script</td> <td></td> <td>34 cha</td> <td>ap_pw[] = "12345678";</td>	Standard Lines 35 Standard Databox Marg CLUBT # Jinks BAMA Databox Marg CLUBT # Jink	> Co script		34 cha	ap_pw[] = "12345678";
Bit AudApart Comparing 36 audApart Comparing 36 audApart Comparing 36 audApart Comparing 37 audApart Comparing 38 audapart Comparing 39 audapart Comparing 39 audapart Comparing 39 audapart Compart Compa	BradsMail/Right 36 char mgtt port[] = "1883"; BradsMail/Right 38 char mgtt port[] = "Nenesas"; BradsMail/Right 40 char mgtt port[] = "Nenesas"; BradsMail/Right 41 char mgtt port[] = "Nenesas"; BradsMail/Right 42 uint8_t at cad data[AT_{CMD_LEMSTmin"; BradsMail/Right 43 char mgtt port[] int8_t int8_t BradsMail/Right char mgtt port[] at cad data[AT_{CMD_L	@ configuration.xml		35 cha	<pre>mqtt_broker_ip[] = "192.168.1.102,";</pre>
Bit Space 37 Bit Madd AdAtson, Mart Club Franker 37 Bit Madd AdAtson, Mart Club Franker 38 Bit Madd AdAtson, Mart Club Franker 39 Bit Madd AdAtson, Mart Club Franker 39 Bit Madd AdAtson, Mart Club Franker 39 Bit Madd AdAtson, Mart Club Franker, Said [] = "adain,";; Char mitt Droker, Pwl] = "Chi Asobe - Club Franker, Said [] = "adain,";; Char mitt Club Franker, Madd Maker, Mado Mart Club Franker, Said [] = "adain,";; Char mitt Club Franker, Madd Maker, Mado Mart Club Franker, Said [] = "adain,";; Char mitt Club Franker, Said [] = "adain,"; Char mitt Club Franker, Said [] = "adain,"; <	Image: Addition of the second of the seco	R7FA6M4AF3CFB.pincfg		36 cha	matt port[] = "1883":
Bit Status CANSD, MATT, CLIPIT at Jack Bit AddA (ANSD, MATT, CL	Product Database Anticop Audri (Librit Handson) 20 BARAM_2NOONDYT(Librit Handson) 39 BARAM_2NOONDYT(Librit Handson) 40 BARAM	ra cfo.txt		37 cha	mott broken sid[] = "admin ":
Break DAXED_ANDER_MATE_CUBNT_distance 9 Develops Addition Constrained 9 Develops Addition DataBoog MARTUR MART_CUBNT 9 Develops Addition DataBoog MARTUR MARTUR CUBNT 9 Develops Addition DataBoog MARTUR MARTUR CUBNT 9 Develops Addition DataBoog MARTUR MAR	BAMA DANSOD, MOT (LIGHT disease) 38 Char m cutt_ [J] = "DALSOD ASD (LIGHT"; char at cmd_cdata[] = "\r\n"; BAMA_DANSOD, MATU, CLIST 40 BAMA_DANSOD, MATU, CLIST 40 BAMA_DANSOD, MAND, DANSOD, MAND, DansoD, MATU, CLIST 40 Char m cutt, ClintT, char at cmd_cdata[] = "\r\n"; Char m cutt, ClintT, char at cmd_cdata[] 40 Char	RA6M4 DA16200 MOTT CL	IENT.elf.ilink	20	multiplication () () ()
<pre>> ① Brodes Astance > Decompose Astance ></pre>	30 Decempt Assame 30 Add Zubodking DANSDA, STATURENT 30 Add Zub	RA6M4 DA16200 MOTT CL	IENT.elf.launch	38 cha	mqtt_broker_pw[] = " <u>Kenesas</u> ";
Product 2000-04100 0.041000 undTC (LINFT Readw ZhootDation 0.041000 undTC (LINFT Line 1 + at c.end_end[] = "\r\n"; Line 1 + at c.end_end[] = "\r\n"; Line 1 + at c.end_end data[ATC,CDD_LENGTH]; uint32 t part array[3]; char ip_addr[20]; distance 1 + at c.end_end data[ATC,CDD_LENGTH]; uint32 t part array[3]; char ip_addr[20]; distance 1 + at c.end_end data[ATC,CDD_LENGTH]; uint32 t part array[3]; char ip_addr[20]; distance 1 + at c.end_end data[ATC,CDD_LENGTH]; uint32 t part array[3]; char ip_addr[20]; distance 1 + at c.end_end data[ATC,CDD_LENGTH]; uint32 t part array[3]; char ip_addr[20]; distance 1 + at c.end_ends ts */ for the 2 + at	PARALZ-JOODHID_DAISED_MATTCLENT 40 char at_cmd_end[] = "\r\n"; PARALZ_JOODHID_JASED_MATTCLENT 40 uint8.t at_cmd_end[] [] = "\r\n"; Paress,WG_SINSD_MAMD_mes 40 uint8.t at_cmd_end[] [] = "\r\n"; 41 uint8.t at_cmd_end[] [20]; 40 42 uint8.t at_cmd_end[20]; 41 43 uint8.t at_cmd_end[20]; 41 44 uint8.t at_cmd_end[20]; 41 45 -/** AT Command sets */ //* 46 -/** AT Command sets */ -/* 47 da16200_at_cmd_set1; gda16200_mcd_set1] = - 48 - Code Flash Secure (kB) : 20 - 48 - Code Flash Secure (kB) : 12 - 48 - SRAM Secure (kB) : 4 - 48 - SRAM Secure (kB) : 4 - 58 - SRAM Secure (kB) : 4 - 58	> (7) Developer Assistance		39 cha	<pre>mqtt_client_id[] = "DA16200-client";</pre>
Brader Zucodunis Datacco gaskrisu ANDT CLIMIT 41 1 <t< td=""><td>Product Subscience 41 uint32_t part_array[3]; tint32_t uint32_t part_array[3]; that Process, Win, DAXSOD, SAMAN, Dense 41 uint32_t part_array[3]; that tint32_t part_array[3]; that Process, Win, DAXSOD, SAMAN, Dense 43 uint32_t part_array[3]; that tint32_t <</td><td>RA6M4 ZMOD4410 DA16200 I</td><td>MOTT CLIENT</td><td>40 cha</td><td>at cmd end[] = "\r\n";</td></t<>	Product Subscience 41 uint32_t part_array[3]; tint32_t uint32_t part_array[3]; that Process, Win, DAXSOD, SAMAN, Dense 41 uint32_t part_array[3]; that tint32_t part_array[3]; that Process, Win, DAXSOD, SAMAN, Dense 43 uint32_t part_array[3]; that tint32_t <	RA6M4 ZMOD4410 DA16200 I	MOTT CLIENT	40 cha	at cmd end[] = "\r\n";
Present With Stoom LAND UND CLEMPT CLEMPT with a tag of a tag	Properties ::::::::::::::::::::::::::::::::::::	RA6M4 ZMOD4410 DA16200 1	SPARKFUN MOTT CLIENT	41	
Presents, Will, DAMSOR, RAAMA Draw 42 Unit(52, t) part (100, 100, 100, 100, 100, 100, 100, 100	Presext WILDANDROM Added Dame 2 ZMODAND 2 Added Dame 4 2 UIII 05 _ a c dat_array[3]; char ip_addr[20]; 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	RA6M4 ZMOD4410 HS3001 D	A16200 MOTT CLIENT	42	2 + at and data[AT_CND_LENCTU].
2 ZubObitity BAAAK_NowedS 43 44 45 46 45 46 47 47 47 47 47 47 47 47 47 47 47 47 47	220004010 2404M Nemos 43 43 43	Renesas Wifi DA16200 RA6M4	Demo	42 UIII	ac_diu_uata[A1_ch0_tenoin];
44 char ip_addr[20]; 45 -/** AT Command sets */ 46 -//** AT Command sets */ 47 -//* LAR JINSPECTED 27 D This structure must be accessible in user code. It cannot be static. */ 48 -//** AT Command sets */ 48 -//** LAR JINSPECTED 27 D This structure must be accessible in user code. It cannot be static. */ 48 -//** AT Command sets */ 49 -//** AT Command sets */ 40 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//** 6 -//*** 6 -//*** 6 -//***	44 char ip_addr[20]; 45 -/** AT Command sets */ 46 -/** AT Command sets */ 48 da16200_at_cmd_set[] = 49 - 48 da16200_at_cmd_set[] = 49 - 49 - 49 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 49 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 49 - 41 - 42 - 44 - 44 - 44	TMOD4410 RA6M4 NonOS	00000	43 uin	32_t part_array[3];
45 -/** AT Command sets */ 47 47 48 47 47 47 48 47 49 46 40 47 41 47 42 47 43 46 44 47 44 44 47 45 48 46 48 46 48 46 48 46 48 46 48 47 48 48 48 48 48 48<	45 47 47 47 47 47 47 47 47 47 47 47 47 47			44 cha	ip addr[20];
46 */** AT Command sets */ 47 47 48 47 48 47 49 47 49 47 49 47 40 47 40 47 40 47 40 47 40 47 40 47 41 48 42 47 43 47 44 48 45 48 46 48 47 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 48 49 48 49 48 49 48 49 48 49 48 49 48 49 48 49 48	46 47 47 48 48 49 40 47 47 47 48 40 40 40 40 40 40 40 40 40 40 40 40 40			45	
Appendix Appen	and and and and and and and and and and			10 0 /88	AT Command cots #/
4/4 4/4 <td>47 <</td> <td></td> <td></td> <td>40</td> <td>AT COMMAND SECS -7</td>	47 <			40	AT COMMAND SECS -7
48 da16200 _st_cnd_set_t g_da16200 _md_set[] = Properties 20 Problems in Smatt Booker Image: State Stat	48 49 da162000_at_cmd_set_f g_da162000_cmd_set[] = 49 Propeters ::::::::::::::::::::::::::::::::::::			4/ /*L	RA_INSPECTED 27 D This structure must be accessible in user code. It cannot be static. */
Properties in Control	And C Properties (*) Problems (*) Proble			48 da1	200_at_cmd_set_t g_da16200_cmd_set[] =
Properties 22 Problems & Smart Book T (LINT) of State Complete 22 (Manager And Complete 22 (Mana	Properties: Image: Properties: </th <th></th> <th></th> <th>49 1</th> <th></th>			49 1	
Properties (i) (i) Produces (ii) (ii) March (iii) (iii	Importence (b) function (b)				
spend value Code Flash Secure (kB) : 20 data modified fore - Code Flash Secure (kB) : 12 data modified fore - Data Flash Secure (kB) : 0 linked fore - SRAM Secure (kB) : 4 mme da1600_MATC_CLIBNT/mer/da1600_AT Finished target connection 608: 63733 genet Sd2-Secure OB 53734	Operation Nume Code Flash Secure (kB) : 20 Inited faile - Code Flash Secure (kB) : 12 Istemating Market, S22, 302.00 PM - Data Flash Secure (kB) : 4 Istemating Market, S22, 302.00 PM - SRAM Secure (kB) : 4 Istemating Market, S22, 302.00 PM - SRAM Secure (kB) : 4 Istemating Market, S22, 302.00 PM - SRAM Secure (kB) : 4 Istemating Market, S24, S22, MARKET, CLEMTWordsH020, MART, CLEMTWORdsH02	J Problems Va	smart prowser	🔽 📻 A 163	
infe - Code Flash Secure (kB) : 20 edizeld toue - Code Flash MSC (kB) : 12 istandified Marsh, 2022, 02:00 PM - Data Flash MSC (kB) : 0 inked fale - Data Flash MSC (kB) : 4 inked fale - SRAM Secure - SRAM Secure isse 24:82 bytes - - SRAM Secure - - isse 24:82 bytes - - - - - isse - - - - - - isse - - - -	Infe - Code Flash Secure (kB) : 20 defined fue - Code Flash Secure (kB) : 20 defined fue - Code Flash Secure (kB) : 0 ibided fue - Code Flash Secure (kB) : 0 ibided fue - Code Flash Secure (kB) : 0 ibided fue - Secure (kB) : 0 stop stop - Secure (kB) : 4 stop stop - Secure (kB) : 4 stop stop - Secure (kB) : 4 stop Secure (kB) : 4 - stop Secure (kB) : 4 - stop GB: 63733 Secure CM - stop - Secure CM - - stop - Secure CM - - stop - Secure (kB) : 4 - stop - - - - - Stop - - - - - Stop S	roperty	Value		Numeror and control inclusion or national orangement
deried false ostabile twe ostabile twe last modified March 8, 202, 3020 PM inked false location PrisSTDalegMATT_CLIENTurcida1500_ACE path //AAMA_DA1500_MATT_CLIENTurcida1500_ACE path //AAMA_DA1500_MATT_CLIENTurcida1500_ACE colse 63733 control Stabilescure stabilescure control stabilescure control	derived false cestable true Last modified March (202, 302.00 PM) Inited False Inite	r Info			- Code Flash Secure (kB) : 20
ediable toue - Data Status - Data Status - - Data Status -	editable two Limidal Muchik 2022, 2020 PFM Limidal False Linidal False Location FristDialog/MCT_ClieRT/word/a16300_ACz path //// ARAM_DA1600_MCT_CLIERT/word/a16300_ACz path /// ARAM_DA1600_MCT_CLIERT/word/a16300_ACz size 26432 bytes	derived	false		- Code Elash NSC (kB) : 12
Last modified March 8, 202, 3020 PM -<	Instend Much (202, 2020 PM) - Data PLASIN Secure (KB) : 0 Inited False - SRAW NSC (KB) : 4 Isoconcol PUST Dialogia/KCT_CLEMT/Words1600_ALC Finished target connection (KB) : 4 path //// Alabagia/KCT_CLEMT/words1600_ALC Finished target connection - SRAW NSC (KB) : 4 stem /// Alabagia/KCT_CLEMT/words1600_ALC Finished target connection - - - stem // Const connection - - - - - stem // Const connection - - - - stem // Const connection - - - - stem Stobscore // Const connection - -	editable	true		
Iniked false false - SRAM Secure (kB) : 4 name da1600_ALT SRAM SSC (kB) : 4 peth //AdMAD_ALASOD_MOTT_CLUBNT/worlda1600_ALT Finished target connection (kB) : 4 size 2442 byte 501: 63733 - SRAM Secure *	Initial Table Initial Table Ionation FXSTD0Julgs/MCIT_Client/RedMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA16000_MCIT_Client/BackMLDA1600_	last modified	March 9, 2022, 3:02:09 PM		- Data Flash Secure (Kb) : 0
bostion INSTDates/MCTT_CLENT/MARK_DAIA020_MCTT_CLENT/mord/a1600_AL path //AAMA_DAIA020_MCTT_CLENT/mord/a1600_AL size 24-62 bytes Connection Status ov Stat	Instance Finished target connection site CONTROL site <td>linked</td> <td>false</td> <td></td> <td>- SRAM Secure (kB) : 4</td>	linked	false		- SRAM Secure (kB) : 4
name da16200_LTc and a 16200_LTc and a 16200_L	name da1000_ALC ALC ALC ALC ALC ALC ALC ALC ALC ALC	location	F:\SST\Dialog\MQTT_Clien	t\RA6M4_DA16200_MQTT_CLIENT\src\d	- SRAM NSC (kB) : 4
peth //AAAA DA1400 MCTT_CLENT/World+1600 ATc site 24-82 bytes CDB: 63733 Control Stores Visite Visit	path // AddAdd_Databool_ACCT_CLENT/we/databool_ACC See 26,432 bytes CDB: 63733 Comparison Status of Market Section Status of Market Section Section Status of Market Section Section Status of Market Section Sectio	name	da16200_AT.c		
size 26,42 bytes Particular Large Connection Connection status of 26,22 bytes Connection status of 27,33 Toront connection status of 27,000 StopSecure Status of 26,000 StopSecure Status of 26,000 Status of	size 26432 bytes PLITISHEE Griges Connection GDE: 52733 Grant constant on status of Witable Smart Inset 590:11:22707	path	/RA6M4_DA16200_MQTT_0	LIENT/src/da16200_AT.c	Finished tanget connection
GDB: 63733 Constraint status OV > St05score Witable Smart Inset 590:11.22707 >	Corporate composition status (NV Composition status (NV SSDSecure (NV) (N) SSDSecure (NV)	size	26,432 bytes		Finished target connection
Torret connection status Mr Specific connection status Mr StDSecure Writable Smartineet \$90:11:2207 2	StDSecure Wittable Smart Insert 590:11:22707				GDB: 63733
Vitable Smart Insert 550-11:22707	International SSD/Secure Writable Smart Insert 590:11:22707				Timest connection status OF
opporter satisfication and the smart inset 290:11:22/07	Share Share 300,500 Wittabe Share 300,1122,007	Constant CODEser			Mideland Frankland Rev. 1, 2007
		suspended SSD:Sect	ure		Writable Smart Insert 290:11:22/07

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

v2021_10 - RA6M4_DA16200_MQTT_CLIENT/src/	/da16200_AT.c - e ² studio	Weden Itele	- a x
Ene goit Source Keractor Navigate Search	RA6M4_DA16200_MQTT_CLIEF	Window Help	
Project Evolution 12		4+16200 AT # M	
DA16200 AWS IoT AT CMD Sparkfun RA2L		2 *	* Convright [2020_2021] Renesas Flectronics Corporation and/or its affiliates All Rights Reserved
EK_RA6M4_HS3001_PMOD1_T		20	instants the factors of the second seco
HS300x_RA6M4_NonOS		20	Manalude Newson AT N
SA6M4_DA16200_MQTT_CLIENT [Debug]		21	#include _dal6200_A1.h_
> 🔆 Binaries		22	<pre>#include "dialog_wifi_demo.h"</pre>
> 🔊 Includes		23	<pre>#include "common_utils.h"</pre>
> 🐸 ra		24	
> 😂 ra_gen		25	fsp.err.t AT cmd send ok (da16200 at cmd index t cmd index):
✓ ²³ src		26	for one t AT and and data (dat6200 at and index t and index upt16 t wait time ma);
> 📴 SEGGER_RTT		20	rsperr_t AT_cum setu data(datazao at cum index_t cum index, duncio t wait_time ins);
> 🖻 common_utils.h		27	<pre>tsp_err_t AT_cmd_set_contirm(da16200_at_cmd_index_t cmd_index);</pre>
> [c] da16200_AT.c		28	fsp_err_t wifi_con_init(void);
> h da16200_A1.h		29	<pre>fsp err t wifi_con_routine(void);</pre>
> [c] dialog_witi_demo.c		30	fsp err t matt con routine(void):
> h dialog_witi_demo.h		31	
> in nai_entry.c		33	shan country[]U(U")
> 🛃 Debug		32	cnar country[] = ch;
> Contra da		33	<pre>char ap_ssid[] = "Renesas Test Router',";</pre>
> Charge		34	char ap_pw[] = "12345678";
> script		35	char mgtt broker ip[] = "192.168.1.102.";
R7EA65MAE3CER pipefa		36	char mott port[] = "1993":
a cloth		37	then mater booken sciel = "adds"
RA6M4 DA16200 MOTT CLIENT.elf.ilink		37	char mqcr_oloke[ssin]] = domin, ,
RA6M4 DA16200 MOTT CLIENT.elf.launc	h	38	char mqtt_broker_pw[] = <u>Kenesas</u> ;
> (7) Developer Assistance		39	<pre>char mqtt_client_id[] = "DA16200-client";</pre>
RA6M4 ZMOD4410 DA16200 MQTT CLIENT	r	40	<pre>char at cmd end[] = "\r\n";</pre>
RA6M4 ZMOD4410 DA16200 SPARKFUN M	IQTT_CLIENT	41	
RA6M4 ZMOD4410 HS3001 DA16200 MQT	T CLIENT	42	uint9 t at and data[AT_CMD_LENCTU];
Renesas_Wifi_DA16200_RA6M4_Demo	-	42	utinta_t ac_uu_uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu
ZMOD4410_RA6M4_NonOS		43	uints2_t part_array[s];
		44	char ip_addr[20];
		45	
		46 8	/** AT Command sets */
		47	/*IDRA INSPECTED 27 D This structure must be accessible in user code. It cannot be static */
		40	/ LONG_INFICTED 2/ D THIS SCIENCE INSE DE ACCESSIDE IN USER CODE. IL CANNOT DE STATLE. /
		48	datozoo_ar_cwd_ser[r R_datozoo_cwd_ser[] =
		24	
Properties 23 Int Problems we smart brows	en		
Property	Value		Premy Drate Directory and received and the premy drate of the premy dr
✓ Info			- Code Flash Secure (kB) : 20
derived	false		- Code Flash NSC (kB) + 12
editable	true		Data Elach Secure (kP) + 0
last modified	March 9, 2022, 3:02:09 PM		- Data Flash Secure (KD) ; 0
linked	false		- SRAM Secure (kB) : 4
location	F:\SST\Dialog\MQTT_Client\RA6N	14_DA16200_MQTT_CLIENT	- SRAM NSC (kB) : 4
name	da16200_AT.c		
path	/RA6M4_DA16200_MQTT_CLIENT/	/src/da16200_AT.c	Einished target connection
size	26,432 bytes		CONCOURSE CONNECTION
			GUB: 03/33
			Tarat connection status OV
Suspended SSD:Secure			Writable Smart Insert 590 : 1 : 22707

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.



<u>^</u>			
Name	Date modified	Туре	Size
na 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
sources.mk	3/9/2022 3:03 PM	MK File	1 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	Type	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
١.	🗟 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	
💿 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 = 000 R4 = 00000000, R5 = 00000000, R6 = 000 R2 = 200300000, R9 = 0000000F, R10= 200 R122 = 2030830 SP(R13) = 20000C80, MSP= 20000C80, PSP= VFSR = F9000000 + MSPR = NZCVQ, PSPR = CFEP = 00000000, CONTROL = 00, FAULTHA	000000, R3 = 0000000 00000, R7 = 0000000 07FDE, R11= 0000000 000000000, R14(LR) 01000000, IPSR = 00 SK = 00, BASEPRI =	00 00 11 = FFFFFFFF 0 (NoException) 00, PRIMASK = 00		^	
Security extension regs: MSP_S = 20000C80, MSPLIM_S = PSP_S = 00000000 PSPIIM_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	Program & L1-Verify	0%	0.000s		
	1.2-Varify	0%	0.000=		
FPS0 = 00000000, FPS1 = 00000000, FPS2 FPS4 = 00000000, FPS5 = 00000000, FPS6 FPS8 = 00000000, FPS9 = 00000000, FPS1		Comparing range 0x00000000 - 0x00005FFF (24 KiB)	0.367s		
FPS12= 000000000, FPS13= 000000000, FPS1 FPS16= 00000000 FPS17= 00000000 FPS1	4= 00000000, FPS15= 8= 00000000 FPS19=	= 00000000 = 00000000			
FPS20= 00000000, FPS21= 00000000, FPS2 FPS24= 00000000, FPS25= 00000000, FPS2 FPS28= 00000000, FPS29= 00000000, FPS3 FPSCR= 00000000	2= 000000000, FPS23= 6= 00000000, FPS27= 0= 00000000, FPS31=	= 00000000 = 00000000 = 00000000			
Downloading file [JLink\RA6M4_DA16200_ I-Link: Flash download: Bank 0 @ 0x010	MQTT_CLIENT.mot] 0A100: Skipped. Cor	ntents already match		~	

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
	O ICP/IP
	<u>Existing Session</u>
	Specify Target Device
	R/FA6M4AF V
	Script file (optional)
	Target Interface & Speed
	SWD - 4000 kHz
	RTT Control Block
	Auto Detection O Address Search Range Enter and an an and address mass (a) the DTT Control black and
LOG: ROMTbl[1][6 LOG: RTT Viewer	<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	_MQTT_CLIENT.el ~ 🌼		B [%] ≥ 0 = N × → ∞ [H = ∞(0)]	👔 🛊 • 94 • 105 • 🕸 De 000 🐨 🐑 🍪 💋 🙋	9 🛷 = 📑 🗃 🖬 🛉	9 · 8 · • ↓ ↓ ↓ · ↓ · 1
							Q 🔡 🗟 C/C++ 😝 Debug 🚳 FSP Configura
ng 😂 🛛 🔁 🙀 🙀 🗧 🖂	da16200_AT.c	3 RA6M4_DA16200_MQTT_CI	.IENT.map	RA6M4_DA16200_MQTT_CLIENT.map ×		- 8	(x)+V 🎭 B 🛋 M 🔂 P 🛛 🖓 E 🥐 E 🦖
A6M4_DA16200_MQTT_CLIENT.elf [Rene	1524	.bss.button	push			<u>^</u>	8 8 9
RA6M4_DA16200_MQTT_CLIENT.eff [1]	1525		0x200005e8	0x1 ./src/dialog wifi demo.o			v 🛃 RA6M4_DA16200_MQTT_CLIENT [Debug]
1 Thread #11 (single core) [core: 0] ()	1526		0x200005e8	button push			> 🚰 Binaries
Renesas GDB server (Host)	1527	.bss.button	status	-			>) Includes
	1528		0x200005e9	0x1 ./src/dialog wifi demo.o			> 28 ra gen
	1529		0x200005e9	button status			v 🕼 src
	1530	*fill*	0x200005ea	0x2			> 😂 SEGGER_RTT
	1531	.bss.gp prv	agt periods				> a common_utils.h
	1532	0, _1 ·	0x200005ec	0x18 ./ra/fsp/src/r agt/r agt.o			> E da16200_ALC
	1533	*(COMMON)					> a dialog_wifi_demo.c
	1534	COMMON	0x20000604	Øxa8 ./src/SEGGER RTT/SEGGER RTT.	0		> 🔝 dialog_wifi_demo.h
	1535		0x20000604	SEGGER RTT			> a hal_entry.c
	1536	COMMON	0x200006ac	0xa0 ./src/da16200 AT.o			V 💩 Debug
	1537		0x200006ac	part array			
	1538		0x200006b8	ip addr			> es src
	1539		0x200006cc	at cmd data			> 🕉 RA6M4_DA16200_MQTT_CLIENT.elf - [arm/le
	1540	COMMON	0x2000074c	0x8 ./ra gen/common data.o			le makefile
	1541		0x2000074c	g ioport ctrl			makefile.init
	1542	COMMON	0x20000754	0x5c ./ra gen/hal data.o			RA6M4 DA16200 MOTT CLIENT.elf.in
	1543		0x20000754	g wifi uart ctrl			RA6M4_DA16200_MQTT_CLIENT.map
	1544		0x20000784	g timer ctrl			RA6M4_DA16200_MQTT_CLIENT.rpd
	1545		0x200007a0	g external sw1 ctr1			RA6M4_DA16200_MQTT_CLIENT.sbd
	1546	COMMON	0x200007b0	0x40 ./ra/fsp/src/bsp/mcu/all/bsp	group irg.o		RADINA_DATIG200_MQTT_CETENTSPEC
	1547		0x200007b0	g bsp group ing sources	_6		> 🗁 demo
	1548	COMMON	0x200007f0	0x4 ./ra/fsp/src/bsp/mcu/all/bsp	10.0		> 😂 ra_cfg
	1549		0x200007f0	g protect ofswe counter			> 😂 script
	1550	COMMON	0x200007f4	0x180 ./ra/fsp/src/bsp/mcu/all/bsp	ira.o	-	configuration.xml PTEAGAMAGE/CER pipede
	1551		0x200007f4	en renesas isr context			a cfa.txt
	1552	COMMON	0x20000974	0x8 ./ra/fsp/src/bsp/mcu/all/bsp	register protection.o		RA6M4_DA16200_MQTT_CLIENT.elf.jlink
	1553		0x20000974	g protect counters			RA6M4_DA16200_MQTT_CLIENT.elf.launch
	1554	COMMON	0x2000097c	0x4 ./ra/fsp/src/bsp/cmsis/Devic	e/RENESAS/Source/system.o		> ⑦ Developer Assistance
	1555		0x2000097c	SystemCoreClock			RASMA ZMOD4410_DA16200_MC21_CELENT
	1556		0x20000980	= ALIGN (0x4)			RA6M4_ZMOD4410_HS3001_DA16200_MQTT_CLIE
	1557		0x20000980	bss end = .			Renesas_Wifi_DA16200_RA6M4_Demo
	1558						ZMOD4410_RA6M4_NonOS
		<				>	<
	Console 32 1711 Re	aisters 🗊 Debug Shell 🛷	Search Problems	ebugger Console 🛞 Smart Browser 👖 Memory 🎏 Call Hierarchy			
	RA6M4_DA16200_MQTT	CLIENT.elf (Renesas GDB Han	(ware Debugging)	grand a contract			
	Hardware brea	kpoint set at a	ddress 0x1170				
	Hardware brea	akpoint set at a	ddress Øx1182				
>	<						

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.

! 中国联通 🗢	09:22	53% 🔳
MQTTool		
Topic: button		
QOS: 0 1 2		
Unsubscr	ribe (Clear
Status: Subscribed to: bu	utton	
button button is pressed		>
((o)) ↓ Connect Subscribe	1 Publish	Stats About
Connect Subscribe	Publish	Stats About

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

		Descript	ion	
Rev.	Date	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.

Notice

- Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
- Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
- 3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
- 4. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
- Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.
 "Standard": Computers: office acuipment: communications acuipment: test and measurement equipment: audio and visual equipment: home.
 - "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.

"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user's manual or other Renesas Electronics document.

- 6. When using Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
- 7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
- 8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
- 9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
- 10. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
- This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
 Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas
- Electronics products. (Note1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.
- (Note2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.4.0-1 November 2017)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan www.renesas.com

Contact information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit: www.renesas.com/contact/.

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

IMPORTANT NOTICE AND DISCLAIMER

RENESAS ELECTRONICS CORPORATION AND ITS SUBSIDIARIES ("RENESAS") PROVIDES TECHNICAL SPECIFICATIONS AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR NON-INFRINGEMENT OF THIRD-PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for developers who are designing with Renesas products. You are solely responsible for (1) selecting the appropriate products for your application, (2) designing, validating, and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, or other requirements. These resources are subject to change without notice. Renesas grants you permission to use these resources only to develop an application that uses Renesas products. Other reproduction or use of these resources is strictly prohibited. No license is granted to any other Renesas intellectual property or to any third-party intellectual property. Renesas disclaims responsibility for, and you will fully indemnify Renesas and its representatives against, any claims, damages, costs, losses, or liabilities arising from your use of these resources. Renesas' products are provided only subject to Renesas' Terms and Conditions of Sale or other applicable terms agreed to in writing. No use of any Renesas resources expands or otherwise alters any applicable warranties or warranty disclaimers for these products.

(Disclaimer Rev.1.01)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu, Koto-ku, Tokyo 135-0061, Japan www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact Information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit <u>www.renesas.com/contact-us/</u>.