

一步一步学习CC3200 与MQTT 服务器通讯

RF-star

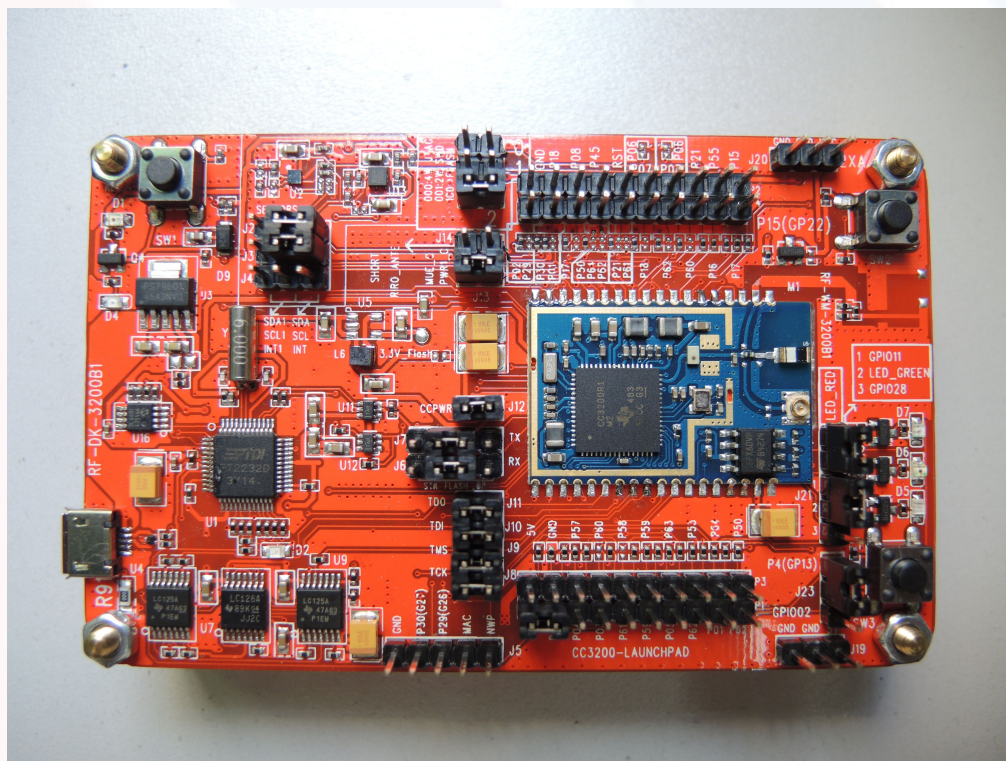
❖ 什么是MQTT?

1、MQTT (Message Queuing Telemetry Transport, 消息队列遥测传输) 是IBM开发的一个即时通讯协议, 有可能成为物联网的重要组成部分。该协议支持所有平台, 几乎可以把所有联网物品和外部连接起来, 被用来当做传感器和致动器 (比如通过Twitter让房屋联网) 的通信协议。MQTT具有以下特点:

- 轻量级的 machine-to-machine 通信协议。
- publish/subscribe模式。
- 基于TCP/IP。
- 支持QoS。
- 适合于低带宽、不可靠连接、嵌入式设备、CPU内存资源紧张。
- 是一种比较不错的Android消息推送方案。
- FacebookMessenger采用了MQTT。
- MQTT有可能成为物联网的重要协议。

❖ 预先装备

2、TI已经帮我们把MQTT的协议移植到了CC3200平台，请下载CC3200最新的SDK包，本篇以CC3200SDK_1.1.0版本、CCS6.0.1、cloudmqtt服务器、使用信驰达RF-DK-3200B1开发板讲解。



❖ 操作流程

3、使用CCS导入MQTT工程，路径为：C:\ti\CC3200SDK_1.1.0\cc3200-sdk\example\mqtt_client；如图1。

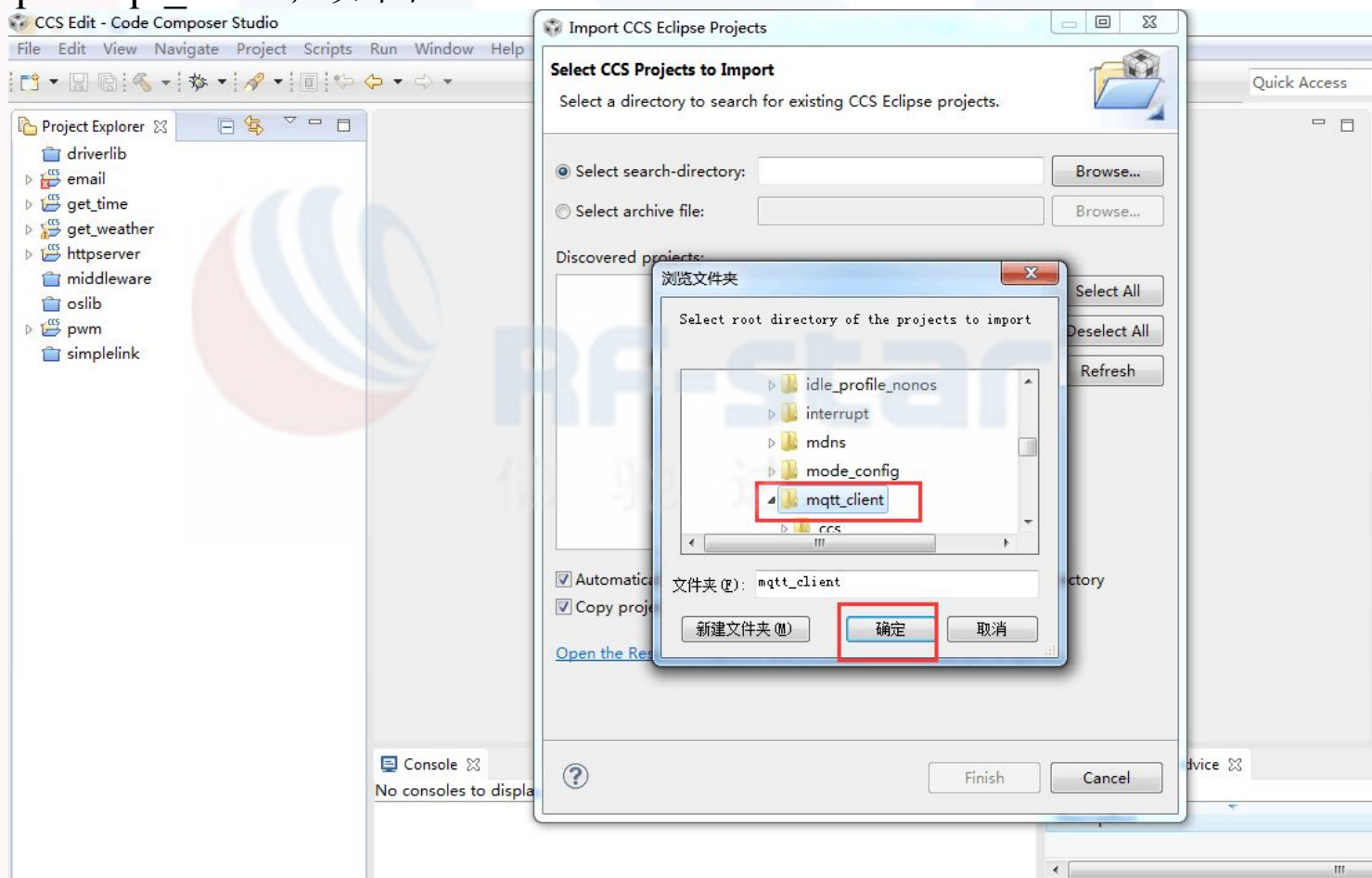


图 1

点击Finish完成导入，如图2。

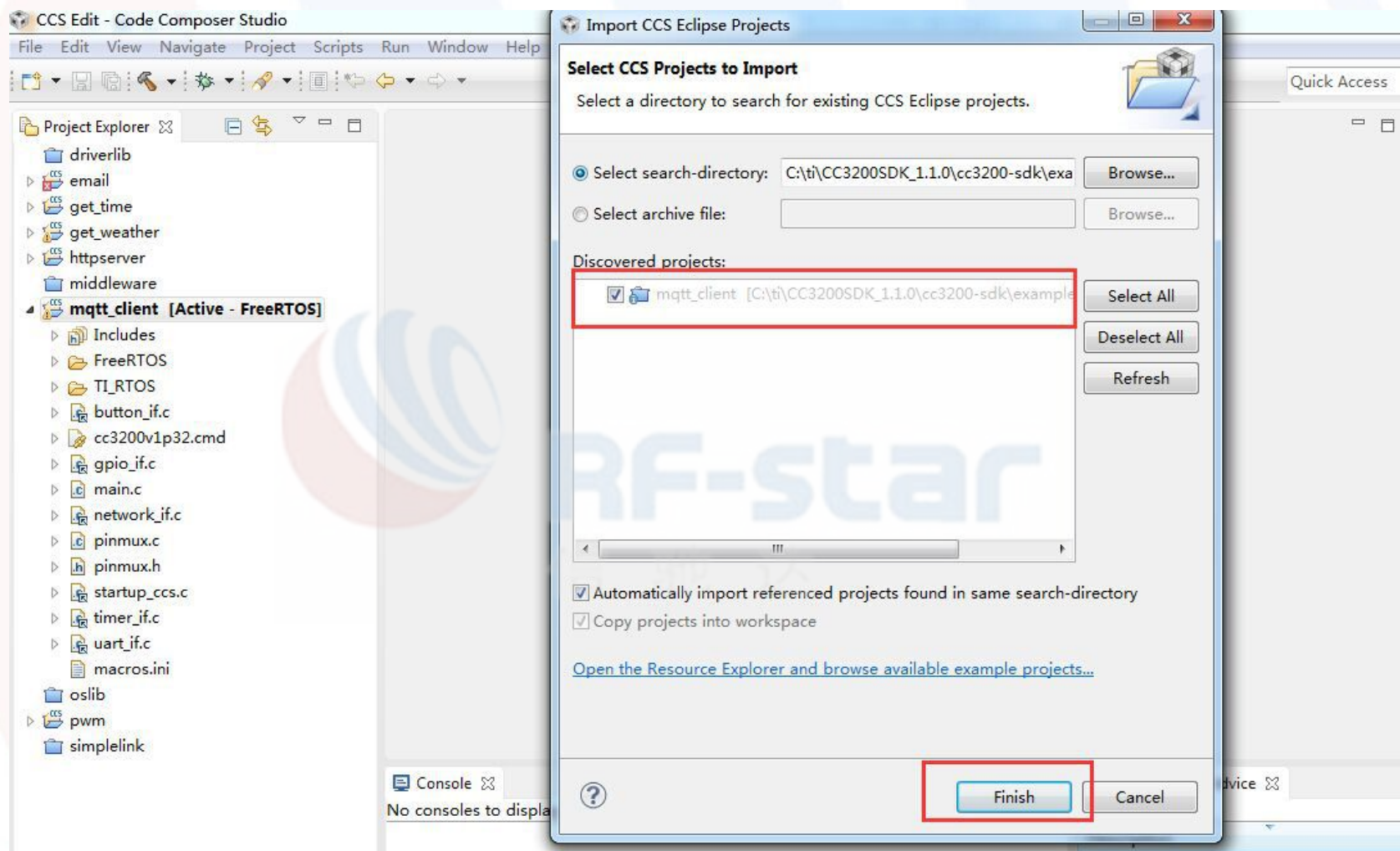


图 2

导入后如图3。

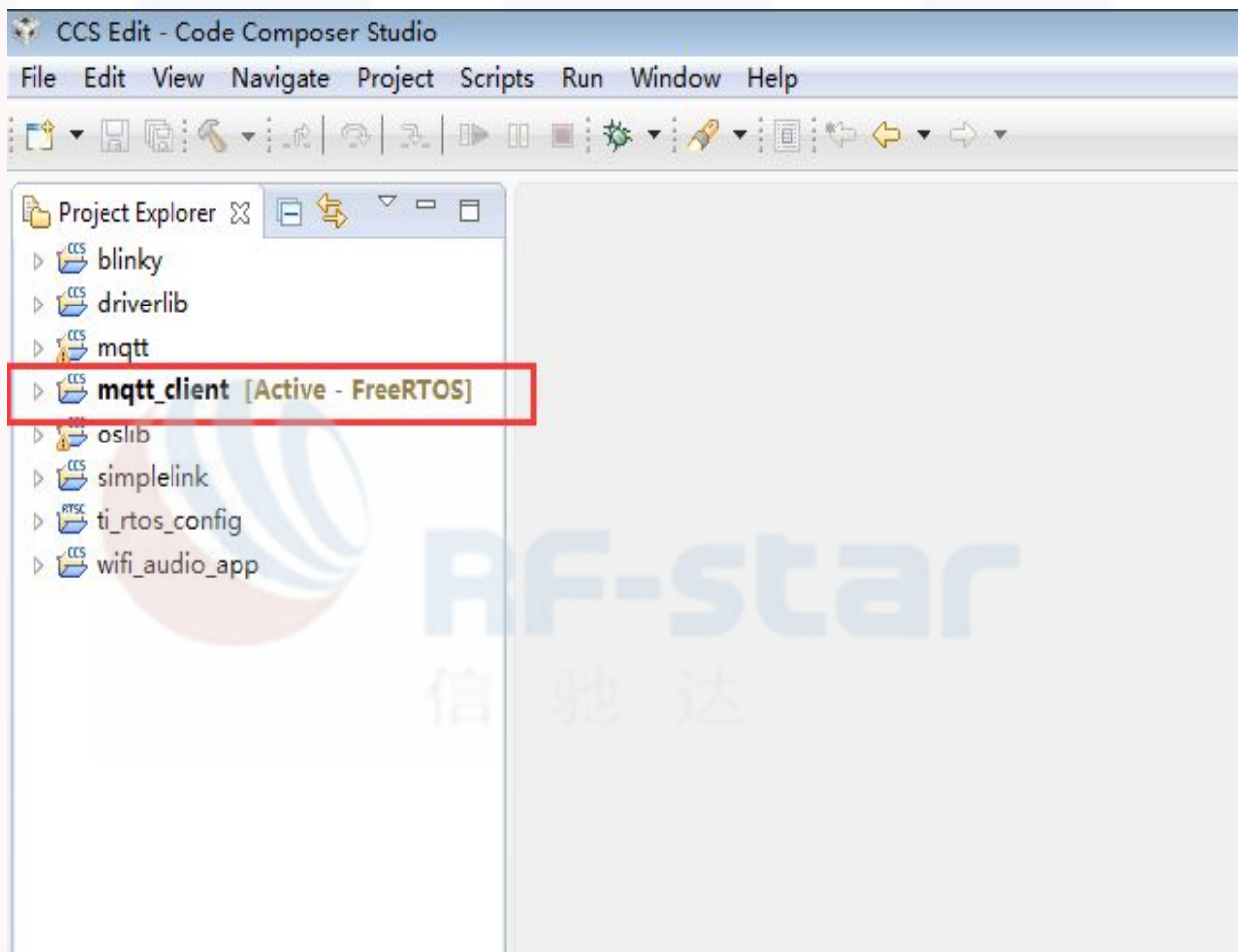


图 3

4. 申请 MQTT 服务器账号与密码，在浏览器输入：
<http://www.cloudmqtt.com>，点击Control Panel，如图4。

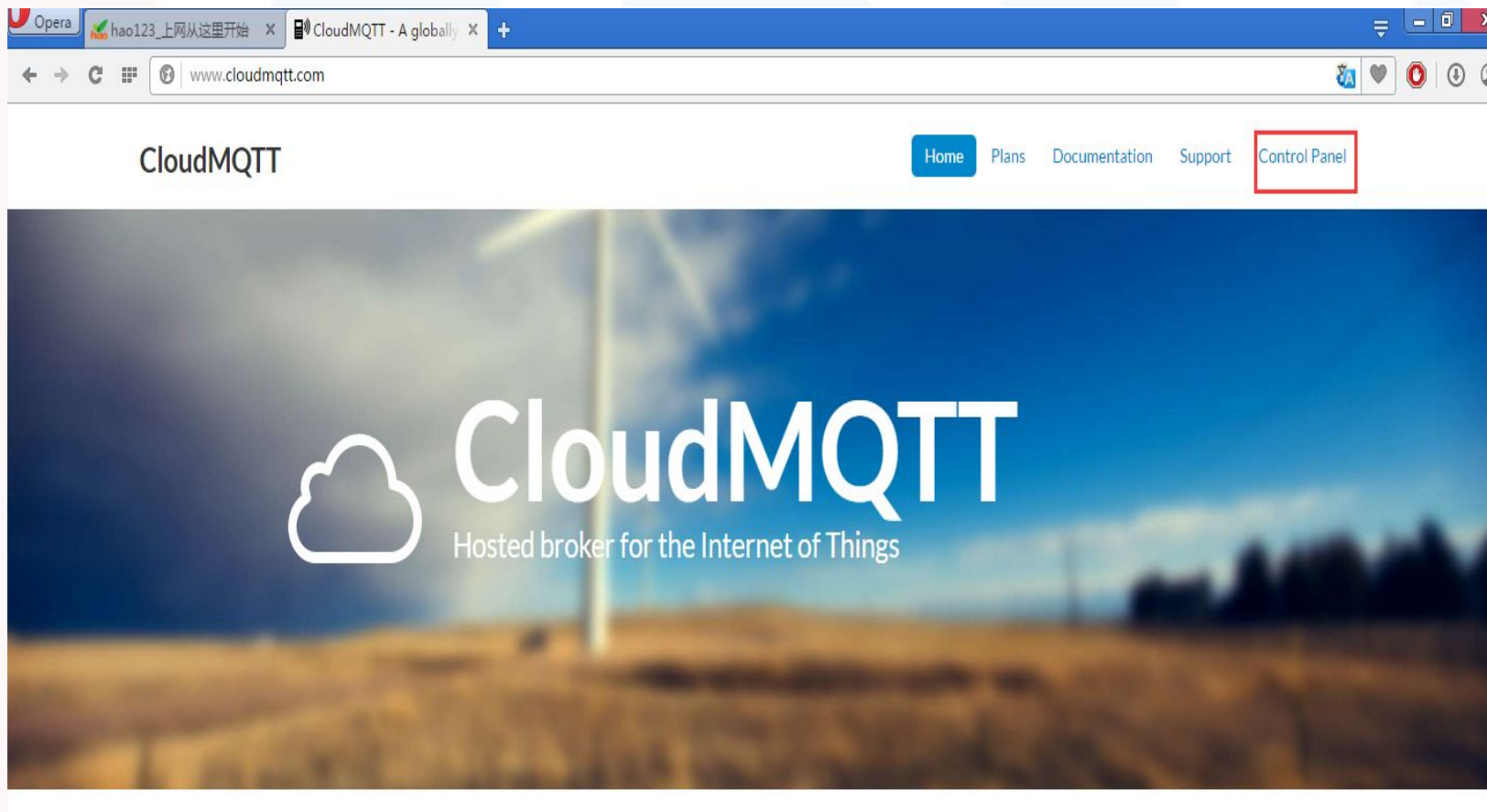


图 4

输入你的邮箱并点Sign up，我这里使用了qq邮箱演示，如图5。

Login to access your account

E-mail:

163.com

Password:

••••••

Login

☐ Keep me logged in for two weeks

Sign up If you don't have an account yet

E-mail:

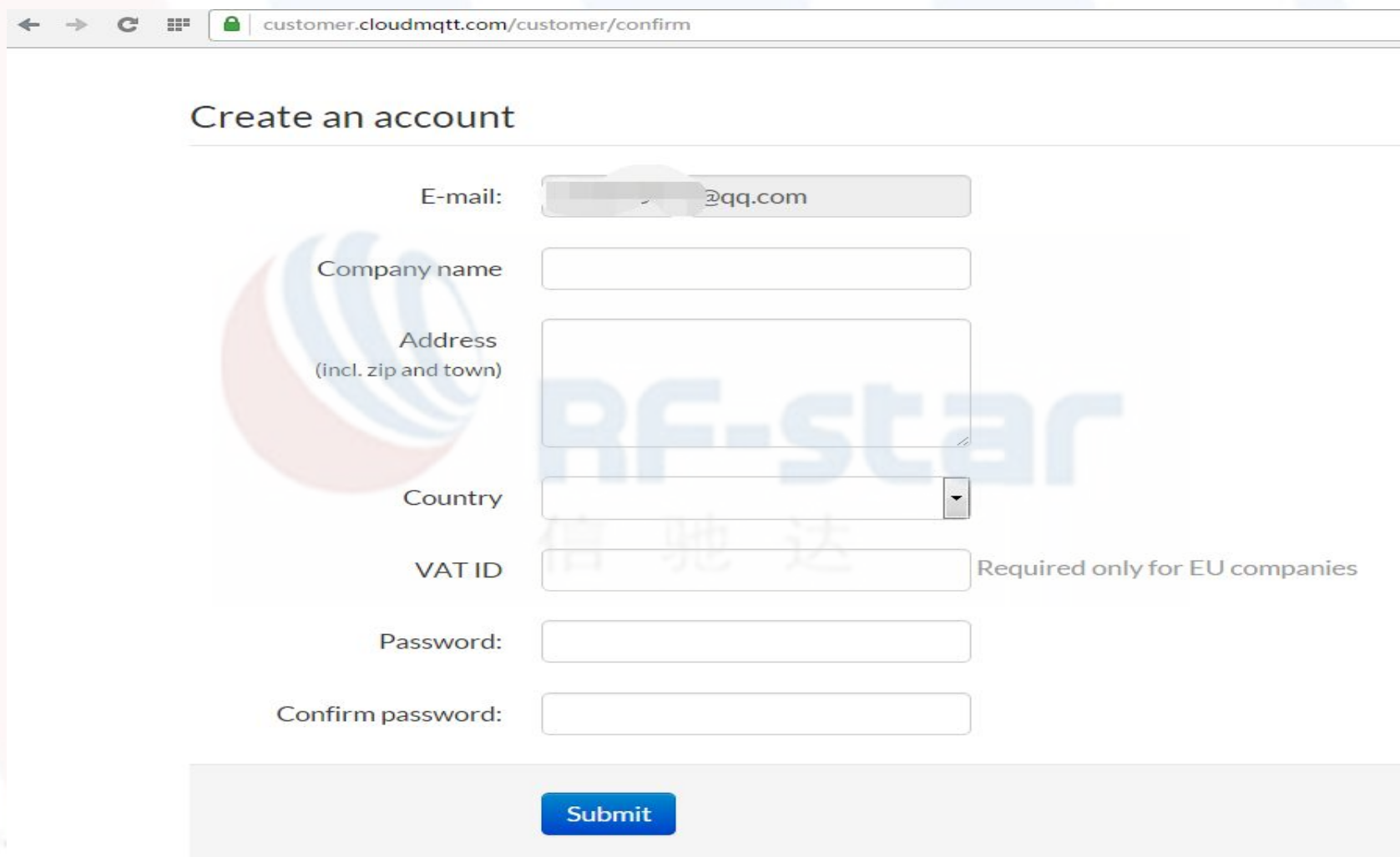
@qq.com

Sign up



图 5

很快你将收到一封由cloudmqtt网站发过来的邮件，点击里面的链接，打开后如图6。



The screenshot shows a web browser window with the address bar displaying `customer.cloudmqtt.com/customer/confirm`. The page title is "Create an account". The form contains the following fields and labels:

- E-mail:** A text input field containing a masked email address ending in `@qq.com`.
- Company name:** A text input field.
- Address (incl. zip and town):** A large text input field.
- Country:** A dropdown menu.
- VAT ID:** A text input field. To its right, the text "Required only for EU companies" is displayed.
- Password:** A text input field.
- Confirm password:** A text input field.

At the bottom of the form is a blue button labeled "Submit".

图 6

并填写资料，随便填一些资料，注意记住密码，提交后，再点击Create，如图7。

CloudMQTT

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CloudMQTT Instances for [redacted]qq.com (Log out)

[Account](#) ([Edit](#))[PayPal](#) ([Change](#))[Invoices](#) ([All](#))

[redacted]@qq.com
china

Not set up.

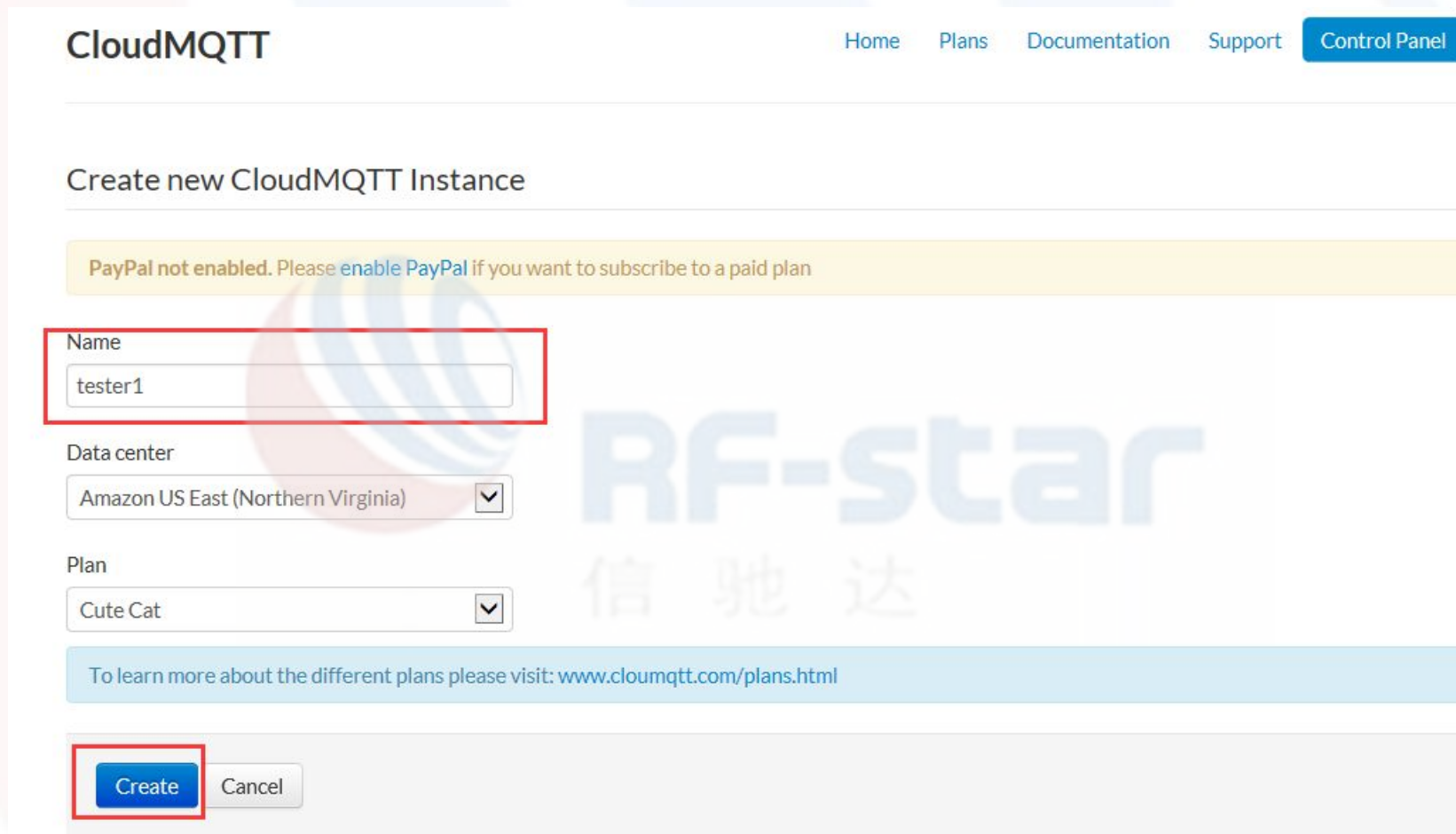
[+ Create](#)

Name	Plan	Region
------	------	--------

You don't have any instances yet, do you want to [create](#) one?

图 7

Name也是随便填，这里填tester1, 再点击Create，如图8。



CloudMQTT

Home Plans Documentation Support **Control Panel**

Create new CloudMQTT Instance

PayPal not enabled. Please [enable PayPal](#) if you want to subscribe to a paid plan

Name

tester1

Data center

Amazon US East (Northern Virginia) ▼

Plan

Cute Cat ▼

To learn more about the different plans please visit: www.cloumqtt.com/plans.html

Create Cancel

图 8

点击tester1的Details，如图9。

CloudMQTT

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CloudMQTT Instances for [redacted]@qq.com ([Log out](#))

[Account](#) ([Edit](#))[PayPal](#) ([Change](#))[Invoices](#) ([All](#))

[redacted]@qq.com
china

Not set up.

[+ Create](#)

Name	Plan	Region	
tester1	Cat	US	Details Edit Delete

图 9

注意这几个参数，等会在程序里需要填写，如图10。

CloudMQTT Console uaqgcfov

[Websocket UI](#)[CloudMQTT Stats Interface](#)

Instance info

Server	m11.cloudmqtt.com
User	uaqgcfov
Password	YWD9iPwBnURj
Port	18888
SSL Port	28888
Websockets Port (TLS only)	38888
Connection limit	10

[Users and ACL](#)[Bridges](#)[Amazon Kinesis Stream](#)

Manage Users

ACLs

图 10

5. 切回到CCS6中的程序，在mqtt_client中的main文件中，修改SERVER_ADDRESS、PORT_NUMBER为MQTT服务器tester1中，Instance info中的Server、Port，如图11。

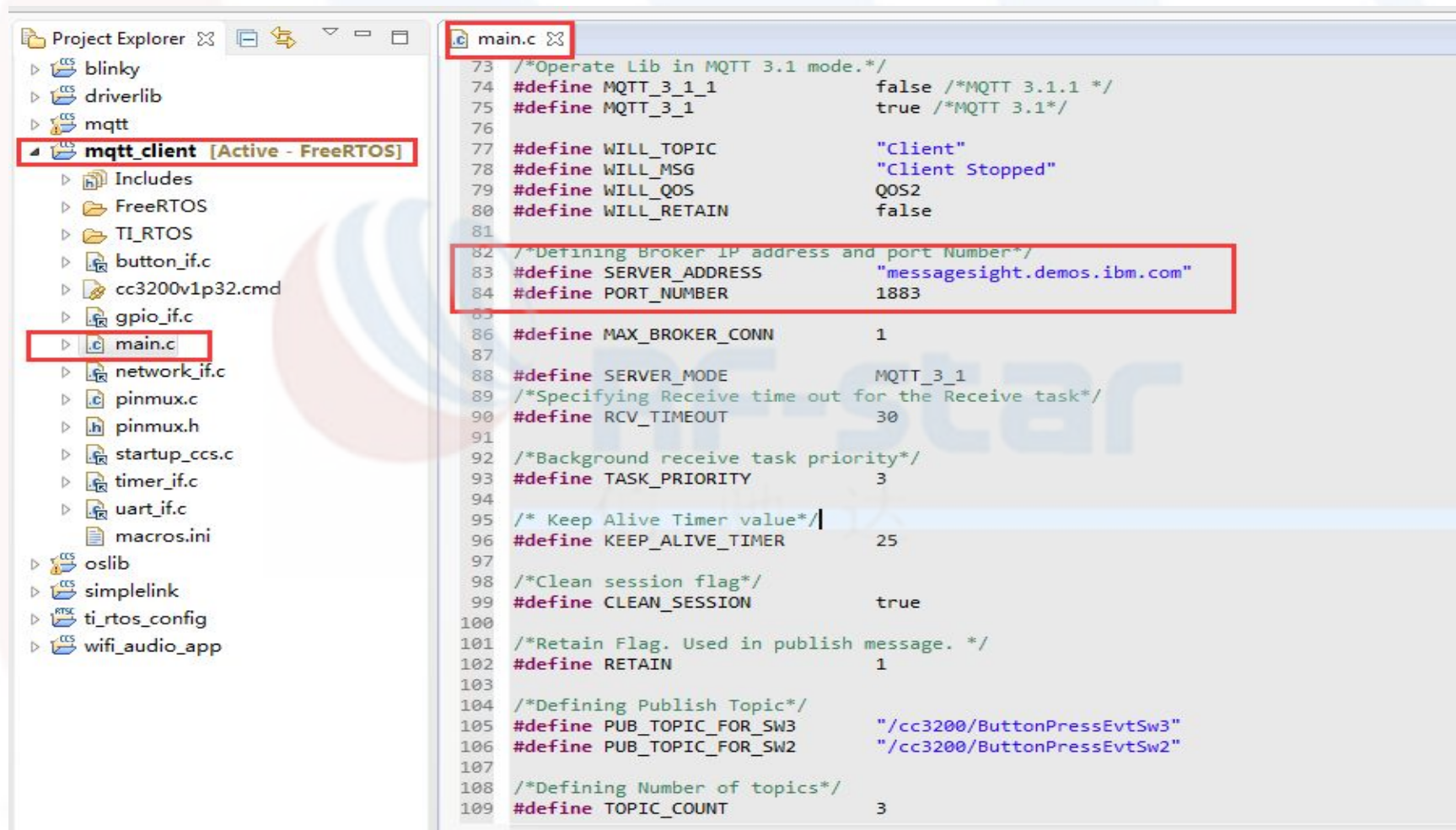


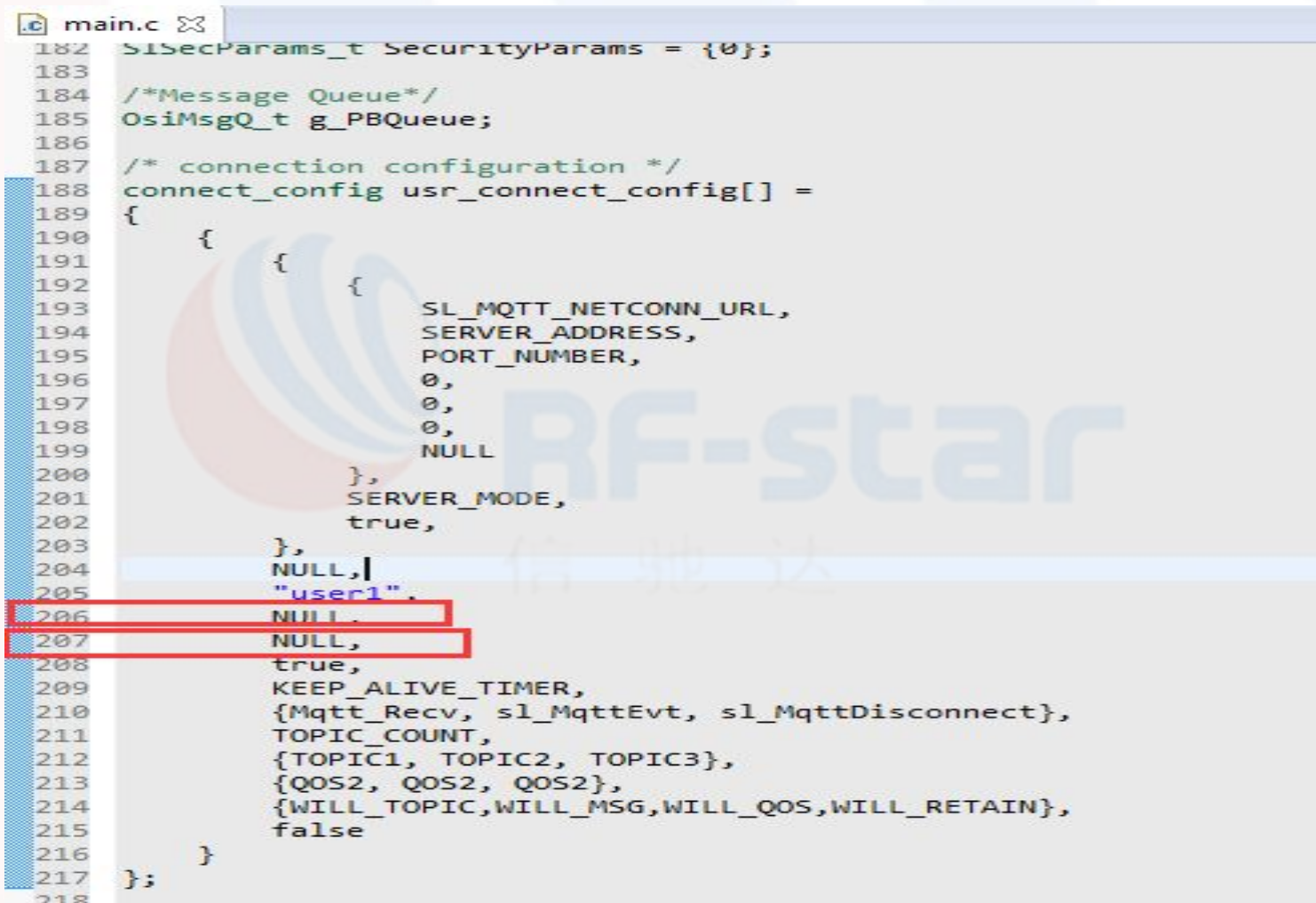
图 11

修改后效果如图12。

```
82 /*Defining Broker IP address and port Number*/
83 // #define SERVER_ADDRESS "messagesight.demos.ibm.com"
84 #define SERVER_ADDRESS "m11.cloudmqtt.com"
85 // #define PORT_NUMBER 1883
86 #define PORT_NUMBER 18888
87
88 #define MAX_BROKER_CONN 1
89
90 #define SERVER_MODE MQTT_3_1
91 /*Specifying Receive time out for the Receive task*/
92 #define RCV_TIMEOUT 30
93
94 /*Background receive task priority*/
95 #define TASK_PRIORITY 3
96
97 /* Keep Alive Timer value*/
98 #define KEEP_ALIVE_TIMER 25
99
100 /*Clean session flag*/
101 #define CLEAN_SESSION true
102
```

图 12

还是在main文件中，此两处需要修改，替换为MQTT服务器tester1中，Instance info中的User、Password，如图13。



```
182  SLSecParams_t SecurityParams = {0};
183
184  /*Message Queue*/
185  OsiMsgQ_t g_PBQueue;
186
187  /* connection configuration */
188  connect_config usr_connect_config[] =
189  {
190      {
191          {
192              {
193                  SL_MQTT_NETCONN_URL,
194                  SERVER_ADDRESS,
195                  PORT_NUMBER,
196                  0,
197                  0,
198                  0,
199                  NULL
200              },
201              SERVER_MODE,
202              true,
203          },
204          NULL,|
205          "user1",
206          NULL,
207          NULL,
208          true,
209          KEEP_ALIVE_TIMER,
210          {Mqtt_Recv, sl_MqttEvt, sl_MqttDisconnect},
211          TOPIC_COUNT,
212          {TOPIC1, TOPIC2, TOPIC3},
213          {QOS2, QOS2, QOS2},
214          {WILL_TOPIC,WILL_MSG,WILL_QOS,WILL_RETAIN},
215          false
216      }
217  };
218
```

图 13

修改后效果如图14。

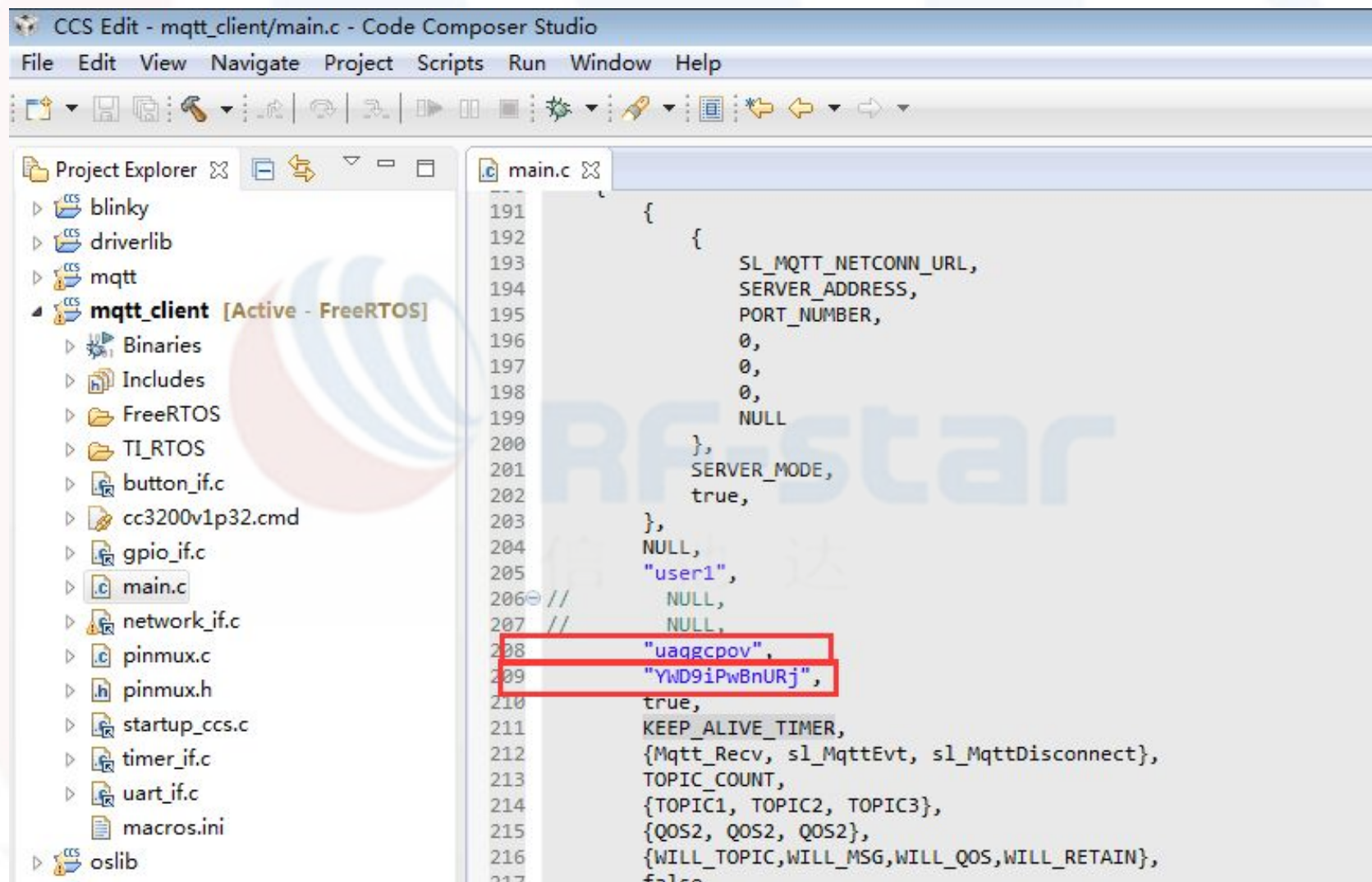


图 14

修改main文件中，打开common.h，需要修改里面的Wi-Fi热点的参数，如图15。



```
.c main.c ✕
20 // Copyright (C) 2014 Texas Instruments Incorporated
13
16 // Application Name      -   MQTT Client
29
32 //! \addtogroup mqtt_client
36
37 // Standard includes
38 #include <stdlib.h>
39
40 // simplelink includes
41 #include "simplelink.h"
42
43 // driverlib includes
44 #include "hw_types.h"
45 #include "hw_ints.h"
46 #include "hw_memmap.h"
47 #include "interrupt.h"
48 #include "rom_map.h"
49 #include "prcm.h"
50 #include "uart.h"
51 #include "timer.h"
52
53 // common interface includes
54 #include "network_if.h"
55 #ifndef NOTERM
56 #include "uart_if.h"
57 #endif
58
59 #include "button_if.h"
60 #include "gpio_if.h"
61 #include "timer_if.h"
62 #include "common.h"
63 #include "utils.h"
64
65
66 #include "sl_mqtt_client.h"
67
```

图 15

修改三个参数，分别是SSID名，加密类型和密码，如图16。



```
main.c common.h network_if.h
51 extern "C"
52 {
53 #endif
54
55
56 //
57 // Values for below macros shall be modified as per access-point(AP) properties
58 // Simplelink device will connect to following AP when application is executed
59 //
60 #define SSID_NAME          "Tenda_AP"      /* AP SSID */// SoftAP
61 #define SECURITY_TYPE      SL_SEC_TYPE_WPA/* Security type (OPEN or WEP or WPA*/
62 #define SECURITY_KEY       "12345678"      /* Password of the secured AP */
63 #define SSID_LEN_MAX      32
64 #define BSSID_LEN_MAX     6
65
66
67 #ifndef NOTERM
68 #define UART_PRINT(x,...)
69 #define DBG_PRINT(x,...)
70 #define ERR_PRINT(x)
71 #else
72 #define UART_PRINT Report
73 #define DBG_PRINT  Report
74 #define ERR_PRINT(x) Report("Error [%d] at line [%d] in function [%s] \n\r",x,__LINE__,__FUNCTION__)
75 #endif
```

图 16

例程中，发布了两个按键的消息和订阅了三个LED的主题，如图17。



```

common.h  network_if.h  main.c
97 /* Keep Alive Timer value*/
98 #define KEEP_ALIVE_TIMER      25
99
100 /*Clean session flag*/
101 #define CLEAN_SESSION        true
102
103 /*Retain Flag. Used in publish message. */
104 #define RETAIN                1
105
106 /*Defining Publish Topic*/
107 #define PUB_TOPIC_FOR_SW3     "/cc3200/ButtonPressEvtSw3"
108 #define PUB_TOPIC_FOR_SW2     "/cc3200/ButtonPressEvtSw2"
109
110 /*Defining Number of topics*/
111 #define TOPIC_COUNT           3
112
113 /*Defining Subscription Topic Values*/
114 #define TOPIC1                "/cc3200/ToggleLEDCmdL1"
115 #define TOPIC2                "/cc3200/ToggleLEDCmdL2"
116 #define TOPIC3                "/cc3200/ToggleLEDCmdL3"
117
118 /*Defining QOS levels*/
119 #define QOS0                  0
120 #define QOS1                  1
121 #define QOS2                  2
122
123 /*Spawn task priority and OSI Stack Size*/
124 #define OSI_STACK_SIZE       2048
125 #define UART_PRINT           Report
126
127 typedef struct connection_conf
  
```

发布的消息

订阅的主题

图 17

把程序保存，编译，并下载CC3200的开发板上。

6. 把串口调试工具打开，可以查看程序运行打印出来的信息，如图18。



图 18

切换到浏览器MQTT服务器界面上，点击“Websocket UI”，如图19。

CloudMQTT Console uaqgcgov

☒ Websocket UI ☐ CloudMQTT Stats Interface

Instance info

Server	m11.cloudmqtt.com
User	uaqgcgov
Password	YWD9iPwBnURj
Port	18888
SSL Port	28888
Websockets Port (TLS only)	38888
Connection limit	10

Users and ACL


Bridges

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Manage Users

图 19

打开后界面如图20。

 api.cloudmqtt.com/sso/cloudmqtt/websocket

Websocket

Send message

Topic

Message

Send

Received messages

Topic	Message
-------	---------

图 20

按下开发板SW2按键，从浏览器可以看到服务器上有数据上传，如图21。

Websocket

Send message

Topic

Message

Send

Received messages

Topic

/cc3200/ButtonPressEvtSw2

Message

Push button sw2 is pressed on CC32XX device

图 21

同时串口工具也打印有CC3200向服务器发布的消息，如图22，SW3按键的功能也是相似的。

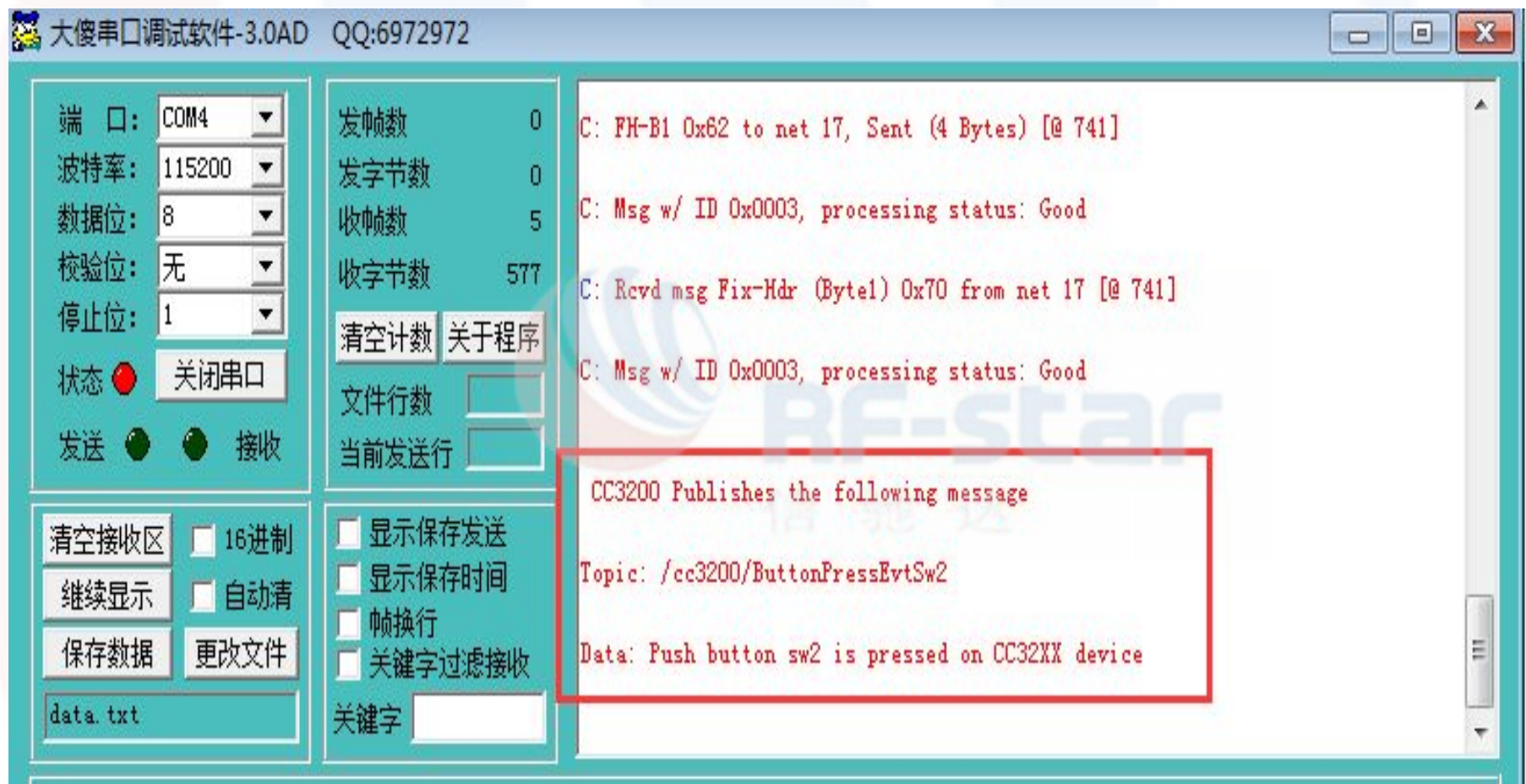
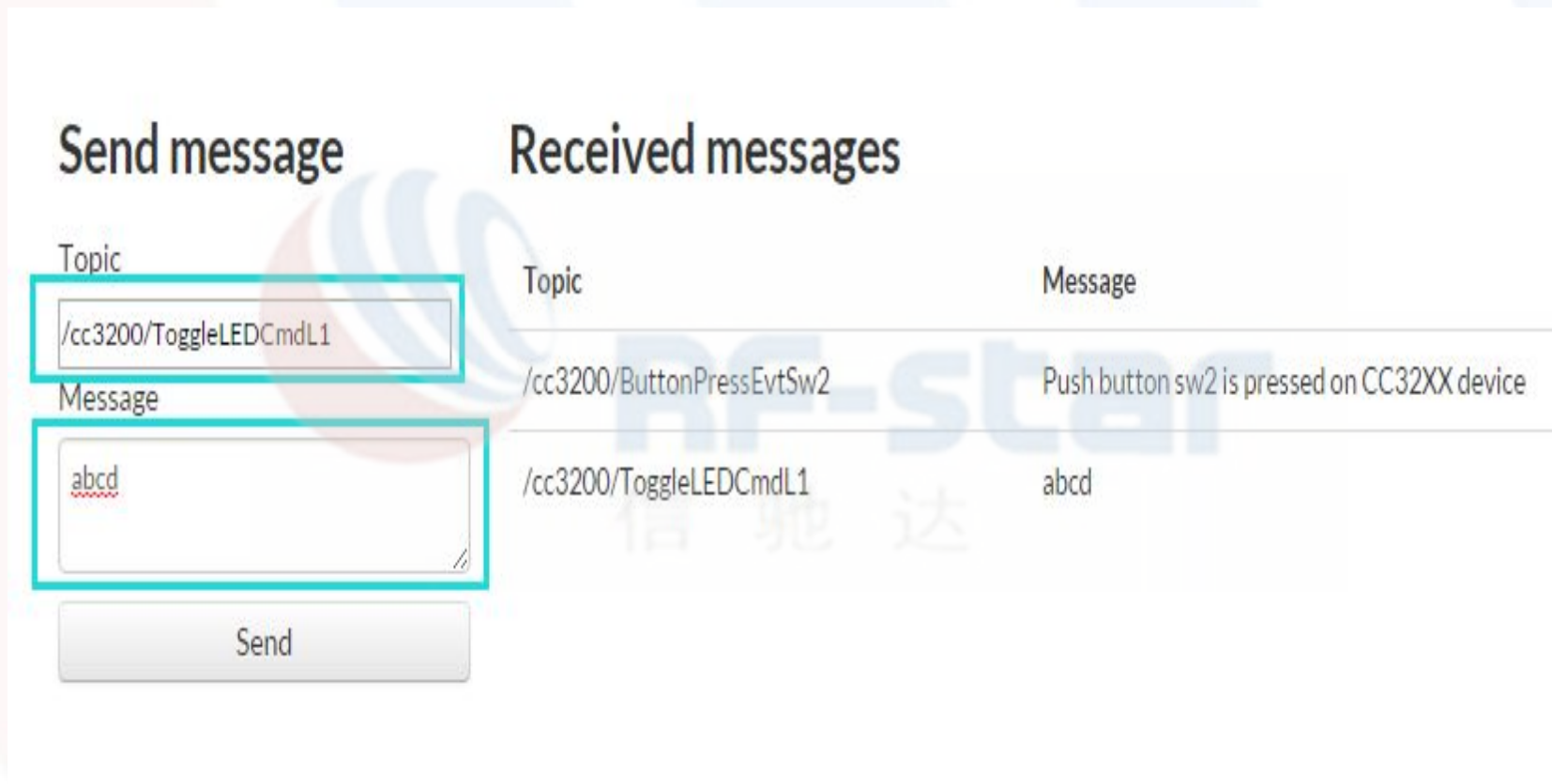


图 22

从MQTT服务器下发信息给CC3200，由于在程序中接收到消息，只比较主题的信息，没对里面的数据处理，所以发任意字符即可，如图 23，Topic 为“/cc3200/ToggleLEDCmdL1”，数据为“abcd”。



The image shows a web-based MQTT client interface. On the left, under the heading "Send message", there is a "Topic" input field containing "/cc3200/ToggleLEDCmdL1" and a "Message" input field containing "abcd". Below these fields is a "Send" button. On the right, under the heading "Received messages", there is a table with two columns: "Topic" and "Message". The table contains two entries: the first entry has the topic "/cc3200/ButtonPressEvtSw2" and the message "Push button sw2 is pressed on CC32XX device"; the second entry has the topic "/cc3200/ToggleLEDCmdL1" and the message "abcd".

Received messages	
Topic	Message
/cc3200/ButtonPressEvtSw2	Push button sw2 is pressed on CC32XX device
/cc3200/ToggleLEDCmdL1	abcd

图 23

可以看到开发板的红灯点亮，如图24，再发一次，红灯熄灭，同理，发送 /cc3200/ToggleLEDCmdL2、/cc3200/ToggleLEDCmdL3，可以使另外两个灯状态翻转。

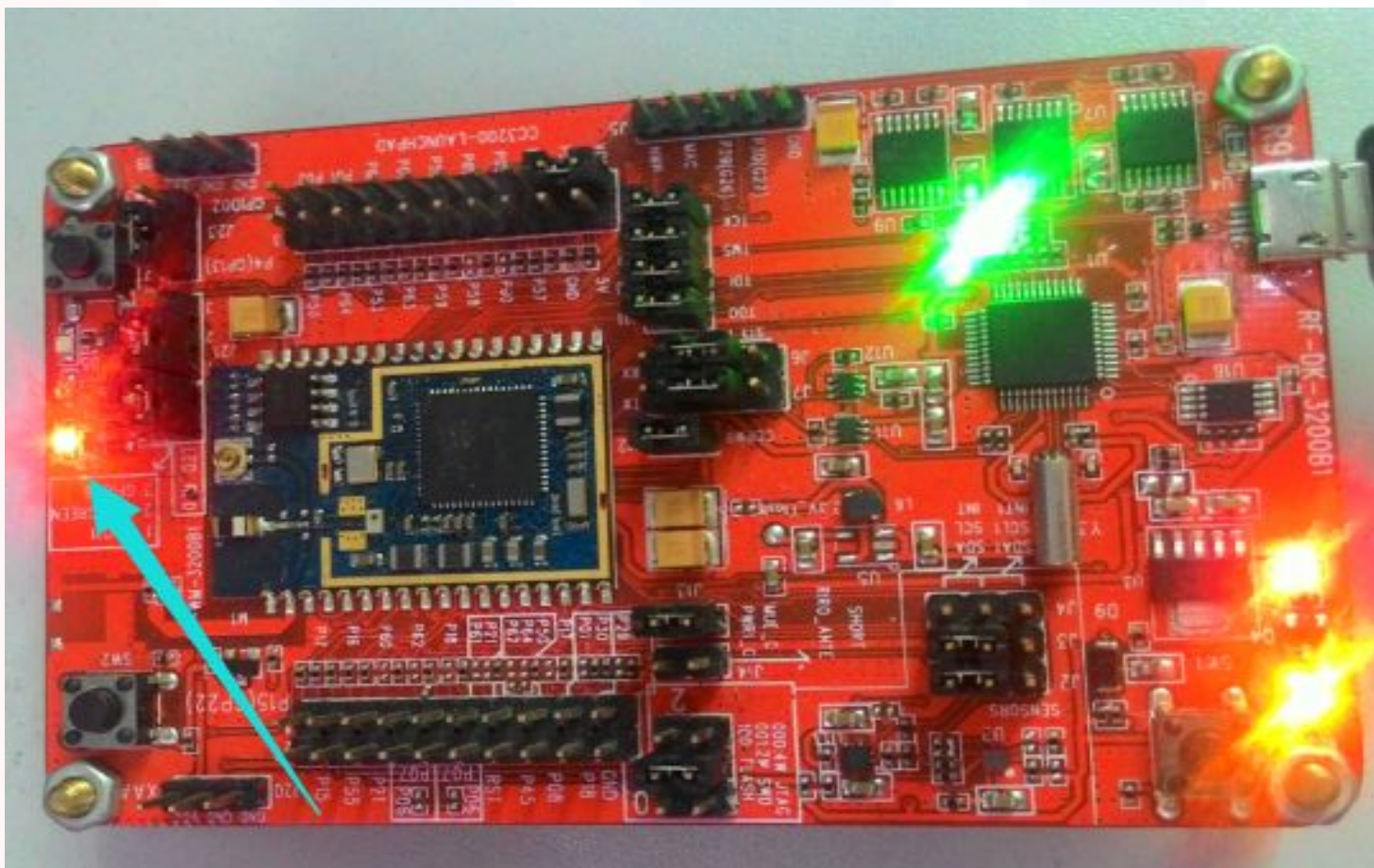


图 24



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