

### WiFi Module

# BMC81M001 Arduino Library V1.0.3 Description

Revision: V1.20 Date: December 20, 2023
www.bestmodulescorp.com



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## Introduction

The Best Modules BMC81M001 is a WiFi module, which uses the UART communication method. This document provides the description of the BMC81M001 Arduino Lib functions and how to install the Arduino Lib. The example demonstrates the data transmission functions of TCP, Alibaba Cloud Platform and ThingSpeak.

## Arduino Lib Functions

Arduino	Lib Name: BMC	81M001	Lib Version: V1.0.3								
		Construct	tors & Initialisation								
	BMC81M001(H	lardwareSerial*theSeriall = &	Serial)								
	Description	Constructor, select hardware UART communication method									
1	Parameter	* theSerial: hardware UART	communication interface selection								
	Return Value	rn Value —									
	Note		—								
	BMC81M001(u	int16_t rxPin,uint16_t txPin)									
	Description	Constructor, select software	UART communication method								
2	Parameter	rxPin: Software UART RX pi txPin: Software UART TX pi	n n								
	Return Value		_								
	Note		—								
	void begin(uint	32_t baud = BMC81M001_ba	udRate)								
	Description	Module initialisation									
3	Parameter	baud: baud rate, defaults to	115200								
	Return Value	void									
	Note		—								
		Performan	ce Functions (TCP)								
	bool connectTo	AP(String ssid,String pass)									
	Description	The module is connected to	WiFi								
4	Parameter	Ssid: WiFi name pass: WiFi password									
	Return Value	Execution result: true: Succeeded false: Failed									
	Note		—								
	bool connectTC	CP(String ip,int port)									
	Description	Connect to TCP server									
5	Parameter	ip: TCP server IP address port: Port number									
	Return Value	Execution result: true: Succeeded false: Failed									
	Note	The IP address and port nur	nber are defined by the server								



	bool writeData1	cp(int Dlength, char Dbuffer[])						
	Description	Transmit a data to the TCP server						
6	Parameter	Dlength: Data length Dbuffer[]: Data						
	Return Value	Irn Value Execution result: true: Succeeded false: Failed						
	Note	—						
	String readData	аТср ()						
	Description	Connect to TCP server and read the data transmitted by the server						
7	Parameter	—						
	Return Value	Data transmitted by the TCP server						
	Note	—						
		Performance Functions (lot)						
	bool configMqtt	(String clientlid, String username, String password, String mqtt_host, int server_port);						
	Description	Configure the MQTT connection parameter						
8	Parameter	Clientlid: client, user ID. username: user name. password: password. mqtt_host: server address. server port: server port.						
	Return Value	Execution result: true: Succeeded false: Failed						
	Note —							
	bool setPublish	Topic(String publishtopic);						
	Description	Set the publish default Topic						
	Parameter	The default publish Topic in the Topic list on the IoT platform						
9	Return Value	Execution result: true: Succeeded false: Failed						
	Note	_						
	bool setSubscri	betopic(String subscribetopic);						
	Description	Set the subscribe default Topic						
	Parameter	The default subscribe Topic in the Topic list on the IoT platform						
10	Return Value	Execution result: true: Succeeded false: Failed						
	Note	—						
	bool setTopic(S	tring topic)						
	Description	Set the custom topic categories for IoT Platform						
	Parameter	topic: The transmission media between a message publisher and a subscriber						
11	Return Value	Execution result: true: Succeeded false: Failed						
	Note	_						



	bool writeString	(String Dbuffer,String topic)
	Description	Transmit a data to IoT Platform in String data format
	Parameter	Dbuffer: A character data to be transmitted
12		topic: The transmission media between a message publisher and a subscriber
	Return Value	Execution result:
		false: Failed
	Note	_
	bool writeBytes	(char Dbuffer[],int Dlength,String topic)
	Description	Transmit a data to IoT Platform in Byte data format
13	Parameter	Dbuffer[]: Data Dlength: Data length topic: The transmission media between a message publisher and a subscriber
	Return Value	Execution result: true: Succeeded false: Failed
	Note	_
	void readlotDat	a (String *ReciveBuff,int *ReciveBufflen,String *topic)
	Description	Connect to the IoT platform and then read the data transmitted by the platform
14	Parameter	*ReciveBuff: The received data *ReciveBufflen: The received data length *topic: The topic for the received data
	Return Value	void
	Note	—
		Other Functions
	bool reset(void)	
	Description	Software reset module
	Parameter	void
15	Return Value	Execution result: true: Succeeded false: Failed
	Note	—
	int sendATCon	nmand(String StringstrCmd,int timeout,uint8_t reTry);
	Description	Send AT command
16	Parameter	StringstrCmd: AT command timeout: timeout reTry: timeout times
	Return Value	Execution result: true: Succeeded false: Failed
	Note	

Note 1: Login to Alibaba Cloud IoT Platform, Enter the console → Select public instance → Device management → Device → Click to view and enter the corresponding product → Click MQTT connection parameters to view.



Instance Details	Devi	ces						
Devices ^	1948年3月	× ×	Total Devices @ 1	Activated Devices	• Online •			
Products	Device	List Batch Management	Advanced Search					
Devices 1	Add Dev	ce Batch Add Dev	ceName 🗸 Enter Dev	iceName Q	Search by Device Tag 💙			
Groups	De De	iceName/Alias	Product	Node Type	Device Status 🙆 🏆	Last Online	Enable/Disable	
Device Distribution	Ard	uino_Wifi	Intelligent switch	Devices	Online	Feb 16, 2023, 15:59:01.886		View   Delete
· 247454193								
Instance Datalla		← Ardu	ino_Wifi 🌼	nline				
Instance Details			lligent switch View					Mary
Devices		ProductKey	hj3hM0mUhMj Copy					
Products			0					
Devices		Device Inform	atio Stopic List	ISL Data Device	e Shadow - Manage Fi	lies Device Log Online Debug	Groups	
		Device Informa	tion					
Groups		Product Name	Intelligen	t switch		ProductKey hj3hM	0mUhMj Copy	
Device Simulation		Node Type	Devices		MOTT Conner	stion Parameters		~
Device Distribution	n	Alias 🔘	Edit		MQ11 Connec	cuon Parameters		<u></u>
		Created At	Nov 22, 21	022, 13:43:57	clientId	hj3hM0mUhMj.Arduino_Wifi securemode 534880746	=2,signmethod=hmacsha256,	timestamp=1676
		MOTT Conception	Online	<b>`</b>	username	Arduino_Wifi8chj3hM0mUhMj		
Message Forwarding			raiameters men 4	)	passwd	9f7b0cbb9de8980aad95f2b6cf14e4b289f3	717afb0bd5cdc5bf381443991	111c
Maintenance					mqttHostUrl	iot-06z00ac1cwfkn1s.mqtt.iothub.aliyuncs	.com	
Security Center		More Device In	formation		port	1883		
		SDK Language					Cop	y Close
		Module Informatio	n -					



Note 2: Login to Alibaba Cloud IoT Platform, Enter the console  $\rightarrow$  Select public instance  $\rightarrow$  Device management  $\rightarrow$  Device  $\rightarrow$  Click to view and enter the corresponding product  $\rightarrow$  Topic categories  $\rightarrow$  Custom topic.

			A T A 111 A 14 1 DARA
Instance Details			Intelligent switch Publish
Devices	^		ProductKey hj3hM0mUhMj Copy Total Devices 1 Manage
Products			Product Information Tanic Categories [
Devices			roduct monnation topic categories
Groups			Topics for Basic Communications Topics for
Device Simulation			Edit Topic Category
Device Distribution			Topic Category
			/hj3hM0mUhMj/\${deviceName}/user/ardunio
Message Forwarding	$\sim$		/hj3hM0mUhMj/\${deviceName}/user/update
Maintenance	$\sim$	<	/hj3hM0mUhMj/\${deviceName}/user/update/error
Security Center	$\sim$		
			/hj3hM0mUhMj/\${deviceName}/user/get

Documentation and Tools



## Arduino Lib Download and Installation

BMC81M001 Library: Refer to the following two methods to install the BMC81M001 Arduino Library.

#### Method 1: Search for installation

Arduino IDE  $\rightarrow$  Sketch  $\rightarrow$  Include Library  $\rightarrow$  Manage Libraries...  $\rightarrow$  Search BMC81M001  $\rightarrow$  Install

File Edit	Sketch Tools Help		-	
	Verify/Compile	Ctrl+R		
	Upload	Ctrl+U		
	Upload Using Programmer	Ctrl+Shift+U		-
a.,	Export compiled Binary	Ctrl+Alt+S		
11.14	Show Sketch Folder	Ctrl+K		
The second	Include Library		Δ	
	Add File	1	Manage Libraries	Ctrl+Shift+I
	10 m		Add .ZIP Library	Method 1

Search for Installation Step 1

👼 Library Manager	×
Type All V Topic All V BMC81M001	
18712 man Meny	^
1: Rear Mediani Mill long & Reading Leases, Berry for Indens, 109038 and 10910 (1071) accurate lines (1071)	and the second second
arrenard and sona addition). Its and thatfina suggest, arreadors others of industs (MI, augi) and its arreador.	states rap
Version 1	U.1 V Install

Search for Installation Step 2

#### Method 2: Download the .ZIP library before adding it

Download the Arduino example (BMC81M001 Library) under the DOCUMENTS menu from the Best Modules website (<u>https://www.bestmodulescorp.com/bmc81m001.html</u>).

Add .ZIP library: Arduino IDE  $\rightarrow$  Sketch  $\rightarrow$  Include Library  $\rightarrow$  Add .ZIP Library...

File Edit	Sketch Tools Help	
	Verify/Compile Ctrl+R	
	Upload Ctrl+U	
	Upload Using Programmer Ctrl+Shift+U	a second second second
	Export compiled Binary Ctrl+Alt+S	fours sectal port in
	Show Sketch Folder Ctrl+K	
(	Include Library >	Δ
	Add File	Manage Libraries Ctrl+Shift+I
	Lude - man. Press 11. Av-	Add .ZIP Library
		Arduino libraries Method 2



## Arduino Example

### **Example 1: TCP**



**Physical Connection Diagram** 

Example 1 function: The module is connected to the mobile phone hotspot to implement bidirection data communication with the TCP server APP on the mobile phone.

1. Open the example:

Arduino IDE  $\rightarrow$  File  $\rightarrow$  Examples  $\rightarrow$  Select Lib (BMC81M001)  $\rightarrow$  Select example (TCP)

2. Example Description:

UDP

ESP TouchAbout

Firstly, users need to modify the WiFi information and TCP server information in the TCP.h file, shown as follows:



Local port

CONFIRM

6000



#### 3. Connect to WiFi and TCP server

```
#include "TCP.h"
BMC81M001 Wifi (6,7);
void setup()
{digitalWrite(LED, LOW);
                              // Configure the serial monitor
  Serial.begin(9600);
 Wifi.begin();
                              // Module initialisation
  if(!WiFi.connectToAP(WIFI SSID,WIFI PASS))// Set the connected
                                            // hotspot name and password
    Serial.println("Disconnect to WIFI");
  if(!WiFi.connectTCP(IP, IP Port)) // Connect to TCP server (APP)
  {
    Serial.println("Disconnect to TCP server");
  }
  else
  {Serial.println("Connected to TCP"); }
```

4. In this example, if the data is transmitted on the serial monitor, the data will be directly uploaded to TCP server, and the module information can be viewed on TCP/UDP network debug assistant. The transmitted data on TCP/UDP network debug assistant can be viewed on the serial monitor.

```
void loop() {
tcpBuff=Wifi.readDataTcp(); // Monitor the data received by the module
if(tcpBuff!=0)
{
  Serial.println(tcpBuff);
}
while (Serial.available() > 0) / / When the data transmitted by the serial
                               // monitor is received, execute data
                               // transparent transmission
{
  SerialBuff[resLen++] = mSerial.read();
  delay(10);
if(resLen>0)
  digitalWrite(LED, HIGH); // LED on when a data is received
  if(WiFi. writeDataTcp (resLen,SerialBuff))// Transmit a data to TCP
                                            // server
  {
    Serial.println("Send data sucess");
    digitalWrite(LED,LOW); // LED off when a data is transmitted
                               // successfully
  }
  clearBuff();
}
void clearBuff() {
  <code>memset(SerialBuff,' \0', RES_MAX_LENGTH); // Clear the character array of</code>
                                          // the received serial data
  resLen = 0;
```



The program execution result is displayed on the APP and the serial monitor:



### Example 2: Alinyun\_lot



**Physical Connection Diagram** 

Example 2 function: The module is connected to the mobile phone hotspot and then connected to the Alibaba Cloud Platform instance, which can implement data transparent transmission.

1. Open the example:

Arduino IDE  $\rightarrow$  File  $\rightarrow$  Examples  $\rightarrow$  Select Lib(BMC81M001)  $\rightarrow$  Select the corresponding example (Alinyun\_Iot).

2. Login to IoT platform (<u>https://account.alibabacloud.com/</u>) and register, select public instance  $\rightarrow$  create products and devices  $\rightarrow$  custom topic, fill MQTT parameters and various topics into the Aliyun\_Iot.h file. The specific process is as follows:



 Create Product: After entering the public instance, click the menu device management on the left → Product → Create product

		IN FIGURENT DEVICES / FIGURES / CIEGLE FIGURELUCUMENTATION	
Instance Details		← Create Product (Device TSL)	
Devices	^	Create Product Create Product from Device Center	
Products 1		* Product Name	
Devices		Smart 2	
Groups		* Category	
Device Simulation		* Node Type	
Device Distribution		Directly Connected Device	Gateway device
Message Forwarding	~	Networking and Data Format	
Maintenance	~	* Network Connection Method	
Security Center	~	Wi-Fi	
		* Data Type 🔞	
Documentation and Tools	s	ICA Standard Data Format (Alink JSON)	
		✓ Checksum Type	
		✓ Authentication Mode	
		More	
		→ Product Description	
		(5)	
🗐 Feedback		OK Cancel	

 Custom topic, define the data transmission media: Device management → Product → View the newly created product → Topic categories → Custom topic

Devices ^	roductKey hj3hM0mUhMj Copy		ProductSecret	
Products 1	otal Devices 1 Manage		Edit Topic Category	×
Devices Groups Device Simulation	Product Information Topic (ht.go) es Topics for Basic Communications Topics f Edit Topic Category (4	Define Feature Message	O Use slashes (/) to delimit the category hierarchy. The first category is ProductKey. The second category is DeviceName. The third category is used to identify custom topic categories in Po Categories in Po Categories. The Category include: the /a15T****dhV(ghexicName)User/update topic category include: topic/categori***dhV(mydexice2/user/update.	5
Device Distribution IoT孪生引擎 New	Topic Category /hj3hM0mUhMj/\$(deviceName)/user/ardunio		* Device Operation Authorizations Publish and Subscribe 5	~
Message Forwarding $\sim$	/hj3hM0mUhMj/\${deviceName}/user/update		* Topic Category (hi3hM0mLlbMi///deviceName)/user/arduing	
Maintenance ~	/hj3hM0mUhMj/\$(deviceName)/user/update/error		arduino 6	
Security Center	/hj3hM0mUhMj/\$(deviceName)/user/get		Description Enter a description	
Documentation and Tools			0/1	100
			Canc	el





 Return to "Product" interface → "Manage device" → "Add device" → DeviceName, Click "OK".

Instance Details	Produc	ts								
Devices ^			Overview of Device Conner	tion F	Process					
Products 1 Devices Groups		IT OF BREAT	Create Product A product is a collection of devices with the same	02	Create Device Create a device and obtain the identity information that is	0	3 Edit TSL Model All devices under the product inherit the TSL	Device-side Develop Integrate Link SDK and develop device-side	o 05	View Submitted Da View the submitted property data. Integra
Device Simulation				0						
Device Distribution	Create Produc	ct Quick Start	Search by product name	Q	Select Product Tag				$\sim$	
	Product Name	c	Productikey		Node type		rested at	AD	(2)	
Message Forwarding	智能的并失		hj3hM0mUhMj		Devices		Nov 22, 2022, 13:59:28	Vi	w Manage Dev	ces Delete
Instance Details		Devices								
Devices	^	Intelligent swi	itch 🗸	Total	Devices O		Activated Devices	1	Online 😡	
Products		Device List	Batch Management Ad	vance	d Search					
Devices						г				
Groups		Add Devile	Batch Add DeviceName		Enter DeviceName		Add Device			×
Device Simulation		DeviceName	/Alias	Prod	luct	Nc	Note: You do not r specified, Alibaba	need to specify DeviceNar Cloud will issue a unique i	ne. If DeviceN dentifier unde	ame is not ir the product
Device Distribution		Arduino_Wif				De	as DeviceName.			
							Products			
Message Forwarding	~						DeviceName			
Maintenance	~ <						Arduino-Wifi 4			
Security Center	$\sim$						Alias 🔘			
							Enter an alias.			
Documentation and Too	ols								5	Cancel

4) Check the MQTT connection parameters of the device: Device → Check the newly created device Arduino-Wifi → Device information → Check the MQTT parameters. Viewing the device topic, which is in the same way as the step 2 for custom topic.

Fill the CLIENTLID, USERNAME, PASSWORD, MQTT\_HOST, SERVER\_PORT and other MQTT parameters into the Aliyun\_Iot.h file. Fill the PUBLISHTOPIC, SUBSCRIBERTOPIC, CUSTOMTOPIC and other topic categories into the Aliyun\_Iot.h file.

Instance Details	Devi	ces						
Devices ^	\$2858377	× ✓ Tota	Devices	<ul> <li>Activated Devices Ø</li> <li>1</li> </ul>	• Online @			
Products	Device	List Batch Management Advance	d Search					
Devices 1	Add Dev	e Batch Add DeviceName	✓ Enter DeviceName	Q	Search by Device Tag			
Groups	De	iceName/Alias Pro	duct N	ode Type	Device Status 🙆 🖓	Last Online	Enable/Disable	
Device Simulation	Ard	uino_Wifi Intellig	ent switch D	evices	Online	Feb 16, 2023, 15:59:01.886		View Delete
Device Distribution	_							
		← Arduino	Wifi Online					
Instance Details		← Arduno_						
Devices		Products Intelligent sw	itch View				DeviceSecret	View
Products		Productkey hjshMi	лтопму сору					
		Device Informatio	Topic List TSL	Data Device S	ihadow Manage Files	Device Log Online Debug G	roups	
Devices		Device Information						
Groups		Product Name	Intelligent switch			DrockstKey bi3bM0m11b	Mi Com	
Device Simulation		Node Type	Devices			nosocaty iganitation	eopy	
Davies Distribution		Alias 🔘	Edit		MQTT Connecti	on Parameters		×
Device Distributor		Created At	Nov 22, 2022, 13:4	3:57	clientId	hj3hM0mUhMj.Arduino_Wifi securemode=2,sign	method=hmacsha256,tim	iestamp≘1676
		Current Status 🔘	Online		1000	534880746		
Message Forwarding		MQTT Connection Parameters	Here(4)		passwd	9f7b0cbb9de8980aad95f2b6cf14e4b289f3717aft	50bd5cdc5bf38144399111	ic in the second se
Maintenance			Ŭ		mqttHostUrl	iot-06z00ac1cwfkn1s.mqtt.iothub.aliyuncs.com		· •
Maintenance	~	More Device Informatio	n		port	1883		
Security Center		SDK Language						· · · · · ·
		Module Information					Сору	Close



Aliyun lot Aliyun lot.h §					
1 #ifndef _BMC81M001_H					
2 #define _BMC81M001_H	MQTT Connect	tion Parameters X			
3 4	clientId	hj3hM0mUhMj.Arduino_Wifi securemode=2,signmethod=hmacsha256,timestamp=1676			
5 //***********************************		535372399			
6 //***********************************	username	Arduino_Wifi&hj3hM0mUhMj			
7 #include "Aliyun_Iot.h" 8 #include "BMC81M001 b"	passwd	c91ae0ef2d2cdfdce70b24a6215b6f4335d78dff1c72fbe101609e78c3de709f			
9	mqttHostUrl	iot-06z00ac1cwfkn1s.mqtt.iothub.aliyuncs.com			
10 //***********************************	port	1883			
11 //*************** wifi information *****************//					
12 //		Copy Close			
14 #define WIFI_SSID "iQOO_Neo_855					
15 #define WIFI_PASS "12345678 /"	Instance Details	← Intelligent switch Publish			
10 17 #define CLIENTLID "mytest  securemode=3\signmethod=	hr	ProductKey hj3hM0mUhMj Copy			
18 #define USERNAME "Arduino_Wifi&gqzn81RWZC2"	Devices	Total Devices 1 Manage			
19 #define PASSWORD "9CF1D3420F07ECC02250EF829D9EAC8529	A{ Products	Product Information Topic Categories E			
20 #define MQTT_HOST "gqzn8lRw2C2.iot-as-mqtt.cn-snangna 21 #define SERVER PORT 1883	1. Devices	Tables for Basis Communications Tables for			
22	Groups	topics for basic communications topics for			
23 #define PUBLISHTOPIC "ggzn81RWZC2/Arduino_Wifi/user/u	Device Simulation	Edit Topic Category			
24 #define SUBSCRIBERTOPIC "qqzn81RWZC2/Arduino_Wifi/use 25 #define CUSTOMTOPIC "qqzn81RWZC2/Arduino_Wifi/user/ar	Device Distribution	Topic Category			
26		/hj3hM0mUhMj/\$(deviceName)/user/ardunio customtopic			
	Message Forwarding				
	Maintenance				
	Security Center	/hj3hM0mUhMj/\$(deviceName)/user/update/error			
		/hj3hM0mUhMj/\$(deviceName)/user/get subscribetopic			
	Documentation and To	sols			
// The connected WiFi account nas	seword				
Whether MITT COTP Will account par					
#define WIFI_SSID "1000_Neo_855"	// MC	poile phone notspot name			
#define WIFI_PASS "12345678.!"	// Mo	obile phone hotspot password			
// aliyun MQTT information					
#define CLIENTLID "mytest   securemo	de=3	ignmethod=hmacshal			
timestamp=6789	"				
#dofino USEDNAME "Anduino Wificares	01007001				
#define DISCHORD #0CE1D3420E07ECC	101KW4C2~	0002709520700672"			
#define PASSWORD "9CF1D3420F0/ECCU	JZZJUEF8Z	ADAFACODZAYODO/Z			
<pre>#define MQTT_HOST "gqzn81RWZC2.iot</pre>	-as-mqtt	.cn-shanghai.aliyuncs.com"			
#define SERVER PORT 1883	// Pa	art number			
// aliyun TOPIC information					
#define PUBLISHTOPIC "gggn81PW7C2/Arduine Wifi/user/undate"					
#define CUDCCDIDEDEDECDIC HaranolDEVEC2/Arduine With/user/update					
#aenne SUBSCRIBERTOPIC "gqzn8iRWZCZ/Arauino_win/user/get"					
#define CUSTOMTOPIC "gqzn81RWZC2/#	Arduino_W	/ifi/user/ardunio"			

Note: When the CLIENTID was defined, the "\\" should be added in front of ",".



3. Example Description:

According to the data generated by Alibaba Cloud Platform to initialize the module. This process includes software reset module, connect to WiFi and connect to Alibaba Cloud IoT, shown as follows:

```
#include "Aliyun_Iot.h"
BMC81M001
                Wifi(&Serial1);
void setup()
{
  digitalWrite(LED, LOW);
  Serial.begin(9600); // Configure the serial monitor
  Wifi.begin();
                    // Module initialisation and configuration
  Wifi.reset();
  Serial.print("WIFI Connection Results:");
  if(Wifi.connectToAP(WIFI_SSID,WIFI_PASS)==0) // According to the name
                      // and password to connect to WiFi
    Serial.println("fail");
  }
  else {Serial.println("success");}
  Serial.print("Aliyun Connection Results:");
  Wifi.sendATCommand("AT+CIPSNTPCFG=1,8,\"ntp1.aliyun.com\"",1000,2);
  // Connect to alivun
  if (Wifi.configMqtt (CLIENTLID, USERNAME, PASSWORD, MQTT HOST,
     SERVER PORT) == 0) // Configure MQTT parameter
  {
    Serial.println("fail");
  }
  else
  {
    Serial.println("success");
    Wifi.setPublishTopic(PUBLISHTOPIC); // Configure the subscribe and
    // publish Topic after the connection is successful
    Wifi.setSubscribetopic(SUBSCRIBERTOPIC);
  }
  Serial.print("Topic set Results:");
  if(Wifi.setTopic(CUSTOMTOPIC)==0) // Set the custom Topic
  {
    Serial.println("fail");
  }
  else {Serial.println("success");}
  delay(200);}
```

4. After executing, users can view the device status on the platform.

DeviceName/Alias	Product	Node Type	Device Status 👩 🙄	Last Online	Enable/Disable	Actions
Arduino_Wifi	Intelligent switch	Devices	Online	Feb 16, 2023, 15:59:01.886		View   Delete



5. In this example, when the serial monitor transmits a data, the module will only execute the data transparent transmission function. The data received by the serial monitor is directly uploaded to the cloud platform, and the information uploaded by the module can be recorded and viewed in the platform log.

```
void loop()
{
 Wifi.readIotData(&aliyunReciveBuff, &aliyunReciveBufflen, &recTopic);
  // Monitor the data received by the module
  if (aliyunReciveBufflen)
  {
    Serial.println(aliyunReciveBufflen);
    Serial.println(aliyunReciveBuff);
  }
// When the data transmitted by the serial monitor is received, execute
// data transparent transmission
  while (Serial.available() > 0) // Receivehe the data from the serial
// monitor
  {
    SerialBuff[resLen++] = Serial.read();
    delay(10);
  }
  if(resLen>0)
  {
    digitalWrite(LED, HIGH);
    DATA BUF = (String )SerialBuff;
    topic = PUBLISHTOPIC;
    if(Wifi.writeString(DATA BUF,topic))
      Serial.println("Send String data sucess");
    if(Wifi.writeBytes(SerialBuff, resLen, topic))
    {
      Serial.println("Send byte data sucess");
    clearBuff();
  }
}
void clearBuff() {
 memset(SerialBuff,'\0', RES MAX LENGTH); // Clear the received array
  // data
  resLen = 0;
}
```



### Example 3: ThingSpeak



**Physical Connection Diagram** 

Example 3 function: The module is connected to the mobile phone hotspot and then connected to the channel of the ThingSpeak platform, the data will be transmitted to display on the platform.

- 1. Open the example: Arduino IDE→File→Examples→Select Lib(BMC81M001)→Select the corresponding example (ThingSpeak).
- 2. Login to the ThingSpeak platform (<u>https://thingspeak.com/</u>), after registering the account, create a new data channel, and then create a new MQTT device, fill the MQTT parameters into the ThingSpeak.h file.
  - 1) Register an account and enter the platform: click "Get Start For Free" to enter the platform interface, register an account and log in.





2) Create channels: click New Channel, fill in the Name and number of open data fields, and save the channel.



 Create MQTT device: fill into the device name, select the new channel, click "Add Channel", wait for "Allow Publish" and "Sublish" is OK, then click "Add Device".

☐ ThingSpeak™ 📃	<b>□ ThingSpeak ™</b>	
Channels - Apps - Devices - MQTT Support - Commercial Use How to Buy	MQTT Devices  I did a new device  Add a new device  Device Information  Name*  Wifi  Description	Authorize channels to access   select a Channel
	Enter optional information about this device for later reference. Authorize channels to access (wfr (2181120) Add Channel Authorized Allow Channel No channels authorized. Cancel Add Dov/ce	Cancel Add Device



4) Click "edit", check the new MQTT device parameter, fill the data into the ThingSpeak.h file.





3. Example Description:

After module initialization, connect the hotspot, configure the MQTT parameters, connect the channel of the ThingSpeak platform, and the data will be transmitted to the platform. Shown as below:

```
#include "ThingSpeak.h"
BMC81M001
                Wifi(&Serial1);
void setup()
{
  digitalWrite(LED, LOW);
  Serial.begin(9600);
                              // Configure the serial monitor
 Wifi.begin();
                              // Module initialisation and configuration
 Wifi.reset();
  Serial.print("WIFI Connection Results:");
  if(Wifi.connectToAP(WIFI_SSID,WIFI_PASS)==0) // According to the name
                              // and password to connect to WiFi
  {
    Serial.println("fail");
  }
  else {Serial.println("success");}
  Serial.print("ThingSpeak Connection Results:");
  if (Wifi.configMqtt(CLIENTLID, USERNAME, PASSWORD, MQTT HOST,
     SERVER PORT) == 0) // Configure MQTT parameter
  {
    Serial.println("fail");
  }
  else
  {
    Serial.println("success");
  }
 delay(200); }
```



4. In this example, a data is transmitted on the serial port monitor, and the data is uploaded directly to the cloud platform, where it can be seen on the channel interface.

```
void loop()
{
 Wifi.readIotData(&ReciveBuff, &ReciveBufflen, &recTopic);// Monitor the
                                      //data received by the module
  if (ReciveBufflen)
  {
   Serial.println(ReciveBufflen);
   Serial.println(ReciveBuff);
  }// When the data tramsmitted by the serial monitor is received,
  // execute data transparent transmission
  while (Serial.available() > 0)// Receive the dta from the serial
                                 // monitor
  {
    SerialBuff[resLen++] = Serial.read();
    delay(10);
  }
  if(resLen>0)
  {
   digitalWrite(LED, HIGH);
   DATA BUF = "field1="; // Send the channel field 1 data
   DATA BUF += SerialBuff;
   topic = PUBLISHTOPIC;
    if (Wifi.writeString (DATA BUF, topic))
    {
      Serial.println("Send String data sucess");
    }
    clearBuff();
    digitalWrite(LED, LOW);
    }
  }
void clearBuff() {
 memset(SerialBuff,'\0', RES_MAX_LENGTH); // Clear the received array
                                           // data
  resLen = 0;
```



5. The ThingSpeak will display the results and users can view the data received from the chart.

<b>ThingS</b> Access: Private	peak™	
Private View	Public View	Channel Settings
Sharing A	PI Keys Dat	a Import / Export
🕈 Add Visua	alizations	Add Widgets
Export ree	cent data	
Channe	Stats	

Created: 2023-06-08T05:57:15Z Last entry: 2023-06-12T01:11:12Z Entries: 27





### Example 4: ThingSpeakPublish



Physical Connection Diagram

Example 4 and Example 5 can be used together to achieve remote data exchange between two WiFi devices, one as a Publish end and the other as a Subscribe end. The implementation functions are as follows:

Publish end: Upload the temperature and humidity data of the Temperature and Humidity module BME33M251 to ThingSpeak;

Subscribe end: Read the temperature and humidity data which is uploaded by the Publish end from ThingSpeak and then display the data on the OLED module;





Example 4 function: Read the temperature and humidity data of the Temperature and Humidity module BME33M251 and publish the data to the channel of the ThingSpeak platform through MQTT device 1 (Publish).

- 1. Open the example: Arduino IDE  $\rightarrow$  File  $\rightarrow$  Examples  $\rightarrow$  Select Lib (BMC81M001)  $\rightarrow$  Select the corresponding example (ThingSpeakPublish).
- 2. Login to the ThingSpeak platform (<u>https://thingspeak.com</u>), after registering the account, create a new data channel, (wifi t&h), create a new MQTT device (Publish), fill the MQTT parameters into the ThingSpeak.h file.



1) Register an account and enter the platform: click "Get Start For Free" to enter the platform interface, register an account and log in.



2) Create channels: click New Channel, fill into the Name (e.g. wifi t&h), Field1 (e.g. humidity) and Field2 (e.g. temperature), save the channel.

🖵 ThingSp	eak™	New Channel			
Signed in successfully.		х	Name		
My Channels			Description		
New Channe Search by tag		Q	Field 1 Field Label 1		
Name 🗢	Updated \$		Field 2		
■ Wifi	2023-06-08 05:57		Field 3		
			1		
			Save Channe	et,	



3) Create MQTT device 1: fill into the device name (Publish), authorize the publish and subscribe of the channel wifi t&h, click Add channel, wait for the Allow Publish and Sublish is OK, then click Add Device. This Publish device is used to upload the temperature and humidity module data.

⊏ ThingSpeak <sup>™</sup>		
Channels • Apps • Devices • MQTT Support • Commercial Use How to Buy	MQTT Devices dd a new dovice Edit Subscribe Device Information Name Subscribe Description	Authorize channels to access () Select a Channel
	Enter optional information about this device for later reference. MQTT Credentials Use these MOTT credentials to publish and	Cancel Add Device MQTT Devices Add a new devic
	subscribe to ThingSpeak channels. Learn Mor Client ID LiwJDBccDxULGxUwDiANEjs	Device Details: Publish No description Delete
	LiwJDBccDxULGxUwDiANEjs	Authorized Channels and Permissions: Wifi t&h (2181120)
	Password IC	

4) Click the "edit" button on the right of the device (Publish), check the MQTT device (Publish) MQTT parameter, fill the data into the ThingSpeakPublish.h.





3. Example Description:

After module initialization, connect the hotspot, configure the MQTT parameters, connect the channel of the ThingSpeak platform. Shown as below:

```
#include "ThingSpeak.h"
#include <BMD31M090.h>
#include <BM25S2021-1.h>
                               // Temperature and Humidity module
BMC81M001 Wifi(&Serial1);
BM25S2021 1 BMht(&Wire2);
void setup()
{
  Serial.begin(9600);
  BMht.begin();
  Wifi.begin();
                               // WIFI module,
                   // Temperature and Humidity moduleinitialization
  Wifi.reset();
  Serial.print("WIFI Connection Results: ");
  if (Wifi.connectToAP(WIFI SSID,WIFI PASS) == 0) // connect the hotspot
  {
    Serial.println("fail");
  }
  else {Serial.println("success");}
  Serial.print("ThingSpeak Connection Results: ");
  if (Wifi.configMqtt(CLIENTLID, USERNAME, PASSWORD, MQTT_HOST, SERVER_
     PORT) == 0)
  // According the MQTT to connect the ThingSpeak platform
  {
    Serial.println("fail");
  }
  else {Serial.println("success");}
  delay(200);
  Wifi.setPublishTopic(PUBLISHTOPIC); // Subscribe Topic,
                                      // update the channel data
  Wifi.setSubscribetopic(SUBSCRIBERTOPIC2);
  Wifi.setSubscribetopic(SUBSCRIBERTOPIC1);
  topic = PUBLISHTOPIC; // Publish Topic
```



4. Polling the Temperature and Humidity module data, sending the humidity data to field 1 in the channel and the temperature data to field 2 in the channel.

```
void loop()
 data1=BMht.readHumidity(); // Get the humidity data
 Humidity=String(data1,2); // Convert the floating data to a string
 DATA_BUF = "field1=";
                              // The channel 1 data
 DATA_BUF += Humidity;
 if (Wifi.writeString(DATA_BUF,topic)) // Publish the data to channel 1
  {
   Serial.println("Send String data sucess");
   delay(1000);
 }
 clearBuff();
 data1=BMht.readTemperature(false); // Get the temperature data
 Temperature=String(data1,2); // Convert the floating data to a string
                               // The channel 2 data
 DATA BUF = "field2=";
 DATA_BUF += Temperature;
 if (Wifi.writeString(DATA_BUF,topic)) // Publish the data to channel 2
  {
   Serial.println("Send String data sucess");
   delay(1000);
 clearBuff();
 delay(2000);
```



5. The ThingSpeak will display the results and users can view the data received from the chart.





### Example 5: ThingSpeakSubscribe



Physical Connection Diagram

Example 5 function: Subscribe to the data update Topic, receive the latest temperature and humidity data of the corresponding channel of ThingSpeak by creating and connecting MQTT device 2 (Subscribe), and display it on the OLED module.

- 1. Open the example: Arduino IDE → File → Examples → Select Lib (BMC81M001) → Select the corresponding example (ThingSpeakSubscribe).
- 2. ThingSpeak channel does not need to be created, and the wifi t&h in Example 4 can be used. Create a new MQTT device (Subscribe) and fill the parameters into the ThingSpeakSubscribe.h file.
  - 1) Create MQTT device 2: fill into the device name(Subscribe), authorize the publish and subscribe of the channel wifi t&h, click Add channel, wait for the Allow Publish and Sublish is OK, then click Add Device. This Subscribe device is used to receive the latest updated data from the channel.



⊐ ThingSpeak <sup>∞</sup>	≡ ⊐ ThingSpeak ~ ≡	
Channels - Apps - Devices - MQTT Support -	MQTT Devices	Authorize channels to access ()Select a Channel
Commercial Use How to Buy	Deviceunformation	Authorized Allow Allow Channel Publish Subscribe
	Name Subscribe	Wifi (2181120)
	Enter optional information about this device for later reference.	Cancel Add Device
	MQTT Credentials Use these MQTT credentials to publish and subscribe to ThingSpeak changeds Learn More	Device Details: Publish No description Delete
	Client ID	Authorized Channels and Permissions: Wifi t&h (218112)  v pub v sub
	LiwJDBccDxULGxUwDIANEjs	Device Details: Subscribe Edit
	LiwJDBccDxULGxUwDiANEjs	No description Delete
	Password Ib	Authorized Channels and Permissions: Wifi t&h (2181120)
		Wifi t&h (2181120)

2) Click the "edit" button on the right of the device (Subscribe), check the MQTT device (Subscribe)

MQTT parameter, fill the data into the ThingSpeakSubscribe.h file.





#### 3. Example Description:

After module initialization, connect the hotspot, configure the MQTT parameters, connect the channel of the ThingSpeak platform. Shown as below:

```
#include "ThingSpeakRead.h"
#include <BMD31M090.h>
#include <BM25S2021-1.h>
                                             // OLED module
BMC81M001 Wifi(&Serial1);
BMD31M090
             BMD31(128,64, &Wire2);
float data1;
String Humidity;
String Temperature;
void Display();
void setup()
{
  BMD31.begin(0x3C);
  BMD31.setFont(FontTable 8X16);
  delay(100);
  Serial.begin(9600);
  Wifi.begin();
  Wifi.reset();
  Display();
  Serial.print("WIFI Connection Results: ");
  if(Wifi.connectToAP(WIFI_SSID,WIFI_PASS)==0) // connect the hotspot
  {
    Serial.println("fail");
  }
  else {Serial.println("success");}
  Serial.print("ThingSpeak Connection Results: ");
  if (Wifi.configMqtt (CLIENTLID, USERNAME, PASSWORD, MQTT HOST, SERVER
     PORT) == 0) // According the MQTT to connect the ThingSpeakplatform
  {
    Serial.println("fail");
  }
  else {Serial.println("success");}
  delay(200);
  Wifi.setPublishTopic(PUBLISHTOPIC);
  // Subscribe Topic, update the channel data
  Wifi.setSubscribetopic(SUBSCRIBERTOPIC2);
  Wifi.setSubscribetopic(SUBSCRIBERTOPIC1);
```



4. Polling the platform to check whether there is updated data, identify the corresponding data if there is updated data and displayed on the OLED module.



5. The OLED display results are as follows:





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