

## AT32F407/437 LWIP FreeRTOS Multicast

## Introduction

This sample code introduces how to run LwIP protocol stack on FreeRTOS and demonstrates example application of UDP multicast.

Applicable products:

Part number	AT32F407xx
	AT32F437xx

List of peripherals:

Main peripherals	EMAC
	GPIO
	USART

# 1 Application method

## 1.1 Hardware requirements

- 1) LED2/LED3
- 2) USART1(PA9/PA10)
- 3) AT-START-F407/ AT-START-F437 evaluation board
- 4) Ethernet cable

## 1.2 Software requirements

- 1) APP\_Release
  - multicast\_udp\_test host computer tool
- 2) SourceCode
  - at32f407\_freertos/ at32f437\_freertos source code
  - FreeRTOS source code
  - LWIP source code
  - AT32 driver library
- 3) Doc
  - SC0104\_AT32F407\_437\_LWIP\_FreeRTOS\_Multicast\_V2.0.0

*Note: All projects are built around keil 5. If users want to use them in other compiling environments, please refer to AT32F407\_Firmware\_Library\_V2.x.x/project/at\_start\_f407/templates (such as IAR6/7, keil 4/5) for a simple change.*

## 1.3 Example of application

- 1) Open the *at32f407\_freertos/ at32f437\_freertos* source code, compile and then download to the evaluation board;
- 2) Configure the IP address segment of the PC to be the same as that of the evaluation board, as shown in Figure 1;
- 3) Open the *multicast\_udp\_test* tool, enter the multicast address and port for sending and receiving, and then click on the “multi join” button, as shown in Figure 2;
- 4) Enter the string to be send and click on the “Send” button, and the evaluation board receives the data and transmits the same content to the host;
- 5) Use the *wireshark* tool to view the multicast communication process, as shown in Figure 3.

In daily application, this sample code realizes hot swap and calls *ethernetif\_set\_link* function to perform corresponding LWIP processing on the network connection status.

Figure 1. Set PC network segment

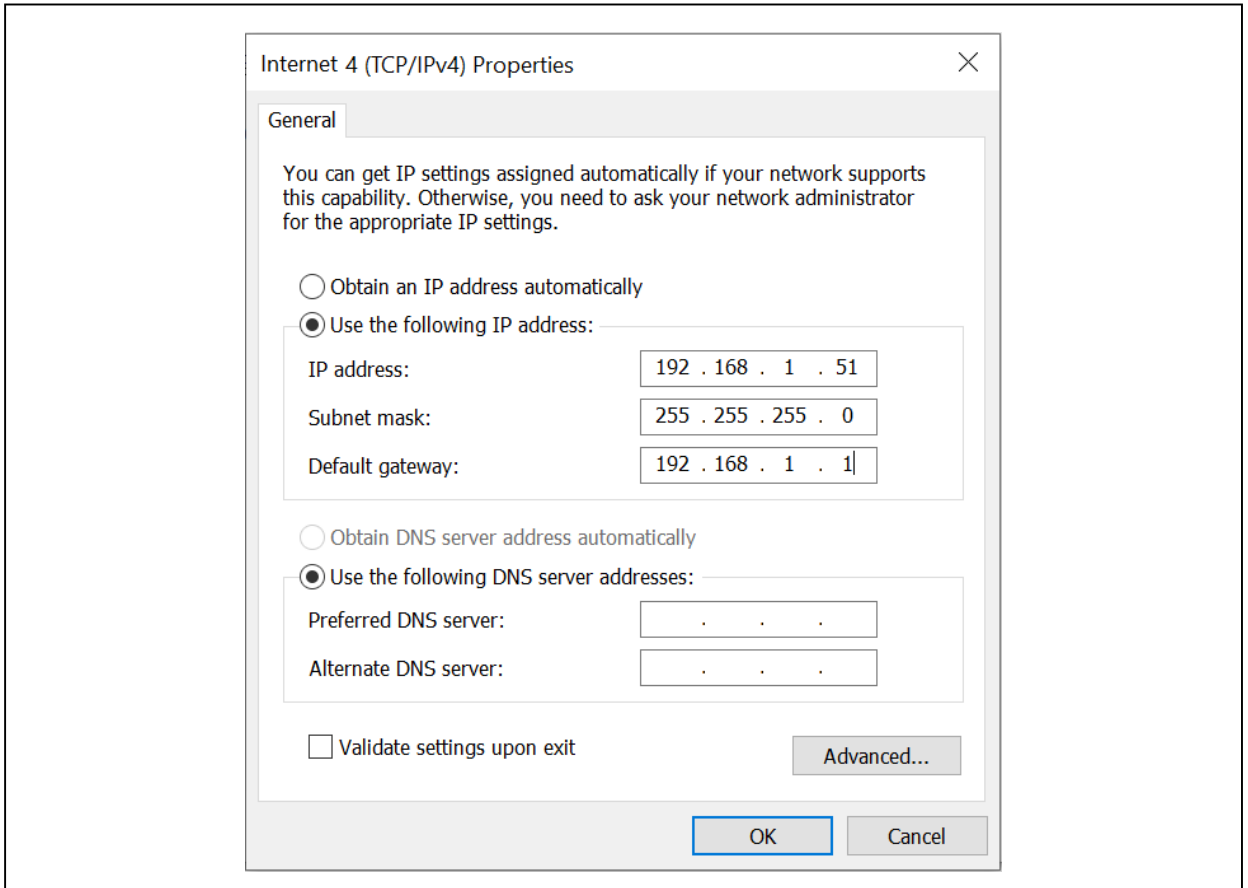


Figure 2. Host sends a string and receives feedback from evaluation board

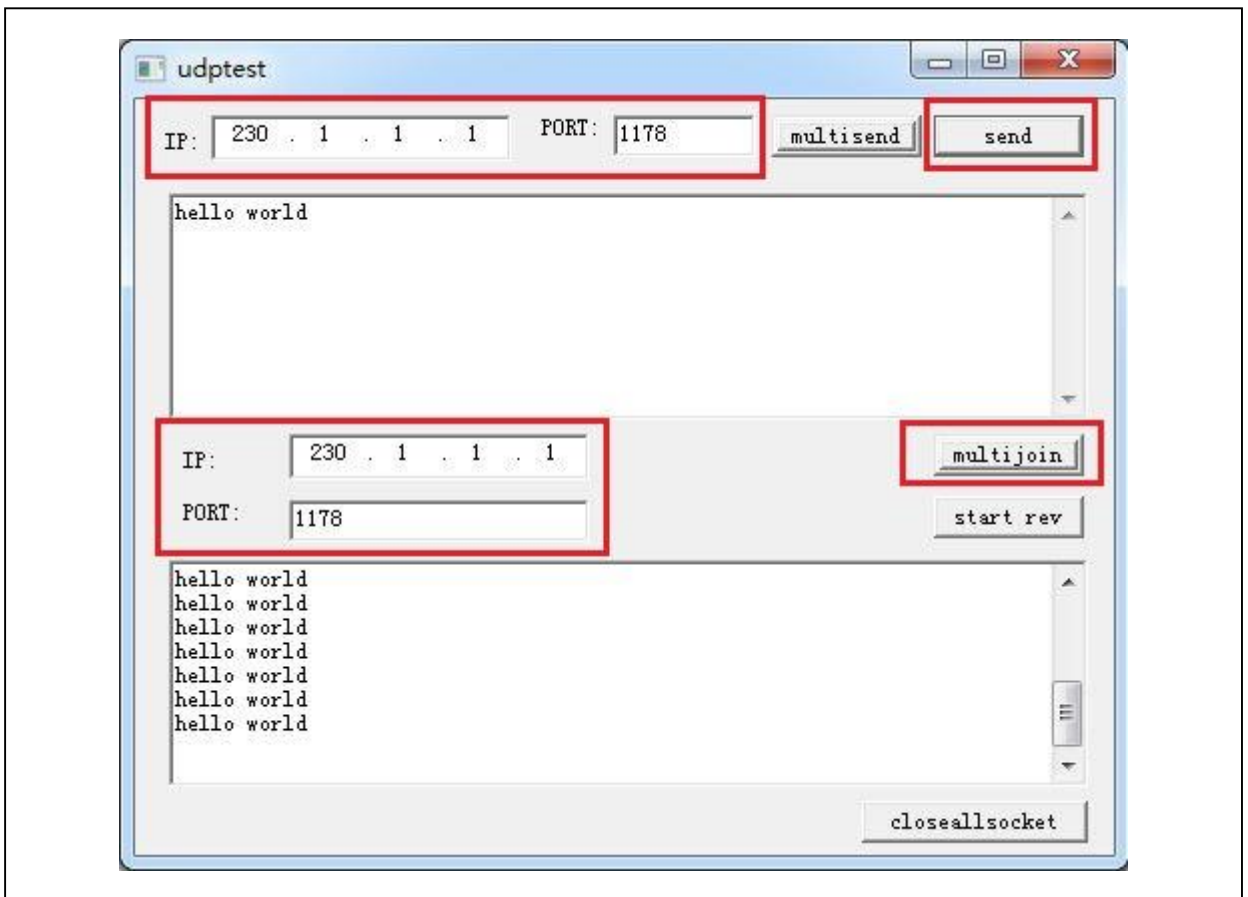


Figure 3. View multicast communication process through wireshark

No.	Time	Source	Destination	Protocol	Length	Info
29915	253.978253	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=12
29923	259.360933	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29924	259.362203	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14
29926	259.792752	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29927	259.793962	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14
29928	260.128791	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29929	260.130062	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14
29931	260.368800	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29932	260.370007	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14
29933	260.624852	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29934	260.626138	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14
29935	261.560741	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29936	261.562034	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14
29939	265.416623	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29940	265.417916	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14
29942	265.960643	192.168.1.51	230.1.1.1	UDP	56	sgi-storman(1178) → sgi-storman(1178) Len=14
29943	265.961925	192.168.1.56	230.1.1.1	UDP	60	sgi-storman(1178) → sgi-storman(1178) Len=14

▶ Frame 29943: 60 bytes on wire (480 bits), 60 bytes captured (480 bits) on interface 0  
 ▶ Ethernet II, Src: Castelle\_45:56:01 (00:00:44:45:56:01), Dst: IPv4mcast\_01:01:01 (01:00:5e:01:01:01)  
 ▶ Internet Protocol Version 4, Src: 192.168.1.56 (192.168.1.56), Dst: 230.1.1.1 (230.1.1.1)  
 ▶ User Datagram Protocol, Src Port: sgi-storman (1178), Dst Port: sgi-storman (1178)  
 ▶ Data (14 bytes)

```

0000  01 00 5e 01 01 01 00 00 44 45 56 01 08 00 45 00  ..^..... DEV...E.
0010  00 2a 00 30 00 00 ff 11 12 b0 c0 a8 01 38 e6 01  .*0.... ..8..
0020  01 01 04 9a 04 9a 00 16 b1 cf 68 65 6c 6c 6f 28  ....hello
0030  77 6f 72 6c 64 0d 0a 00 00 00 00 00          world...
  
```

## 2 Revision history

Table 1. Document revision history

Date	Version	Revision note
2022.09.29	2.0.0	Initial release.

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