

## Introduction

This sample code demonstrates how to run LwIP protocol stack on UCOSIII, and build UDP echo server and TCP echo server.

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
  - Network debugging assistant
- 2) SourceCode
  - at32f407\_UCOSIII/ at32f437\_ UCOSIII source code
  - UCOSIII source code
  - LWIP source code
  - AT32 driver library
- 3) Doc
  - SC0082\_AT32F407\_437\_LWIP\_UCOSIII\_V2.0.2

*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 at32f407\_ UCOSIII / at32f437\_ UCOSIII, compile and 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 network debugging assistant, and enter the local and remote IP addresses, as shown in Figure 2 (UDP) and Figure 3 (TCP);
- 4) Enter the string to be sent; then the evaluation board receives the string and transmits the same content to the host.

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

*Note:* If the data received and sent by the network port is occasionally lost, check whether the amount of code exceeds the zero-wait area of the chip. In this case, users can selectively compile important codes into the zero-wait area.

Figure 1. Set PC network segment

The image shows a network configuration dialog box with a 'General' tab. The dialog contains the following elements:

- General** (tab)
- Text: "You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings."
- Radio button:  Obtain an IP address automatically
- Radio button:  Use the following IP address:
  - IP address:
  - Subnet mask:
  - Default gateway:
- Radio button:  Obtain DNS server address automatically
- Radio button:  Use the following DNS server addresses:
  - Preferred DNS server:
  - Alternate DNS server:
- Checkbox:  Validate settings upon exit
- Button:
- Buttons:  and

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

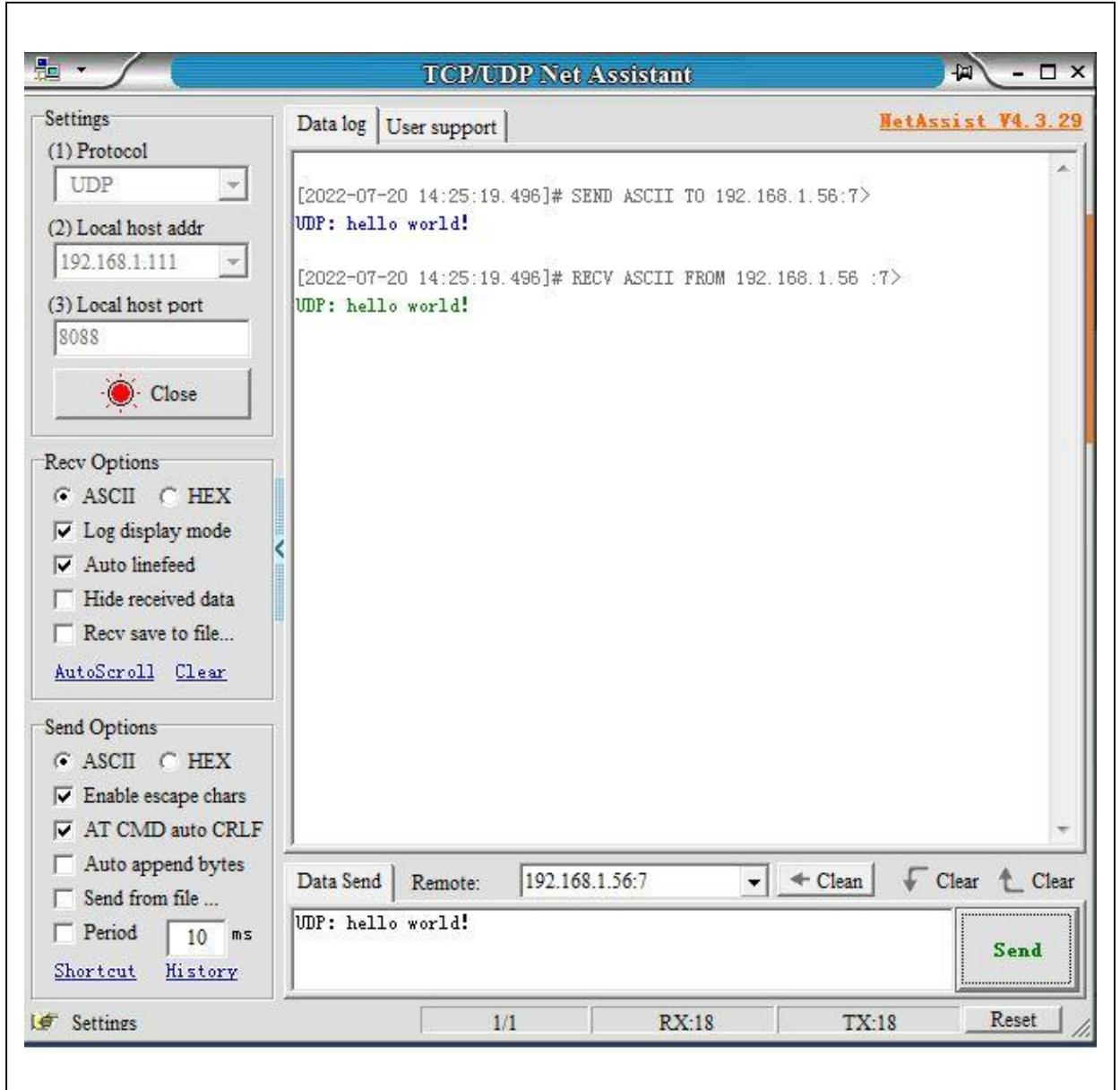
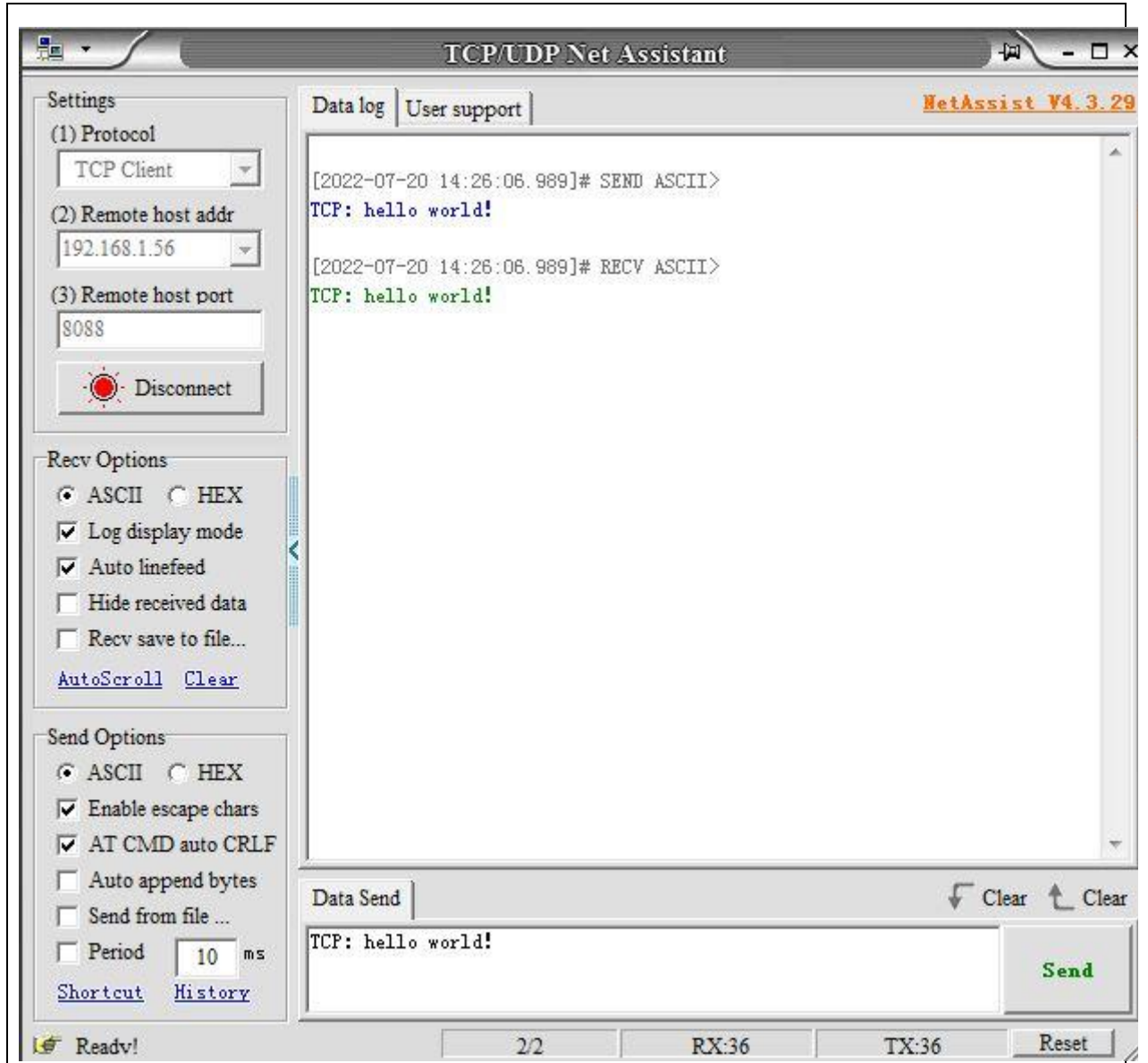


Figure 3. TCP host sends a string and receives feedback from evaluation board



## 2 Revision history

Table 1. Document revision history

Date	Version	Revision note
2022.03.25	2.0.0	Initial release.
2022.04.15	2.0.1	1. Rectified the print warning during LWIP operation; 2. Added network connection status detection feature.
2022.07.20	2.0.2	1. Modified task scheduling mode; 2. Modified hardware verification function; 3. Added TCP echo server.

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