[Notes] RX Family Lightweight IP (lwIP) Driver Using Firmware Integration Technology Rev.1.00

R20TS1161EJ0100
Rev.1.00
Sep.05.2025

Outline

When using Lightweight IP (lwIP) Driver Using Firmware Integration Technology, note the following point.

1. Notes on using the “r_lwip_driver_low_level_output” function

1. Notes on Using the “r_lwip_driver_low_level_output” Function

1.1 Applicable Product

1.1.1 Lightweight IP (lwIP) Driver Using Firmware Integration Technology

See Table 1.1 for the applicable revision and document number of Lightweight IP (lwIP) Driver Using Firmware Integration Technology. In this document, the Lightweight IP (lwIP) Driver Using Firmware Integration Technology is generally referred to as “the lwIP driver FIT module”.

Table 1.1 Applicable revision of lwIP driver FIT module

LwIP driver FIT module revision	Document number
Rev.1.00	R20AN0788EJ0100

1.2 Applicable Devices

- RX65N group
- RX72M group
- RX72N group
- RX64M group
- RX71M group
- RX66N group

1.3 Details

1.3.1 Premises

The lwIP[*1] stores variables associated with the packet to be sent to the pbuf (packet buffer) structure[*2]. The packet may span over multiple pbufs, chained as a singly linked list called pbuf chain.

When lwIP transmits a packet to the Ethernet, the lwIP calls “r_lwip_driver_low_level_output” function of the lwIP driver FIT module with the pbuf structure associated with the packet as the second argument. The function transmits the payload data referenced by the pointer in the member of the pbuf structure to the Ethernet using the Ethernet FIT module[*3]. In this document, the “r_lwip_driver_low_level_output” function is generally referred to as the “low_level_output” function.

Note 1. RX Family Lightweight IP (lwIP) Module Using Firmware Integration Technology (R20AN0789)
Note 2. Packet buffers (PBUF) (Lightweight IP stack - lwIP)
Note 3. RX Family Ethernet Module Using Firmware Integration Technology (R01AN2009)

1.3.2 Problem

When the “low_level_output” function implemented in the applicable product is called with the pbuf chain as the second argument, the payload data referenced by each pbuf constituting the pbuf chain is transmitted in separate Ethernet frames. Transmitting a packet in multiple Ethernet frames separately may cause the packet to be treated as a malformed by a destination host.

1.4 Condition

The problem may occur when the lwIP calls the “r_lwip_driver_low_level_output” function of the applicable product with the pbuf chain consisting of multiple pbufs.

1.5 Workaround

Enable LWIP_NETIF_TX_SINGLE_PBUF option in the lwIP by setting its value to 1.

If the option is enabled, the lwIP tries to put all the packet data to be sent into a single pbuf. This configuration prevents the lwIP from passing a pbuf chain as the second argument to the “low_level_output” function when transmitting the packet, thereby avoiding the aforementioned problem.

1.5.1 Setting the option

Add a definition for the LWIP_NETIF_TX_SINGLE_PBUF macro to the configuration header file lwipopts.h or r_lwip_rx_config.h in your project. The following shows an example of how to add the definition to the lwipopts.h header.

```
10   #ifndef __LWIPOPTS_H__
11   #define __LWIPOPTS_H__
12
13   #include "r_lwip_rx_config.h"
14
15   #define LWIP_NETIF_TX_SINGLE_PBUF 1          // Add this.
16
17   #endif /* __LWIPOPTS_H__ */
```

Note that manual edits to the configuration file, such as above, will be overwritten by the Smart Configurator’s code generation, restoring the header file to its original content. For details on how to suppress automatic code generation by the Smart Configurator, refer to section 6.1 in the application note of the lwIP driver FIT module.

1.6 Schedule for Fixing the Problem

The problem will be fixed in the next revision.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Sep.05.25	-	First edition issued

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/

TS Colophon 4.3