

AN13458

Implement IPv6 + IPv4 Communication on One ENET Port based on LWIP

Rev. 0 — 15 November 2021

Application Note

1 Introduction

This document is a quick guide to show how to implement IPv6 + IPv4 communication on one ENET port based on LWIP.

Environment setup:

- SDK: 2.10.1
- IDE: MCUXpresso 11.4.0
- EVK: i.MX RT1170
- PC: Win10

2 Steps

1. Download the i.MX RT1170 SDK 2.10.1 and import the `lwip_udpecho_bm_cm7example` project.
2. In `lwipopts.h`, refer to [AN13458SW](#). Add the code as below:

```
#define LWIP_IPV6 1
```

3. In `lwip_udpecho_bm.c`, refer to [AN13458SW](#). Add the code as below:

```
ip6_addr_t ipaddr_v6;  
s8_t chosen_idx;  
// IPv6  
IP6_ADDR(&ipaddr_v6, PP_HTONL(0xFE800000), PP_HTONL(0x0), PP_HTONL(0x3DD79303), PP_HTONL(0x126c0df0))  
;  
netif_add_ip6_address(&netif, &ipaddr_v6, &chosen_idx);  
netif.ip6_addr_state[chosen_idx] = IP6_ADDR_VALID;  
ip6_addr_assign_zone(ip_2_ip6(&netif.ip6_addr[0]), IP6_UNICAST, &netif);  
netif_ip6_addr_set_state(&netif, 0, IP6_ADDR_TENTATIVE);
```

4. Build the project, download it to the target board, and run the project.
5. Connect the PC and the target board, as shown in [Figure 1](#).

Contents

1	Introduction.....	1
2	Steps.....	1
3	Adding FreeRTOS.....	3
4	About the SW package.....	3
5	Revision history.....	3



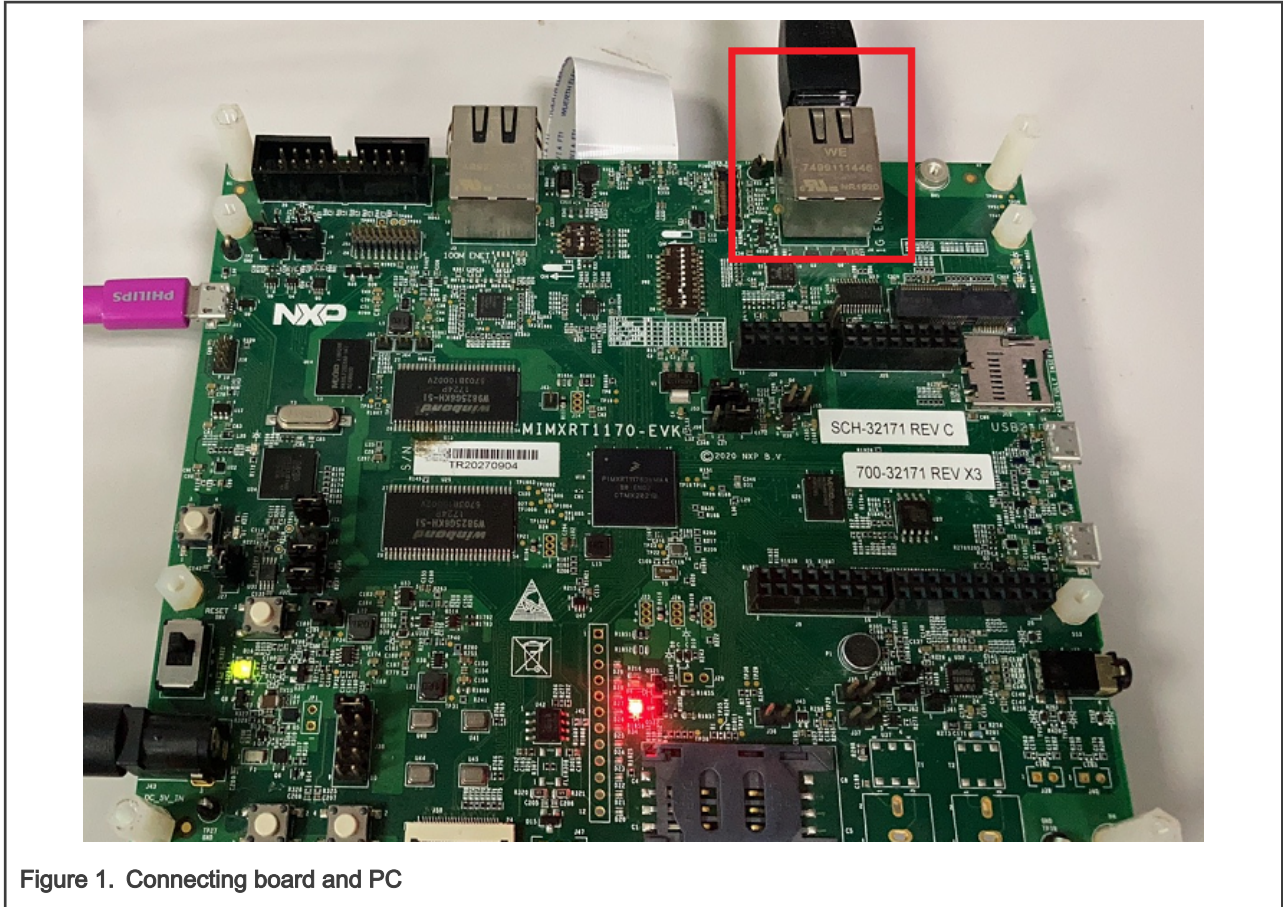


Figure 1. Connecting board and PC

6. Perform the ICMP test.

Open the CMD window and refer to the log below to test IPv6 and IPv4.

```
C:\Users\nxa16038>ping 192.168.0.102
Pinging 192.168.0.102 with 32 bytes of data:
Reply from 192.168.0.102: bytes=32 time=2ms TTL=255
Reply from 192.168.0.102: bytes=32 time=1ms TTL=255
Reply from 192.168.0.102: bytes=32 time=1ms TTL=255
Reply from 192.168.0.102: bytes=32 time=1ms TTL=255
Ping statistics for 192.168.0.102:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms

C:\Users\nxa16038>ping -6 FE80::3DD7:9303:126c:0df0
Pinging fe80::3dd7:9303:126c:df0 with 32 bytes of data:
Reply from fe80::3dd7:9303:126c:df0: time=1ms
Reply from fe80::3dd7:9303:126c:df0: time=1ms
Reply from fe80::3dd7:9303:126c:df0: time=1ms
Reply from fe80::3dd7:9303:126c:df0: time=2ms
Ping statistics for fe80::3dd7:9303:126c:df0:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
```

7. Perform the UDP test.

UDP test needs the tool supporting both IPv6 and IPv4. Such tool is also provided in [AN13458SW](#).

Refer to the log below to perform the test.

```
C:\Users\nxa16038\Desktop\tt2\udp_test_tool\x64\Debug>udp_test.exe -6 FE80::3DD7:9303:126c:df0 7
5001 test_string_12345
Build date and time: Oct 22 2021, 18:50:48
arc = 6
arg[0] = udp_test.exe
arg[1] = -6
arg[2] = FE80::3DD7:9303:126c:df0
arg[3] = 7
arg[4] = 5001
arg[5] = test_string_12345
Send ok.
Receiving...
Get connection.
Get string: test_string_12345
Remote addr: fe80:0000:0000:0000:3dd7:9303:126c:0df0

C:\Users\nxa16038\Desktop\tt2\udp_test_tool\x64\Debug>udp_test.exe -4 192.168.0.102 7 5001
test_string_12345
Build date and time: Oct 22 2021, 18:50:48
arc = 6
arg[0] = udp_test.exe
arg[1] = -4
arg[2] = 192.168.0.102
arg[3] = 7
arg[4] = 5001
arg[5] = test_string_12345
Send ok.
Receiving...
Get connection.
Get string: test_string_12345, len = 17
Remote addr: 192.168.0.102
```

3 Adding FreeRTOS

[AN13458SW](#) is a BM version code. If FreeRTOS is necessary, import the `lwip_udpecho_freertos_cm7` example, and then perform the steps above. When downloading the SDK package, enable both LWIP and FreeRTOS. Then, this example is available.

4 About the SW package

[AN13458SW](#) can be built and run on i.MX RT1170 EVK directly.

5 Revision history

Rev.	Date	Description
0	15 November 2021	Initial release

How To Reach Us

Home Page:

nxp.com

Web Support:

nxp.com/support

Limited warranty and liability— Information in this document is provided solely to enable system and software implementers to use NXP products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits based on the information in this document. NXP reserves the right to make changes without further notice to any products herein.

NXP makes no warranty, representation, or guarantee regarding the suitability of its products for any particular purpose, nor does NXP assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. “Typical” parameters that may be provided in NXP data sheets and/or specifications can and do vary in different applications, and actual performance may vary over time. All operating parameters, including “typicals,” must be validated for each customer application by customer’s technical experts. NXP does not convey any license under its patent rights nor the rights of others. NXP sells products pursuant to standard terms and conditions of sale, which can be found at the following address: nxp.com/SalesTermsandConditions.

Right to make changes - NXP Semiconductors reserves the right to make changes to information published in this document, including without limitation specifications and product descriptions, at any time and without notice. This document supersedes and replaces all information supplied prior to the publication hereof.

Security— Customer understands that all NXP products may be subject to unidentified or documented vulnerabilities. Customer is responsible for the design and operation of its applications and products throughout their lifecycles to reduce the effect of these vulnerabilities on customer’s applications and products. Customer’s responsibility also extends to other open and/or proprietary technologies supported by NXP products for use in customer’s applications. NXP accepts no liability for any vulnerability. Customer should regularly check security updates from NXP and follow up appropriately. Customer shall select products with security features that best meet rules, regulations, and standards of the intended application and make the ultimate design decisions regarding its products and is solely responsible for compliance with all legal, regulatory, and security related requirements concerning its products, regardless of any information or support that may be provided by NXP. NXP has a Product Security Incident Response Team (PSIRT) (reachable at PSIRT@nxp.com) that manages the investigation, reporting, and solution release to security vulnerabilities of NXP products.

NXP, the NXP logo, NXP SECURE CONNECTIONS FOR A SMARTER WORLD, COOLFLUX, EMBRACE, GREENCHIP, HITAG, ICODE, JCOP, LIFE, VIBES, MIFARE, MIFARE CLASSIC, MIFARE DESFire, MIFARE PLUS, MIFARE FLEX, MANTIS, MIFARE ULTRALIGHT, MIFARE4MOBILE, MIGLO, NTAG, ROADLINK, SMARTLX, SMARTMX, STARPLUG, TOPFET, TRENCHMOS, UCODE, Freescale, the Freescale logo, Altivec, CodeWarrior, ColdFire, ColdFire+, the Energy Efficient Solutions logo, Kinetic, Layerscape, MagniV, mobileGT, PEG, PowerQUICC, Processor Expert, QorIQ, QorIQ Qonverge, SafeAssure, the SafeAssure logo, StarCore, Symphony, VortiQa, Vybrid, Airfast, BeeKit, BeeStack, CoreNet, Flexis, MXC, Platform in a Package, QUICC Engine, Tower, TurboLink, EdgeScale, EdgeLock, eIQ, and Immersive3D are trademarks of NXP B.V. All other product or service names are the property of their respective owners. AMBA, Arm, Arm7, Arm7TDMI, Arm9, Arm11, Artisan, big.LITTLE, Cordio, CoreLink, CoreSight, Cortex, DesignStart, DynamIQ, Jazelle, Keil, Mali, Mbed, Mbed Enabled, NEON, POP, RealView, SecurCore, Socrates, Thumb, TrustZone, ULINK, ULINK2, ULINK-ME, ULINK-PLUS, ULINKpro, µVision, Versatile are trademarks or registered trademarks of Arm Limited (or its subsidiaries) in the US and/or elsewhere. The related technology may be protected by any or all of patents, copyrights, designs and trade secrets. All rights reserved. Oracle and Java are registered trademarks of Oracle and/or its affiliates. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org. M, M Mobileye and other Mobileye trademarks or logos appearing herein are trademarks of Mobileye Vision Technologies Ltd. in the United States, the EU and/or other jurisdictions.

© NXP B.V. 2021.

All rights reserved.

For more information, please visit: <http://www.nxp.com>

For sales office addresses, please send an email to: salesaddresses@nxp.com

Date of release: 15 November 2021

Document identifier: AN13458

