Release Notes

TCP/IP stack

Document Number: RNTCPIPSTACK
Rev. 33.0

Contents

1 Revision History

Table 1-1. Revision History

Revision	Date	Author	Description
1.0	June 13, 2017	Cezar Ionescu	EAR 0.8.0 version
1.1	December 4, 2017	Cezar Ionescu	BETA 0.9.0 version
1.2	January 25, 2018	Radu Lazarescu	RTM 1.0.0 version
1.3	February 15, 2018	Vlad Furtuna	Panther BETA 0.9.0 version
1.4	June 6, 2018	Robin Putman	RRU EAR 0.8.3 version
1.5	June 29, 2018	Linh To Hoang	S32K14x RTM 2.0.0 version
1.6	August 3, 2018	Robin Putman	MPC574x RTM 1.0.0
1.7	August 31, 2018	Robin Putman	S32K1xx BETA 2.9.0
1.8	September 28, 2018	Robin Putman	PA BETA 1.9.0
2.0	November 29, 2018	Tu Nguyen Anh	EAR 1.8.0
3.0	December 20, 2018	Tu Nguyen Anh	RTM 2.0.0
4.0	December 20, 2018	Vlad Furtuna	S32 SDK for S32V23x - EAR 0.8.1
5.0	February 28, 2019	Tu Nguyen Anh	RTM 3.0.0
6.0	March 29, 2019	Tu Nguyen Anh	BETA 2.9.0
7.0	March 29, 2019	Tu Nguyen Anh	BETA 0.9.0
8.0	March 29, 2019	Vlad Furtuna	S32 SDK for S32K1XX – RTM – SR 3.0.1
9.0	May 31, 2019	Vlad Furtuna	S32 SDK for Power Architecture RTM 3.0.0
10.0	June, 28, 2019	Vlad Furtuna	S32 SDK for S32V23x - RTM 1.0.0
11.0	July, 31, 2019	Linh To Hoang	S32 SDK for Power Architecture RTM – SR 3.0.1
12.0	Aug, 30, 2019	Linh To Hoang	S32 SDK for S32R294 – RRU2 EAR 0.8.0
13.0	October, 30, 2019	Vlad Furtuna	S32 SDK for S32R294 – RRU2 BETA 0.9.0
14.0	November, 20, 2019	Florin Dinu	S32 PA SDK RTM-SR 3.0.2
15.0	December, 06 2019	Vlad Furtuna	S32 SDK for S32G274A EAR 0.8.0
16.0	December, 19, 2019	Vlad Furtuna	S32 SDK for S32V23x - RTM 1.0.1
17.0	March, 27 2020	Linh To Hoang	S32 SDK for S32G274A BETA 0.9.0
18.0	April, 24 2020	Anca Mihaela Cazacu	S32 SDK for SJA1110 BETA 0.9.0

Release Notes

19.0	September 30, 2020	Nicolae Dobrostomat	S32K3 EAR 0.1.0
20.0	October 29, 2020	Nicolae Dobrostomat	S32K3 EAR 0.1.1 patch with example
21.0	December 8, 2020	Tai Bui Van	S32K3 TCPIP_STACK BETA 0.9.0
22.0	January 15, 2021	Tai Bui Van	S32G2 TCPIP STACK 0.9.1
23.0	April 22, 2021	Tai Bui Van	S32K3 TCPIP_STACK BETA 0.9.1
24.0	Jun 11, 2021	Florin Dinu	S32R45 TCPIP_STACK BETA 0.9.0
25.0	June 16, 2021	Nicolae Dobrostomat	S32G2 TCPIP_STACK BETA 0.9.2
26.0	July 02, 2021	Florin Dinu	S32G2 TCPIP_STACK RTM 1.0.0
27.0	August 30, 2021	Florin Dinu	S32R45 TCPIP_STACK RTM 1.0.0
28.0	November 19, 2021	Tai Bui Van	S32K3 TCPIP_STACK RTM 1.0.0
29.0	November 29, 2021	Tai Bui Van	S32K148 TCPIP_STACK RTM 1.0.0
30.0	January 26, 2022	Tai Bui Van	S32G TCPIP_STACK RTM 1.0.1
31.0	February 25, 2022	Tai Bui Van	S32R45 TCPIP_STACK RTM 1.0.1
32.0	May 13, 2022	Florin Dinu	S32K3 TCPIP_STACK RTM 1.0.1
33.0	June 10, 2022	Hoa Ta Quang	S32K148 TCPIP_STACK RTM 1.0.1

Release Notes

2 Acronyms and definitions

Table 2-2. Acronyms and Definitions

Term	Definition
LWIP	Lightweight IP
EAR	Early Access Release
RTM	Release To Manufacturer
TCP/IP	Transmission Control Protocol/Internet Protocol
FreeRTOS	Free Real Time Operating System

3 Introduction

TCP/IP stack represents a software library that implements the TCP/IP protocol stack

This TCP/IP stack release is intended to be used as integrated with S32 RTD drivers and FreeRTOS in a non-AUTOSAR based environment.

All software included in this package has RTM quality level in terms of feature, testing and quality documentation, accordingly to NXP software release criteria

4 New in this release

Added TCP/IP stack support for S32K1 platform using S32K1 RTD 4.4 RTM 1.0.1 and S32K1 FreeRTOS 10.4.6 UOS 1.0.1 packages.

5 Package contents

The TCP/IP stack package is delivered as source code and consists of:

- LWIP stack, from open-source community: http://savannah.nongnu.org/projects/lwip/

- wolfSSL library, from open-source community: https://www.wolfssl.com

- MPC5748G, MPC5744P, MPC5746R, MPC5777C, S32R274 and S32R294 versions

Release Notes

- o S32 SDK for Power Architecture integration layer.

- o Demo application showing how TCPIP stack is used with S32 SDK for Power Architecture drivers and FreeRTOS.

- S32K148, S32V234, S32G274A and SJA1110 versions

  - o S32 SDK for ARM Architecture integration layer

  - o Demo application showing how TCPIP stack is used with S32 SDK for ARM Architecture drivers and FreeRTOS

- S32K344 RTD version

  - o S32K3 RTD RTM 2.0.0 integration layer

  - o S32K3 FreeRTOS 10.4.6 version 2.0.0 integration layer

  - o Demo application showing how TCPIP stack is used with RTD drivers in S32DS environment.

- S32G RTD version

  - o S32CC 3.0.0 RTD 4.4 RTM integration layer

  - o S32CC FreeRTOS 3.0.0 integration layer

  - o Demo application showing how TCPIP stack is used with RTD and FreeRTOS drivers in S32DS environment.

- S32R45 RTD version

  - o S32CC RTD 4.4 RTM 3.0.0 integration layer

  - o S32CC FreeRTOS 3.0.0 integration layer

  - o Demo application showing how TCPIP stack is used with RTD and FreeRTOS drivers in S32DS environment.

- S32K148 RTD version

  - o S32K1 RTD 4.4 RTM 1.0.1 integration layer

  - o S32K1 FreeRTOS 1.0.1 integration layer

  - o Demo application showing how TCPIP stack is used with RTD and FreeRTOS drivers in S32DS environment.

- Documentation

    o User manual. Describes what is and how use TCPIP stack

    o Release notes. Describe the content, limitations and supported device for TCPIP release

6 Supported hardware and compatible software

6.1 Hardware

- CPUs

    o MPC5744P - 1N15P

    o MPC5748G - 0N78S

    o FS32K148HAMLU 0N20V

    o S32R274 - 2N58R

    o MPC5746R - 1N83M

    o MPC5777C - 3N45H

    o S32V234 - CMN1VUB

    o S32R294 – 0N38Z

    o PS32G274ABVUC 0P77B SBAA2030A

    o P32G399AACVUC SBDA2144 0P72B RRDASBA

    o SJA1110 – revision A

    o P32K344EHVMMS 0P55A CTSA2036A

    o S32R45 - 0P57D

- Boards

    o MPC5748G:

        - Motherboard X-MPC574XG-MB Rev D

        - Daughter Card X-MPC574XG-324DS Rev A

        - Daughter Card MPC574XG-256DS Rev B

    o MPC5744P:

        - Motherboard MPC57XX EVB Mother Board Rev C

- Daughter Card MPC5744P-257DS Rev B1

- o S32K148:
  - S32K148EVB-Q176 29644 PCB RevX1 SCH RevB

- o S32R274:
  - Daughter Card S32R274RRUEVB 700-28921 REV B SCH-28921 REV D
  - MPC57xx MOTHERBOARD 700-27237 REV D SCH-27237 REV C

- o MPC5746R:
  - Motherboard MPC57XX MOTHERBOARD Rev C
  - Daughter Card MPC5746R-252DS: Rev A

- o MPC5777C:
  - Motherboard MPC57XX MOTHERBOARD Rev C
  - Daughter Card MPC5777C-516DS: Rev D

- o S32V234:
  - SBC: FS32V234CMN1VUB board

- o S32R294:
  - S32R294RRU2 PCB 32157 RevX1 SCH RevA
  - PS32R294LOMJD 0N38Z QPP1922P

- o S32G274A/S32G399A:
  - S32G-PROCEVB-S PCB RevX3 SCH RevB1

- o SJA1110
  - X-SJA1110-EVM SPF-38836_A

- o S32K344
  - XS32K3XXCVB-Q257 SCH-47020
  - X-IMX-RMII-BRPHY – Close jumper H3 for Slave configuration.

- o S32R45
  - X-S32R45-PROC-S (PCB REV X3 SCH REV B)
  - Chips: PS32R458AAMUD 0P57D SBC02109B (Cut 2.0)

Release Notes
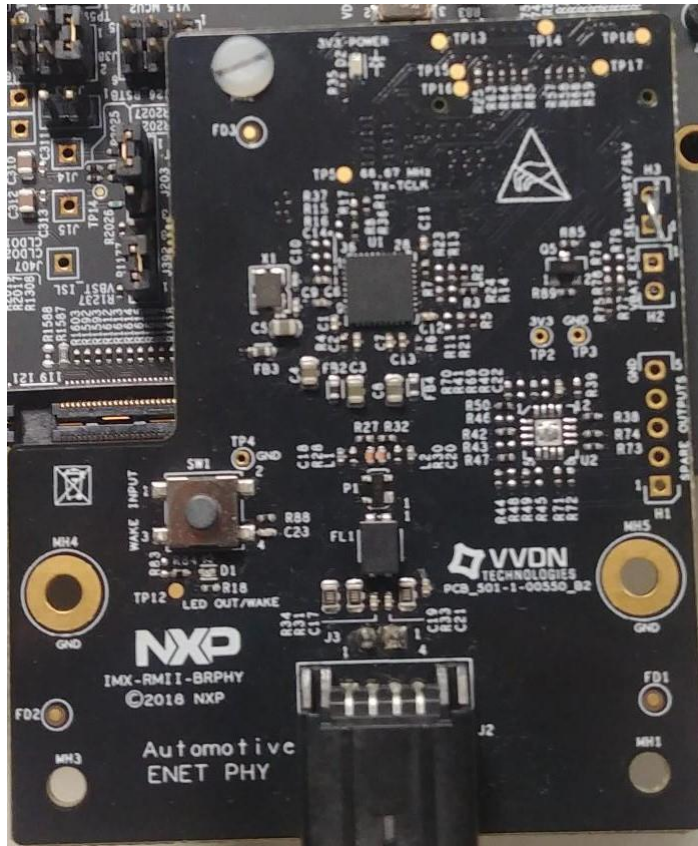
- 100BASE-T1 MEDIACONVERTER NXP from Technical Engineering GmbH – Setup as master with both switches to On position.
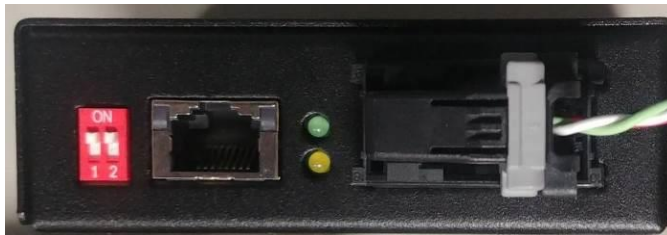
6.2 Software

- Compilers:

    o GCC 9.2.0 20190812 (Build 1649 Revision gaf57174) for S32K1

- Gcc libraries:

    o Newlib

- Drivers

Release Notes

- o SDK drivers for MPC5748G

- o SDK drivers for MPC5744P

- o SDK drivers for S32R274

- o SDK drivers for S32K148

- o SDK drivers for MPC5746R

- o SDK drivers for MPC5777C

- o SDK drivers for S32V234

- o SDK drivers for S32R294

- o SDK drivers for S32G274A

- o SDK drivers for SJA1110

- o S32K3 RTD RTM 2.0.0 drivers with S32K3 development package for S32DS 3.4

- o S32CC RTD RTM 3.0.0 driver with S32G development package for S32DS 3.4 Update 3

- o S32CC RTD 4.4 RTM R 3.0.0 driver with S32R45 development package for S32DS 3.4

- o S32K1 RTD RTM 1.0.1 drivers with S32K1 development package for S32DS 3.4

- OS

  - o FreeRTOS S32K3 2.0.0 v10.4.6 with S32K3 development package for S32DS 3.4

  - o FreeRTOS S32CC 3.0.0 v10.4.6 with S32R45 development package for S32DS 3.4

  - o FreeRTOS S32K1 1.0.1 v10.4.6 with S32K1 development package for S32DS 3.4

  - o FreeRTOS S32CC 3.0.0 v10.4.6 with S32G development package for S32DS 3.4 Update 3

Release Notes

6.3 Supported OS

Device	Baremetal	FreeRTOS
MPC5746R	Yes	Yes
MPC5744P	Yes	Yes
MPC5748G	Yes	Yes
MPC5777C	Yes	Yes
S32K148	Yes	Yes
S32R274	Yes	Yes
S32V234	Yes	Yes
S32R294	Yes	No
S32R274	Yes	No
S32G274A	Yes	Yes
S32G399A	Yes	Yes
SJA1110	Yes	Yes
S32K344	Yes	Yes
S32R45	Yes	Yes

6.4 Installation for RTD packages

Follow these steps to install TCPIP stack package on top of the RTD package. Install the latest version of S32 Design Studio for S32 platform (currently v.3.4 update 3). Install S32K1 development package with S32K1 Real Time Drivers 4.4 Version 1.0.1 package and S32K1 FreeRTOS 1.0.1 package.

1. Open S32DS, from 'Help' menu select 'Install New Software…'
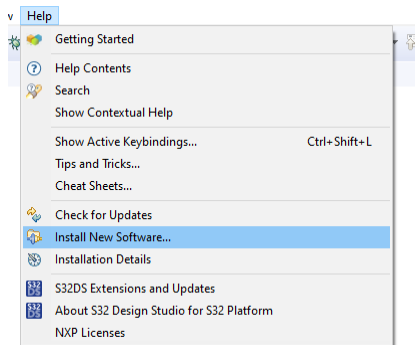
Release Notes

2. Press 'Add…' Button. Make sure the 'Group items by category' is uncheck.
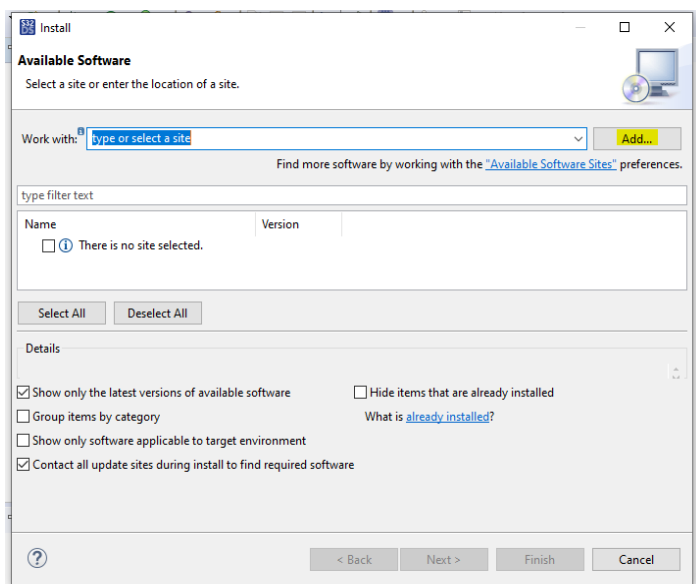
3. Press 'Archive…' button
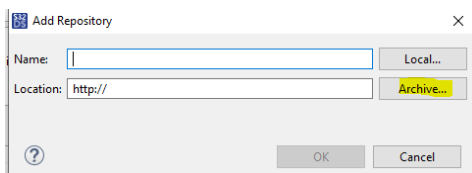
4. Select the archive of the TCPIP package to install.

5. Check the TCPIP package to install and press 'Next >' button.
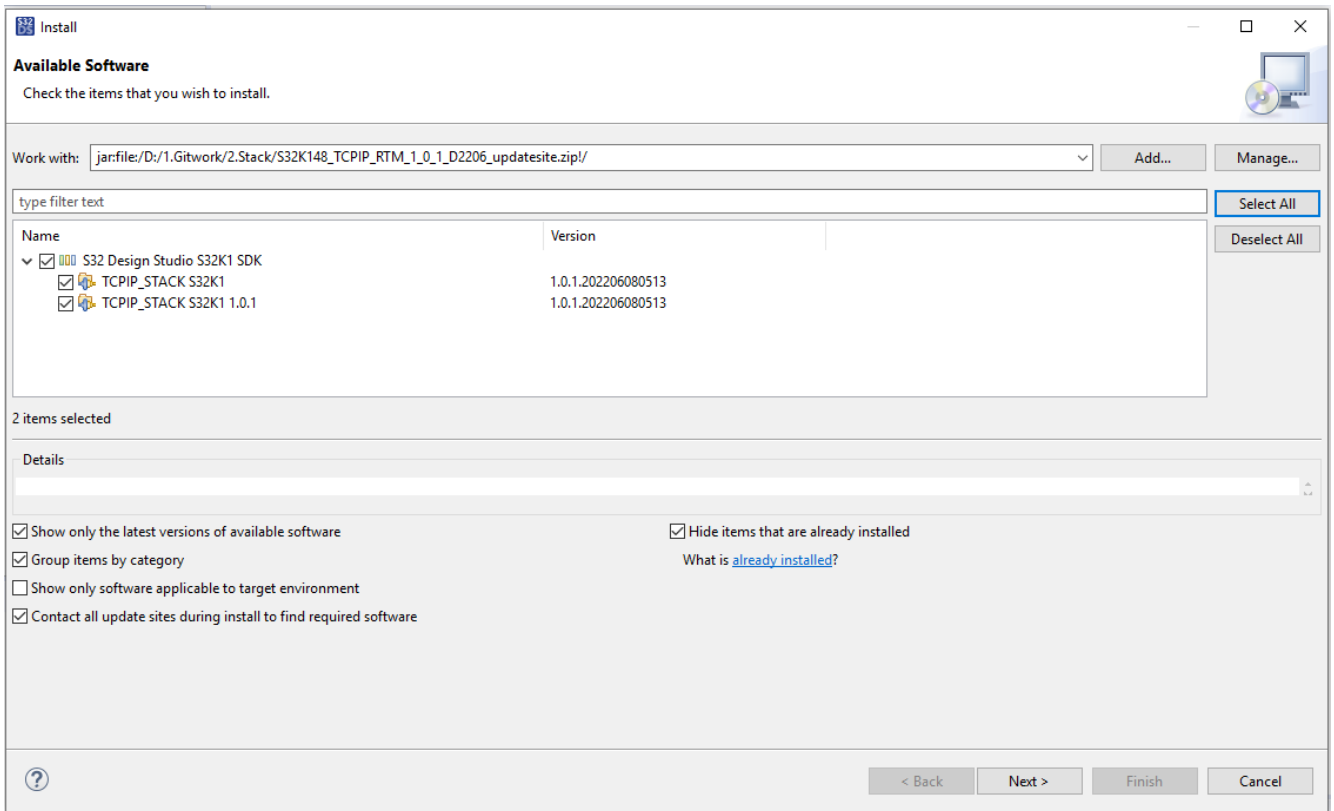
6. Press 'Next >' button.
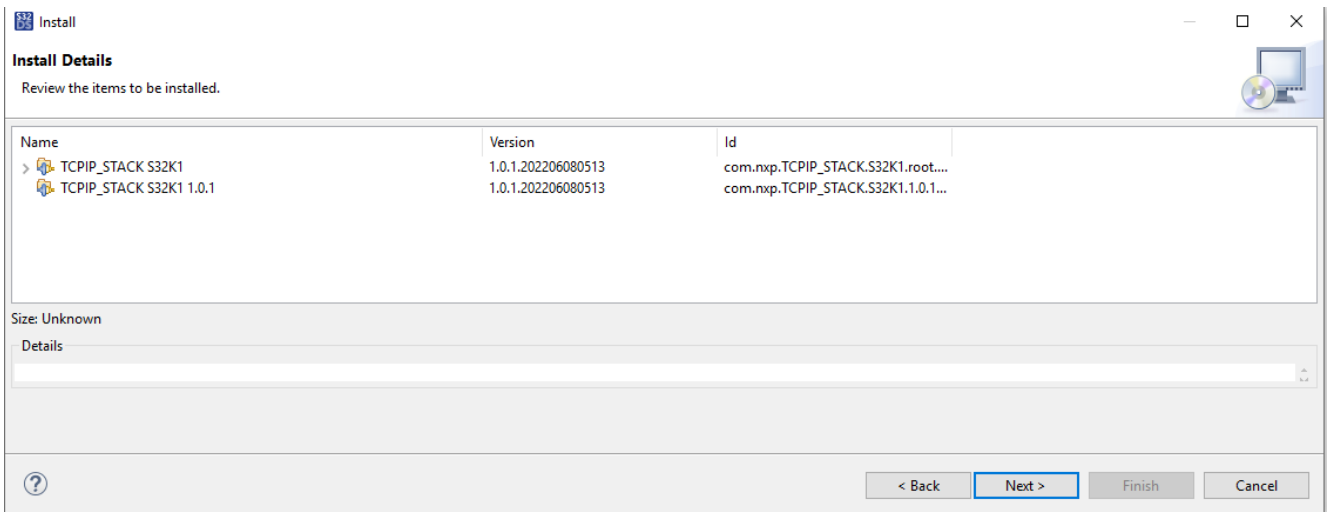
7. Review the License and select 'I Accept…' then press 'Finish' button.
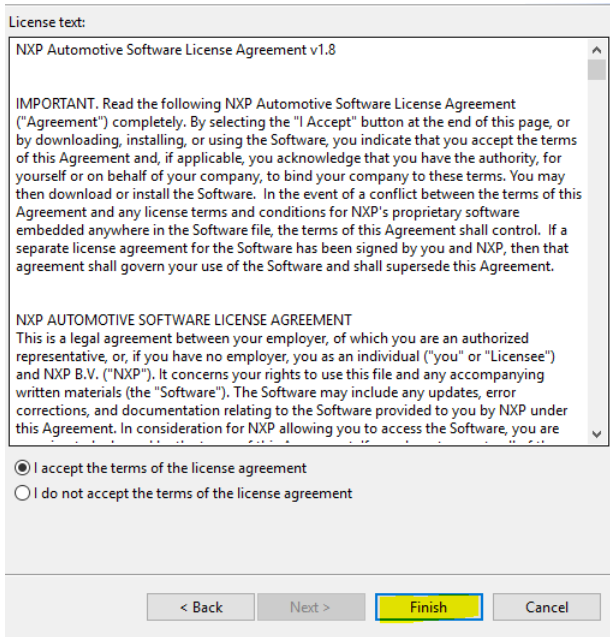
8. Select NXP USA certificates and press 'Accept selected'.
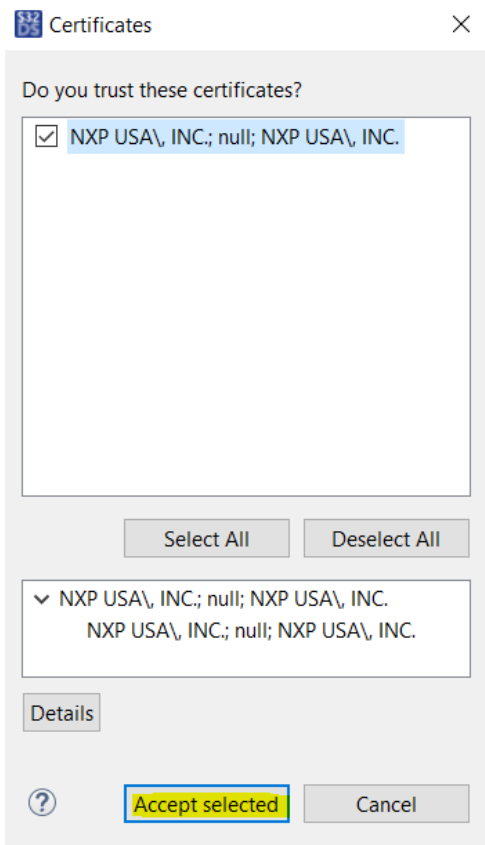
9. Restart S32 Design Studio.

6.5 Building tcpip example using RTD package.

After installing RTD and TCPIP packages use these steps to import, build and run TCPIP stack example:

1. From 'File' Menu select New-> S32DS Project from Example
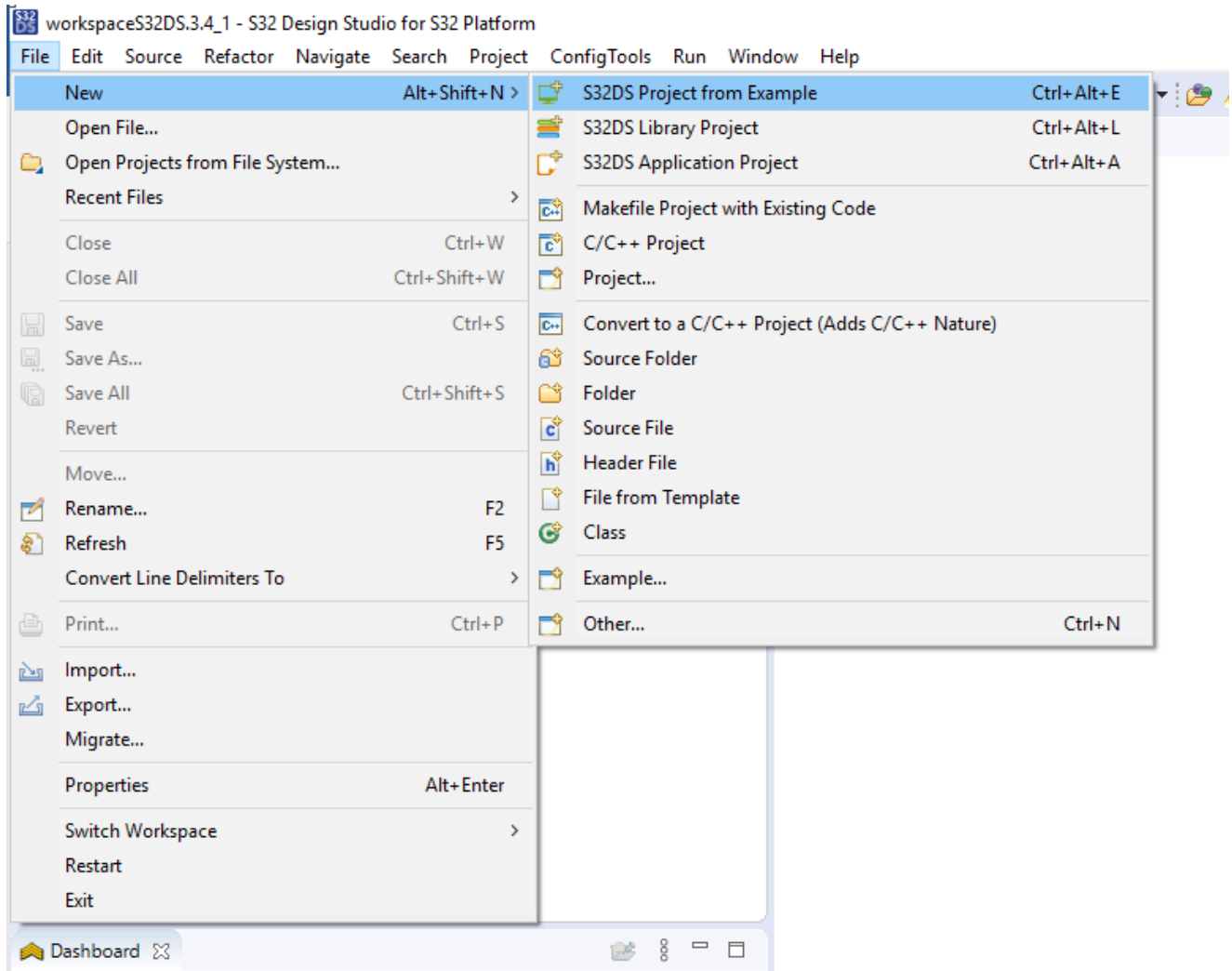
2. Select lwip_s32k148 in S32K1 TCPIP STACK Example Project and press 'Finish' button:
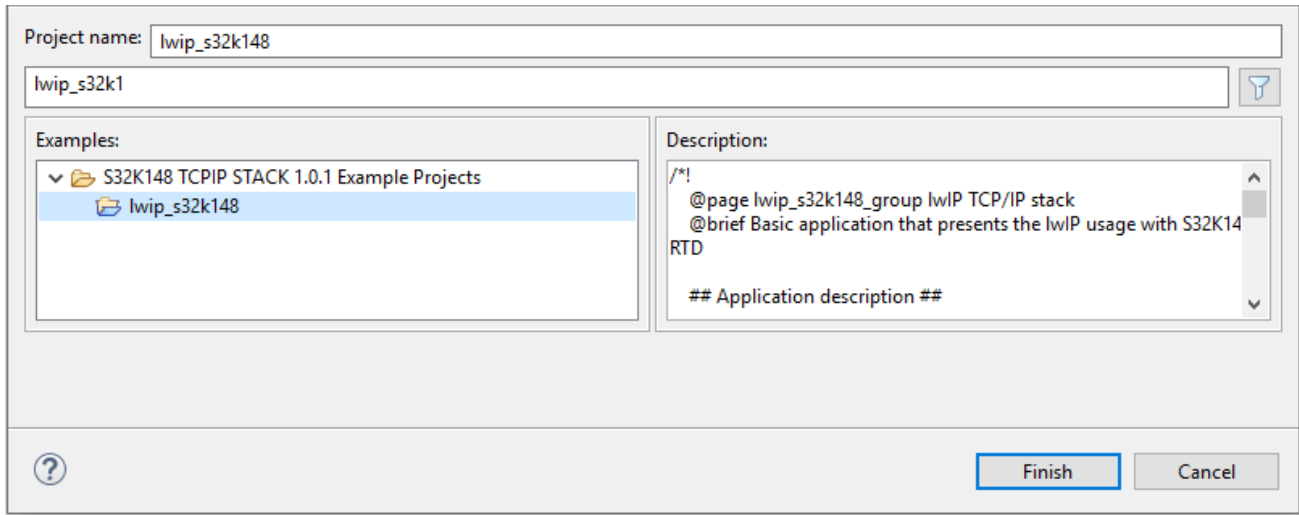
3. Open 'lwip_s32k148.mex' configuration file:
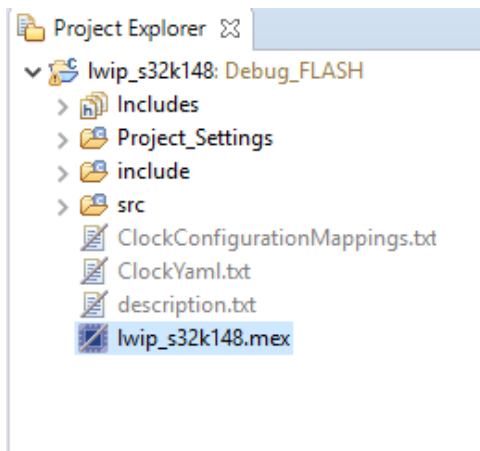
4. Select 'Clock' perspective:
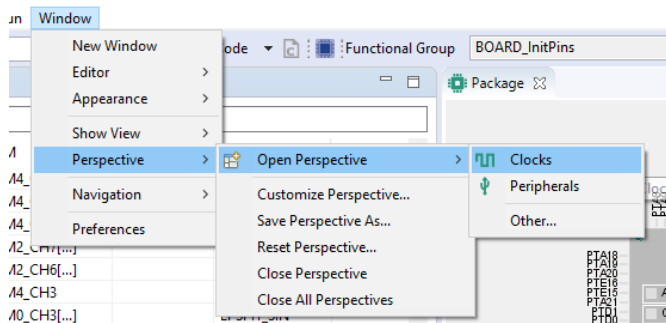
5. Press 'Update Code' button to generate the configuration files:
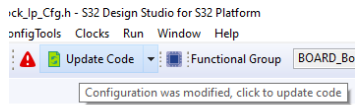
6. Press 'Ok' in the next window:
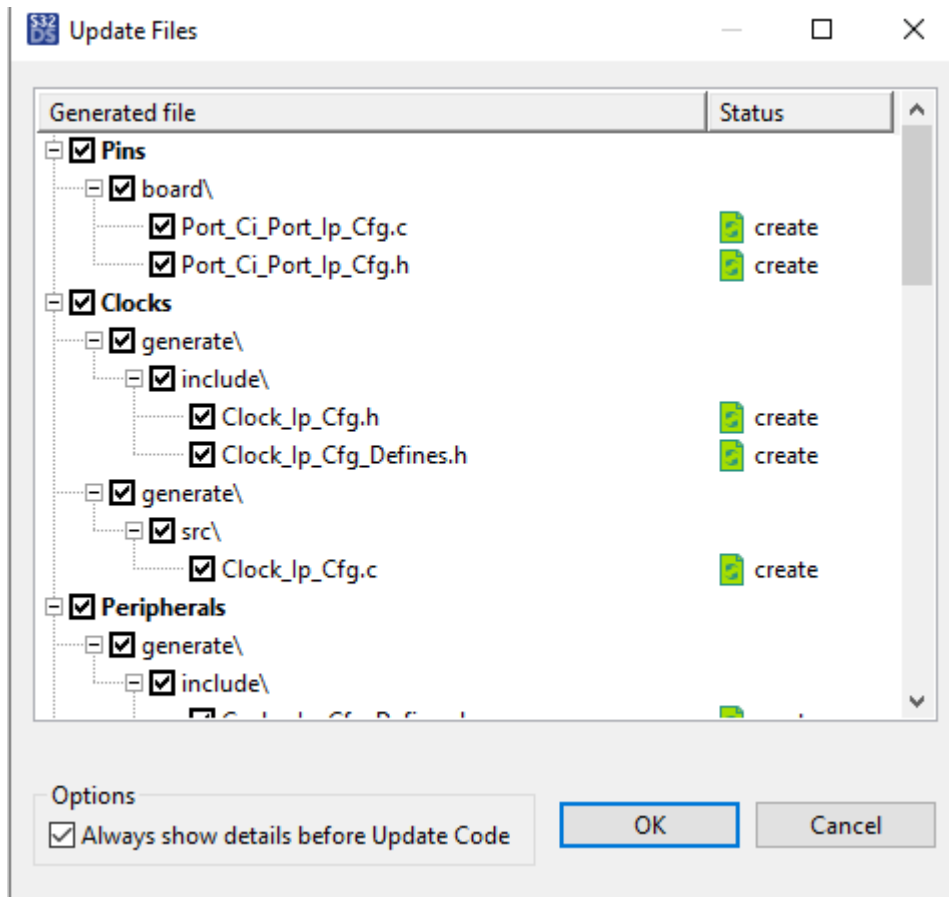
7. Change to 'C/C++' Perspective and build the project

8. Select from 'Run' menu 'Debug configuration':
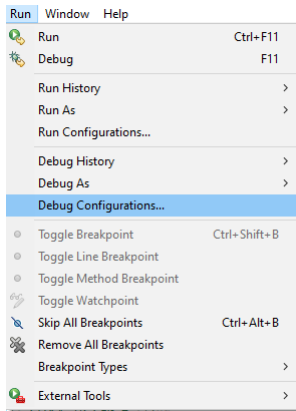
Release Notes

9. Select 'lwip_s32k148_Debug_Flash_S32Debug.launch' debug configuration to run from flash and select your debugger.
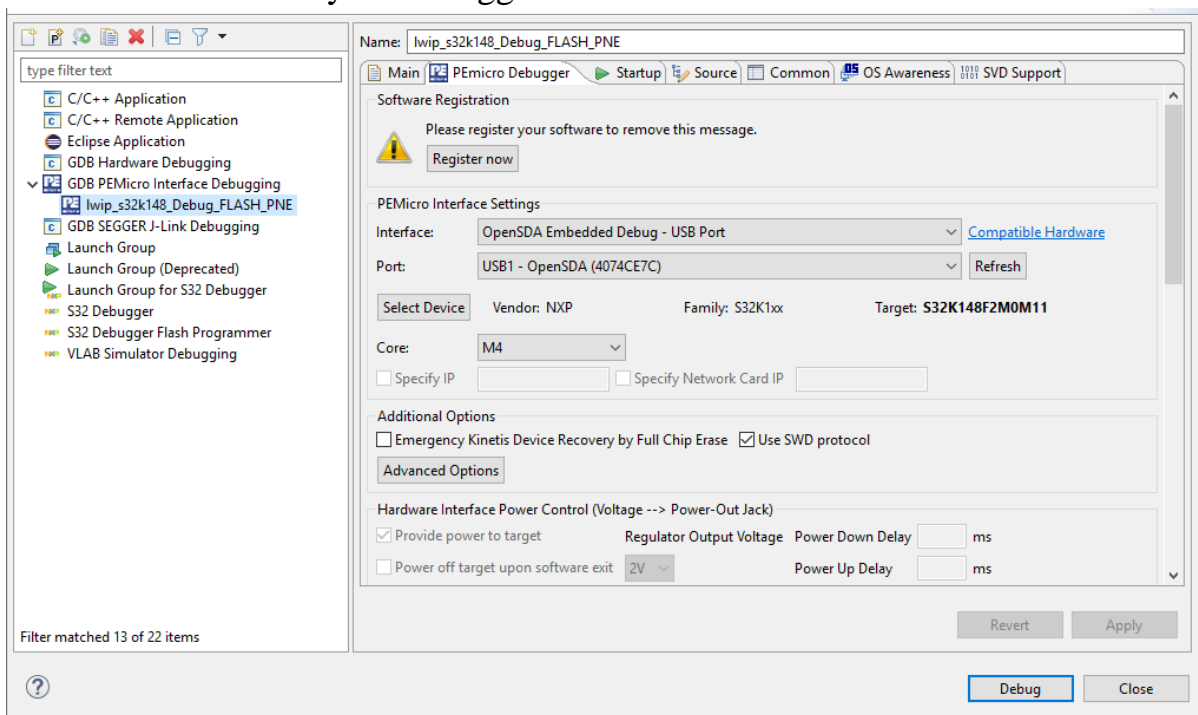
10. Press *"Debug"*

Release Notes

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7 Applications

Basic functionality of the lwip_s32k148 example can be checked by pinging the board from the host PC:

ping 192.168.0.200

The demo provides an SSL echo server. In order to run the SSL echo application, CPU S32K344 must be flashed with HSE firmware in advance. Check the documentation of HSE to see how to flash it.

A host-side utility like *openssl* can be used to connect to the server, e.g.:

*openssl s_client -connect 192.168.0.200:11111 -certform DER -cert <CERT_PATH>/client-cert.der -keyform DER -key <CERT_PATH>/client-key.der -CAfile <CERT_PATH>/ca-cert.pem (*where CERT_PATH is the path to example certificates available in <stack>\tcpip\wolfssl\certs).

For more information about supported application, you can see the "*TCPIP_USER_MANUAL.pdf*" that is contained by this package, located on "*S32DS/software/{PACKAGE_NAME}/stacks/tcpip/doc*".

8 Known issues and limitations

1. HTTP raw - must manually exclude fsdata.c from build. Method: using "Build path -> Remove from -> Debug_RAM/Debug_FLASH" in S32DS project

2. Test "test_http_handshake" "test_http_url" will be skipped if it is performed by a Windows machine

Release Notes

9 Licensing

TCP/IP stack is being licensed together with S32 RTD under the same license model. Please refer to S32 RTD licensing documents for details.

wolfSSL (formerly known as CyaSSL) and wolfCrypt are either licensed for use under the GPLv2 or a standard commercial license.
More information can be found on the wolfSSL website at www.wolfssl.com.

Document Number RNTCPIPSTACK Rev 33.0

Release Notes