Renesas Synergy™ Platform

Getting Started with NetX™ Web Server

Introduction

This application note describes how to install, build, and run a simple web server application on a Renesas Synergy™ development board using the Synergy e² studio or IAR Embedded Workbench® for Renesas Synergy™ (IAR EW for Synergy) Integrated Solutions Development Environment (ISDE), the Synergy Software Package (SSP), and the Express Logic NetX™ Network Stack.

Goals and Objectives

This application note shows how to install, build, and run the example application. The example application supports IPv4. Using your PC, you can view the web server application running on your board in a browser and watch the application run by observing variables being updated when you refresh the browser window.

Prerequisites

As the user of this application note, it is assumed that you have some experience with Synergy e² studio ISDE, IAR EW for Synergy and SSP. For example, before you perform the procedure in this application note, you should follow the procedure in the *Quick Start Guide* for your board to build and run the Blinky project. By doing so, you will become familiar with e² studio and SSP, and ensure that the debug connection to your board is functioning properly.

Required Resources

This application example targets the DK-S7G2 and PK-S5D9 Synergy MCU Group devices. To build and run the example, you need:

- One of the following Synergy MCU Group boards:
  - DK-S7G2 v2.0 or later
  - SK-S7G2 v2.0 or later
  - PE-HMI1 v2.0
  - PK-S5D9 v1.0 or later.
- USB drive (USB mass storage)
- A PC running Microsoft® Windows® 7, with a USB 2.0 port and connection to the Internet, and the following Renesas software installed:
  - e² studio ISDE v7.3.0 or later
  - SSP v1.6.0 or later
  - IAR EW for Synergy v8.23.3 or later
  - SSC v7.3.0 or later.

You can download the required Renesas software from the Renesas Synergy Gallery (www.renesas.com/synergy/software).

Time Required

You can install, build, and run the example application in under 30 minutes. The key steps require you to:

1. Connect to your target board.
2. Select an IP address for the board.
3. Import, configure, and build the project.
4. Run the NetX web server demonstration.

Contents

1. Connecting to the Board

To configure and connect your target board:

1. Follow the procedure in the *Quick Start Guide* for your target board to set up the SEGGER J-Link® debugger connection from your PC to the JTAG connector on the target board and power up the board.

Note: On the DK-S7G2 board 2.0 to V3.1, set DIP switch 3 (**ENET1**) on S5 to ON. Use the Main Board Ethernet 1 port only. For other boards, there is no need to have any DIP switch settings.

Note: On the DK-S7G2 v4.1 board, set DIP switch 3 (**ETHERNET1**) on S6 to ON. Use the Board Ethernet 1 port only. For other boards, there is no need to have any DIP switch settings.

2. Connect an Ethernet cable to the target board.
3. Connect the other end of the cable to the PC through a switch, crossover cable, or straight through to the PC using an Auto MDI-X capable port.

2. Selecting an IP Address for the Board

Use Figure 1 and Figure 2 to configure the static IP address for the Ethernet port of your PC.

In this example, the IP address for the PC is configured as 192.168.0.200.

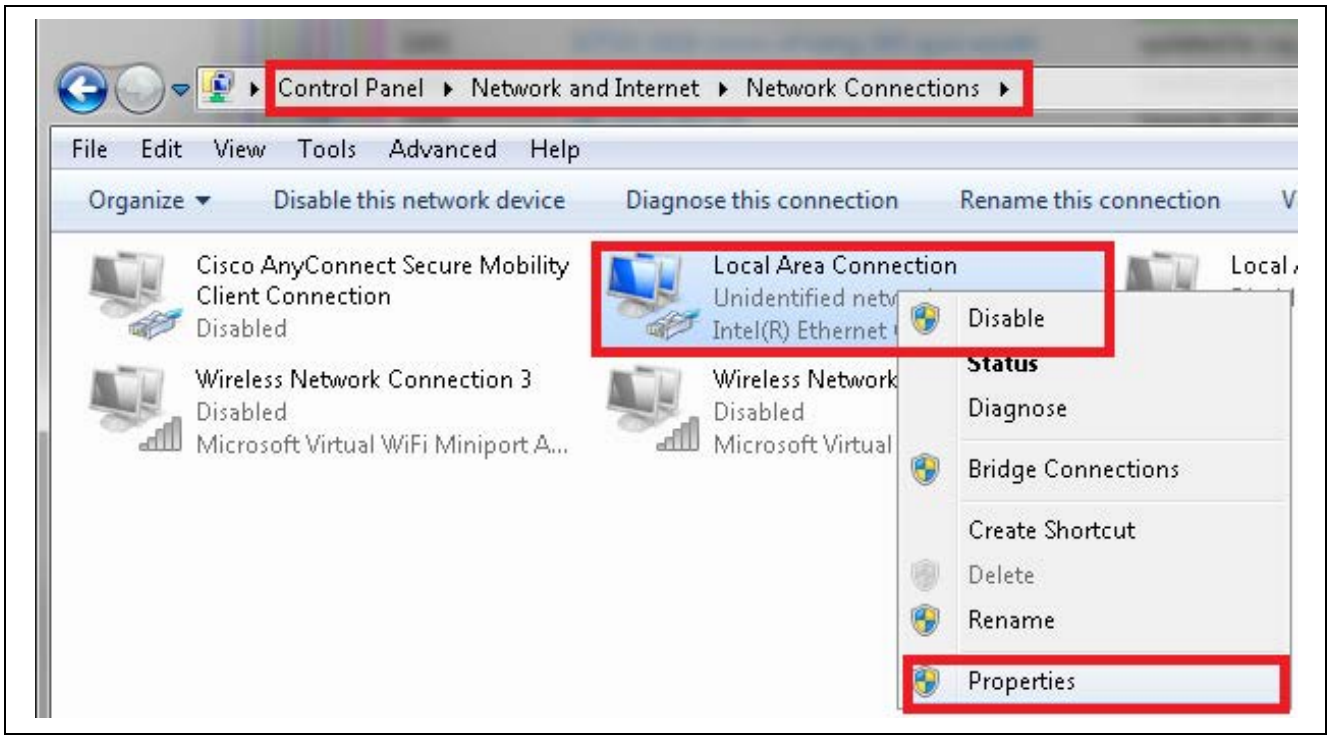

Figure 1. Configure the Ethernet port of your PC to Static IP address to test the board

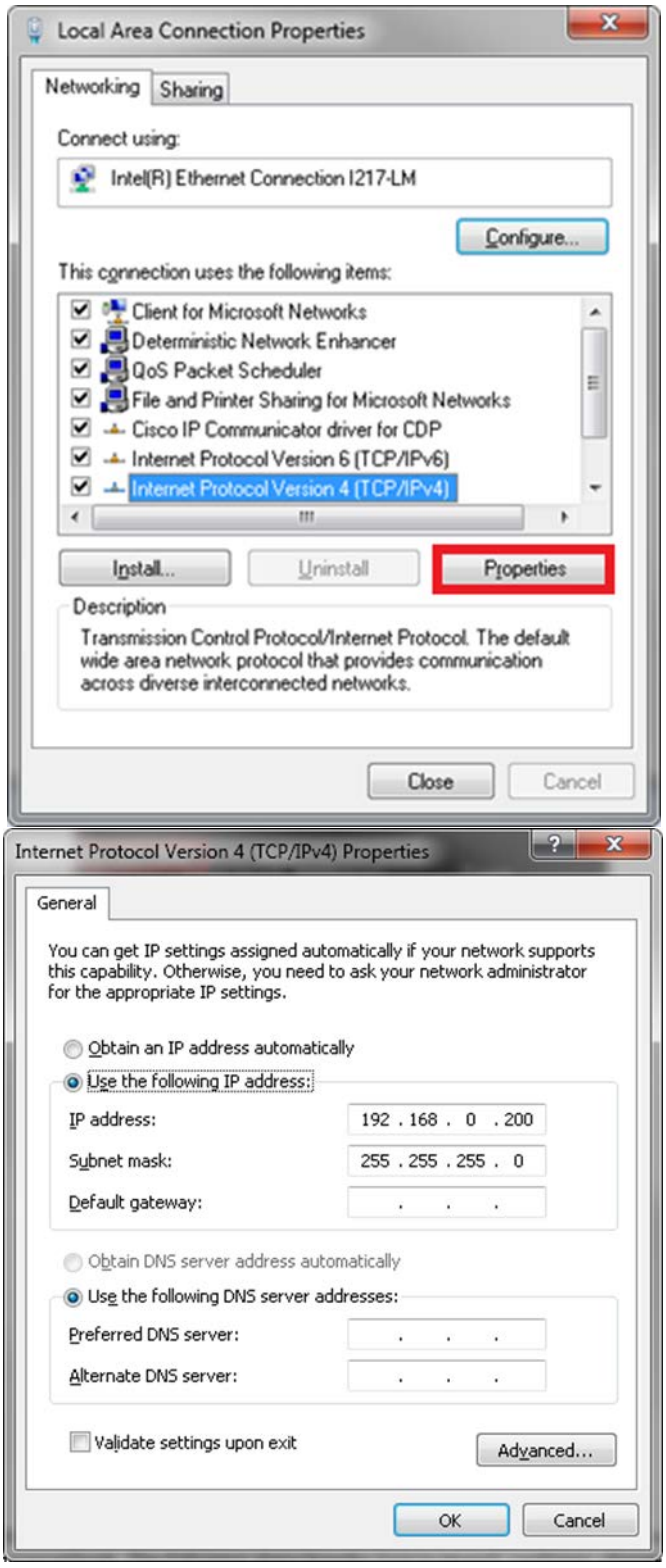

Figure 2. Static IP address for the Ethernet port of the PC

1. Run the command prompt as an administrator:
   A. Click the **Start** icon.
   B. In the search box, type `command prompt`.
   C. Right click on `Command Prompt`.
   D. Select **Run as Administrator**.
   E. A dialog box appears asking “Do you want to allow the following program to make changes to your computer?” Click **Yes**.

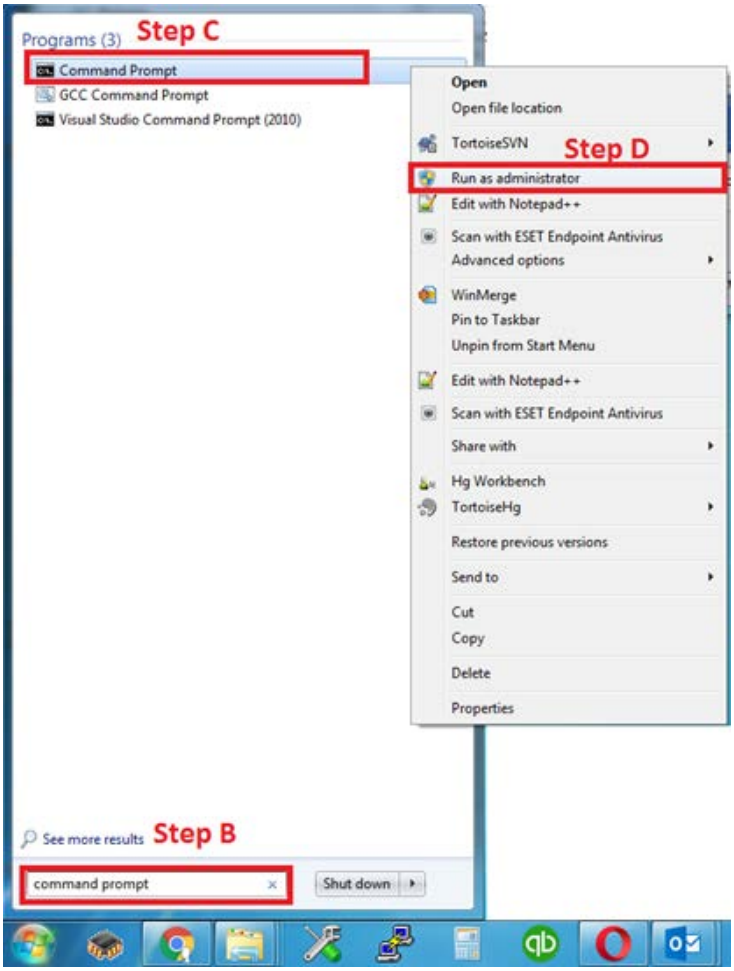

Figure 3. Command Prompt as Administrator

2. In the **Command Prompt** window, enter the command `ipconfig`. You will see a screen like in Figure 4.

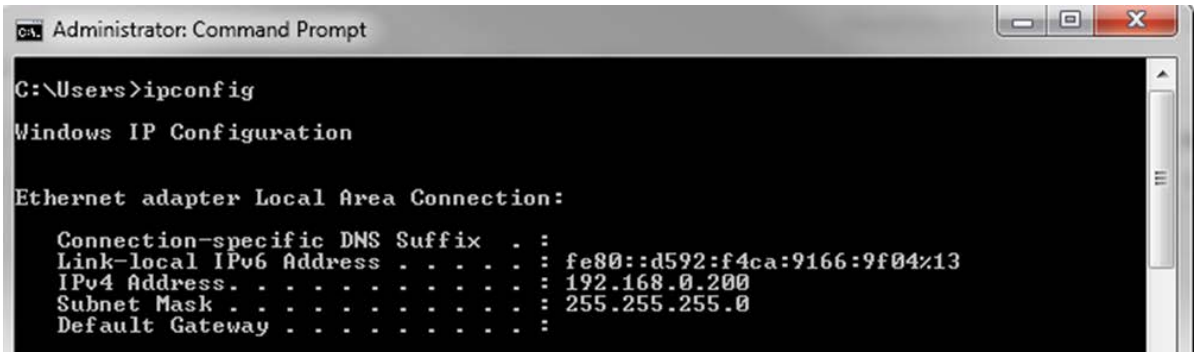

Figure 4. ipconfig results

3. Select an IP address for the board, which is different from the PC and is not being used. In this application, the IP address for the board is chosen as 192.168.0.2.

3. Importing, Configuring, and Building the Project

Before you can run the example application, you must change the default IP addresses for the application in the ISDE configurator to IP addresses that are appropriate for your network and PC. The following steps describe how to import, configure, change the default IP address in the application to an IP address appropriate for your network, and then build the project:

1. Follow the procedure in the *Renesas Synergy™ Project Import Guide* (r11an0023eu0121_synergy_ssp.pdf) to import the project into the e^2 studio ISDE. Do not build the project.
2. Open the `configuration.xml` for the project, select the **Threads** tab, and choose **HTTP Server Thread**.
3. Click the g_ip0, NetX IP instance, on the **Properties** window, and change the IPv4 address to the one selected in section 2, step 3 (for example, 192.168.0.2).

Note: The IPv4 address may vary depending on your network settings.

4. Follow the procedure in the *Renesas Synergy™ Project Import Guide* to build and debug the project. When prompted to select the debug configuration, select **NETX_Webserver_XX_XXXX Debug** in **Renesas GDB Hardware Debugging**.

4. Running the Example Application

To run the application on your Synergy board, insert the USB drive into the USB connector (USB mass storage) as shown in Figure 5 (DK-S7G2), Figure 6 (PE-HMI1), or Figure 7 (SK-S7G2 or PK-S5D9).

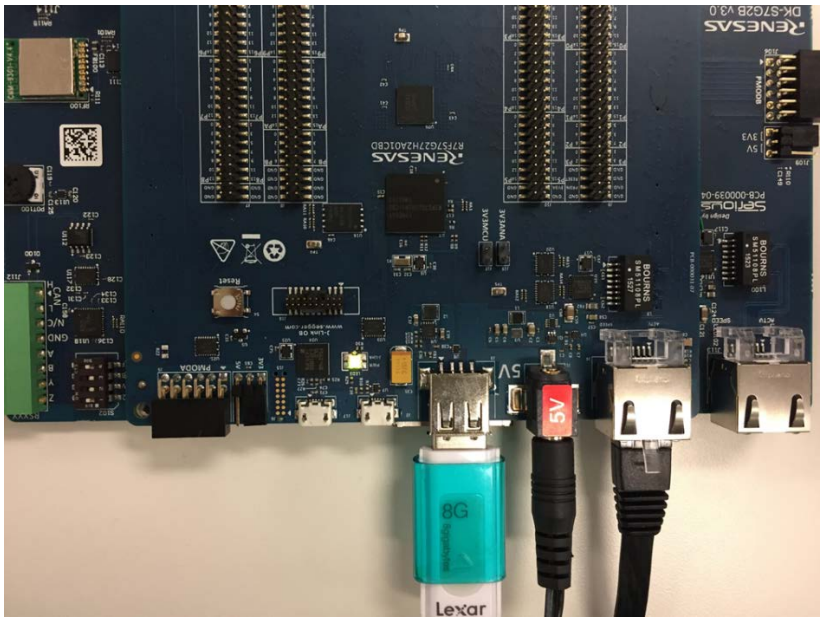

Figure 5. USB Drive and Ethernet Connection for DK-S7G2 Synergy MCU board

Note: On the DK-S7G2 board, set DIP switch 3 (**ENET1**) on S5 to ON. Use the Main Board Ethernet 1 port only. For other boards, there is no need to have any DIP switch settings.

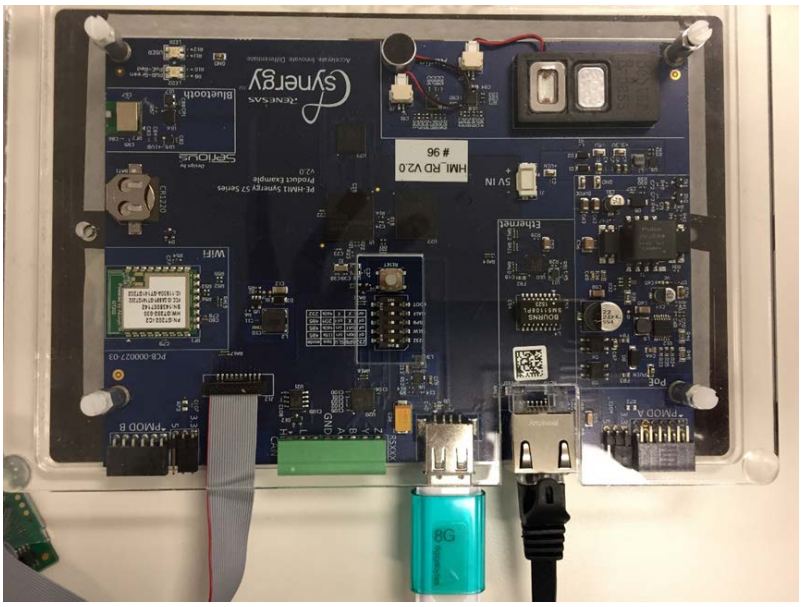

Figure 6. USB and Ethernet connection for the PE-HMI1 board

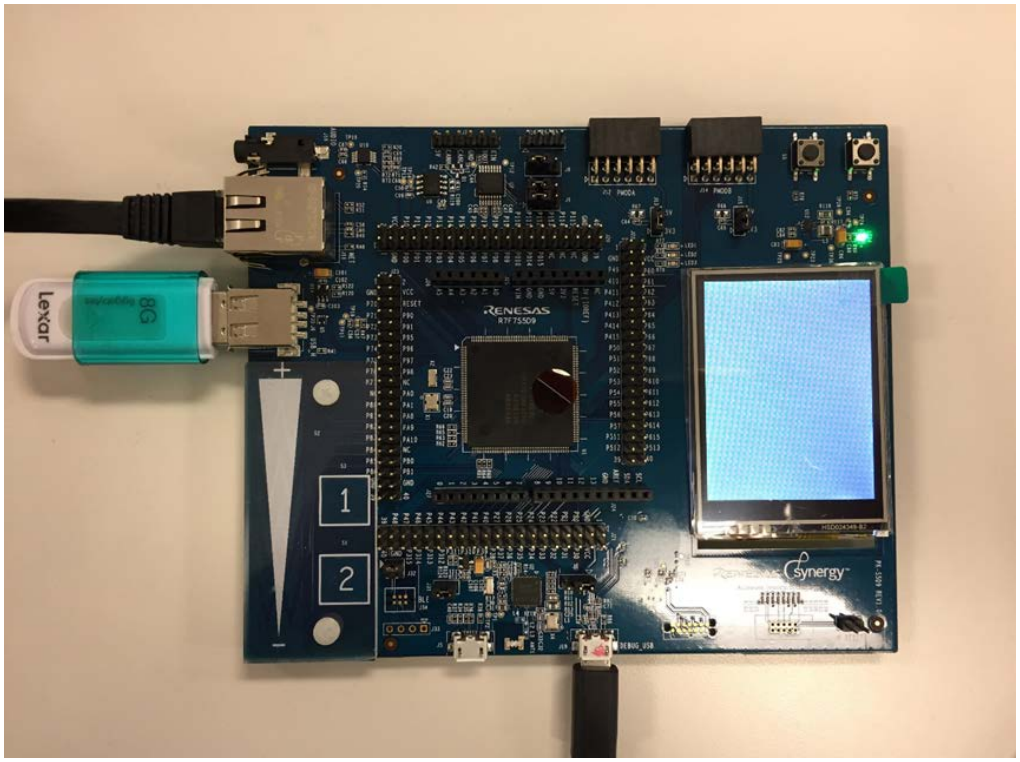

Figure 7. USB and Ethernet connection for the SK-S7G2 and PK-S5D9 boards

If you have properly configured, built, and ran the application, you should see the orange light constantly illuminated on the board near the Ethernet connector. A flashing green light on the same connector indicates data traffic. Figure 8 shows the orange and green Ethernet status LEDs on the DK-S7G2 board. The other kits function the same way.

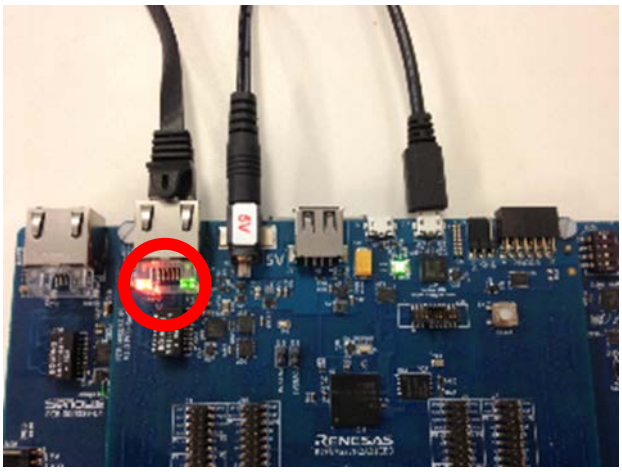

Figure 8. Orange and Green Ethernet Status LEDs

To run the example web server application:

1. In a **Command Prompt** window on your PC, enter the `ping` command with the IP address that you specified for the board (for example, 192.168.0.2). In the following example, the ping result for the board address is shown in Figure 9. If the connectivity and configurations are properly set up, you will see the ping working.

```
C:\Users>ping 192.168.0.2

Pinging 192.168.0.2 with 32 bytes of data:
Reply from 192.168.0.2: bytes=32 time=1ms TTL=128
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128
Reply from 192.168.0.2: bytes=32 time=1ms TTL=128
Reply from 192.168.0.2: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.0.2:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 1ms, Average = 0ms

C:\Users>_
```

Figure 9. Ping results

2. In a web browser, enter the IP address that you used with the `ping` command in the previous step in the text field where you normally type a URL, such as www.google.com. You should see the view in Figure 10.

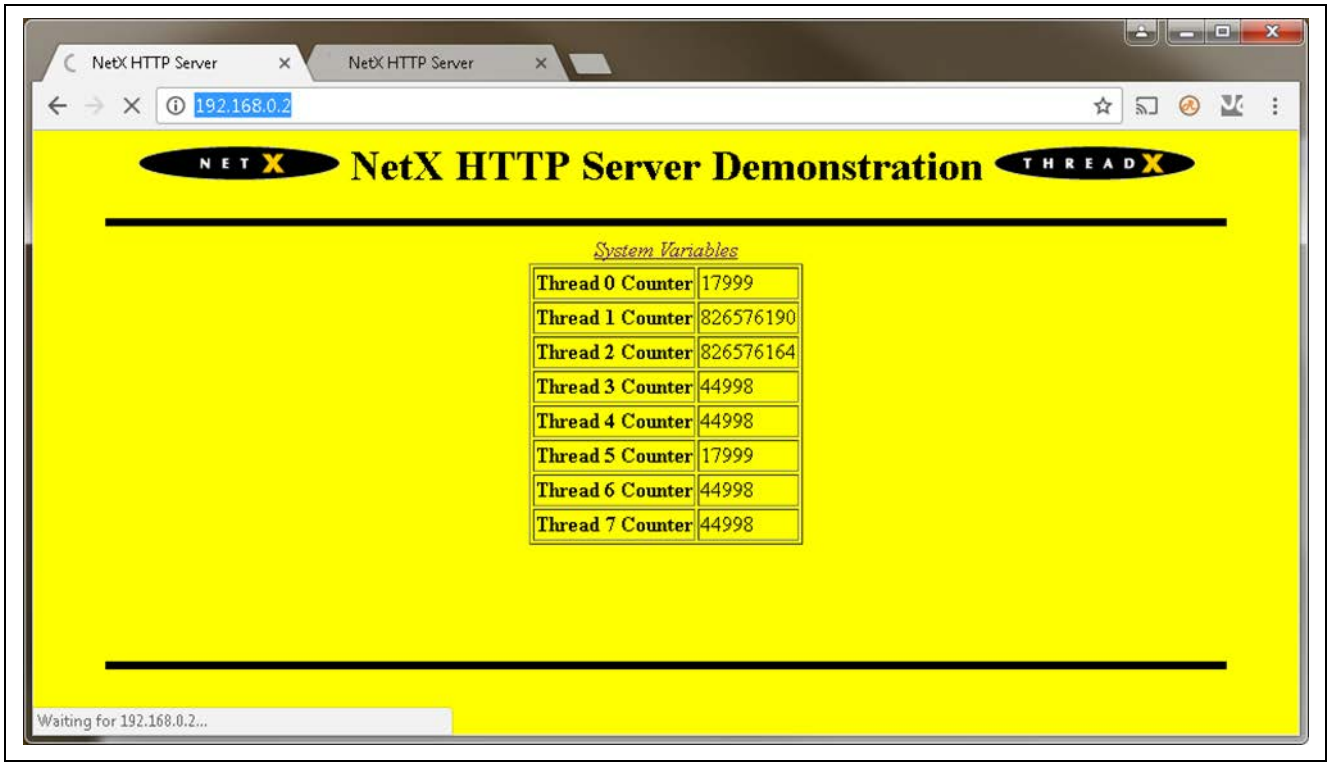

Figure 10. HTTP Webpage

3. Click the **Terminate** button to close the debugger.

Website and Support

Visit the following vanity URLs to learn about key elements of the Synergy Platform, download components and related documentation, and get support.

Synergy Software	www.renesas.com/synergy/software
Synergy Software Package	www.renesas.com/synergy/ssp
Software add-ons	www.renesas.com/synergy/addons
Software glossary	www.renesas.com/synergy/softwareglossary
Development tools	www.renesas.com/synergy/tools
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Parametric search	www.renesas.com/synergy/parametric
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Self-service support resources:	
Documentation	www.renesas.com/synergy/docs
Knowledgebase	www.renesas.com/synergy/knowledgebase
Forums	www.renesas.com/synergy/forum
Training	www.renesas.com/synergy/training
Videos	www.renesas.com/synergy/videos
Chat and web ticket	www.renesas.com/synergy/resourcelibrary

Revision History

Rev.	Date	Description	
		Page	Summary
1.0	Nov.12.15	—	Initial version
1.01	Jan.08.16	—	Updated to remove template references
		—	Updated board connection section for multiple boards
1.02	Jan.22.16	—	Editorial updates. Fixed some IP documentation Issues in the app note.
		—	In code: - Fixed Include Issue - Optimization -02 - No Yellow/Red in configuration - High Drive - One Debug session
1.03	Feb.12.16	—	QSPI support added to code samples.
		—	Editorial update. Fixed IP address from 192.168.0180 to 192.168.1.180.
1.04	Jun.17.16	—	Specified SSP V1.0.0.
1.05	Oct.25.16	—	Minor formatting changes
1.06	Feb.28.17	—	Updated for SSP 1.2.0
1.07	Sep.27.17	—	Updated to SSP 1.3.0
		1	Required resources of SSP version changed
1.08	Feb.27.18	—	Updated for SSP 1.4.0
1.09	Sep.06.18	—	Updated for SSP 1.5.0
1.10	Mar.15.19	—	Updated for SSP 1.6.0

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