

DG0472
Demo Guide
Running Webserver and TFTP Server on
SmartFusion2 Devices Using lwIP and FreeRTOS -
Libero SoC v11.7 SP2



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1 Revision History

The revision history describes the changes that were implemented in the document. The changes are listed by revision, starting with the most current publication.

1.1 Revision 7.0

The following is a summary of the changes in revision 7.0 of this document.

- Libero SoC, FlashPro, and SoftConsole design requirements were updated. For more information, see [Design Requirements](#), page 4.
- Throughout the document, the names of SoftConsole projects used in the demo design (and the associated figures) were updated.

1.2 Revision 6.0

The document was updated for Libero v11.7 software release details (SAR 77020).

1.3 Revision 5.0

The document was updated for Libero v11.6 software release (SAR 53219).

1.4 Revision 4.0

The document was updated for Libero v11.5 software release (SAR 53219).

1.5 Revision 3.0

The following is a summary of the changes in revision 3.0 of this document.

- The document was updated for Libero v11.4 software release details (SAR 60795).
- The document was updated for SmartFusion2 Advanced Development Board details (SAR 60795).

1.6 Revision 2.0

The document was updated to include TFTP server (SAR 55038).

1.7 Revision 1.0

The document was updated for Libero v11.2 software release (SAR 53219).

1.8 Revision 0.0

Revision 0.0 was the first publication of this document.

2 Running Webserver and TFTP Server on SmartFusion2 Device

The demo design associated with this document shows the tri-speed Ethernet medium access controller (TSEMAC) features of the SmartFusion2[®] device. The design has a Webserver and a trivial file transfer protocol (TFTP) server implemented on a SmartFusion2 Advanced Development Board. For more information about this board, see [UG0557: SmartFusion2 SoC FPGA Advanced Development Kit User Guide](#).

The design demonstrates the following.

- Use of SmartFusion2 Ethernet MAC connected to a serial gigabit media independent interface (SGMII) PHY.
- Integration of SmartFusion2 MAC driver with lwIP TCP/IP stack and FreeRTOS operating system.
- Implementation of Webserver on the SmartFusion2 Advanced Development Board.
- Implementation of TFTP server on the SmartFusion2 Advanced Development Board.
- Procedure to run Webserver and TFTP server designs on the SmartFusion2 Advanced Development Board.

The microcontroller subsystem (MSS) of the SmartFusion2 device has an instance of the TSEMAC peripheral, which can be configured between the host PC and the Ethernet network at 10/100/1000 Mbps data transfer rates (line speeds).

For more information about the TSEMAC interface for SmartFusion2 devices, see [UG0331: SmartFusion2 Microcontroller Subsystem User Guide](#).

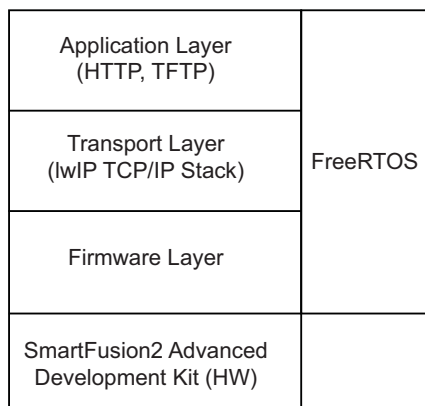
2.1 Webserver and TFTP Server Demo Design Layers

The Webserver and TFTP server demo designs have the following layers.

- Application layer
- Transport layer (lwIP TCP/IP stack)
- RTOS and firmware layer

The following figure is a block diagram of the three layers in the Webserver and TFTP server applications on the SmartFusion2 device.

Figure 1 • Webserver and TFTP Server Applications on a SmartFusion2 FPGA



2.1.1 Application Layer

The Webserver handles the HTTP request from the client (host PC) browser and transfers the static pages to the client in response to its request. When the IP address (for example, <http://10.60.3.25>) is typed in the address bar of the browser, an HTTP request is sent to the port associated with the Webserver. The Webserver then interprets the request and responds to the client with the requested page or resource.

The TFTP client (the host PC) transfers files to the SmartFusion2 device (the TFTP server) using the `TFTP PUT` command. Transferred files are stored in the SmartFusion2 Advanced Development Board external flash memory, which is connected to the SmartFusion2 SPI_0 interface. The file allocation table (FAT) file system on the SPI flash is used to display the files available in SPI flash memory.

2.1.2 Transport Layer (lwIP TCP/IP Stack)

The lwIP TCP/IP stack, developed by Adam Dunkels at the Swedish Institute of Computer Science (SICS), is suitable for embedded systems because of its low system resource usage. The lwIP stack can be used with or without an operating system. It consists of actual implementations of IP, ICMP, UDP, and TCP protocols, as well as the support functions such as buffer and memory management.

For more information about lwIP design and implementation, see www.sics.se/~adam/lwip/doc/lwip.pdf.

lwIP is available (under a BSD license) in C source-code format for download at <http://download.savannah.gnu.org/releases/lwip/>.

2.1.3 RTOS and Firmware Layer

FreeRTOS is an open-source, real-time operating system kernel. In this demo, FreeRTOS is used to prioritize and schedule tasks. For more information about FreeRTOS, including the latest source code, see <http://www.freertos.org>.

The firmware provides software drivers to configure and control the following MSS components.

- Ethernet MAC
- MMUART
- GPIO
- SPI
- RTC

2.2 Design Requirements

The following table lists the hardware and software requirements for running this demo design.

Table 1 • Design Requirements

Design Requirements	Description
Hardware	
SmartFusion2 Advanced Development Kit with: - 12 V adapter - FlashPro5 - USB A to mini-B cable	Rev A or later
Ethernet cable	RJ45
Host PC or laptop	Windows 64-bit operating system
Software	
Libero® System-on-Chip (SoC) for viewing the design files	v11.7 SP2
FlashPro programming software	v11.7 SP2
SoftConsole	v4.0
Host PC drivers	USB to UART drivers
MSS Ethernet MAC drivers	v3.1.100
A serial terminal emulation program	HyperTerminal, TeraTerm, or PuTTY
Browser	Mozilla Firefox or Internet Explorer

2.3 Demo Design

The demo design files are available for download at

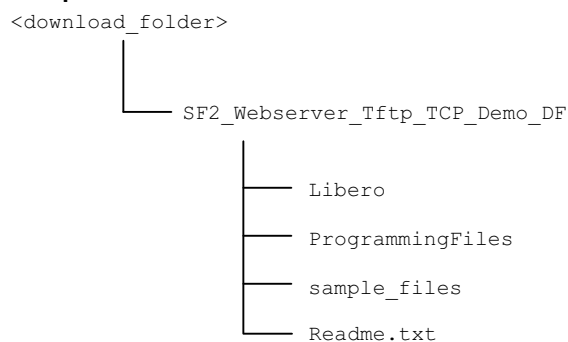
http://soc.microsemi.com/download/rsc/?f=m2s_dg0472_liberov11p7sp2_df.

The demo design files include:

- A Libero SoC hardware project with the corresponding SoftConsole firmware project
- Sample files to be transferred to the SmartFusion2 device using the TFTP server
- Programming files
- A `Readme.txt` file

The following figure shows the top-level structure of the demo design files. For more information, see the `Readme.txt` file.

Figure 2 • Demo Design Files Top-Level Structure



2.3.1 Demo Design Features

- Webserver: Displays options for the following:
 - RTC and Ethernet interface data display
 - LED blinking
 - HyperTerminal display
 - SmartFusion2 Google Search
- TFTP server: Transfers files from the host PC to the SmartFusion2 Advanced Development Board

2.3.2 Demo Design Description

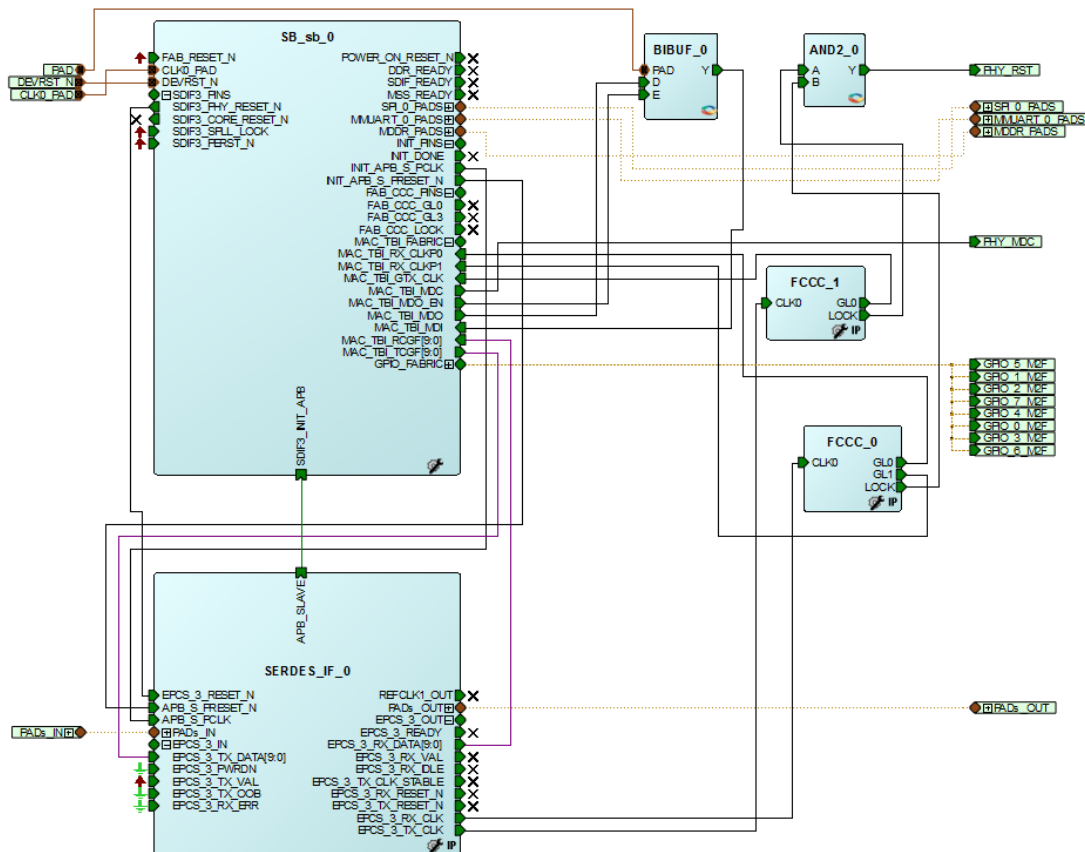
The demo design is implemented using an SGMII PHY interface, by configuring the TSEMAC for ten-bit interface (TBI) operation. For more information about the TSEMAC TBI interface, see [UG0331: SmartFusion2 Microcontroller Subsystem User Guide](#).

This section provides detailed information about the Libero SoC hardware project and SoftConsole firmware project associated with the demo design.

2.3.2.1 Libero SoC Hardware Project

The following figure shows the Libero SoC top-level hardware design implementation for the demo design.

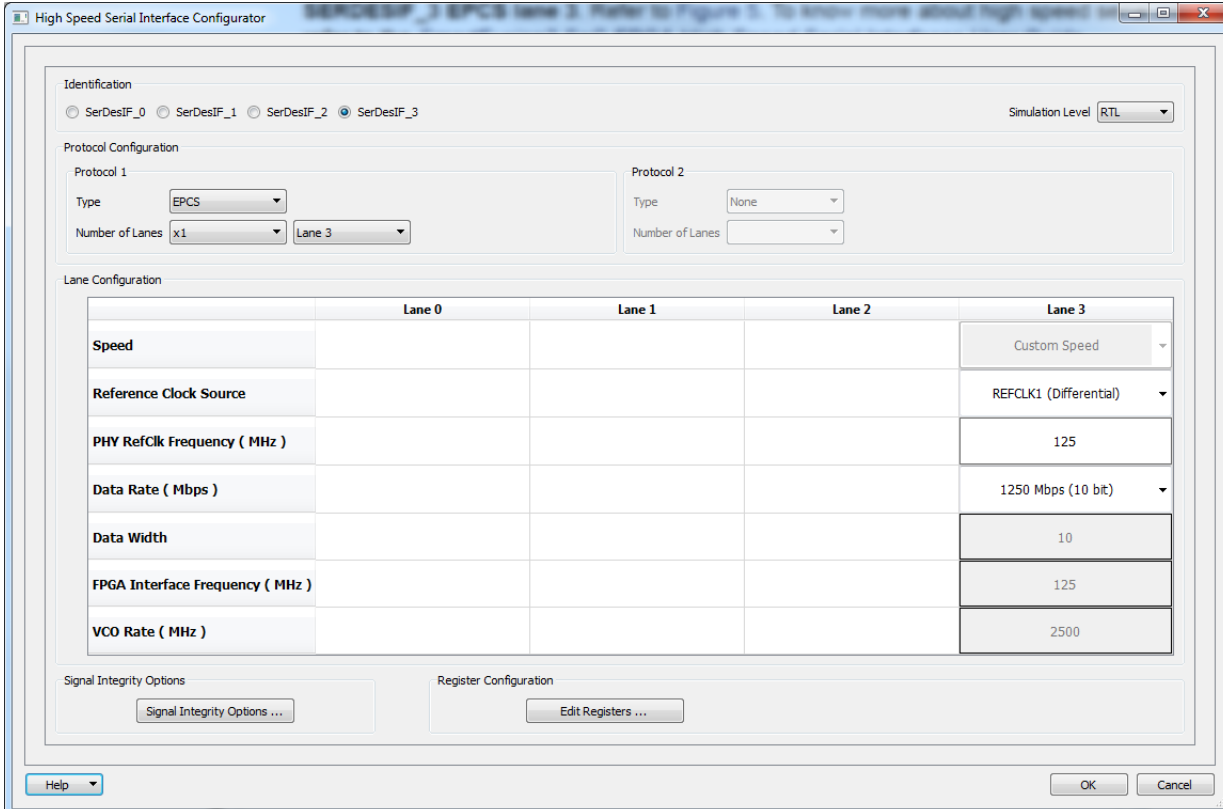
Figure 3 • Libero SoC Top-Level Hardware Design



The Libero SoC hardware project uses the following SmartFusion2 MSS resources and IP.

- TSEMAC TBI interface for supporting Ethernet functionality on the SmartFusion2 device
- MMUART_0 interface for RS-232 communications on the SmartFusion2 Advanced Development Kit
- SPI_0 interface for accessing external flash memory
- General purpose input and output (GPIO) for connecting to the LEDs on the board
- Dedicated input pad 0 as the clock source
- SERDES_IF IP high-speed serial interface configured for SerDesIF_3 EPCS Lane 3 (as shown in the following figure)

Figure 4 • High-Speed Serial Interface Configuration



The High Speed Serial Interface Configurator window is shown with the following settings:

- Identification:** SerDesIF_0, SerDesIF_1, SerDesIF_2, **SerDesIF_3** (selected). Simulation Level: RTL.
- Protocol Configuration:**
 - Protocol 1:** Type: EPCS, Number of Lanes: x1, Lane 3.
 - Protocol 2:** Type: None, Number of Lanes: (empty).
- Lane Configuration:**

	Lane 0	Lane 1	Lane 2	Lane 3
Speed				Custom Speed
Reference Clock Source				REFCLK1 (Differential)
PHY RefClk Frequency (MHz)				125
Data Rate (Mbps)				1250 Mbps (10 bit)
Data Width				10
FPGA Interface Frequency (MHz)				125
VCO Rate (MHz)				2500
- Signal Integrity Options:** Signal Integrity Options ...
- Register Configuration:** Edit Registers ...

For more information about high-speed serial interfaces, see [UG0447: IGLOO2 and SmartFusion2 High Speed Serial Interfaces User Guide](#).

2.3.2.1.1 Package Pin Assignment

Each LED and PHY interface signal on the SmartFusion2 board has a package pin assigned to it. The following table lists the LED port names and corresponding package pins.

Table 2 • LED to Package Pin Assignment

Port Name	Package Pin
LED_1	D26
LED_2	F26
LED_3	A27
LED_4	C26
LED_5	C28
LED_6	B27
LED_7	C27
LED_8	E26

The following table lists the PHY interface signals and corresponding package pins

Table 3 • PHY Interface Signal to Package Pin Assignment

Port Name	Direction	Package Pin
PHY_MDC	Output	F3
PHY_MDIO	Input	K7
PHY_RST	Output	F2

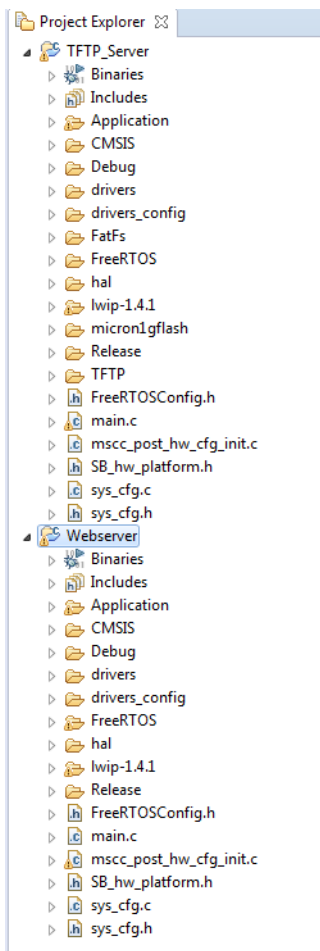
2.3.2.2 SoftConsole Firmware Project

The following stacks available in the SoftConsole Project Explorer are used in this demo design.

- lwIP TCP/IP stack v1.4.1
- FreeRTOS

The following figure shows the directory structure of the demo design in SoftConsole.

Figure 5 • Demo Design Directory Structure in SoftConsole Project



The SoftConsole workspace consists of the following projects.

- TFTP_Server: contains the TFTP server application (which uses LWIP, FreeRTOS, and FatFs) and all the firmware and hardware abstraction layers that correspond to the hardware design.
- Webserver: contains the Webserver application (which uses LWIP and FreeRTOS) and all the firmware and hardware abstraction layers that correspond to the hardware design.

The following figure shows the driver versions used for the demo.

Figure 6 • Demo Design Driver Versions

Generate	Instance Name	Core Type	Version	Compatible Hardware Instance
<input checked="" type="checkbox"/>	SmartFusion2_CMSIS_0	SmartFusion2_CMSIS	2.3.105	SB_sb_MSS
<input checked="" type="checkbox"/>	SmartFusion2_MSS_Ethernet_MAC_Driver_0	SmartFusion2_MSS_Ethernet_MAC_Driver	3.1.100	SB_sb_MSS:MAC
<input checked="" type="checkbox"/>	SmartFusion2_MSS_GPIO_Driver_0	SmartFusion2_MSS_GPIO_Driver	2.1.102	SB_sb_MSS:GPIO
<input type="checkbox"/>	SmartFusion2_MSS_HPOMA_Driver_0	SmartFusion2_MSS_HPOMA_Driver	2.2.100	SB_sb_MSS
<input checked="" type="checkbox"/>	SmartFusion2_MSS_MMUART_Driver_0	SmartFusion2_MSS_MMUART_Driver	2.1.100	SB_sb_MSS:MMUART_0
<input type="checkbox"/>	SmartFusion2_MSS_NWM_Driver_0	SmartFusion2_MSS_NWM_Driver	2.4.100	SB_sb_MSS
<input type="checkbox"/>	SmartFusion2_MSS_PDMA_Driver_0	SmartFusion2_MSS_PDMA_Driver	2.0.102	SB_sb_MSS:DMA
<input checked="" type="checkbox"/>	SmartFusion2_MSS_RTC_Driver_0	SmartFusion2_MSS_RTC_Driver	2.2.100	SB_sb_MSS:RTC
<input checked="" type="checkbox"/>	SmartFusion2_MSS_SPI_Driver_0	SmartFusion2_MSS_SPI_Driver	2.2.101	SB_sb_MSS:SPI_0
<input type="checkbox"/>	SmartFusion2_MSS_System_Services_Driver_0	SmartFusion2_MSS_System_Services_Driver	2.7.100	SB_sb_MSS
<input checked="" type="checkbox"/>	SmartFusion2_MSS_Timer_Driver_0	SmartFusion2_MSS_Timer_Driver	2.2.100	SB_sb_MSS

2.4 Setting Up the Demo Design

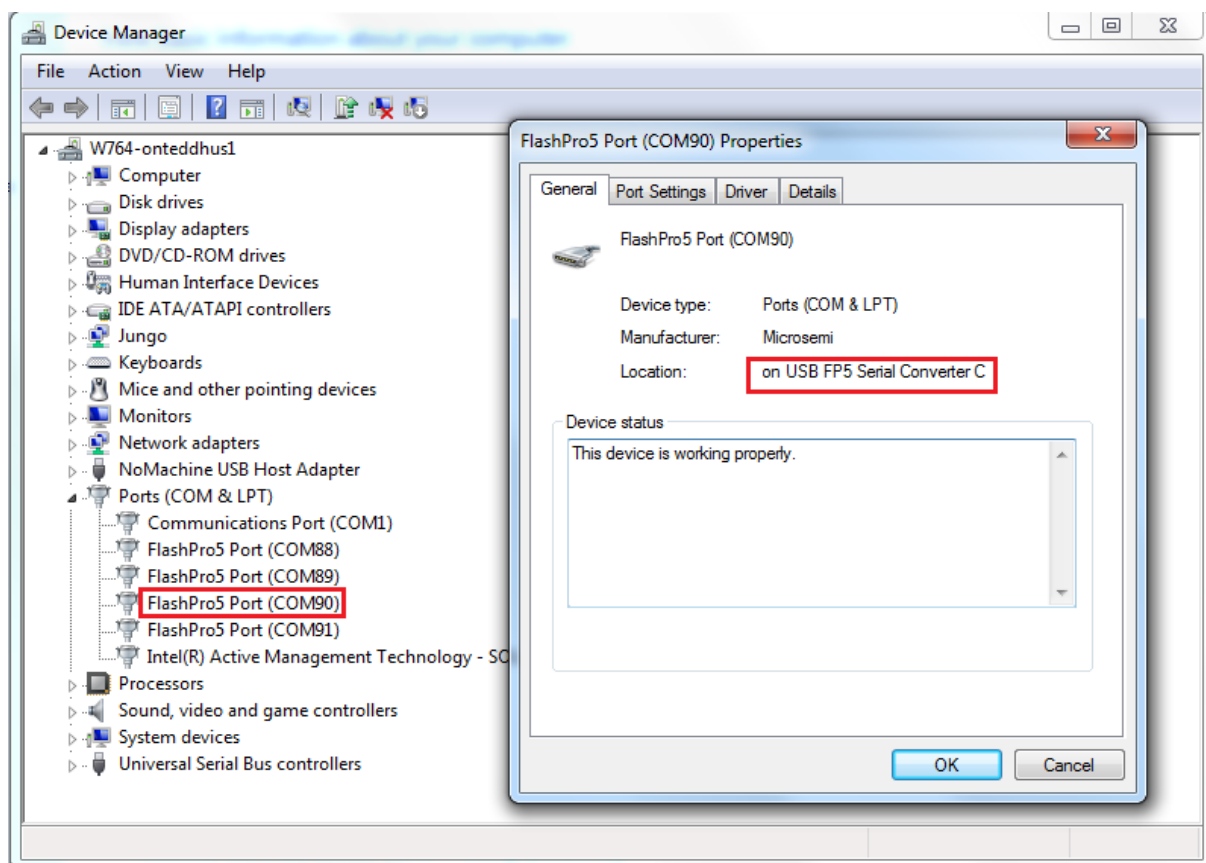
The following steps describe how to setup the demo for SmartFusion2 Advanced Development Board.

1. Connect the host PC to the **J33** connector using a USB A to mini-B cable.
The COM ports are automatically detected and displayed in the Device Manager window.

Note: If the COM ports are not detected automatically, install the FTDI D2XX driver for serial terminal communication through the FTDI mini-USB cable. The driver, along with the installation guide, is available at www.microsemi.com/soc/documents/CDM_2.08.24_WHQL_Certified.zip.

2. Right-click each of the four detected COM ports, and click **Properties** to find the port with the location **on USB FP5 Serial Converter C**, as shown in the following figure.

Figure 7 • Device Manager Window



3. Make a note of the COM port number for use during serial terminal configuration. For more information, see [Running the Demo Design](#), page 10.

- Connect the jumpers on the SmartFusion2 Advanced Development Board as specified in the following table.

Caution: Switch OFF the power supply switch, **SW7**, before connecting the jumpers.

Table 4 • SmartFusion2 Advanced Development Kit Jumper Settings

Jumper	Pin From	Pin To	Comments
J116, J353, J354, J54	1	2	Default jumper settings for the SmartFusion2 Advanced Development Board
J123	2	3	
J124, J121, J32	1	2	JTAG programming through FTDI
J118, J119	1	2	Programming through SPI flash

For information about jumper locations, see [Appendix: Jumper Locations](#), page 24.

- Connect the power supply to the **J42** connector in the SmartFusion2 Advanced Development Kit.
- Depending on the IP mode you want to use for the design, connect one of the following to the **J21** connector of the SmartFusion2 Advanced Development Kit Board using an RJ45 cable.
 - For static IP mode, connect the host PC.
 - For dynamic IP mode, connect any one of the open network ports.

Note: By default, programming files are provided for dynamic IP mode. To run the design in static IP mode, see [Appendix: Running the Design in Static IP Mode](#), page 25.

2.4.0.1 Board Setup

For snapshots of the SmartFusion2 Advanced Development Board setup for the demo design, see [Appendix: Board Setup for Running the Demo](#), page 23.

2.5 Running the Demo Design

In order to run the demo design, perform the following steps:

- Download the demo design files from http://soc.microsemi.com/download/rsc/?f=m2s_dg0472_liberov11p7sp2_df.
- Switch ON the power supply switch (SW7).
- Start a serial terminal emulation program such as HyperTerminal, PuTTY, or TeraTerm.

Note: For this demo, HyperTerminal is used.

- Configure the program's serial terminal settings as follows.
 - Baud Rate: 115200
 - Eight data bits
 - One stop bit
 - No parity
 - No flow control

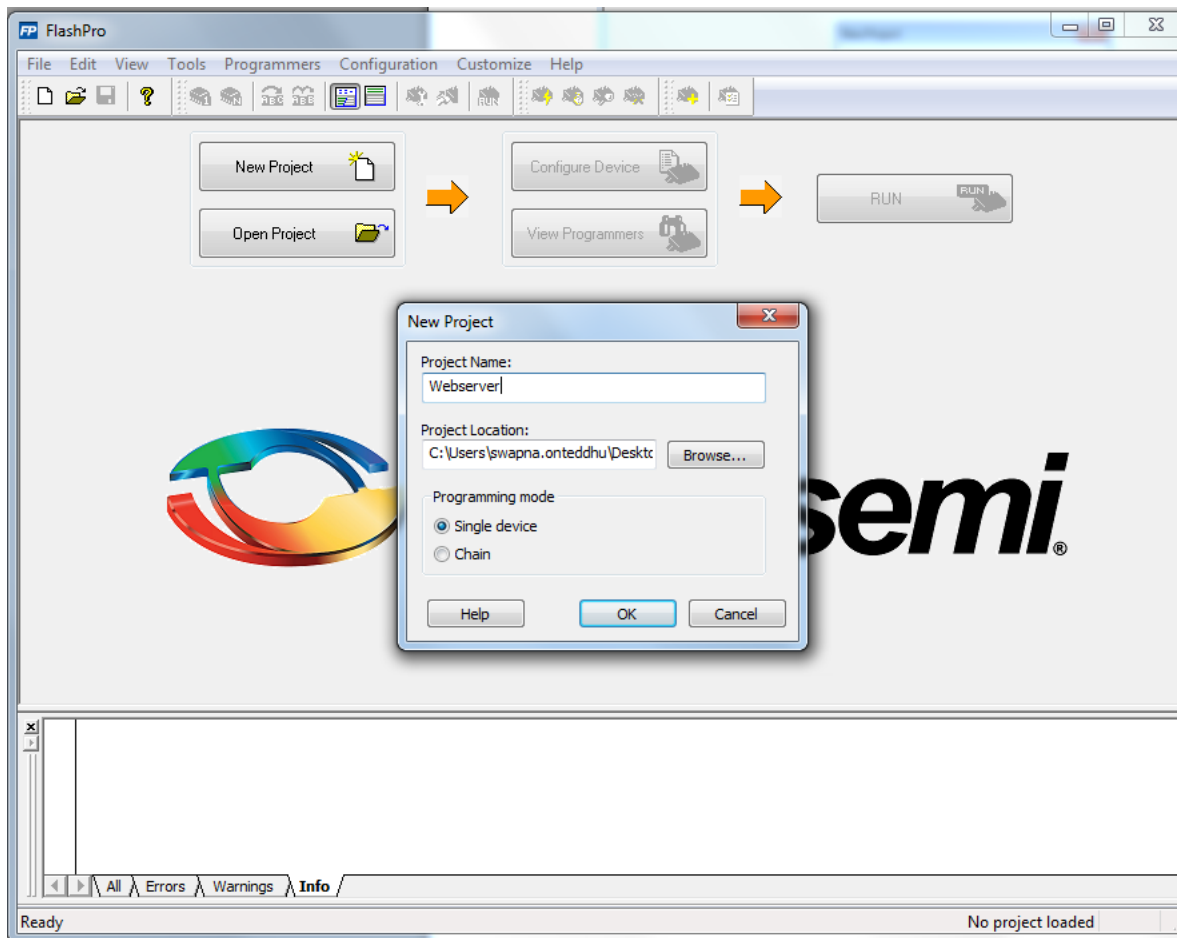
For more information about configuring serial terminal emulation programs, see [Configuring Serial Terminal Emulation Programs Tutorial](#).

2.5.0.1 Running Webserver Demo

The following steps describe how to run the Webserver demo.

1. Launch the FlashPro software.
2. Click **New Project**.
3. In the **New Project** window, enter the project name.

Figure 8 • FlashPro New Project Window

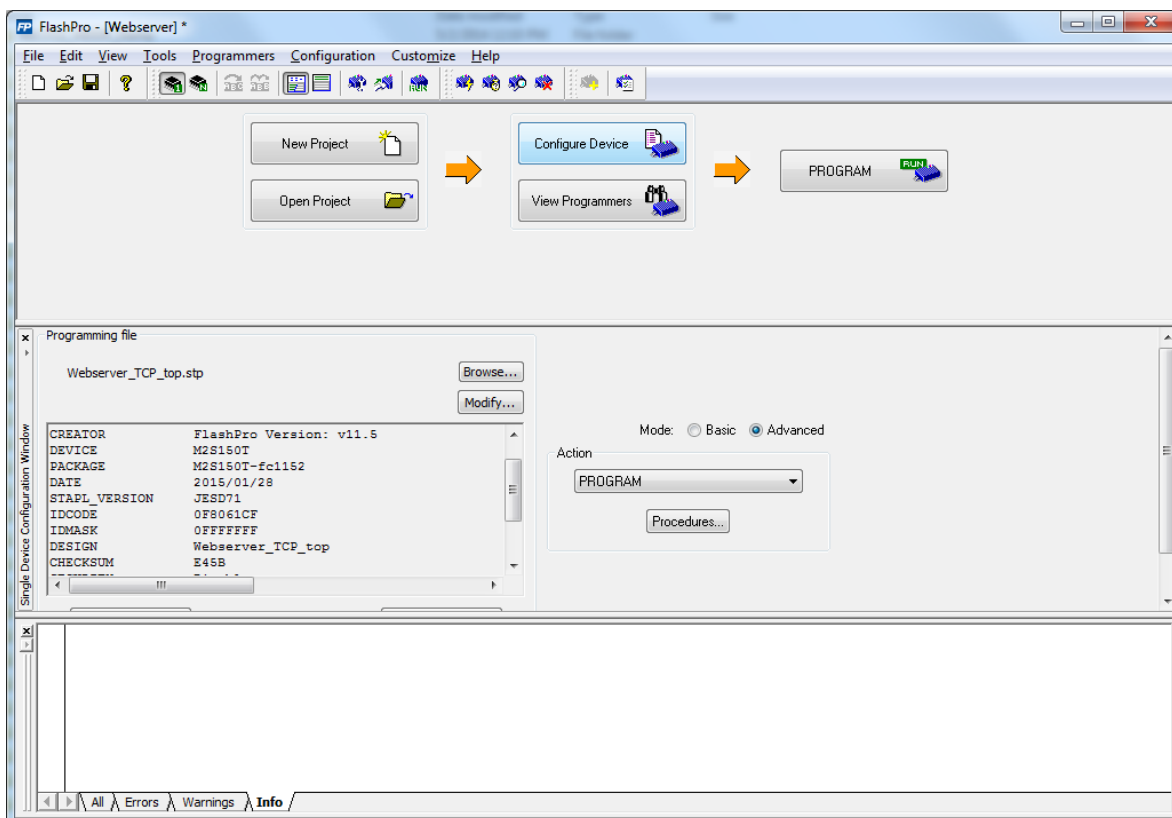


4. Click **Browse**, and navigate to the location where the project is required to be saved.
5. Select **Single device** as the **Programming mode**.
6. Click **OK** to save the project.
7. Click **Configure Device**.

- Click **Browse**, navigate to the location where the `Webserver_TCP_top.stp` file is located, and select the file.

The default location is: `<download_folder>\SF2_Webserver_Tftp_TCP_Demo_DFW\Programming-Files\webserver\`

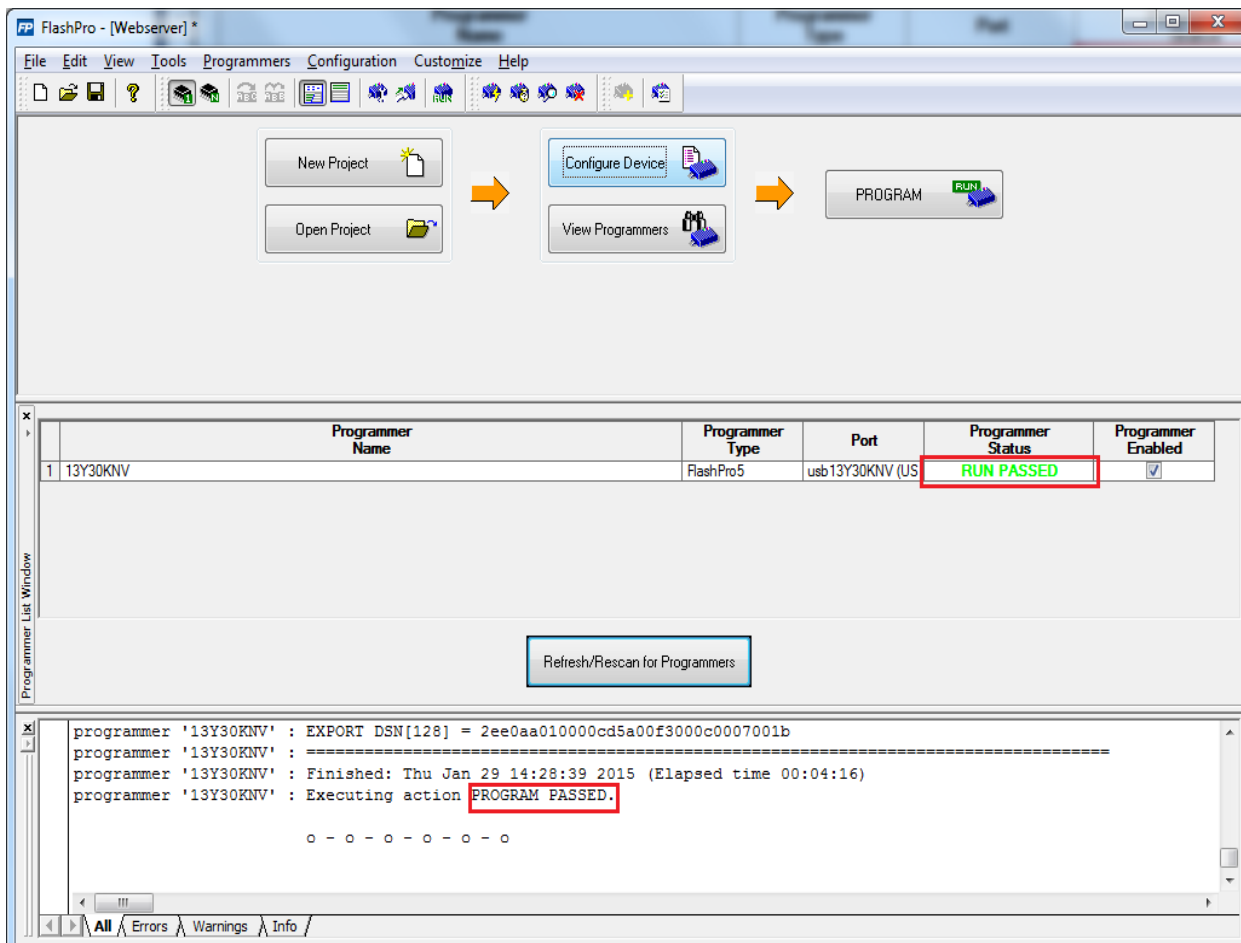
Figure 9 • FlashPro Project Configuration Window



The selected file is ready to be programmed to the device.

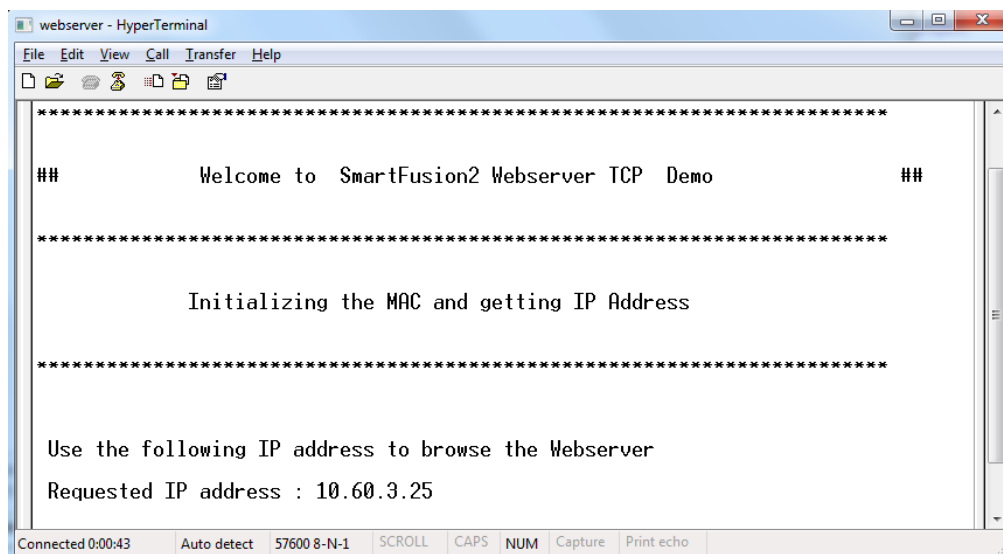
- Click **PROGRAM** to start programming the device. Wait until a PROGRAM PASSED message is displayed, as shown in the following figure.

Figure 10 • FlashPro PROGRAM PASSED Message



The HyperTerminal window displays a welcome message with an IP address, as shown in the following figure.

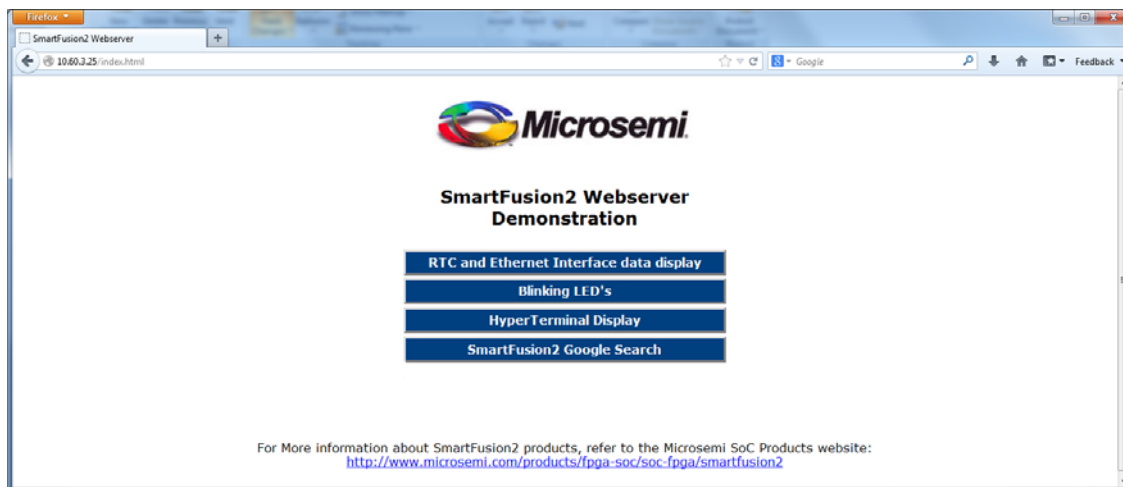
Figure 11 • HyperTerminal with IP Address



10. Open a web browser, and enter the IP address displayed on the HyperTerminal window in the address bar of the browser.

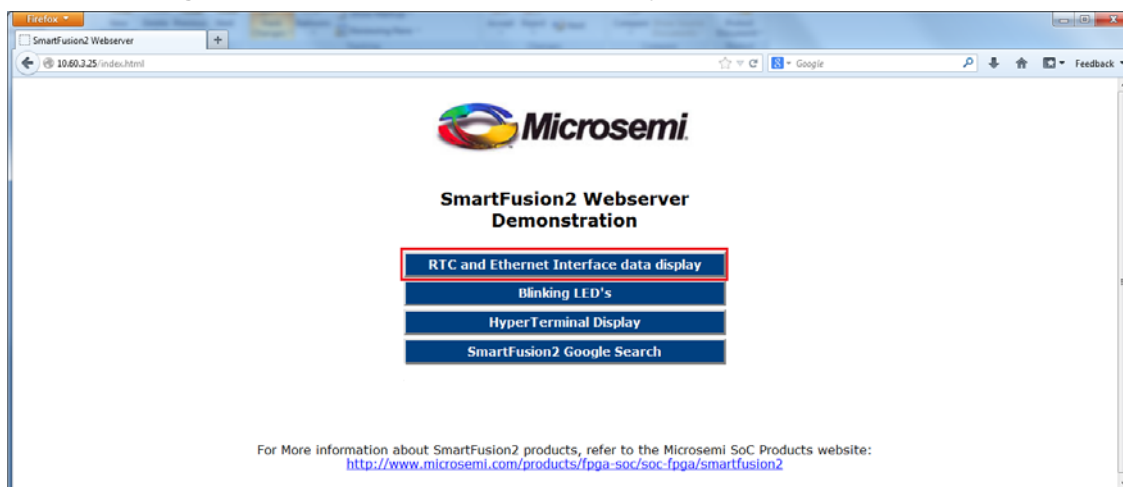
The SmartFusion2 Webserver demo main menu appears, as shown in the following figure.

Figure 12 • Webserver Demo Main Menu



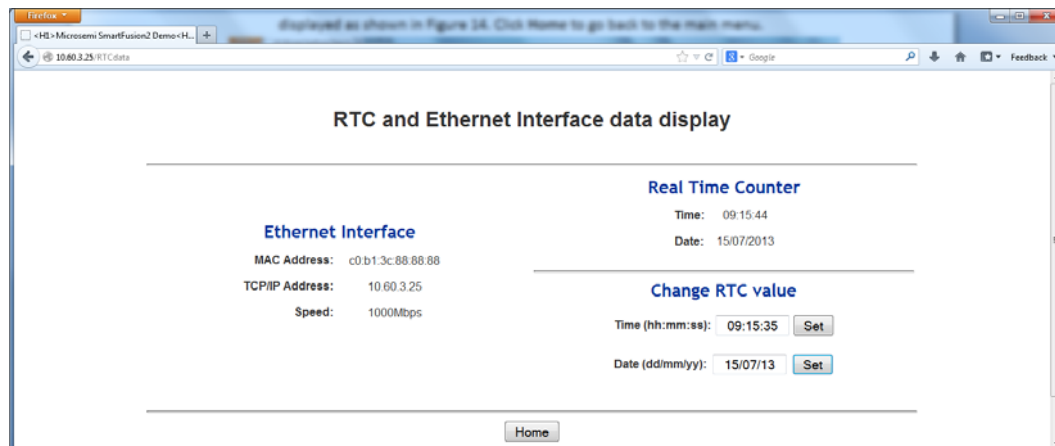
11. Click **RTC and Ethernet Interface data display**.

Figure 13 • Selecting RTC and Ethernet Interface Data Display



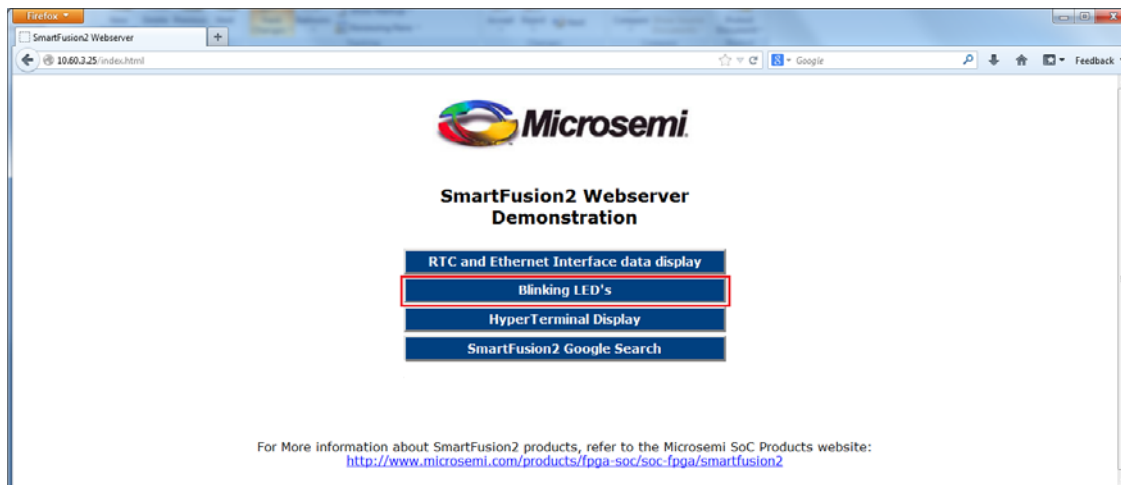
The following web page appears, displaying RTC values and Ethernet MAC properties.

Figure 14 • Webserver RTC and Ethernet Interface Data Display



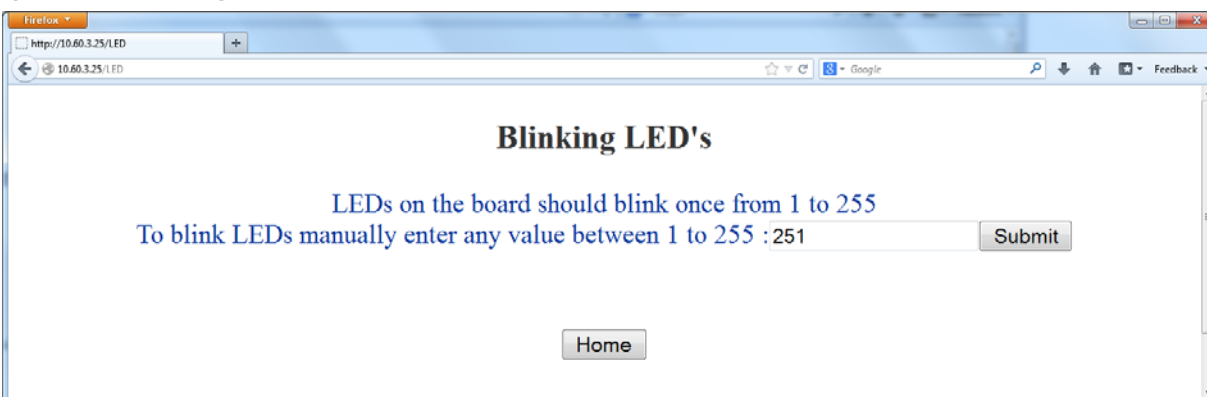
12. Click **Home** to go back to the main menu.
13. Click **Blinking LEDs** on the main menu.

Figure 15 • Selecting Blinking LEDs

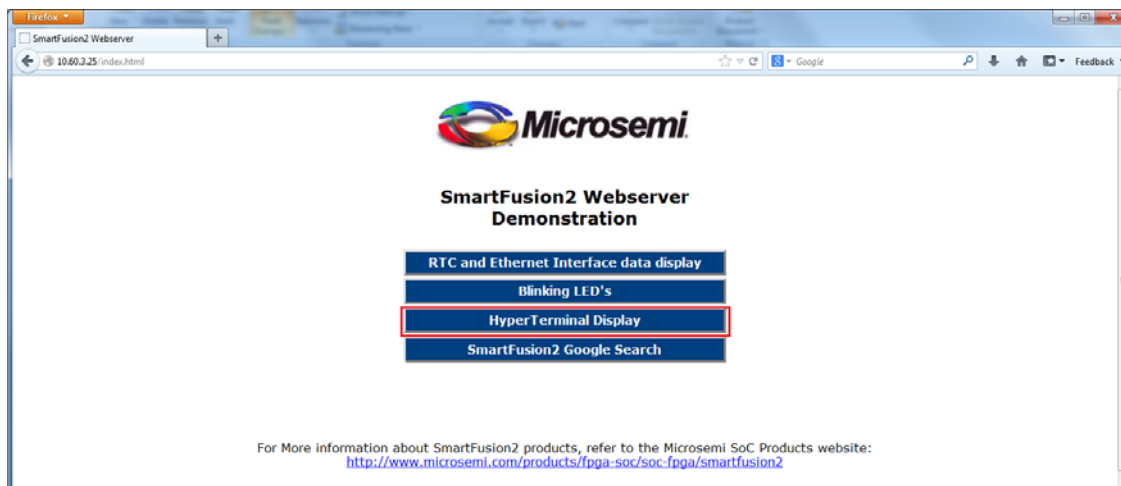


The LEDs on the board start blinking, and a web page appears, with an option to enter a value to toggle LEDs manually.

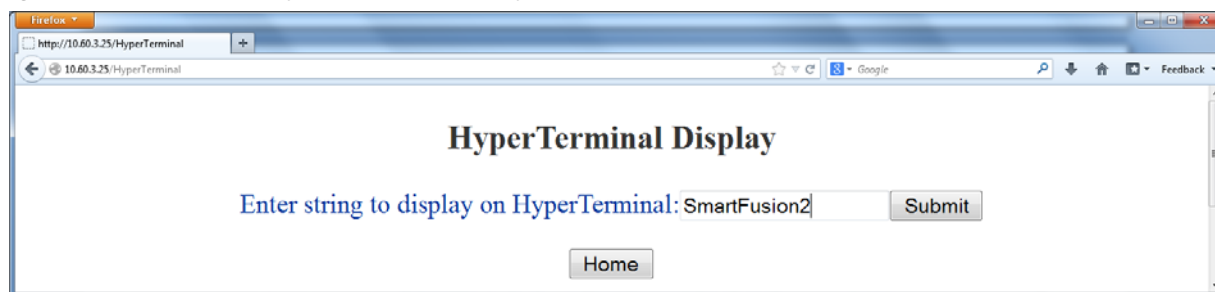
Figure 16 • Entering Values for LEDs to Blink



14. Enter any number between 1-255 to toggle the LEDs manually.
Because the SmartFusion2 Advanced Development Kit has active-low LEDs, if 1 is entered, LED1 goes OFF; if 255 is entered, all the eight LEDs go OFF.
15. Click **Home** to go back to the main menu.
16. Click **HyperTerminal Display** on the main menu.

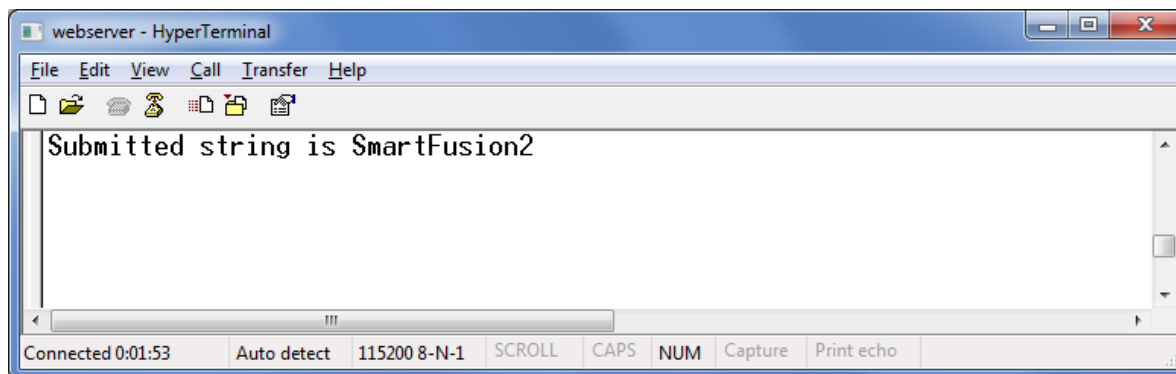
Figure 17 • Selecting HyperTerminal Display

A web page appears with an option to enter a string value to be displayed in HyperTerminal.

Figure 18 • Webserver HyperTerminal Display

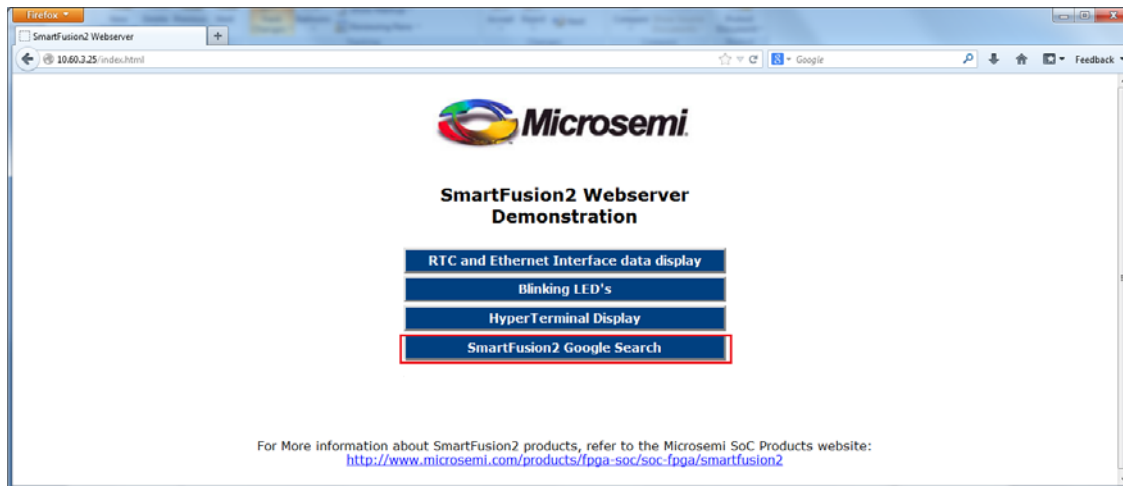
17. Enter the desired string value, and click **Submit**.

The following message appears, indicating that the string was successfully submitted.

Figure 19 • String Display on HyperTerminal

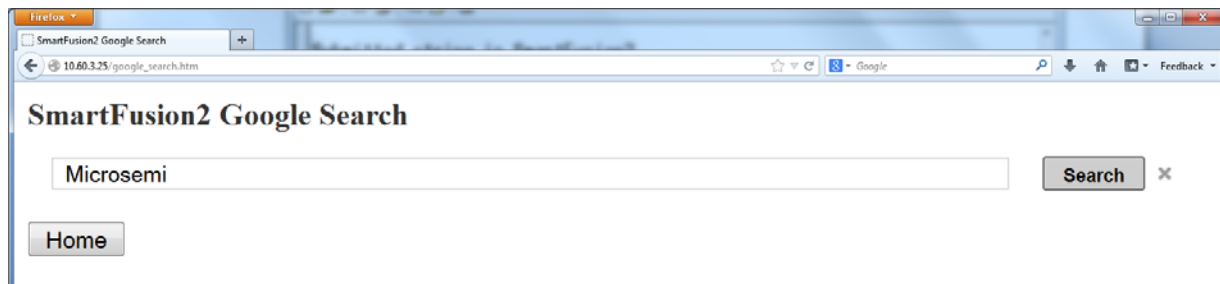
18. Click **Home** to go back to the main menu.

19. Click **SmartFusion2 Google Search** on the main menu.

Figure 20 • Selecting SmartFusion2 Google Search

Note: An Internet connection is required to access the SmartFusion2 Google Search page.

A web page appears, with the **SmartFusion2 Google Search** option.

Figure 21 • Webserver SmartFusion2 Google Search

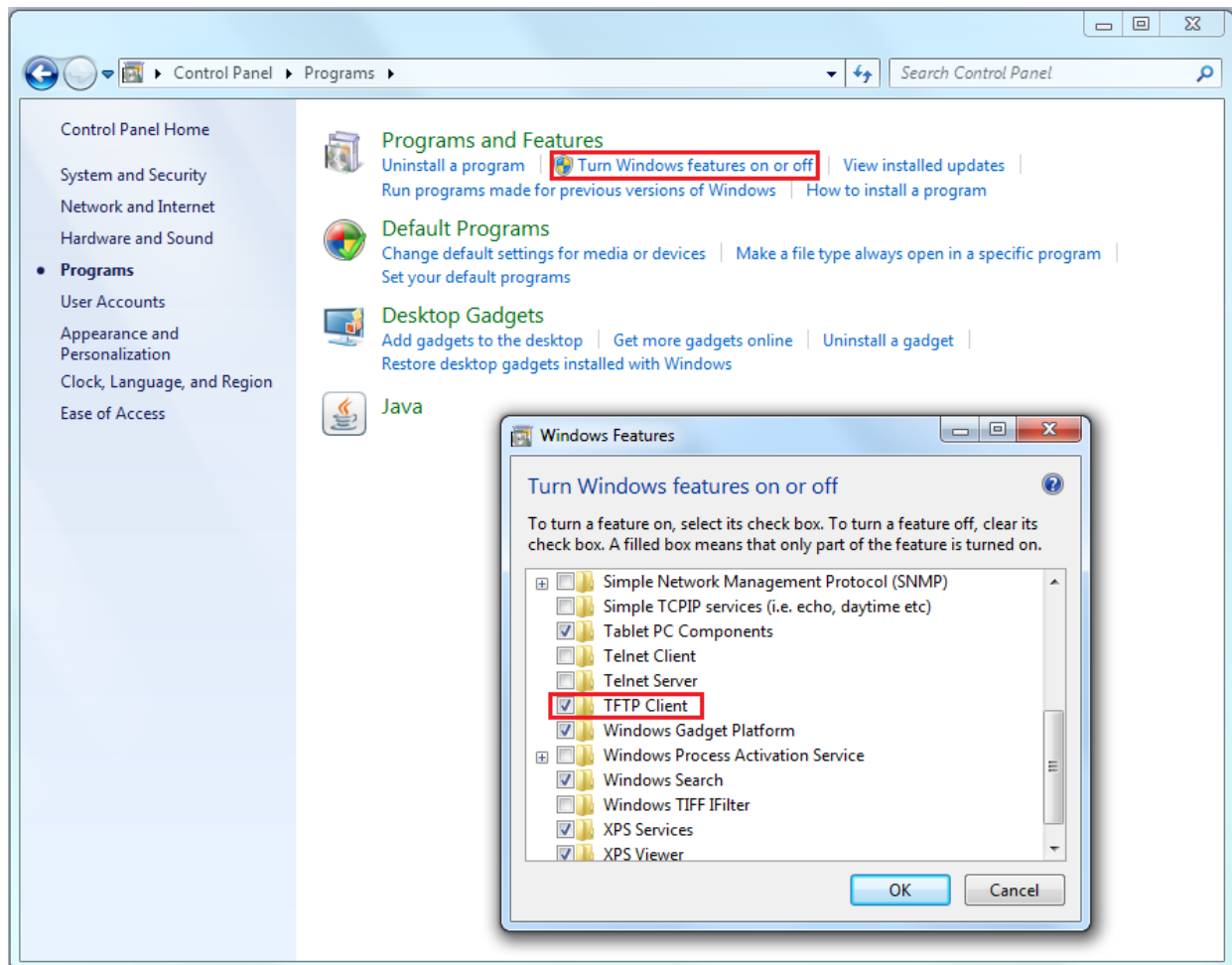
20. Click **Home** to go back to the main menu.

2.5.0.2 Running the TFTP Demo

The following steps describe how to run the TFTP demo.

1. To enable the TFTP client in the host PC, navigate to **Control Panel > Programs and Features**.
2. Click **Turn Windows Features On or Off**, select **TFTP Client** in the Windows Features dialog box, and click **OK**, as shown in the following figure.

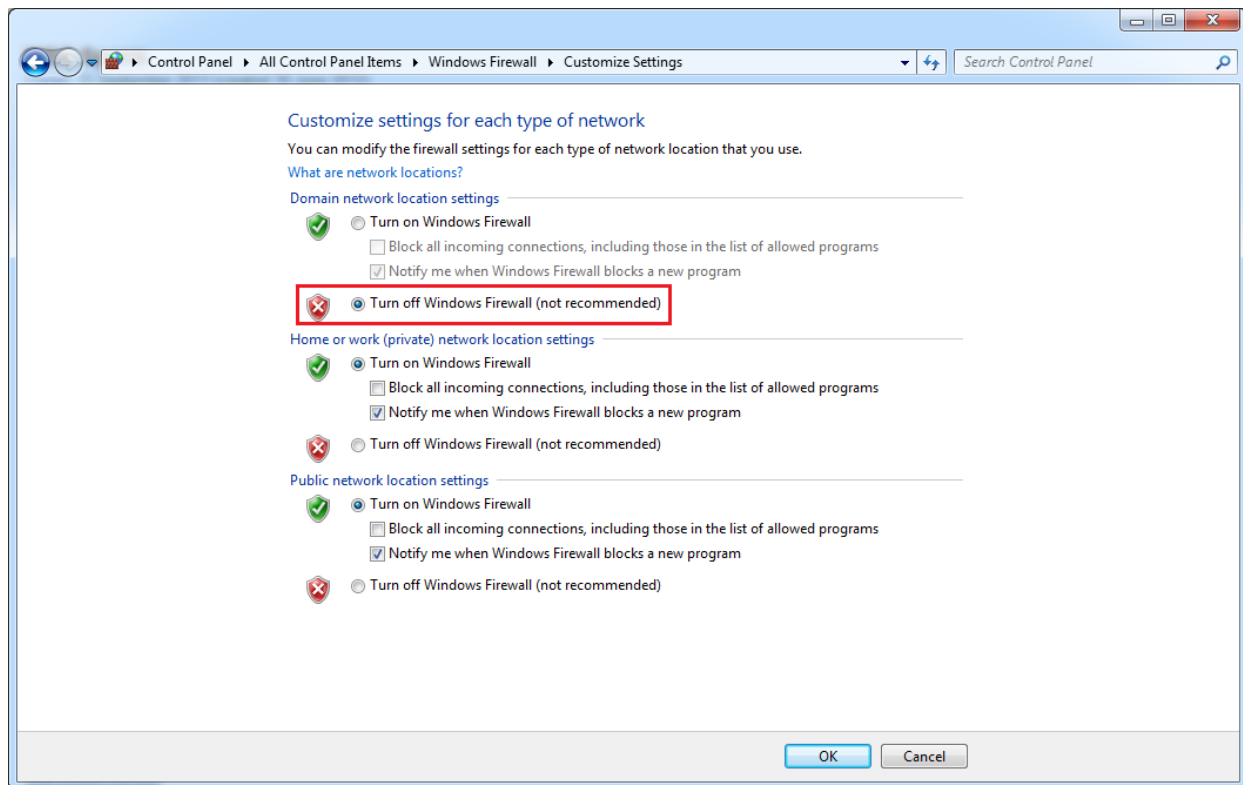
Figure 22 • Enabling TFTP Client in Host PC



3. Navigate to **Control Panel > Windows Firewall**, and click **Turn Windows Firewall On or Off**.

4. Select **Turn off Windows Firewall** under **Domain network location settings**, and click **OK**, as shown in the following figure.

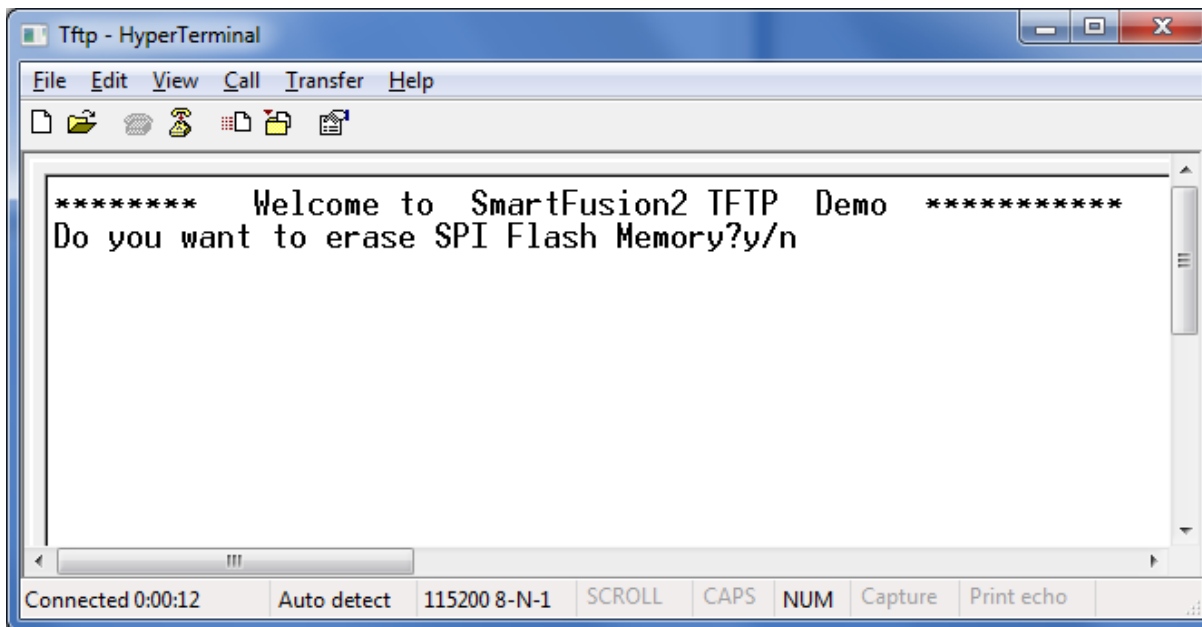
Figure 23 • Windows Firewall Settings



5. Launch the FlashPro software, and program the device with the Webserver_TCP_top_tftp.stp file located at `<download_folder>\SF2_Webserver_Tftp_TCP_Demo_DFP\ProgrammingFiles\Tftp_Server\`. Wait until the PROGRAM PASSED message is displayed. (See steps 1 to 9 of [Running Webserver Demo](#), page 11.)

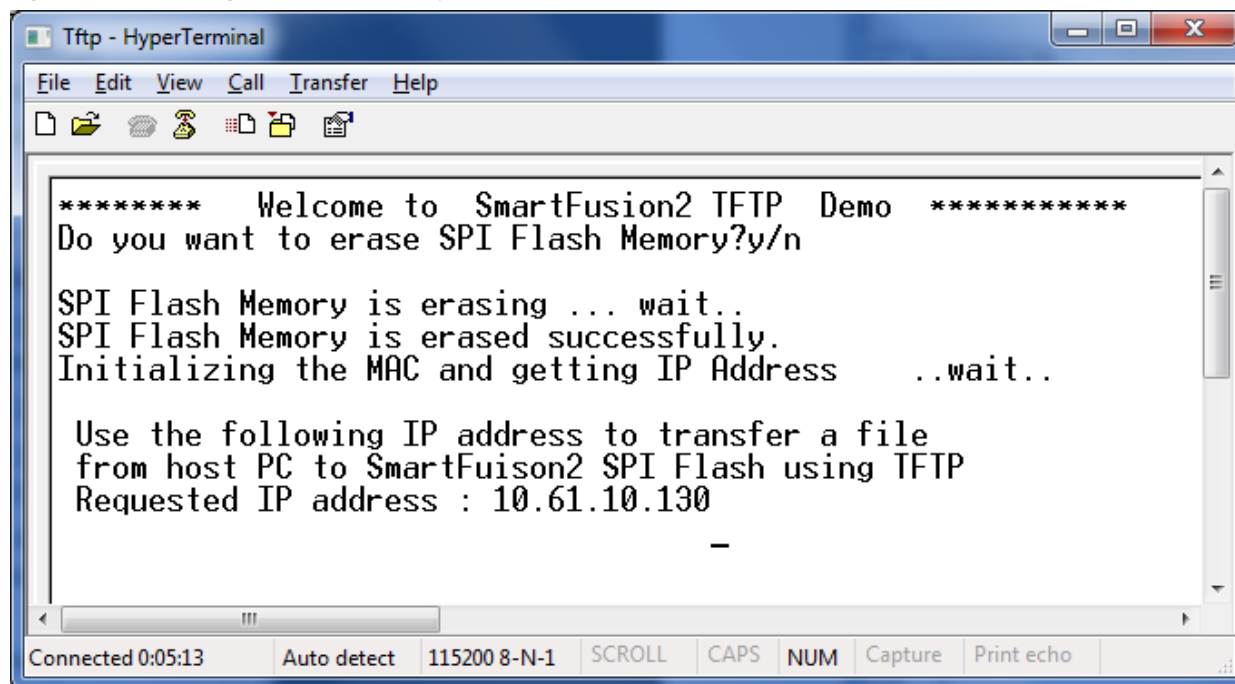
The HyperTerminal window displays a welcome message with an option to clear SPI flash contents, as shown in the following figure.

Figure 24 • HyperTerminal Welcome Message



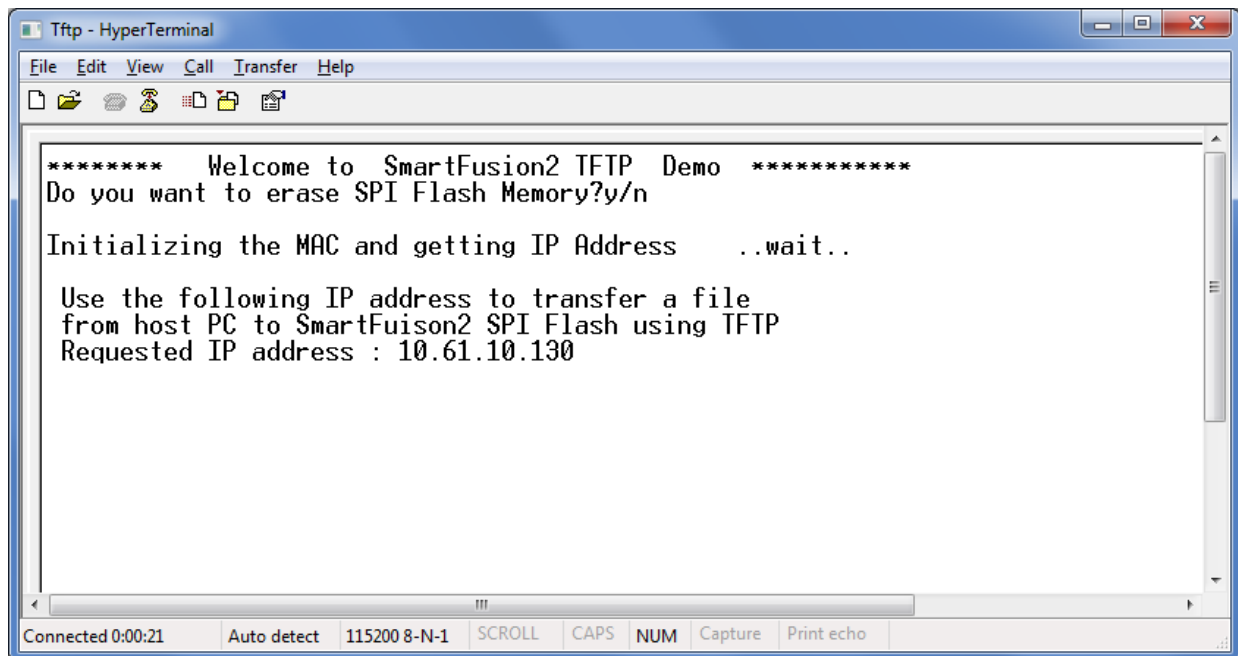
6. Type **y** to erase SPI flash memory, as shown in the following figure.

Figure 25 • Erasing SPI Flash Memory



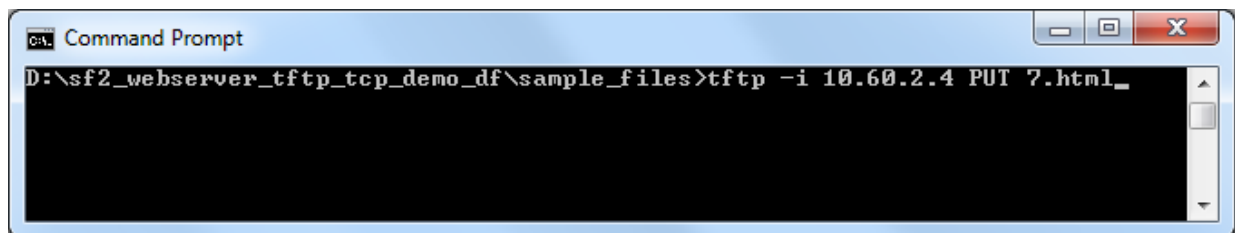
7. Type any key other than **y** to avoid erasing SPI flash.
The HyperTerminal program displays a dynamic IP address, as shown in the following figure.

Figure 26 • HyperTerminal with Dynamic IP Address



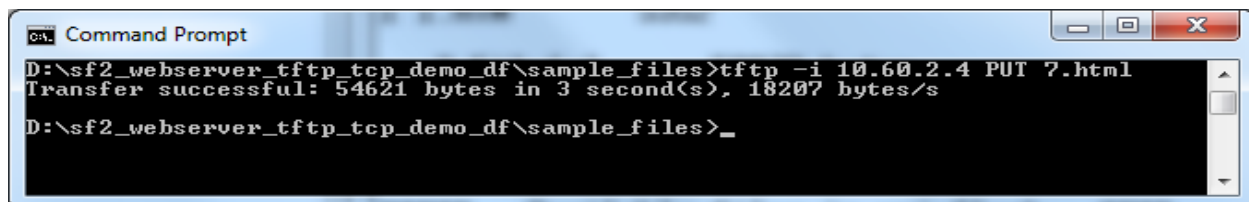
8. Open the command prompt on the host PC, and navigate to the directory where the files to be transferred to the SPI flash are located:
`<download_folder>\SF2_Webserver_Tftp_TCP_Demo_DF\sample_files`
9. Select a file that needs to be transferred, and type the following TFTP command to transfer the file to the TFTP server (the SmartFusion2 device):
`tftp -i < ip address> PUT <file name>`

Figure 27 • Command Prompt



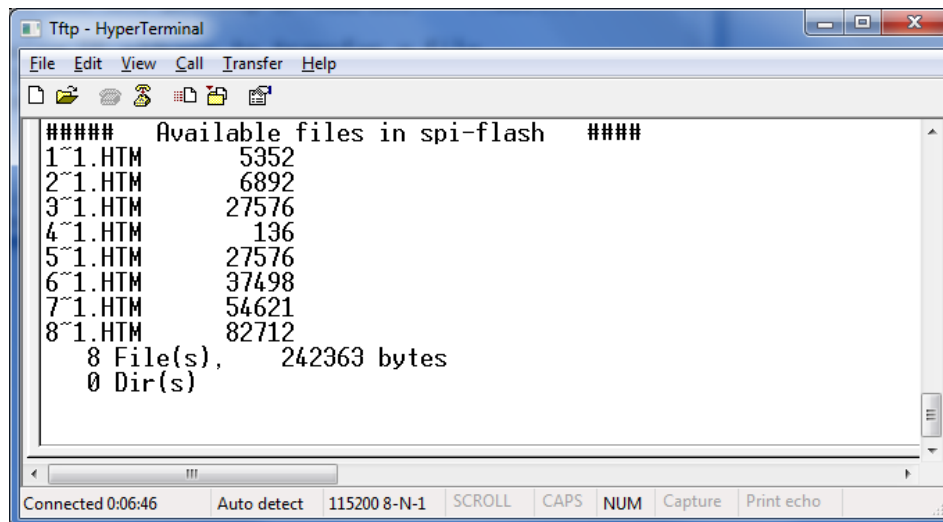
Upon successful file transfer from the host PC to the SmartFusion2 SPI flash, the command prompt displays a message indicating that the transfer was successful.

Figure 28 • Successful Transfer Message



HyperTerminal displays the available files in SPI flash, as shown in the following figure.

Figure 29 • HyperTerminal with Available SPI Flash Files



10. Repeat steps 9 and 10 for any additional files that need to be transferred from the host PC to the SmartFusion2 SPI flash.

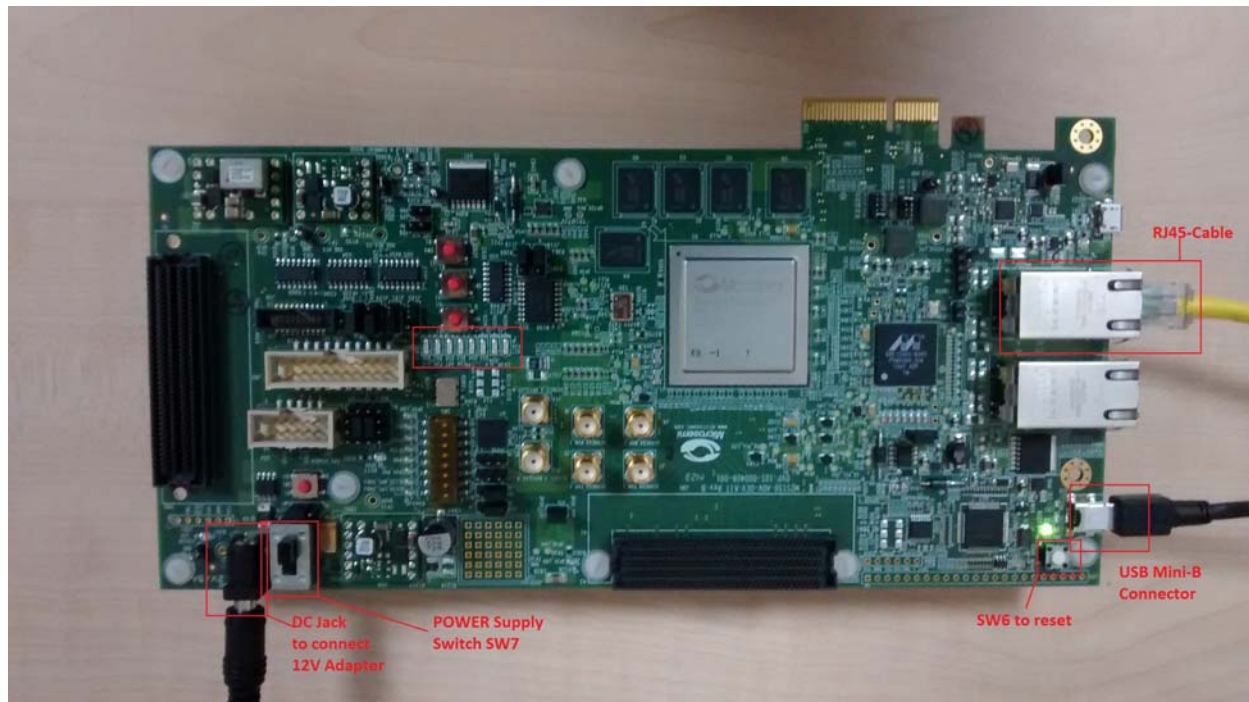
11. After running the demo, close the HyperTerminal window.

Note: To run the SoftConsole project in debug mode, see [Appendix: Running the SoftConsole Project in Debug Mode](#), page 28. To run the design from DDR memory, see [Appendix: Running the Design from DDR Memory](#), page 30.

3 Appendix: Board Setup for Running the Demo

The following figure shows the board setup for running the demo on the SmartFusion2 Advanced Development Board.

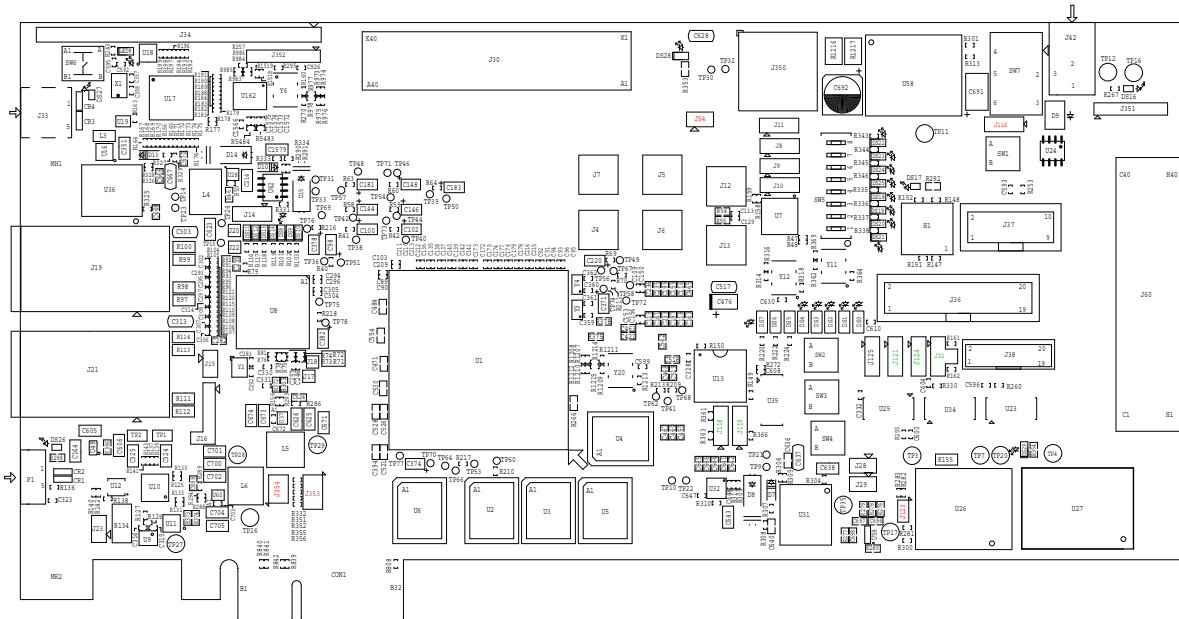
Figure 30 • SmartFusion2 Advanced Development Board Setup



4 Appendix: Jumper Locations

The following figure shows the jumper locations on the SmartFusion2 Advanced Development Board.

Figure 31 • SmartFusion2 Advanced Development Kit Silkscreen Top View



Note: Jumpers highlighted in red in the figure are set by default; jumpers highlighted in green must be set manually.

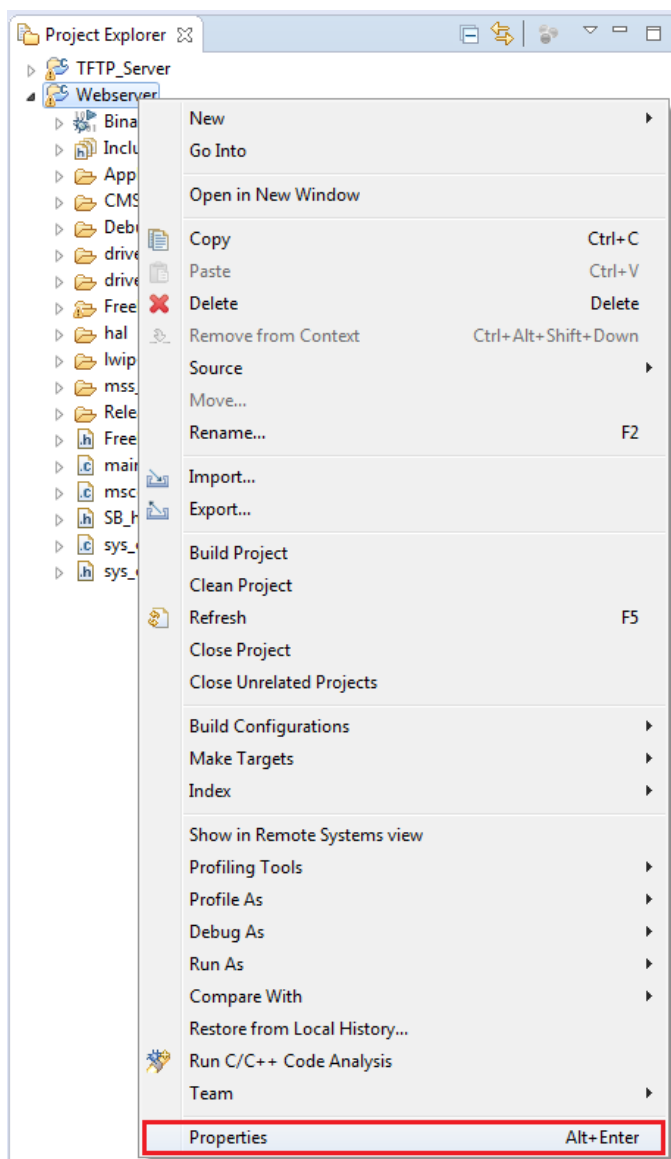
5 Appendix: Running the Design in Static IP Mode

The following steps describe how to run the design in static IP mode.

Note: This procedure provides steps to run the Webserver design. To run the TFTP server design, perform the same steps by selecting the TFTP_Server project in SoftConsole.

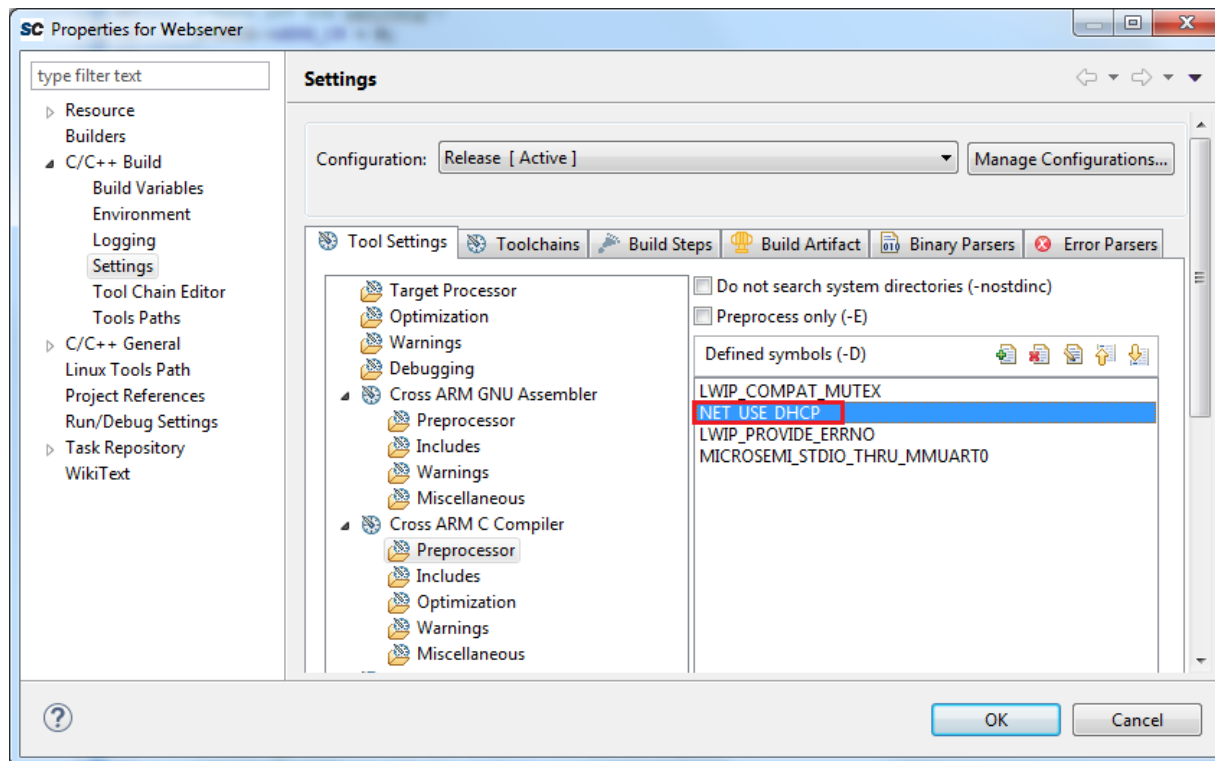
1. In SoftConsole Project Explorer window, right-click the **Webserver** project, and select **Properties**, as shown in the following figure.

Figure 32 • SoftConsole Project Explorer Window



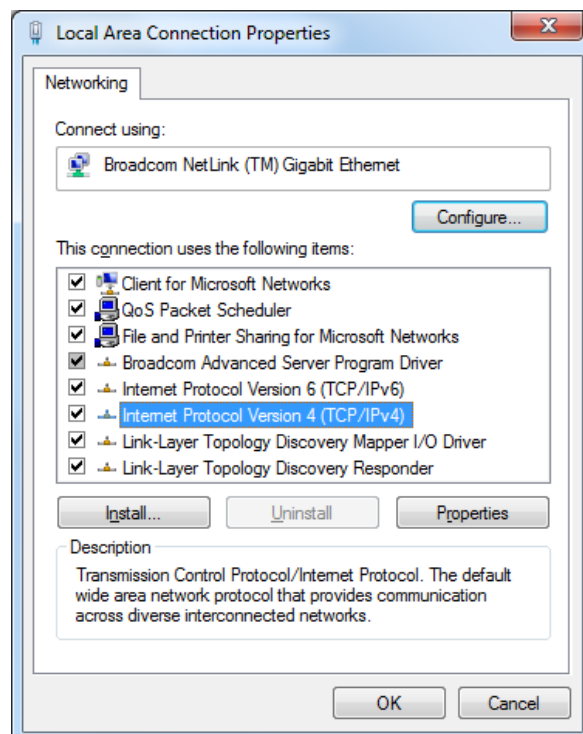
- In the Tool Settings tab of the Properties for Webserver window, remove the **NET_USE_DHCP** symbol, and click **OK**, as shown in the following figure.

Figure 33 • Webserver Properties Window



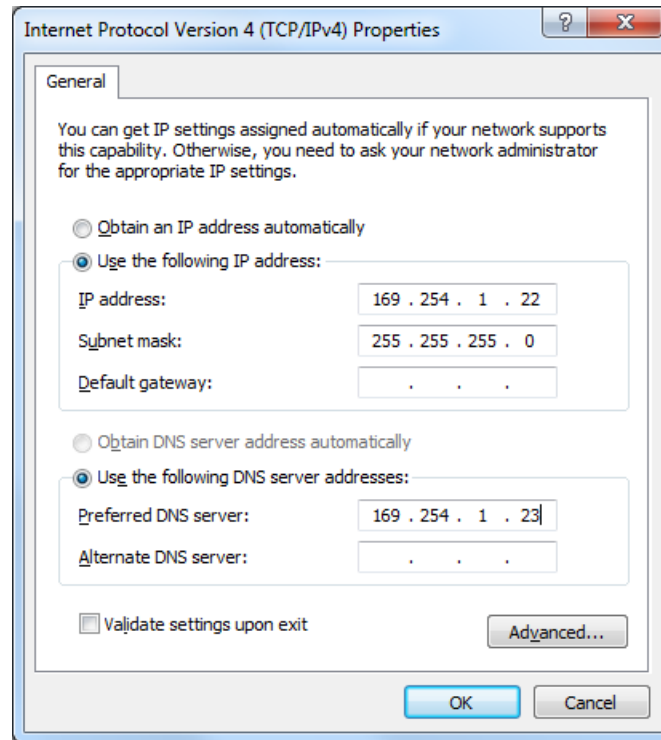
- Change the host TCP/IP settings to reflect the board's static IP address, 169.254.1.23. The following figure shows the host PC TCP/IP settings.

Figure 34 • Host PC TCP/IP Settings



The following figure shows static IP address settings.

Figure 35 • Static IP Address Settings



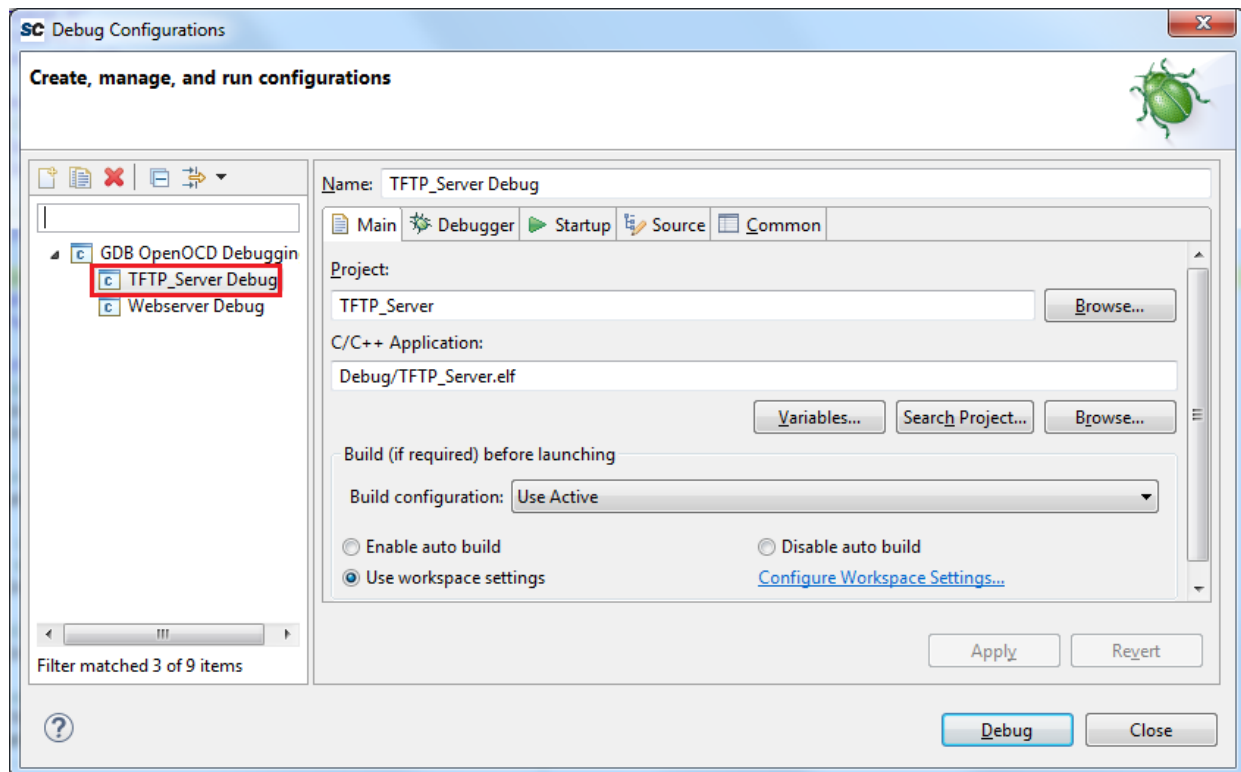
4. After configuring the settings, compile the design, load it into memory, and run it using SoftConsole.

6 Appendix: Running the SoftConsole Project in Debug Mode

The following steps describe how to run the SoftConsole project in debug mode.

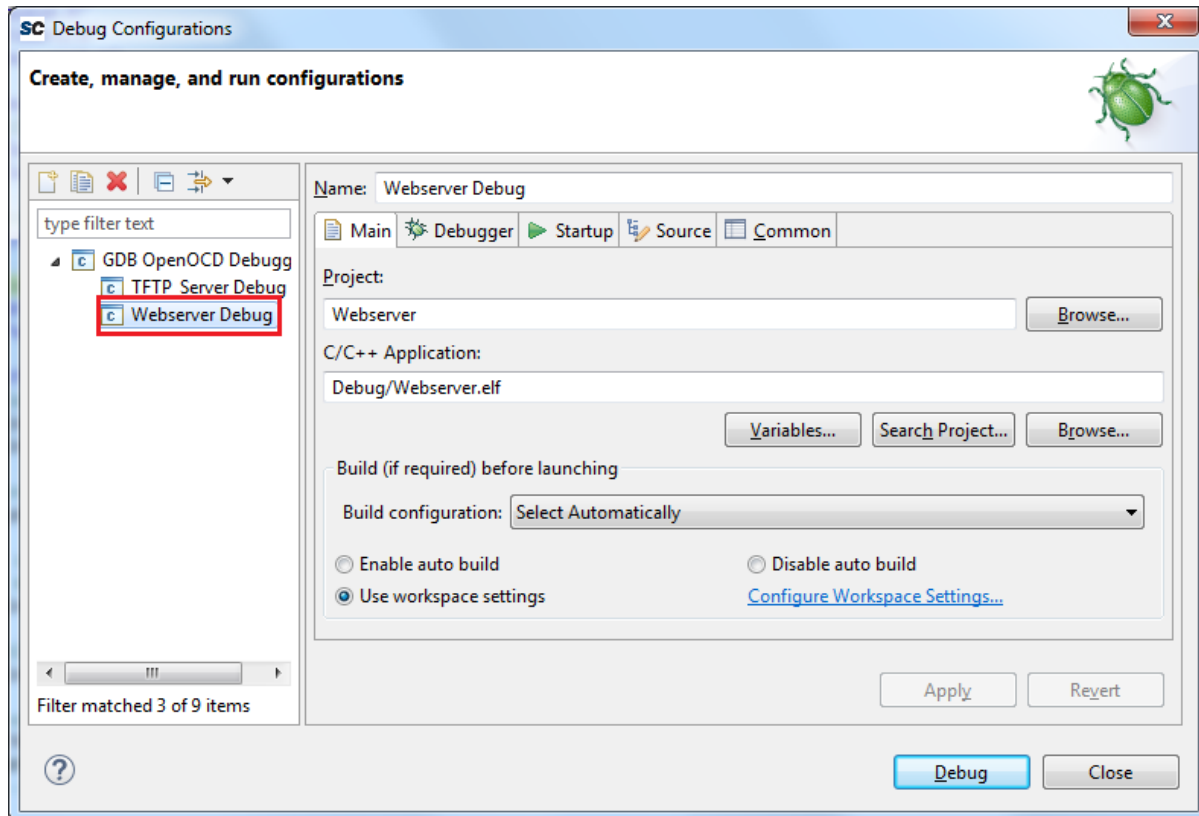
1. In SoftConsole, select **Run > Debug Configurations**.
The Debug Configurations dialog box is displayed.
2. Select the appropriate project:
 - To debug the TFTP_Server project, select **TFTP_Server Debug**, as shown in the following figure.

Figure 36 • Debug Configuration for TFTP_Server



- To debug the Webserver project, select **Webserver Debug**, as shown in the following figure.

Figure 37 • Debug Configuration for Webserver



3. Click **Debug**.

7 Appendix: Running the Design from DDR Memory

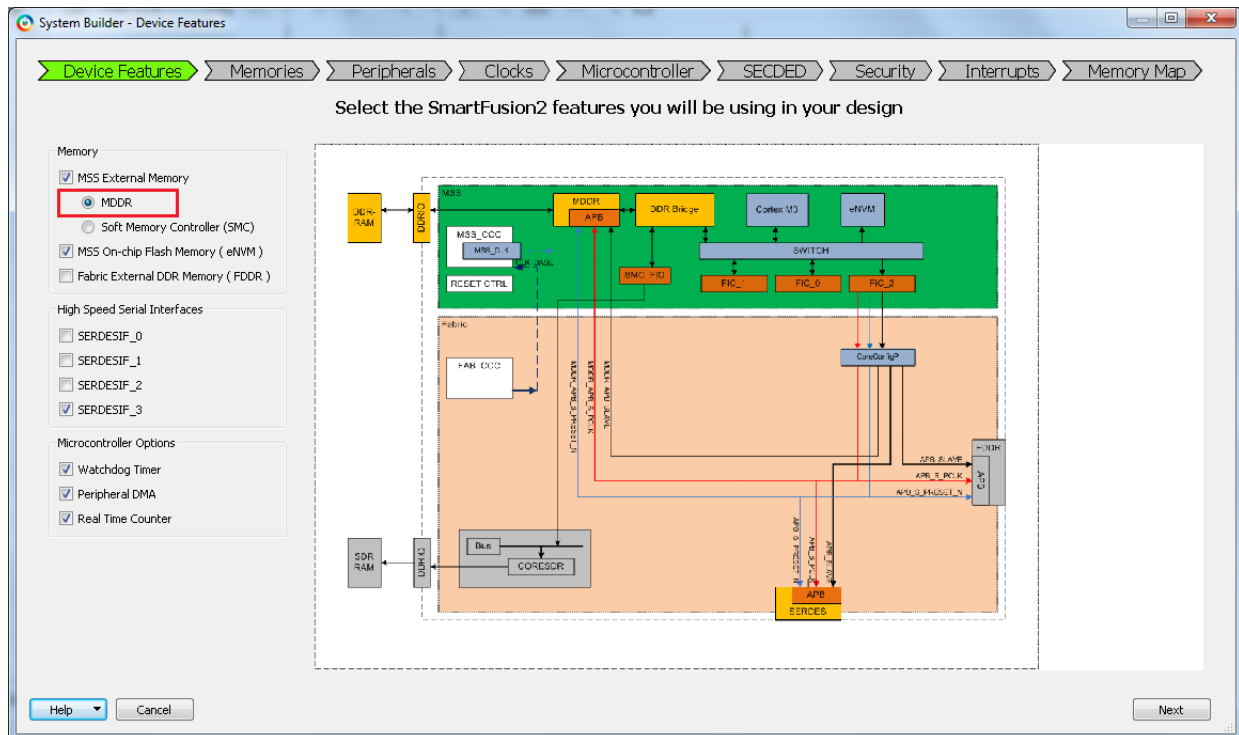
This appendix describes the changes to be made to the Libero SoC and SoftConsole projects in order to run the demo design from DDR memory.

7.1 Changes to Libero SoC Project

Open the project in Libero SoC, and perform the following steps.

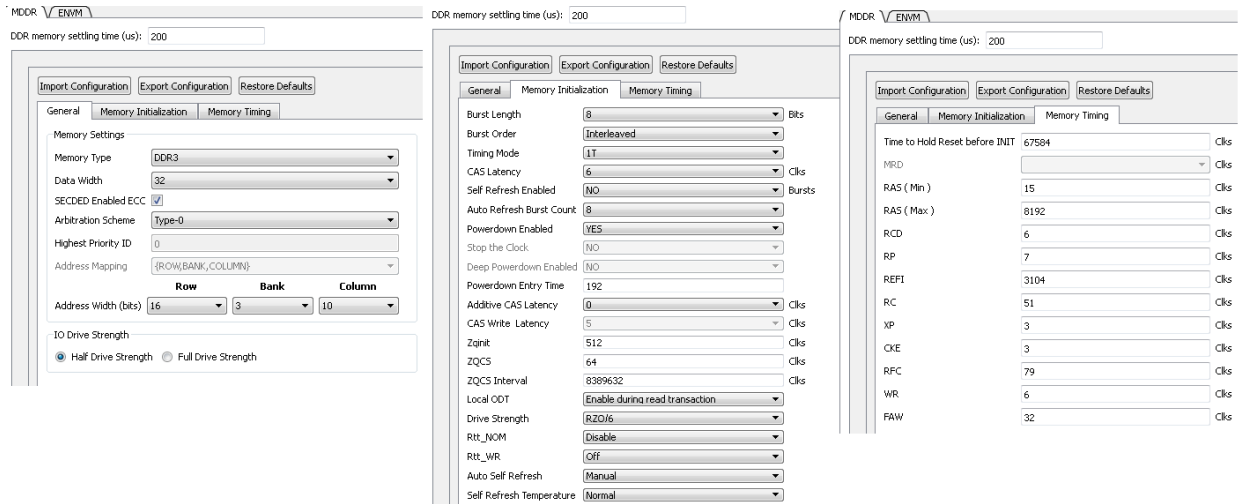
1. In the System Builder, enable MDDR, as shown in the following figure.

Figure 38 • System Builder Device Features



2. Configure the DDR3 settings as indicated in the following figure.
- Note:** The DDR configuration file, `DDR_Config.txt`, is available at:
`<download_folder>\SF2_Webserver_Tftp_TCP_Demo_DF\sample_files\DDR_Config\`

Figure 39 • System Builder Memories



Parameter	Value	Unit
Time to Hold Reset before INIT	67584	Cls
MRD		Cls
RAS (Min)	15	Cls
RAS (Max)	8192	Cls
RCD	6	Cls
RP	7	Cls
REFI	3104	Cls
RC	51	Cls
XP	3	Cls
CKE	3	Cls
RFC	79	Cls
WR	6	Cls
FAW	32	Cls

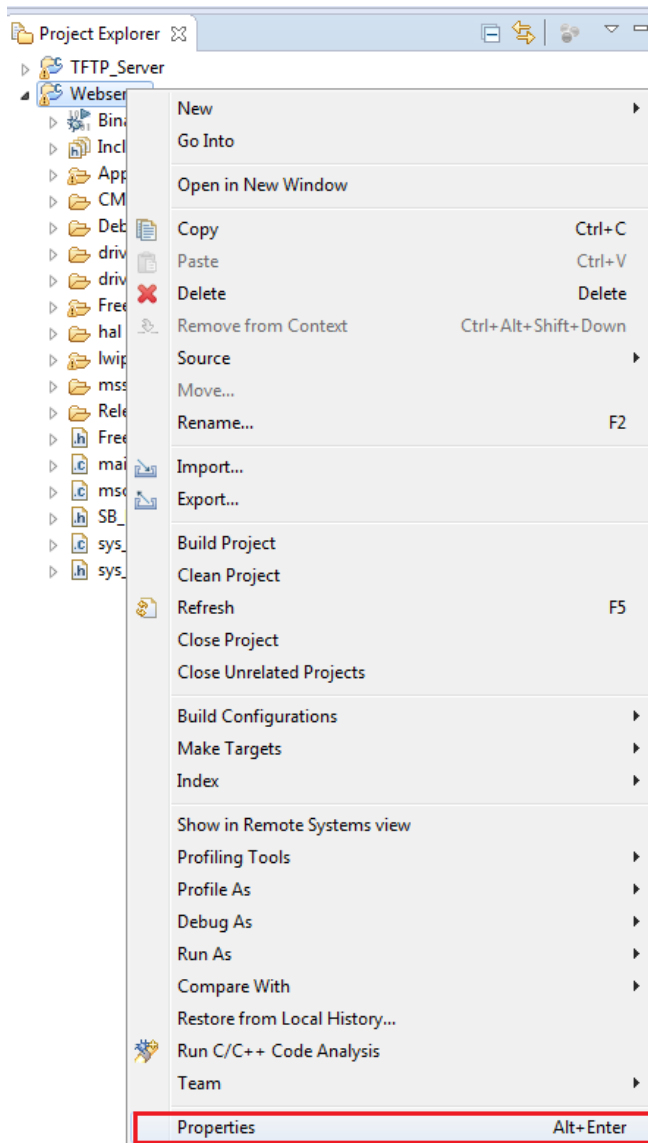
3. Generate the programming file, and program the board.

7.2 Changes to SoftConsole Project for Debug Mode

To run the project in debug mode, perform the following steps in SoftConsole.

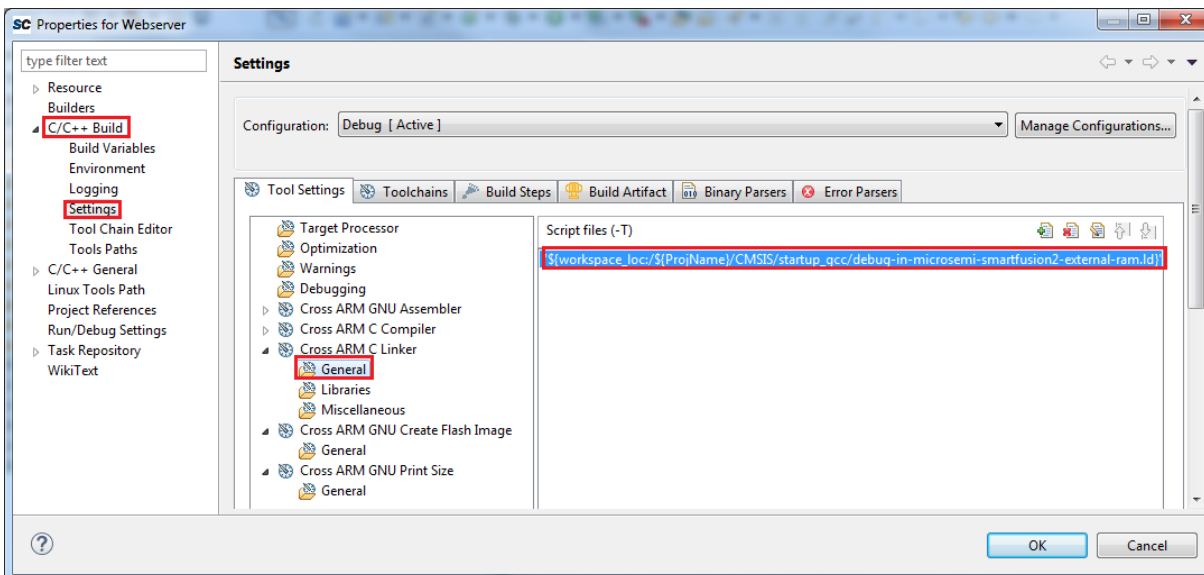
1. In the Project Explorer window, right click the **Webserver** project, and select **Properties**.

Figure 40 • Selecting Webserver Properties



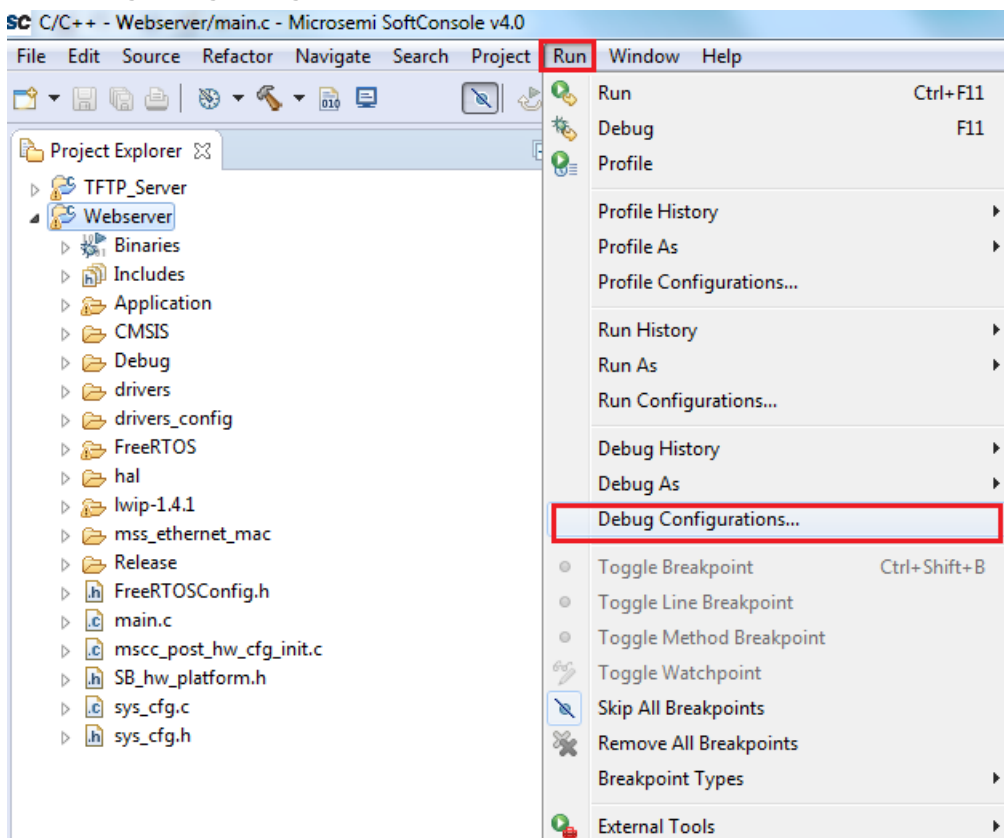
- Set the `debug-in-microsemi-smartfusion2-external-ram.ld` linker script file, as shown in the following figure.

Figure 41 • Setting the Script File



- Build the SoftConsole application, and select **Run > Debug Configurations**, as shown in below figure

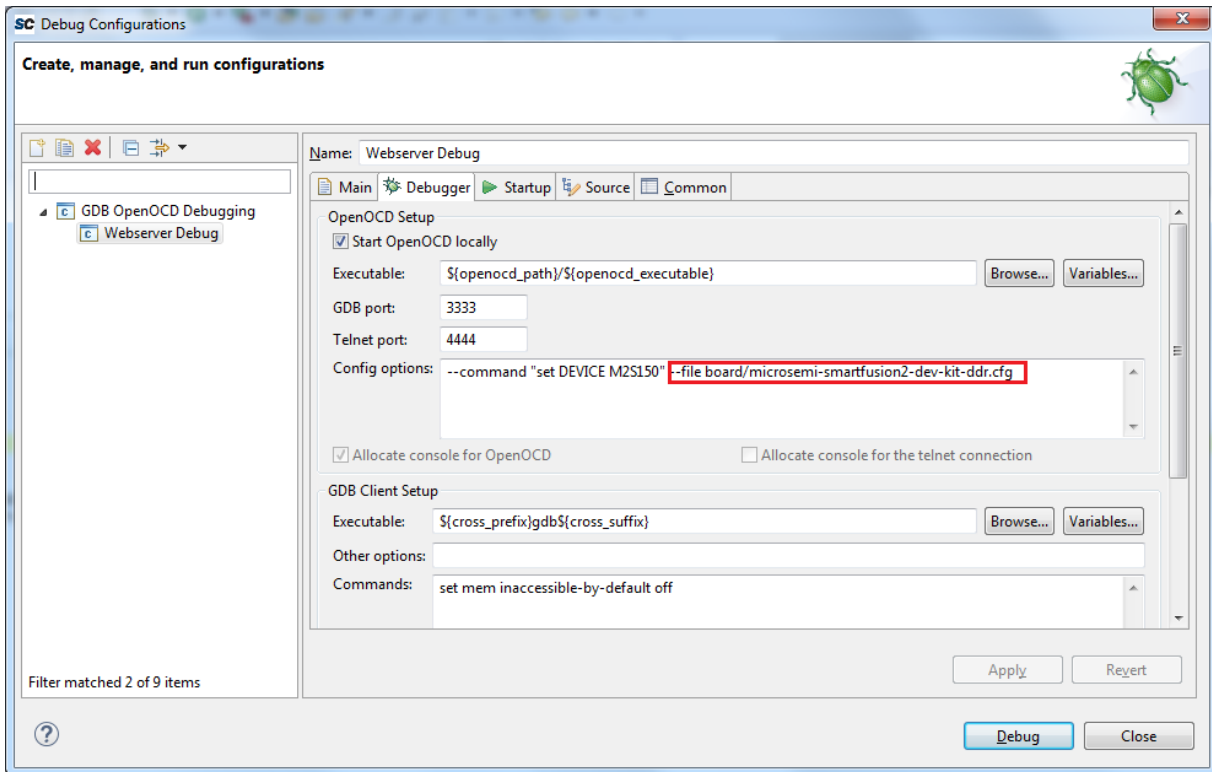
Figure 42 • Selecting Debug Configurations



- In the Debug Configurations window, go to the Debugger tab.

5. In the **config options** field, replace the existing value with `-file board/microsemi-smartfusion2-dev-kit-ddr.cfg`, as shown in the following figure.

Figure 43 • Debug Configurations Window



6. Click **Debug** to run the project from DDR memory in debug mode.