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Fusion Embedded Development Kit

Webserver Demo User's Guide

Actel
POWER MATTERS

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Introduction

Webserver Demonstration

The webserver design demonstrates the use of Actel's Fusion mixed-signal FPGA with an embedded ARM® Cortex™-M1 processor for power management and webserver support. This demo is designed for the Fusion Embedded Development Kit (M1AFS-EMBEDDED-KIT). The Webserver Demo design can be preprogrammed into the kit or can be programmed to the device using the programming file from the Actel website:

www.actel.com/download/rsc/?f=M1AFS_EMBEDDED_KIT_PF

This initial release of the design is for programming and demonstration only. The source files for the demo will be released with the next software version for Libero IDE, v8.6, and SoftConsole v2.3, by the end of July 2009.

Webserver Demo Requirements

Standalone PIO Mode

- M1AFS-EMBEDDED-KIT board
- USB cable for power
- Second USB cable if device needs to be programmed

Webserver Mode

- Ethernet connection or loopback cable

Cortex-M1–Enabled Fusion Embedded Kit

The Fusion Embedded Development Kit board is intended to provide a low-cost embedded system management platform for evaluating the Fusion FPGA advanced features, such as mixed-signal and embedded processor development. The Fusion FPGA on this kit is M1-enabled for ARM Cortex-M1 or Core8051s embedded processor development. In addition, the Fusion Embedded Development Kit board consists of a variety of features for mixed-signal applications, such as voltage sequencing, voltage trimming, gaming, motor control, temperature monitor, and touch screen.

For a detailed description of board-level components, refer to the *Fusion Embedded Development Kit User's Guide*.

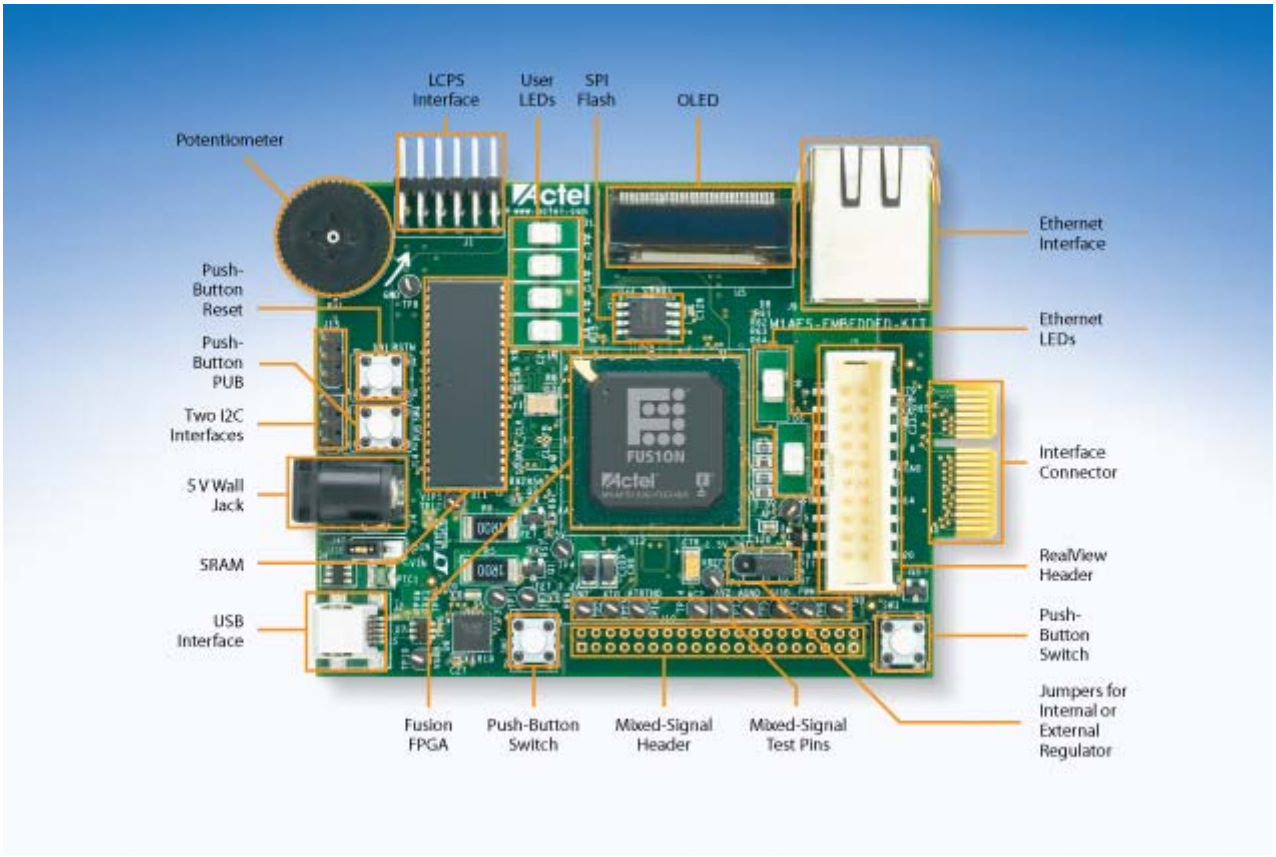

Figure 1 · Fusion Embedded Development Kit Top View

Webserver Demo Block Diagram

The following simplified block diagram shows the main features of the Webserver Demo Design and its connections to the Fusion Embedded Development Kit. The blocks inside the M1AFS1500 FPGA block are Actel IP cores and SmartDesign components. All IP used in the design is available for use with the Libero IDE Gold license provided with the development kit

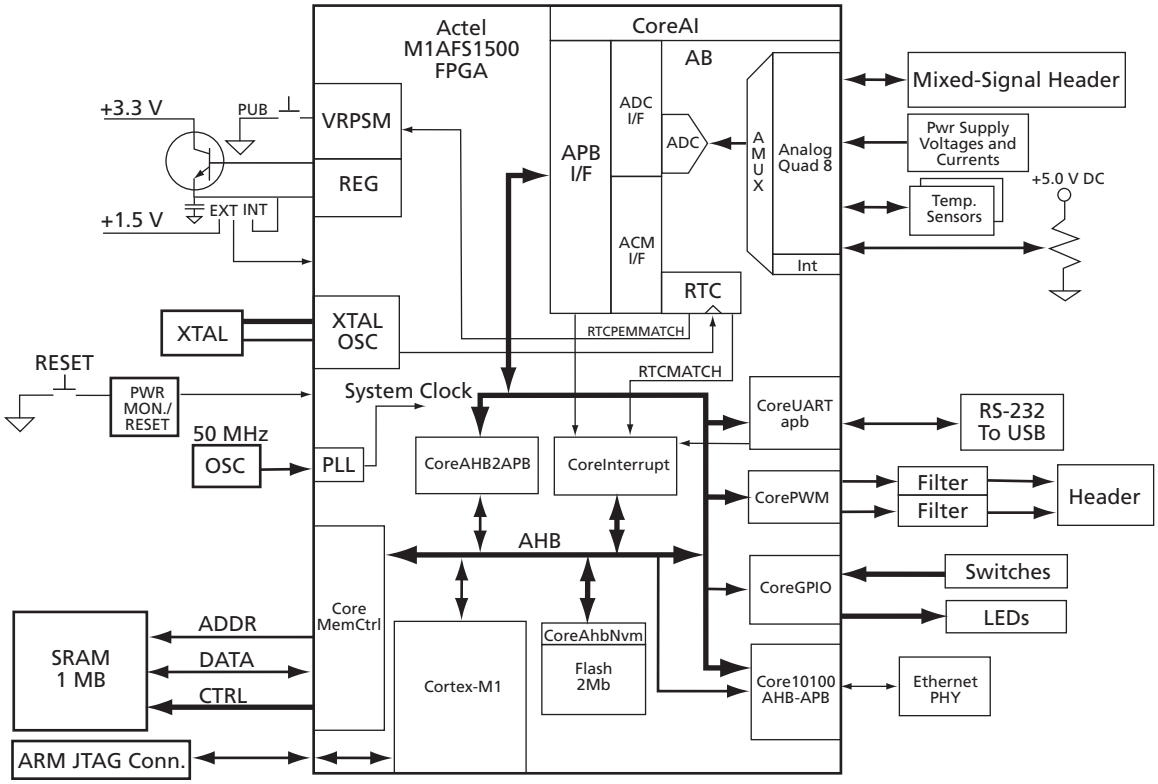

Figure 2 · Webserver Demo Block Diagram

2 Running the Demo

Design Example

The Webserver demonstration design example demonstrates the functionality of the Cortex-M1 processor, Fusion FPGA device, and the various IP cores, including Core10/100 Ethernet MAC, CoreAI, CoreI2C, CorePWM, CoreTimer, CoreGPIO, CoreInterrupt Controller, CoreNVM, CoreAHBSRAM, CoreMemCtrl, and CoreRemap.

The demonstration runs in the following modes:

- PIO Mode
- Webserver

For each of these modes, a basic overview and discussion of operation is given.

Jumper and Switch Settings

Connect the jumpers using the default jumper connections shown in Table 2-1 to enable the pre-programmed demo design to function correctly.

Table 2-1 · Jumper Settings

Jumper	Setting	Comment
JP10	Pin 1-2	Jumper to select either 1.55 V external regulator or Fusion 1.5 V internal regulator. Pin 1-2 = 1.5 V internal Pin 2-3 = 1.5 V external
J40	Pin 1-2	Jumper to select power source. Pin 3-2 = 5 V power block Pin 1-2 = USB

The design can be run in two modes: PIO mode and Webserver mode. On device reset, a menu appears on the organic light-emitting diode (OLED). The options available in this menu are:

- PIO – SW2
- Webserver – SW3

Webserver Demo in PIO Mode

PIO Mode Options

The Webserver demo design in PIO mode includes the modes described below.

Multimeter Mode

Using this mode, you can measure voltage, current, external and internal temperature of FPGA on the board. The voltage, current, and external as well as internal temperature are read over analog channels from the CoreAI (analog interface). The measured readings are displayed on the OLED display. Voltage and current are measured on the AC4 channel (potentiometer), the external temperature is measured from on-board temperature diode, and the internal temperature is measured from diode inside the FPGA.

DAC Mode

Using digital-to-analog conversion (DAC) mode, you can generate an analog signal and measure its voltage. The analog signal is generated with the help of PWM and a low pass filter. Digital values are read from the potentiometer, and the duty cycle of the PWM is set accordingly. The varying duty cycle of the PWM channel generates analog signals in low pass filter.

Note: You can vary the input voltage to the low pass filter with the potentiometer.

VIT Auxiliary Mode

Auxiliary mode is almost same as Multimeter mode. You can measure voltage, current, and external temperature. Inputs are supplied from the external source.The external voltage is read at AV2 and AV5 channels and the readings are displayed on the OLED display. User need to input supply to this channels from external source to test point or mixed signal header on the board. The external temperature is read from the thermistor connected at AT4. Current is read between AV5 and AC5.

Note: Do not supply more than 2 V at AV5. Do not supply more than 8 V at AV2. If no external inputs are supplied, the results in this mode will be incorrect, but the remainder of the demo will work without this.

Self Wakeup Mode

Use this mode to put the FPGA device into sleep mode. After 5 seconds, the FPGA device comes out of sleep mode and the status is indicated on the LED (D2) of the board.

Optional Hardware Setup for Auxiliary Mode

Before running the Webserver demo in PIO mode, follow the steps below to complete the hardware setup.

1. Connect the voltage source of 0 to 8 V at AV2 and AV3.
2. Connect the GND (Ground) channel of the board to an external voltage source GND (ground); otherwise it will not show the correct reading.
3. Connect the EPCOS 100 k NTC thermistor at AT4 on the board.
4. Confirm the jumper position of JP10 from external to internal voltage.
5. To measure auxiliary current through AC5, connect the 1Ω1% register between AV5 and AC5. Apply 1.5 V at AV5.

Notes:

1. Do not apply more than 2 V at AV5.
2. Do not use a voltage range of more than 2 V at AV5 and 8 V at AV2 for auxiliary mode.
3. This demo design uses an EPCOS 100 k NTC thermistor for temperature measurement. All calculation is based on this thermistor. You may not get the correct temperature reading if you are using a different thermistor. In such case, you must modify the source code for the correct measurement.

Operation

Webserver demo in PIO mode works in the modes described below. The first time SW2 is pressed, the OLED will display M1AFS EMBEDDED KIT after the demo can be run. The demo can be run using push-button switches SW2 and SW3. SW2 drives the main menu option whereas SW3 drives the submenu options.

1. Press SW2 to access the main menu. The OLED displays following main menu options:
   - Multimeter mode (press SW2 once for Multimeter mode)
   - DAC mode (press SW2 two times for DAC mode)
   - Auxiliary mode (press SW2 three times for Auxiliary mode)
   - Self Wakeup mode (press SW2 four times for Self Wakeup mode)

2. Press SW3 to access the submenu. The OLED displays following submenu under main menu:
   - Multimeter mode

     Voltage measurement (press SW3 once while you are in Multimeter mode)

     Current measurement (press SW3 two times while you are in Multimeter mode)

     External temperature measurement (press SW3 three times while you are in Multimeter mode)

     Internal temperature measurement (press SW3 four times while you are in Multimeter mode)
   - DAC mode

     Voltage measurement at Potentiometer (press SW3 once while you are in DAC mode)

     Voltage measurement at DAC (press SW3 two times while you are in DAC mode)
   - Auxiliary mode

     Voltage measurement at AV2 (press SW3 once)

     Voltage measurement at AV3 (press SW3 two times, while you are in Auxiliary mode)

     External temperature measurement at AT4 (press SW3 three times while you are in Auxiliary mode)

     External current measurement at AC5 (press SW4 three times while you are in Auxiliary mode)
   - Self Wakeup mode

Running Webserver Demo Design in PIO Mode

To run the Webserver demo design in PIO mode:

1. Download the programming file from www.actel.com/download/rsc/?f=M1AFS_EMBEDDED_KIT_PF. After programming, remove FlashPro and power up the board again. The board boots up with the design and you will see the default message on the OLED (Figure 2-1).

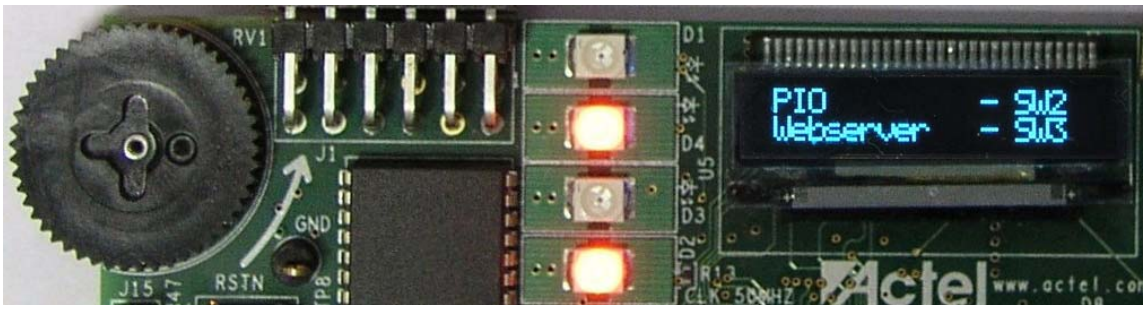

Figure 2-1 · Mode Selection

2. Press **SW2** to run the demo in PIO mode.

3. You will see the message, “ACTEL M1AFS Embedded Kit” displayed on the OLED (Figure 2-2).

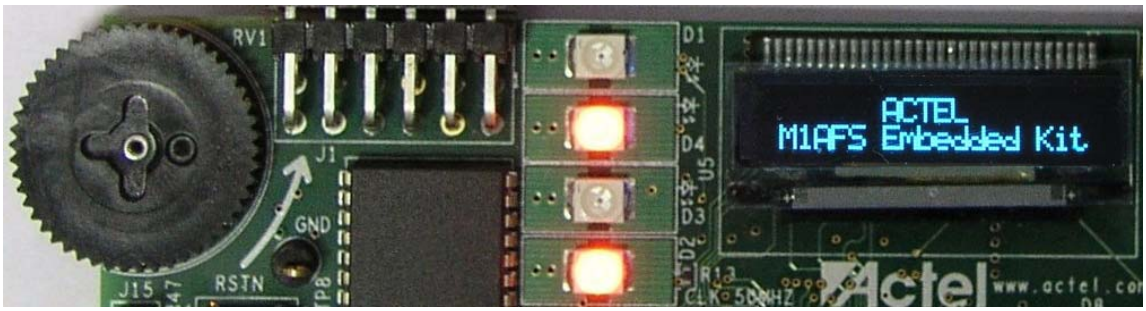

Figure 2-2 · Startup Message

4. Press **SW2** to select Multimeter mode (Figure 2-3).

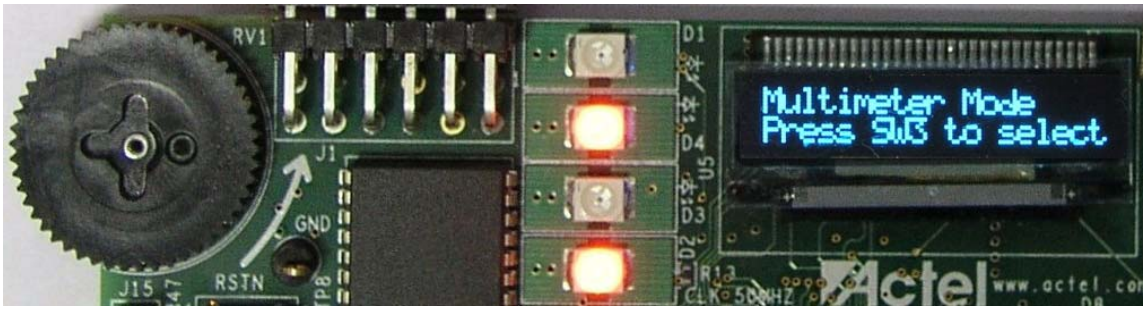

Figure 2-3 · Multimeter Mode Selection

5. Press **SW3** to see the voltage measurement of potentiometer. The OLED displays measured voltage from CoreAI (Figure 2-4).

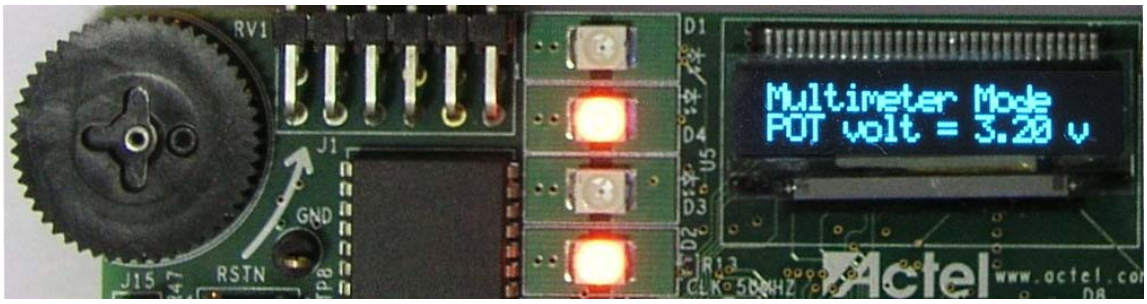

Figure 2-4 · Multimeter Mode – Potentiometer Voltage Measurement

6. Change the potentiometer resistance to see its effect on voltage measurement and the results on the OLED.

7. Press **SW3** to check the current flowing through the potentiometer and see the results on the OLED (Figure 2-5).

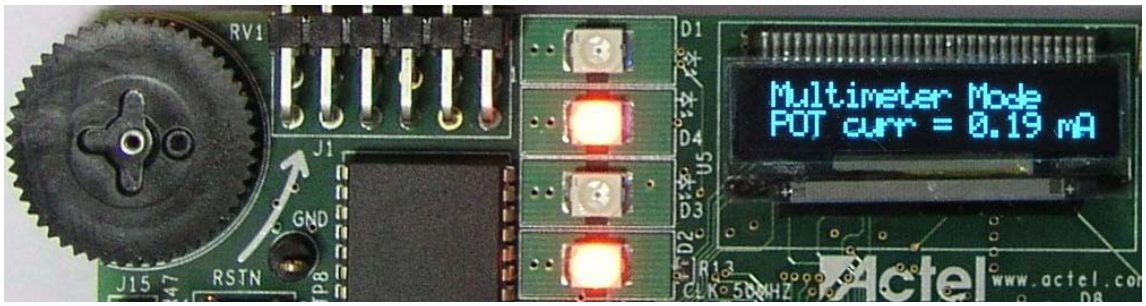

Figure 2-5 · Multimeter Mode – Current Measurement

8. Press **SW3** again to seethe external and internal temperature and examine the results on the OLED (Figure 2-6 and Figure 2-7).

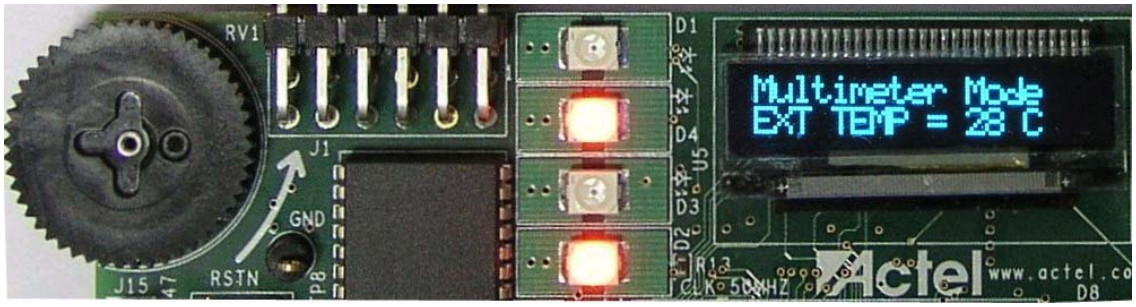

Figure 2-6 · Multimeter Mode – External Temperature Measurement

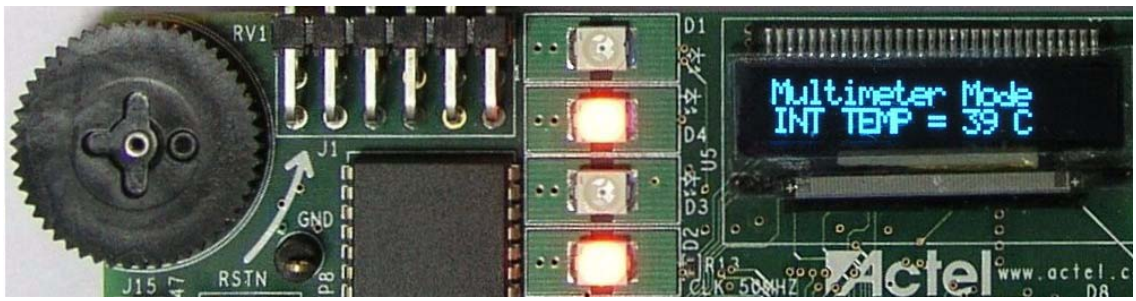

Figure 2-7 · Multimeter Mode – Internal Temperature Measurement

9. Press **SW2** to enter DAC mode (Figure 2-8).

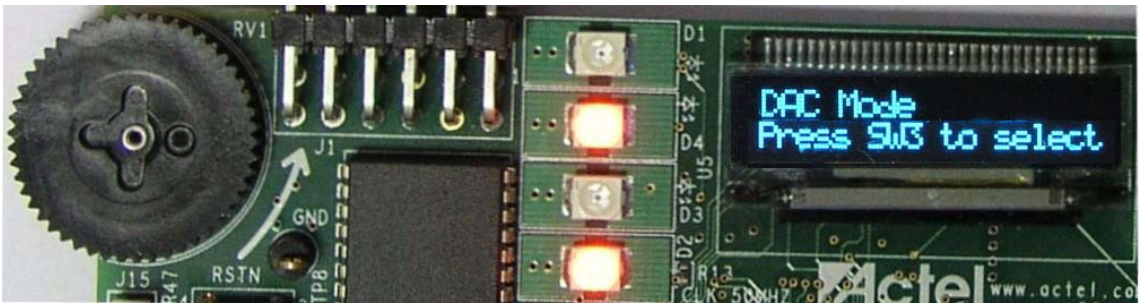

Figure 2-8 · DAC Mode

10. Press **SW3**. The OLED displays voltage reading from the potentiometer (Figure 2-9).

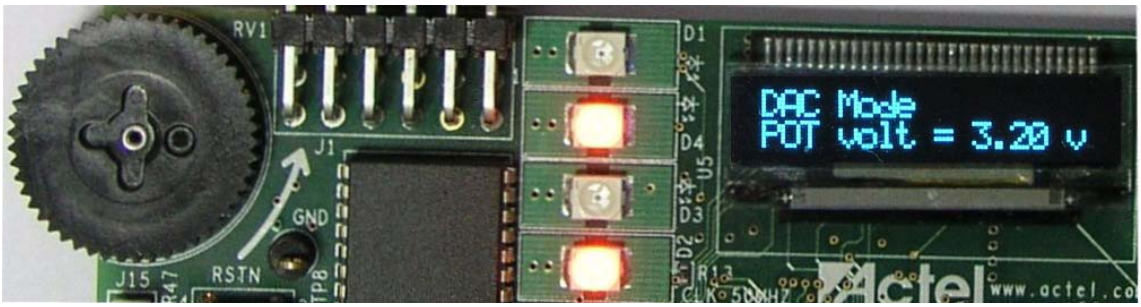

Figure 2-9 · DAC Mode – Potentiometer Voltage Measurement

11. Press **SW3**. The OLED displays voltage reading from the DAC (Figure 2-10).

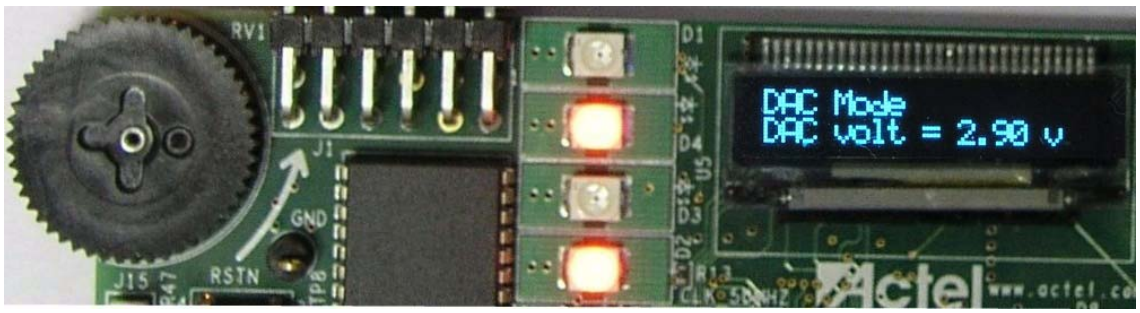

Figure 2-10 · DAC Mode – DAC Voltage Measurement

DAC input comes from the potentiometer. Whenever you change the resistance of the potentiometer, you will see the change in DAC output.

12. Press **SW2** to enter Auxiliary mode (Figure 2-11).

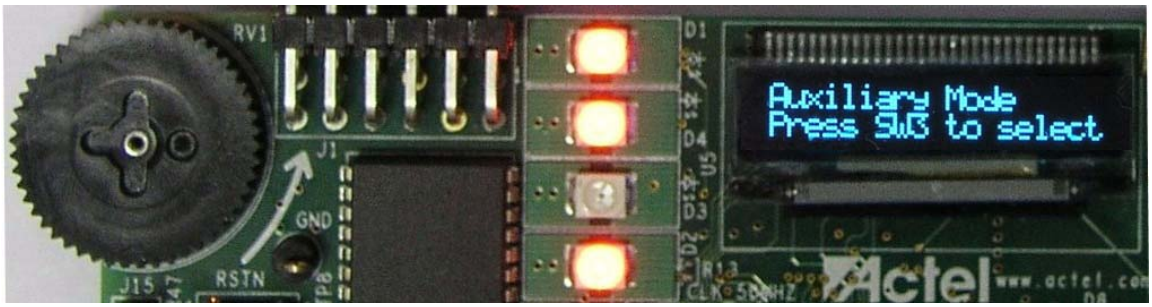

Figure 2-11 · Auxiliary Mode – Default Scroll Message

13. Press **SW3** to see the voltage measurement at the AV2 channel and the results on the OLED (Figure 2-12).

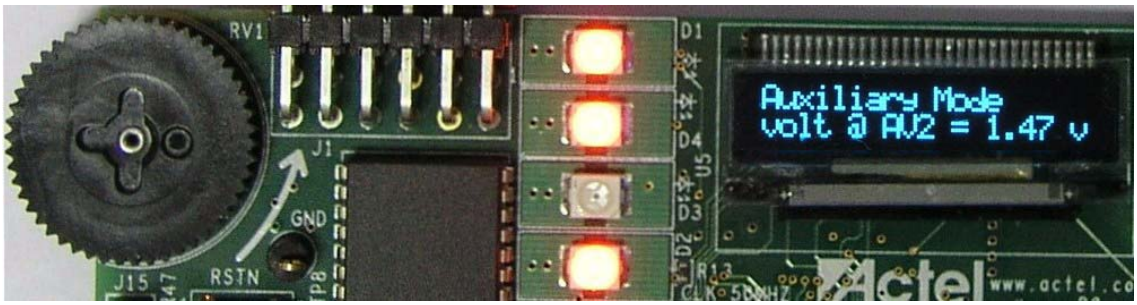

Figure 2-12 · Auxiliary Mode – Voltage Measurement at AV2 Channel

14. Press **SW3** again to see the measured voltage at the AV5 channel on the OLED (Figure 2-13).

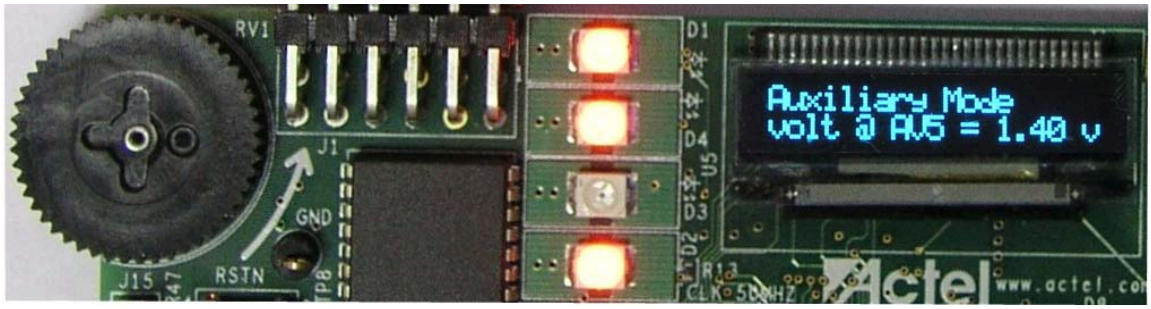

Figure 2-13 · Auxiliary mode – Voltage Measurement at AV5 Channel

15. Press **SW3** again to see the external temperature measurement from the Thermistor at the AT4 channel (Figure 2-14).

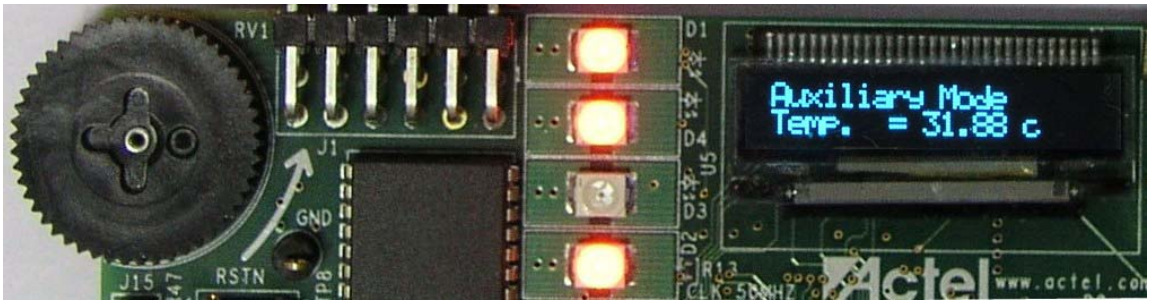

Figure 2-14 · Auxiliary Mode – External Temperature from Thermistor at AT4 Channel

16. Press **SW3** to see the external current measured at the AC5 channel (Figure 2-15).

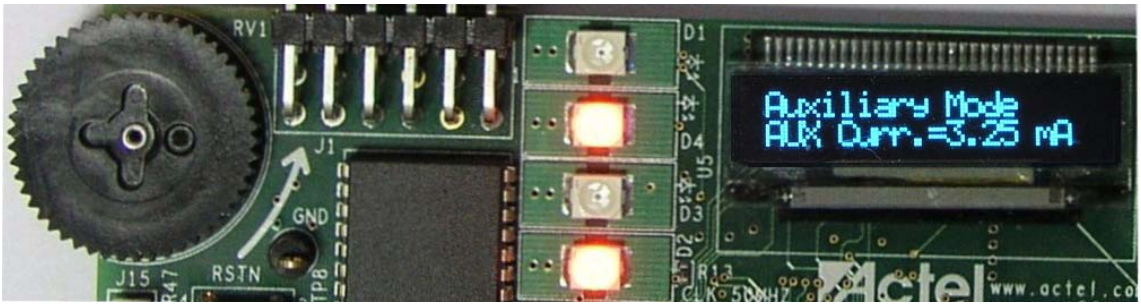

Figure 2-15 · Auxiliary Mode – Current Measurement

17. Press **SW2** to enter Self wake up mode. See Figure 2-16.

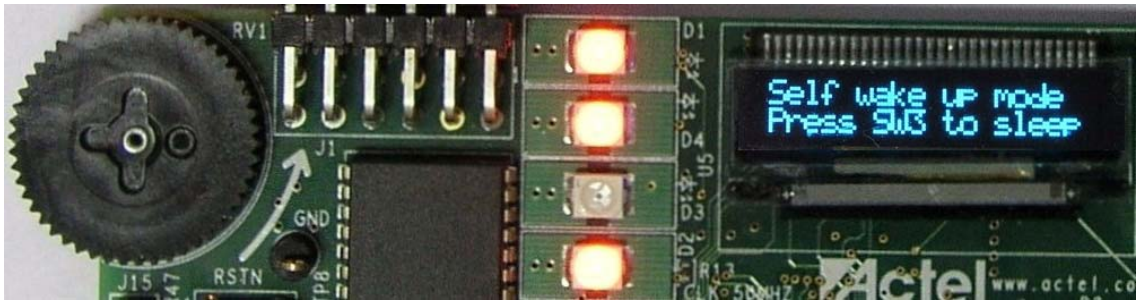

Figure 2-16 · Self Wake Up Mode – Sleep Mode

18. Press **SW3.** This will put the FPGA device into sleep mode. This time LED D2 is off. After 5 seconds LED D2 starts glowing, it indicates FPGA is in Wakeup state and it is powered up.

    Make sure that flash programmer is not connected to the board.

M1AFS Demonstration Design in Webserver Mode

The design example in Webserver mode demonstrates the functionality of Cortex-M1 and Core10/100 ethernet MAC along with some other IPs. It provides a web interface between the board and PC. Webserver mode includes the options described in the following sections.

Webserver Mode Options

Multimeter Mode

Using this mode, you can measure voltage, current, and external and internal temperature of the FPGA on the board. The voltage, current, and temperatures are read over analog channels from the CoreAI (Analog Interface). The measured readings are displayed on the OLED display. Voltage and current are measured on the AC4 channel (potentiometer), the external temperature is measured from an on-board temperature diode, and internal temperature is measured from diode inside the FPGA.

DAC Mode

Using this mode, you can generate an analog signal and measure its voltage. The analog signal is generated with the help of PWM and a low pass filter. Digital values are read from the potentiometer and the duty cycle of the PWM is set accordingly. The varying duty cycle of the PWM channel will generate analog signals in low pass filter.

Note: You can vary the input voltage to the low pass filter with potentiometer.

VIT-Auxiliary Mode

VIT-Auxiliary mode is nearly the same as Multimeter mode. You can measure voltage, current, and external temperature. Inputs are supplied from the external source. The external voltage is read at the AV2 and AV5 channels and the readings are displayed on the OLED display. You must supply input for these channels from an external source to a test point or mixed-signal header on the board. The external temperature is read from the thermistor connected at AT4.

Note: Do not supply more than 2 V at AV5. Do not supply more than 8 V at AV2.

Text Terminal Mode

Use this mode to display the string sent from the web browser on the OLED.

Waveform Mode

This mode is used to generate several types of waveforms. The generated waveform is displayed on the OLED display and the same waveform signal is available at test points. You can also send these signals to CRO (cathode ray oscilloscope). Change the frequency of waveform from the web interface. This mode supports sine, triangular, square, and sawtooth waveforms with five different levels of frequencies, including the default frequency level.

Self-Wakeup Mode

This is the power-saving mode of the device. Use this mode to put the FPGA device into sleep mode. After five seconds, the FPGA device exits sleep mode and the status is indicated on the LED D2 of the board.

Stock Ticker Mode

This mode displays the live stock updates of NASDAQ stock market.

Note: To use this mode, Internet connection is required. This mode is not accessible if you connect the board directly to a PC. In some networks, stock market type websites are not permitted.

Sleeping Stopwatch Mode

This mode is nearly the same as the Self-Wakeup mode. In this mode, however, the device will not wake up automatically. Before entering sleep mode, the contents of the RTC counter are saved in NVM (nonvolatile memory)

and after rebooting, this contents is reloaded into the RTC. To wake up the device manually, press the PUB (power-up bar) button.

Real Time Data Display Mode

This mode displays the statistical information of the board. It shows the reading of all channels that are included in previous modes, along with the packets transmitted and received.

Gadgets Mode

This mode displays various gadgets, such as a clock, calender, and zip look-up.

Note: Internet connection is required for this mode.

Optional Hardware Setup for Auxiliary Mode

Before running the Webserver demo, follow the steps below to set up the hardware.

1. Connect the voltage source of 0 to 8 V at AV2 and 0 to 2 V at AV5.
2. Connect the GND channel of the board to an external voltage source GND (ground); otherwise it will not show the correct reading.
3. Connect the EPCOS 100 k NTC thermistor at AT4 on the board.
4. Confirm the jumper position of JP10 from external to internal voltage.
5. Plug an RJ45 ethernet LAN cable to the board. If you want to run the demo by directly connecting the board to PC, use an RJ45 crossover cable.

Notes:

1. Do not use a voltage range greater than 2 V at AV5 and 8 V at AV2 for VIT-auxiliary mode.
2. This demo design has used an EPCOS 100 k NTC thermistor for temperature measurement. The entire calculation is based on this thermistor. You may not get the correct temperature reading if you are using a different thermistor. In such case, you must modify the source code for the correct measurement. Application note AC299 describes the usage of external resistive temperature detectors (RTD) with Fusion devices and offers a method for calculating correct resistance and voltage conversion factors.
3. The LAN with DHCP server is preferred, but it can function even if a DHCP server in LAN is not available. The board will assign an IP address of 192.168.0.14 IP to itself in the absence of a DHCP server.

   You must make sure this IP address has not been used by anyone in the LAN. To do so, ping 192.168.0.14. This starts the demo if there is no reply from this IP address.

   If you receive a reply from this IP address, it is in use by another device on the LAN. To run the demo, connect the board to your PC directly with a crossover cable.
4. Some DHCP servers require the MAC address before assigning the IP address.The MAC address used here is C0:B1:3C:88:88:88. This MAC address should be available in the list on the DHCP server if the DHCP server requires a MAC address.
5. This demo will work in almost all browsers, but Mozilla FireFox is preferred for best results.

Note: The DAC output will not follow the potentiometer correctly at higher voltages. Full scale voltage generated at DAC in the demo design is 2.9 V. Voltage generated at DAC depends on the board and system design. For more information, refer to http://www.actel.com/products/hardware/devkits_boards/fusion_embedded.aspx.

Running the Webserver Demonstration

The Webserver demonstration can be run with the following network configurations:

- LAN with DHCP Server
- LAN without DHCP Server

The section below explains how to run the demo design in both configurations.

Running the Webserver Demonstration on a LAN with a DHCP Server

To run the Webserver demonstration on a LAN with a DHCP server, follow the steps below:

1. Download the programming file from www.actel.com/download/rsc/?f=M1AFS_EMBEDDED_KIT_PF.
2. The board is programmed with the webserver reference design.
3. Remove USB mini cables connected to the programmer and board.
4. Connect the Ethernet cable (RJ45) to the board.
5. Plug the USB mini cable into the board to power up the board.
6. Make sure that J5.1 is not connected to GND, as these pins are used to remap SRAM and flash.
7. Press the Reset button.
8. The board boots up and the OLED displays the message “Actel” on the first line and the “M1AFS Embedded Kit” on the next line.
9. The board requests a DHCP IP address.
10. Wait for a few seconds.
11. The OLED displays the DHCP IP address, as shown in Figure 2-17.

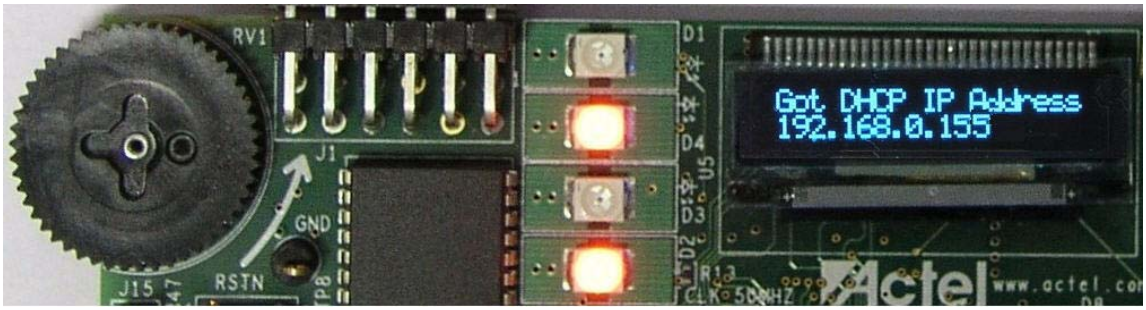

Figure 2-17 · DHCP IP Address Received

12. Verify the network connection with the following command to run the webserver demonstration.
    Example:
    `ping <DHCP IP address>`
    where DHCP IP address is a variable containing the DHCP IP address received from the DHCP server.

13. If you do not receive a reply from ping, the webserver is not connected.

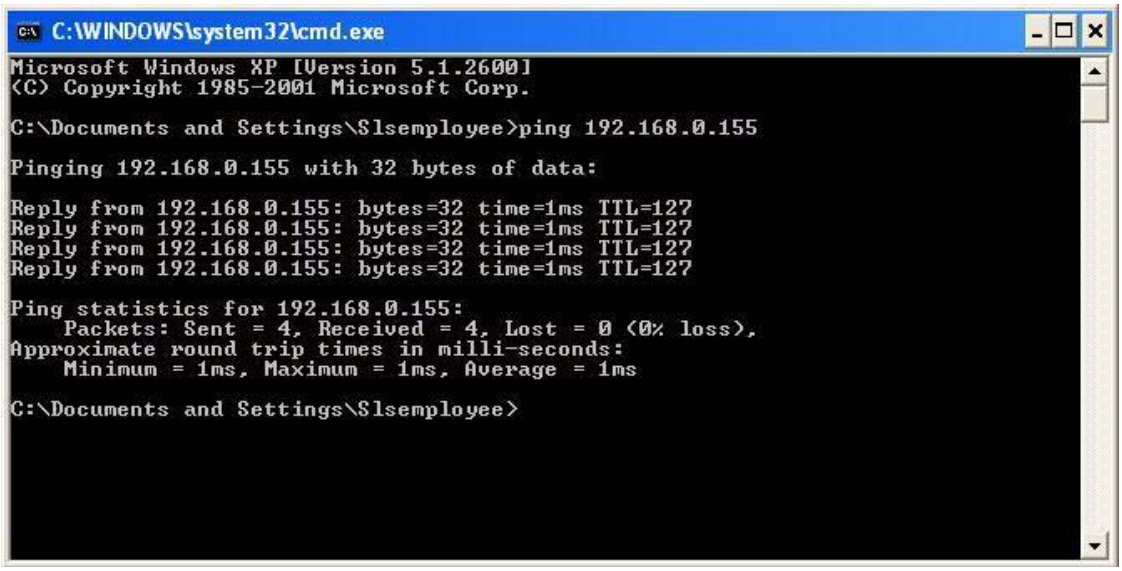

Figure 2-18 · DHCP IP Address

14. Type the DHCP IP address in the URL of your browser. For example, **`http://192.168.0.155`**

15. The Webserver home page with various demonstration modes displays in the browser (Figure 2-19).

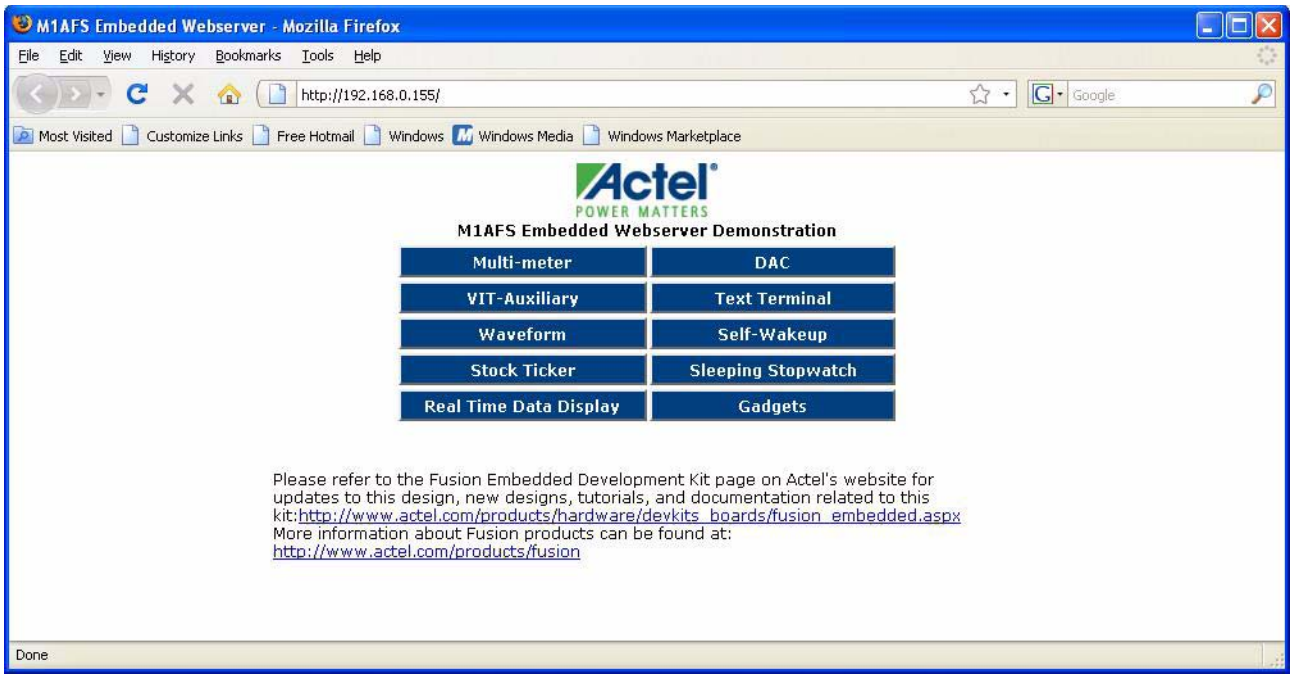

Figure 2-19 · Home Page

16. To run the Webserver \demonstration in different modes, refer to "Demonstration Modes" on page 23.

Running Webserver Demonstration on a LAN without a DHCP Server

To run the Webserver demonstration on a LAN without a DHCP server, follow the steps below:

1. Download the file fusicle_ref_des_m1afs1500_top.pdb on the board from the *Acteldemo_designs\LiberoProject\ fusicle_ref_des_m1afs1500\ designer\impl5* folder.
2. The board is programmed with the webserver reference design.
3. Remove the USB mini cables connected to the programmer and board.
4. Connect one end of the ethernet crossover cable to the board and the other end to your PC's Ethernet port.
5. Plug the USB mini cable into the board to power it up.
6. Make sure that J5.1 is not connected to GND, as these pins are used to remap SRAM and flash.
7. Press the Reset button.
8. The board boots up and the OLED displays the message "Actel" on the first line and the "M1AFS Embedded Kit" on the next line.
9. Wait for a few seconds. The board checks for a DHCP server, if any.

10. As there is no DHCP server available, the OLED displays “NO DHCP, My Static IP” on the first line, and the webserver default IP address, 192.168.0.14, on the second line (Figure 2-20).

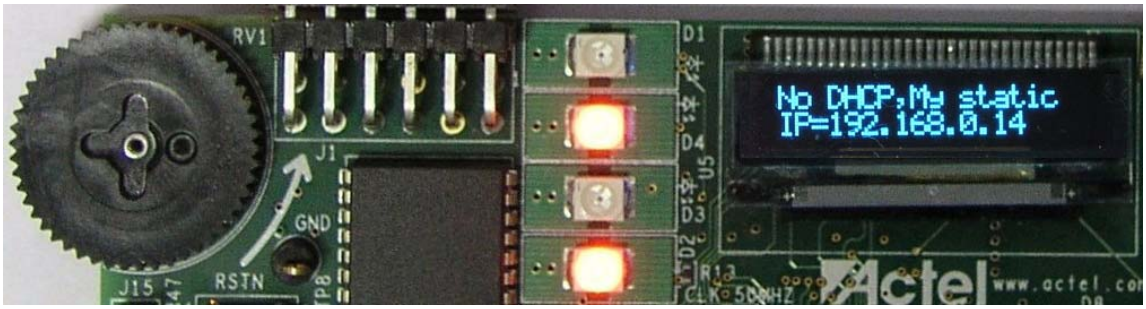

Figure 2-20 · Static IP Address

11. Verify the network connection with the following command:

    `ping 192.168.0.14`

12. If you do not receive a reply from ping, the webserver is not connected. Figure 2-21 shows a typical reply from ping.

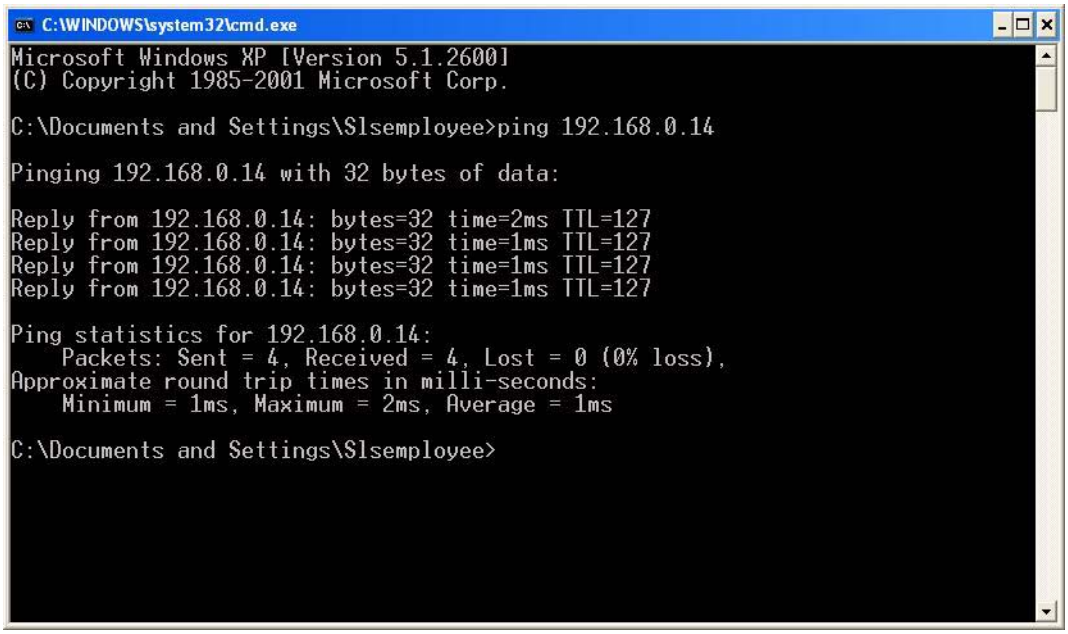

Figure 2-21 · Reply from Ping

13. Type the webserver IP address in the URL of your browser. For example:

    `http://192.168.0.14`

14. The Webserver home page with various demonstration modes displays in the browser (Figure 2-19 on page 21).
15. To run the Webserver demonstration in different modes, refer to “Demonstration Modes” on page 23.

Note: If you are behind the Proxy server and still want to access the Webserver application, follow the steps mentioned in “Troubleshooting” on page 35.

Demonstration Modes

Multimeter Mode

To run the demonstration in Multimeter mode follow the steps below:

1. Click Multimeter Mode.
2. The web page displays readings of various analog channels, such as potentiometer, internal temperature, and external temperature of the board (Figure 2-22).
3. Click one of the following buttons to see the corresponding reading on the OLED display:
   - Potentiometer Voltage
   - Potentiometer Current
   - Internal Temperature
   - External Temperature

   For example, if you click the Potentiometer Voltage button, you will see the potentiometer voltage reading on the OLED display.
4. Change the voltage using the potentiometer.
5. The Potentiometer Voltage reading value is changed on the web page as well as on the OLED display (Figure 2-22).

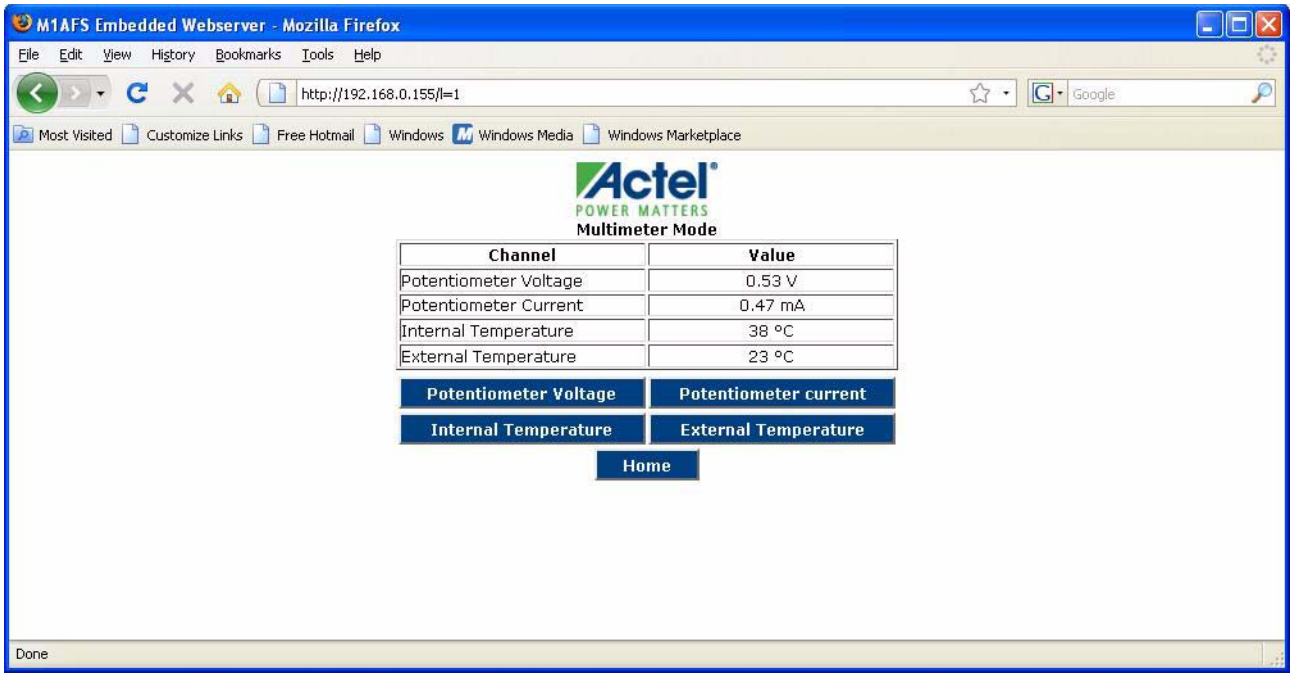

Figure 2-22 · Running Demonstration in Multimeter Mode

6. Click the **Home** button to return to the home page.

   Note: There may be a slight difference between the values displayed on the web page and those displayed on the OLED.

DAC Mode

Follow the steps below to run the demonstration in DAC Mode:

1. Click the **DAC** button.
2. The web page displays Analog readings of the potentiometer and DAC (Figure 2-23).
   Potentiometer input is used to generate DAC voltage.
3. Click one of the following buttons to display the corresponding value on the OLED display.
   - Potentiometer voltage
   - DAC voltage
4. Change the voltage using potentiometer.
5. The web page and OLED displays the varied potentiometer voltage as well as DAC value (Figure 2-23).

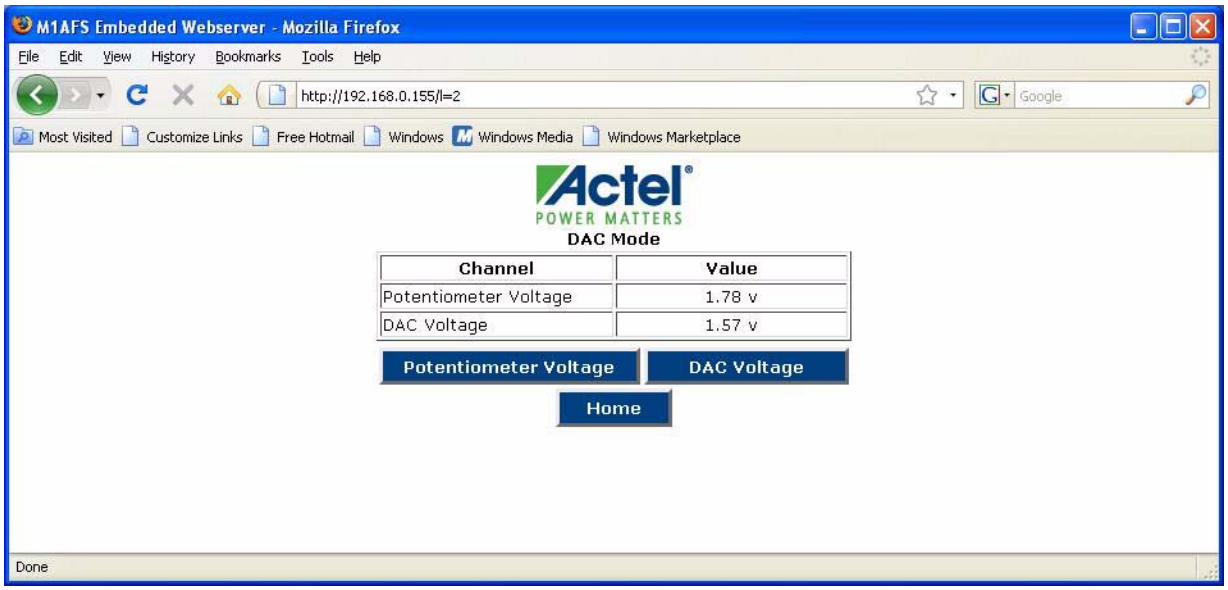

Figure 2-23 · DAC Mode

6. Click the **Home** button to return to the home page.

Note: There may be a slight difference between the values displayed on the web page and those on the OLED.

VIT-Auxiliary Mode

VIT-Auxiliary mode is the same as Multimeter and DAC modes except you input voltage, current, and temperature from an external source. Follow the steps below to run the demonstration in VIT-Auxiliary mode:

1. Click the **VIT-Auxiliary** button.
2. Input voltage at AV5 channel up to 2 V from an external source.
3. Input voltage at AV2 channel up to 8 V from an external source.
4. Connect an EPCOS 10 K Thermistor at the AT4 channel.
5. Make sure there is a common ground between the external voltage source and board.
6. The web page displays the auxiliary current, auxiliary temperature, auxiliary voltage at AV5, and auxiliary voltage at AV2 channel (Figure 2-24 on page 25).

7. To measure auxiliary current through AC5, connect the 1Ω 1% register between AV5 and AC5. Apply 1.5 V at AV5.
   Note: Do not apply more than 2 V at AV5.
8. Click one of the following buttons to display the corresponding value on the OLED display.
   - AV2 Voltage
   - AV5 Voltage
   - Auxiliary Current
   - Auxiliary Temperature

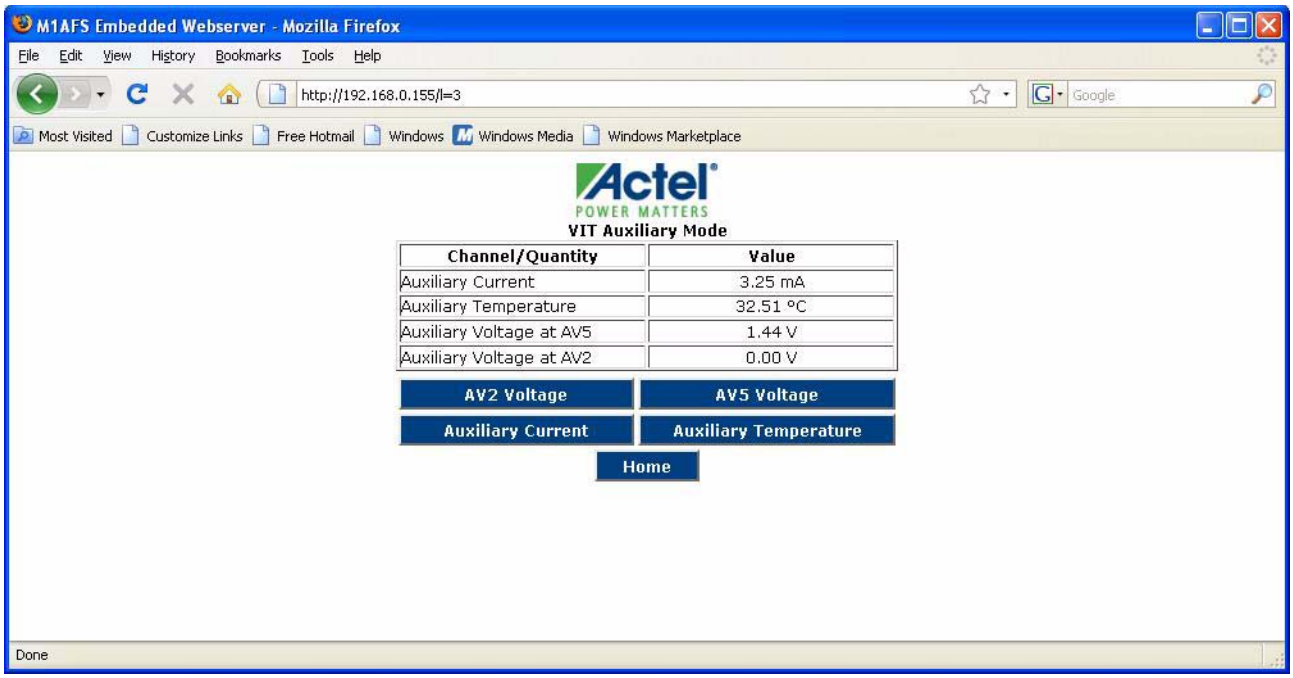

Figure 2-24 · VIT-Auxiliary Mode

9. Click the **Home** button to return to the home page.

Note: There may be a slight difference between the values displayed on the web page and those on the OLED.

Text Terminal Mode

Follow the steps below to run the demonstration in Text Terminal mode:

1. Click the **Text Terminal** button.
2. Enter the string to display on OLED.

3. Press **Enter** or click **Submit** (Figure 2-25). The OLED displays the string you have entered.

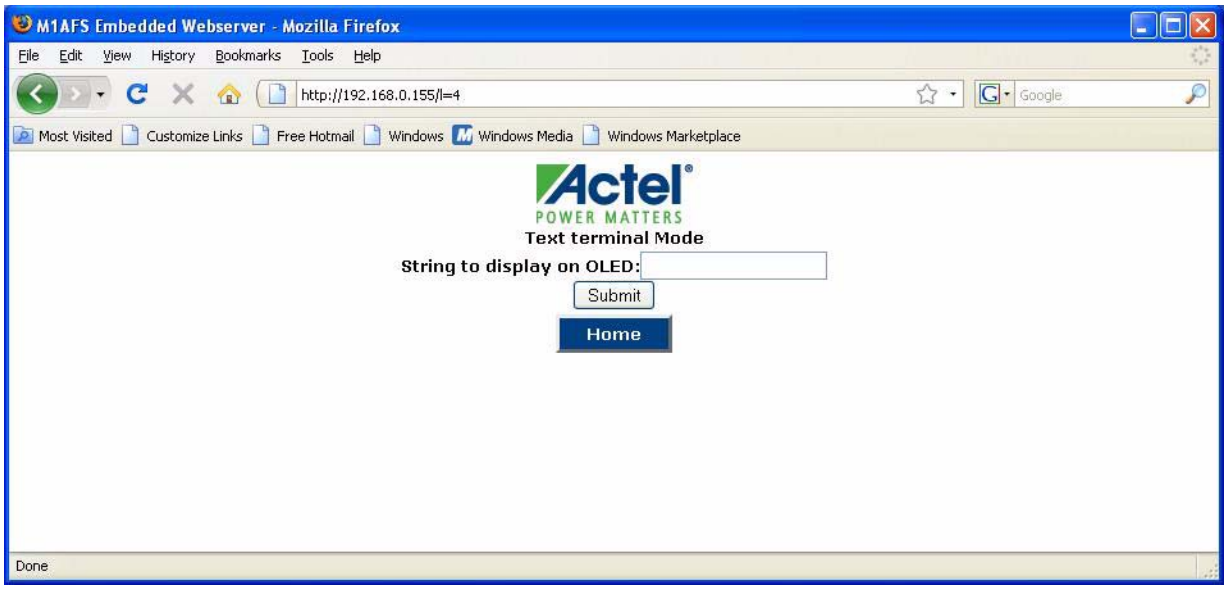

Figure 2-25 · Text Terminal

4. Click the **Home** button to return to the home page.

Waveform Mode

Follow the steps below to run the demo in Waveform mode:

1. Click the **Waveform** button.
2. The web page displays the following buttons (Figure 2-26 on page 27):
   - Sine Wave
   - Square Wave
   - Triangular Wave
   - Sawtooth wave

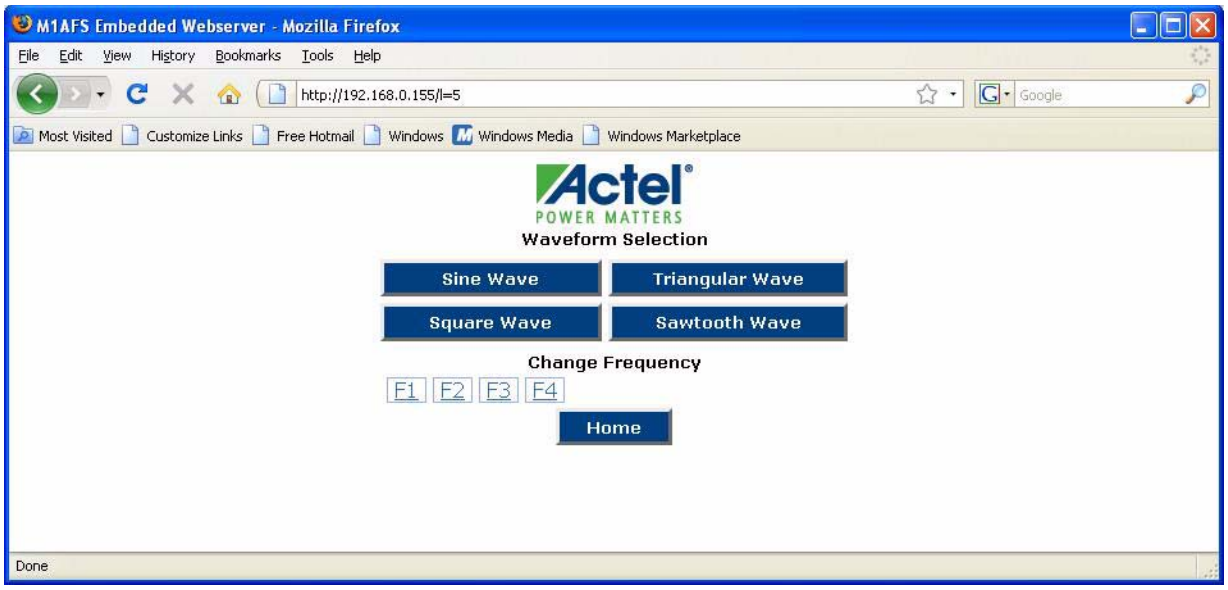

Figure 2-26 · Waveform Selection Web Page

The web page also displays four options (F1, F2, F3, F4) to change the waveform frequency.

3. Click the **Sine Wave** button. The OLED displays a sine wave, as shown in Figure 2-27.

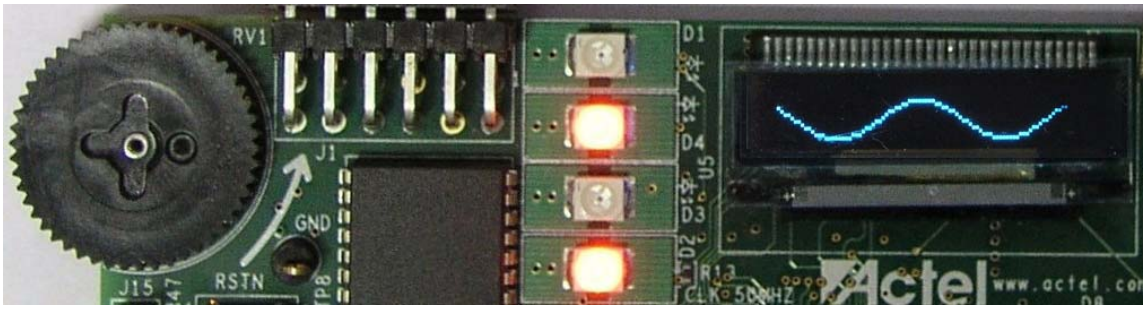

Figure 2-27 · Sine Wave

4. The OLED displays a sine wave with the default frequency set. The same signal will also be generated on the test point **PWM1**.

   Connect the test point (PWM1) to CRO to see the same signal displayed there.

   - Click the **F1** button to change the frequency. The OLED displays the sine wave with frequency F1.
   - Similarly, change the frequency from F1 to F4 and see the results on the OLED display.

5. Click **Square Wave** and repeat step 5 to see the square waveform on the OLED (Figure 2-28).

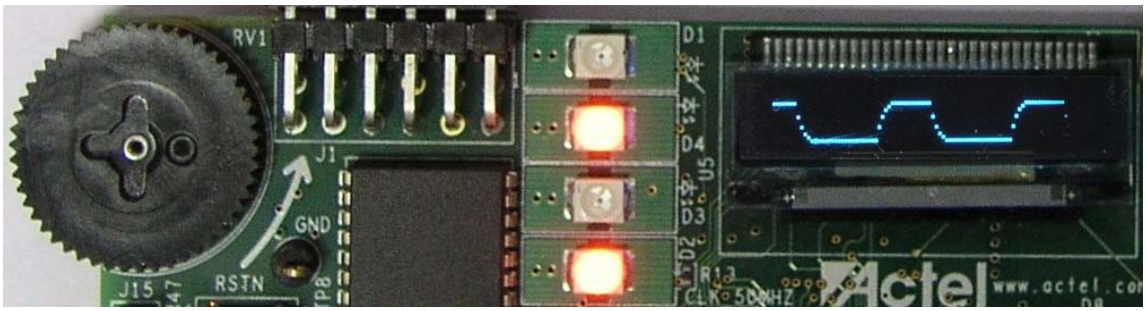

Figure 2-28 · Square Wave

6. Click **Triangular Wave** and repeat step 5 to see the triangular waveform on the OLED (Figure 2-29).

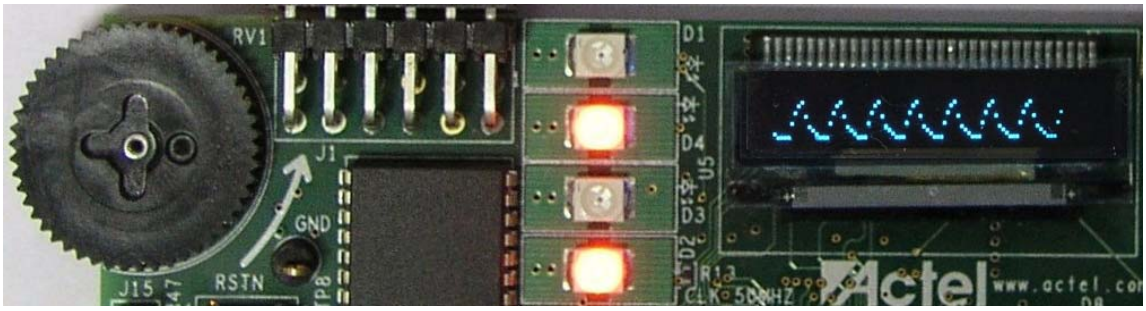

Figure 2-29 · Triangular Wave

7. Click **Sawtooth Wave** and repeat step 5 to see the sawtooth waveform on the OLED (Figure 2-30).

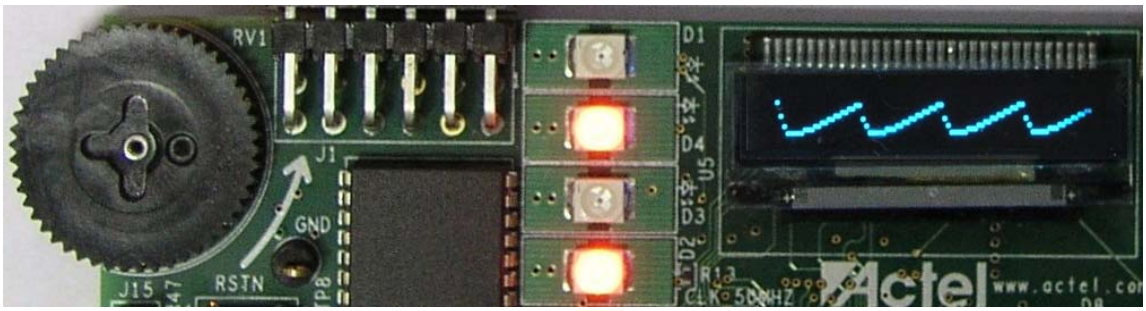

Figure 2-30 · Sawtooth Waveform

8. Click the **Home** button to return to the home page.

Self-Wakeup Mode

Follow the steps below to run the demonstration in Self-Wakeup Mode. Make sure the programmer is disconnected before running this.

1. Set Jumper **JP10** to internal supply.
2. Click the **Self-Wakeup** button. The device will be in power-down mode for 5 seconds. It will wake up after 5 seconds automatically (Figure 2-31).

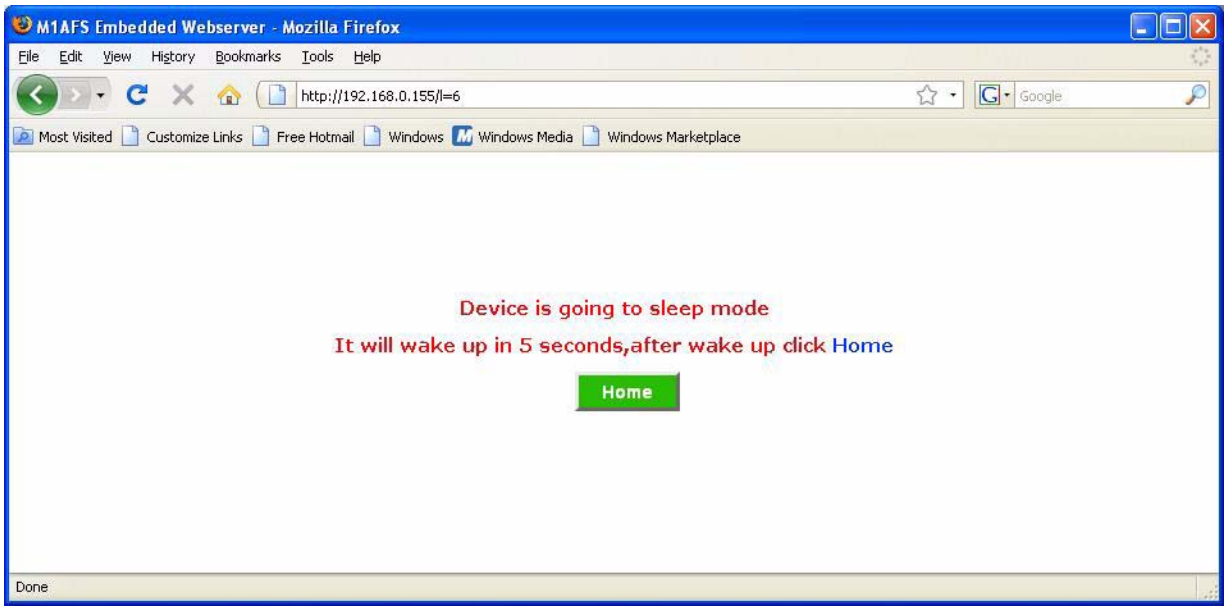

Figure 2-31 · Self Wake-Up

3. Click the **Home** button to return to the home page only after the device wakes up and OLED displays the IP address.

Stock Ticker Mode

You must have an internet connection with proper rights to run the demonstration in Stock Ticker mode. Follow the steps below:

1. Click the **Stock Ticker** button.

2. The web page displays NASDAQ live stock (Figure 2-32).

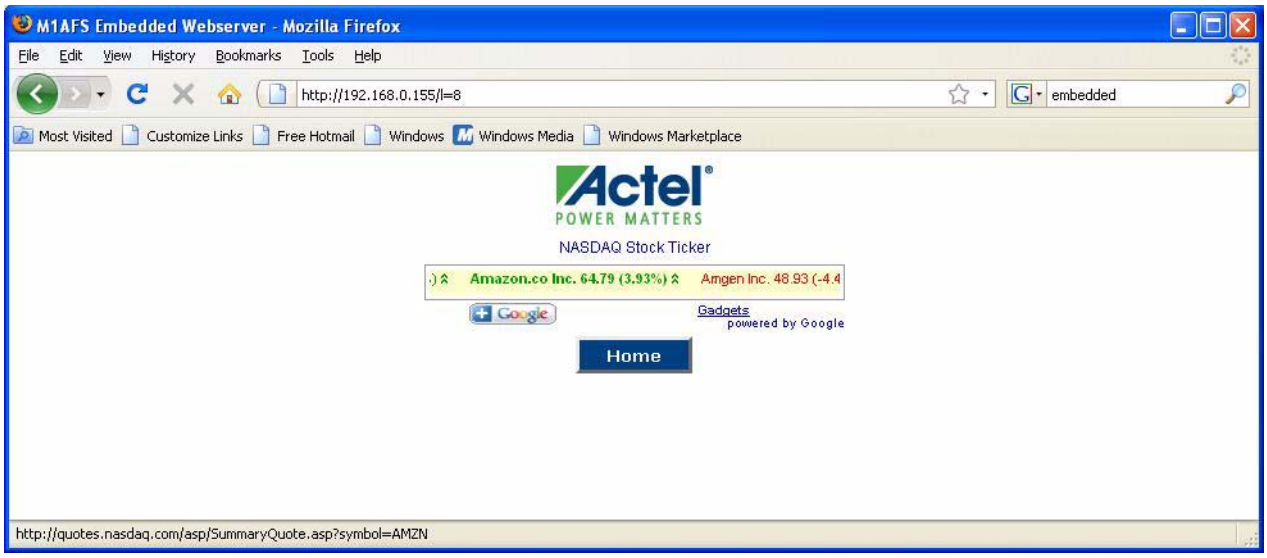

Figure 2-32 · Stock Ticker

3. Click the **Home** button to return to the home page.

Sleeping Stopwatch Mode

Follow the steps below to run the demo in Sleeping Stopwatch mode. Make sure the programmer is disconnected before running this.

1. Set jumper **JP10** to internal supply.
2. Click the **Sleeping Stopwatch** button on the home page.

3. The web page displays the message, “Device is going to sleep mode,” as shown in Figure 2-33.

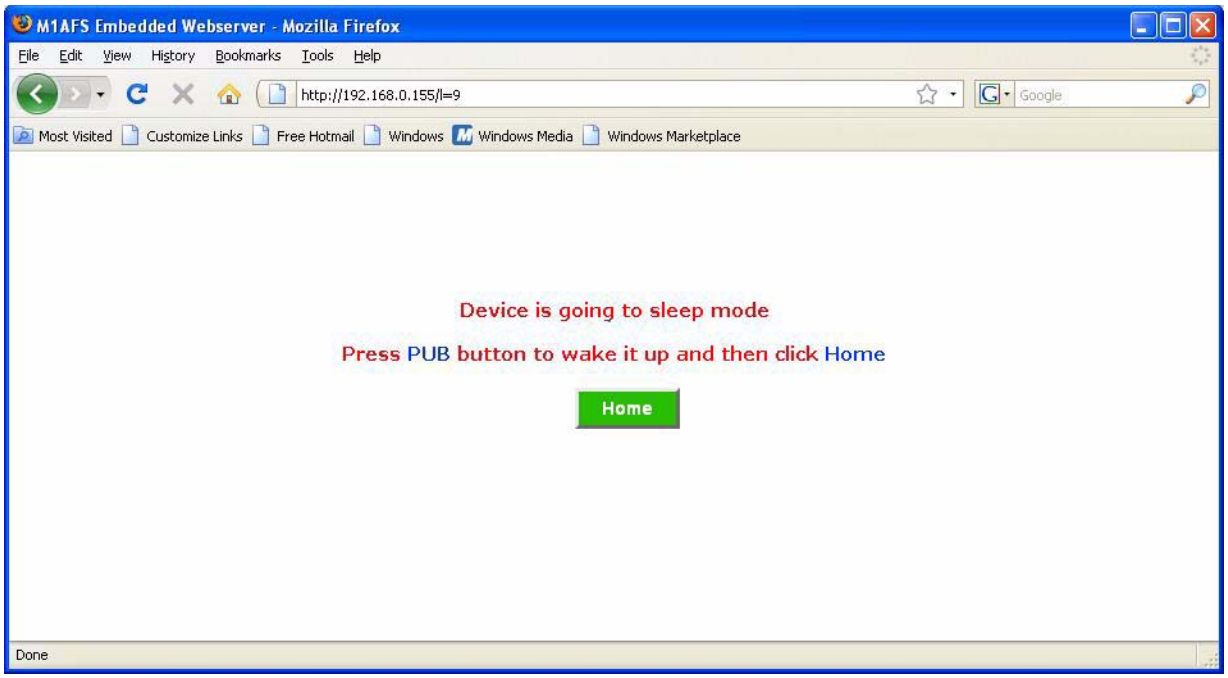

Figure 2-33 · Sleeping Stopwatch Mode

The OLED display shows the continuously updating RTC count. The RTC count will be updated on the OLED display until the device goes to sleep (Figure 2-34).

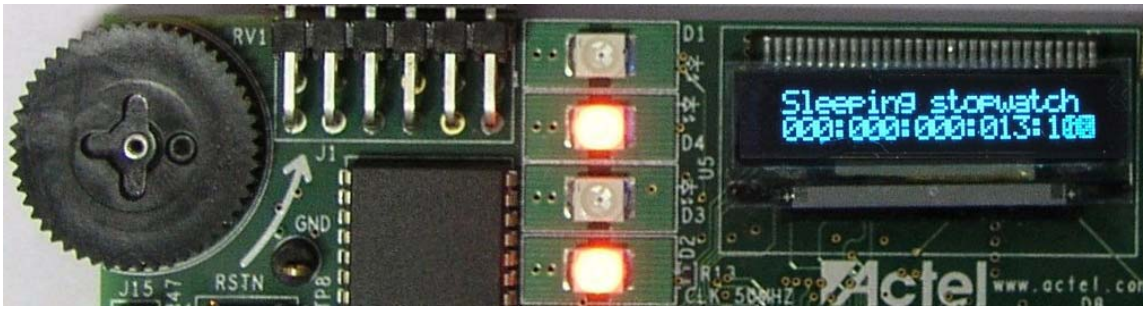

Figure 2-34 · Sleeping Stopwatch

4. In few seconds, device goes into Sleep mode.

5. Press the **PUB** button to wake up the device. The RTC in the FPGA device continuously increments in sleep/wakeup. Upon wakeup you will see incrementing counts on the OLED (Figure 2-35.

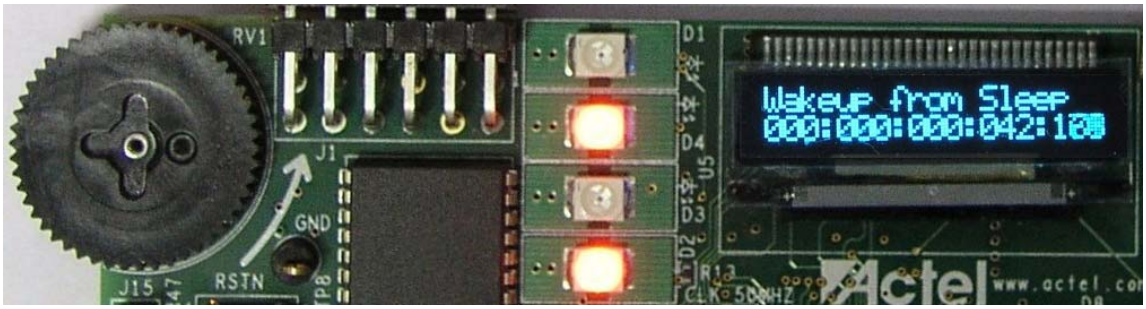

Figure 2-35 · Wakeup from Sleep Mode

6. The counting will continue until you press **SW2**. Upon pressing SW2, the webserver will be started.
7. Click the **Home** button after the DHCP/Static IP address appears on the OLED display.

Real Time Data Display Mode

Follow the steps below to run the demo in Real Time Data Display mode:

1. Click the **Real Time Data Display** button.
2. The web page displays readings of all channels included in Multimeter, DAC, and VIT-Auxiliary mode. In addition, the number of packets transmitted and received is displayed (Figure 2-36).

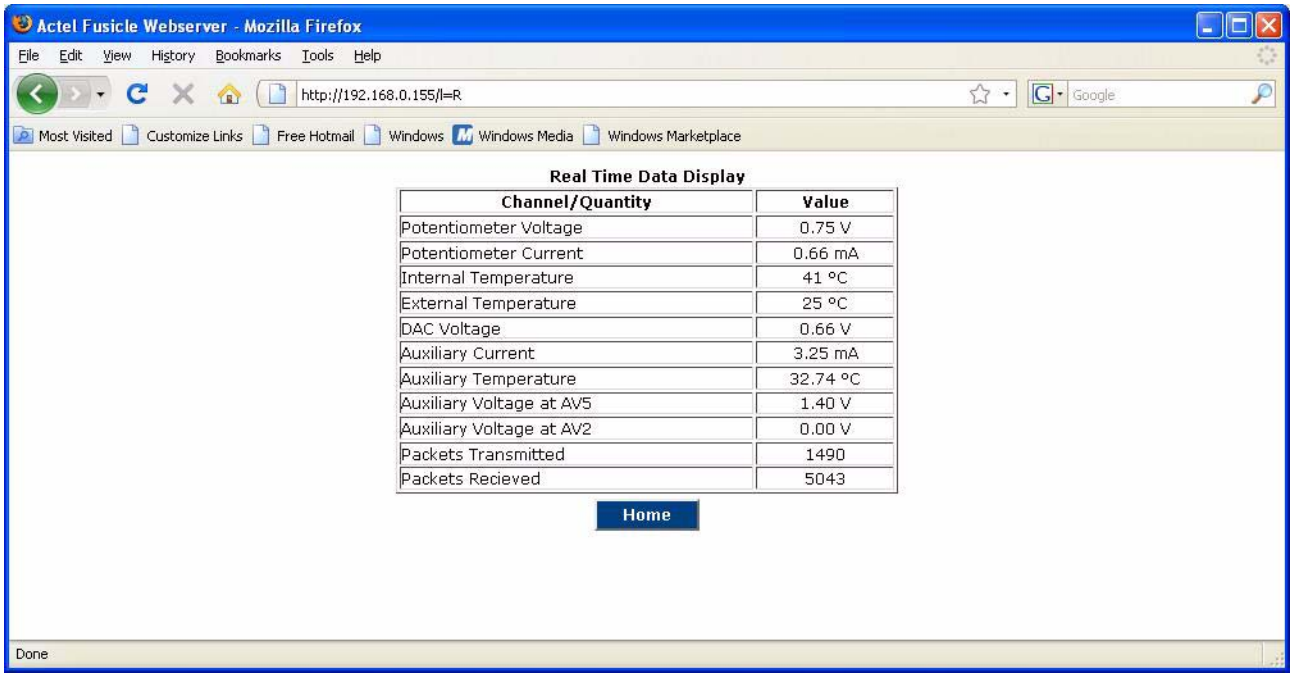

Figure 2-36 · Real Time Data Display

3. The web page refreshes every two seconds and you will see the updated data on the page.
4. Click the **Home** button to return to the home page.

Gadgets

You must have an internet connection with proper access rights to run the demonstration in this mode. Follow the steps below to run the demo in Gadgets mode:

1. Click the **Gadgets** button.
2. The web page displays three different gadgets (Figure 2-37).

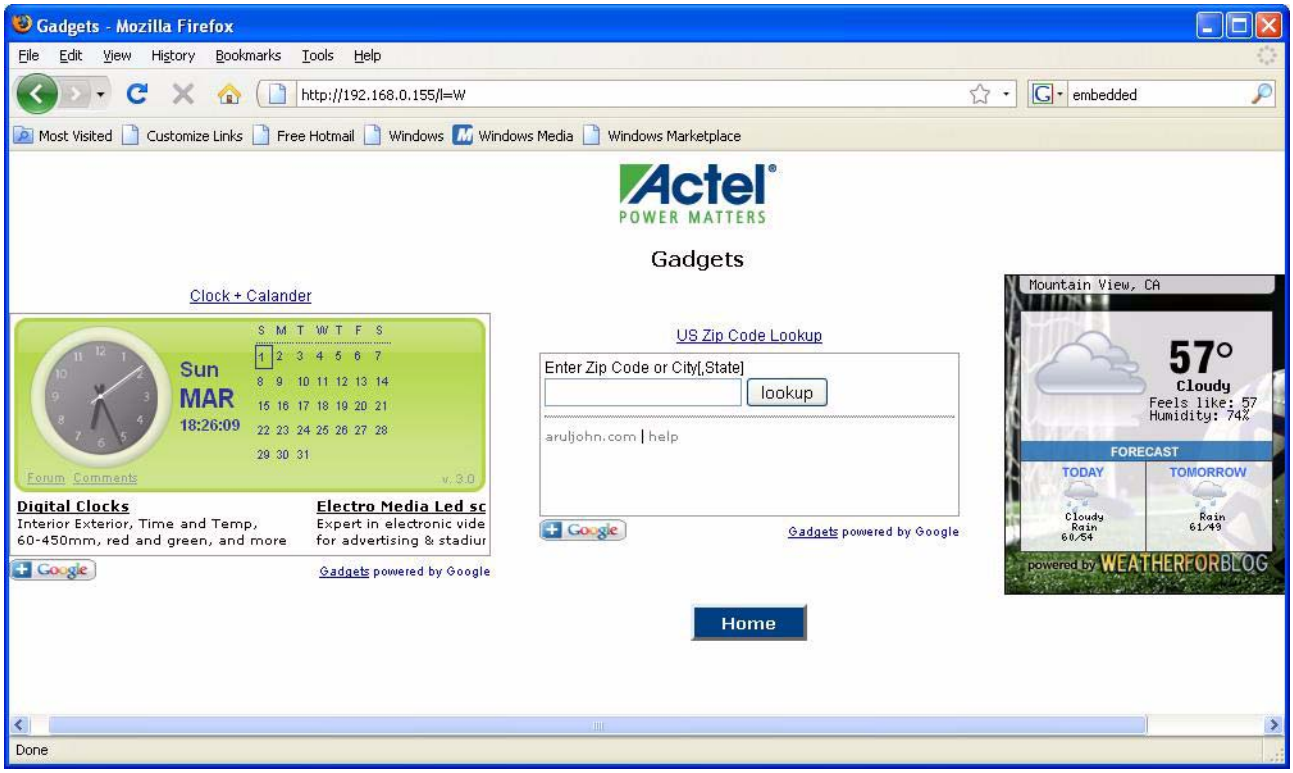

Figure 2-37 · Gadgets

3. Click the **Home** button to return to the home page.

Note: This page takes services from another server for the widget display. This service may not be available in future, in which case the page may not appear as shown in Figure 2-37.

A

Troubleshooting

The following scenarios and handlings will help you debug your demonstration.

Questions and Answers

What if the debugger does not establish a connection with the target?

Stop the debugger and switch off the board. Power it up again and restart the debugger.

What should I do if the board goes into Sleep mode upon removing the FlashPro USB mini cable?

Switch off the board and power it up again. Retry debugging.

What if the OLED display is flickering and you see the garbage data on it?

Switch off the board immediately.

How do I change the static IP address of the board?

To change the static IP address, change the default IP address with the desired address in the array in the tcpip.c file. See the example below:

Default Array

unsigned char my_ip[IP_ADDR_LEN]={192,168,0,14};

To change the default IP address to 192.168.0.26, modify the line with the following:

unsigned char my_ip[IP_ADDR_LEN]={192,168,0,26};

How do I change the MAC address of the board?

To change the MAC IP address, change the default IP address with the desired address in the array in tcpip.c file. See the example below:

Default Array

unsigned char my_mac[ETH_ADDR_LEN]={0xC0,0xB1,0x3C,0x88,0x88,0x88};

To change the MAC address to C0:90:AA:88:88:77, modify the line with the following:

unsigned char my_mac[ETH_ADDR_LEN]={0xC0,0x90,0xAA,0x88,0x88,0x77};

Which web browser I should use to access the webserver application?

You can use most browsers, including Internet Explorer, Mozilla FireFox, Google Chrome, Netscape Navigator, Opera, and others. Mozilla FireFox is the preferred browser.

Does the browser's cache memory affect the page view?

When the waveform mode is accessed multiple times, you will see the **Change frequency** buttons highlighted, even without clicking those buttons.

How can I avoid IP address conflicts?

When the DHCP server is in LAN, IP addresses do not conflict. But if there is no DHCP server and yet you are going to connect the board in LAN, the IP address may conflict, especially in a Class C-type LAN.

The default IP address of the board is 192.168.0.14, so ping this IP address before you connect a board in a LAN without DHCP. A reply from this IP address means it is in use by another device in the network. In such case, do not connect the board in the LAN. First change the IP address according to your network configuration. See "How do I change the static IP address of the board?".

What if I have a DHCP server available in LAN yet the board does not get the IP address?

Some DHCP servers requires a record of known MAC addresses for IP allocation. For example, the MAC address of the board is C0:B1:3C:88:88:88. Make sure that this MAC address is available in the DHCP server's MAC address list. For more information, ask your network administrator.

I am behind a proxy server. What should I do if I want to access the webserver application by directly connecting to PC?

Check with your network administrator. If appropriate, follow the instructions below to disable the proxy server.

To disable the proxy server in Mozilla FireFox, follow the steps below:

1. Open **Firefox**.
2. Select **Tools** > **Options**.
3. Click the **Advanced** tab.
4. Click the **Network** tab (Figure A-1).

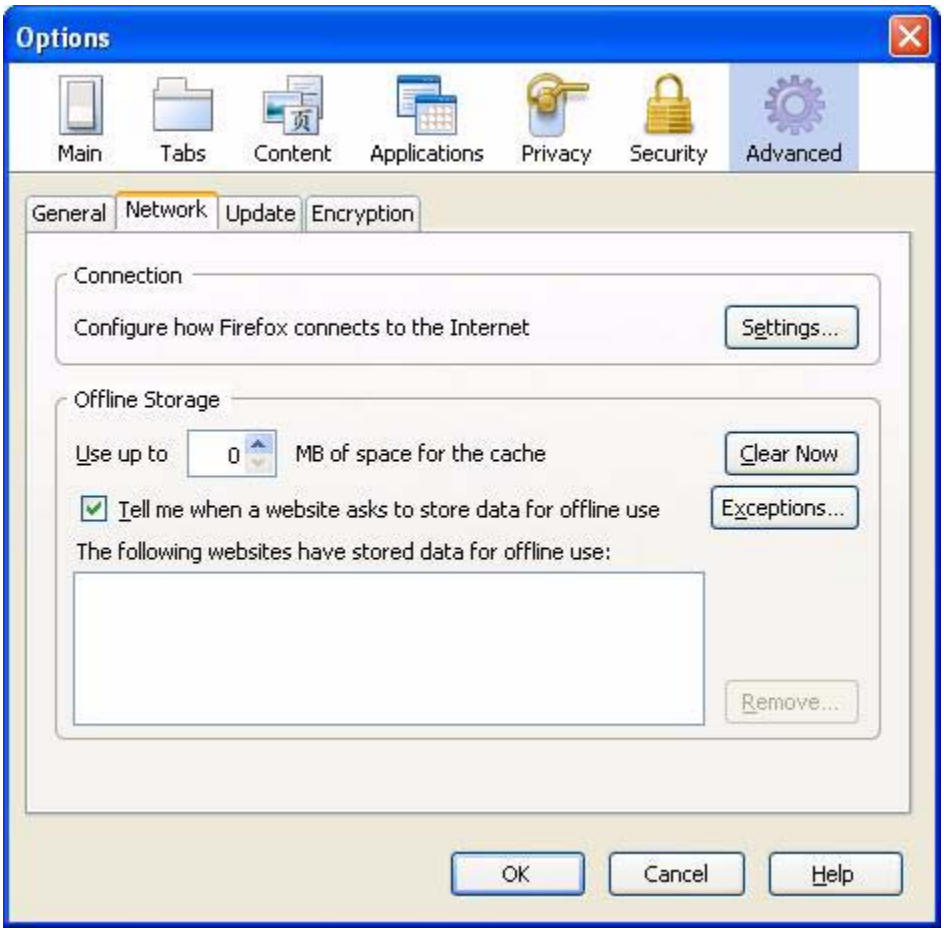

Figure A-1 · Tools > Options > Advanced > Network

5. Click the **Settings** button (Figure A-2).

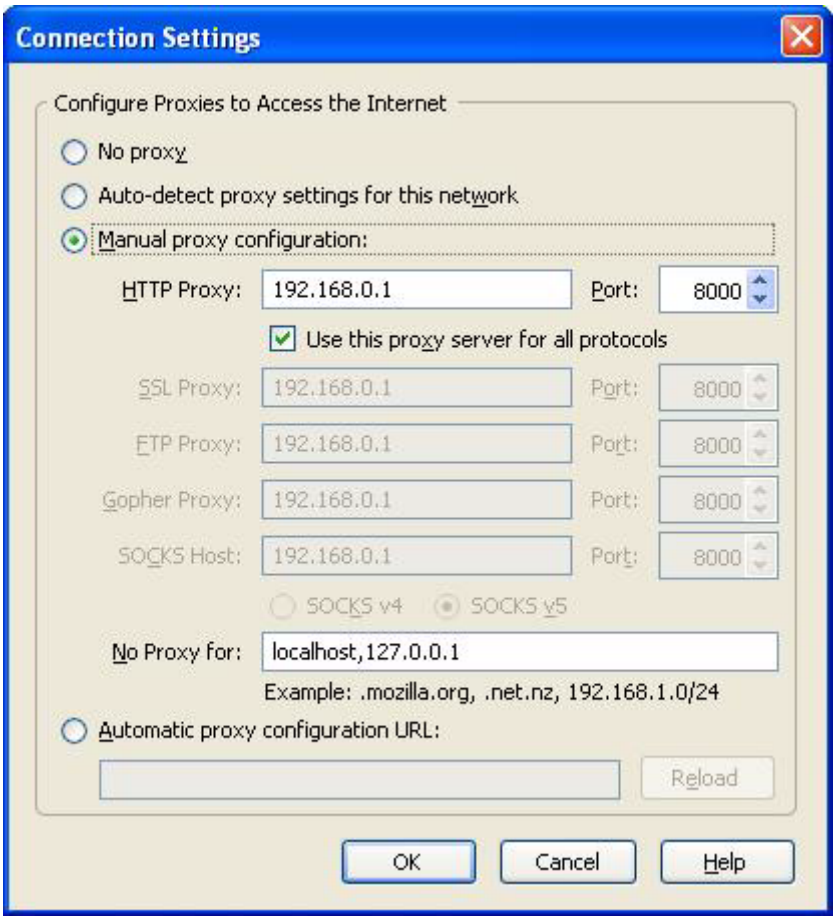

Figure A-2 · Connection Settings Dialog Box

6. Select the **No proxy** option to disable the proxy server (Figure A-3).

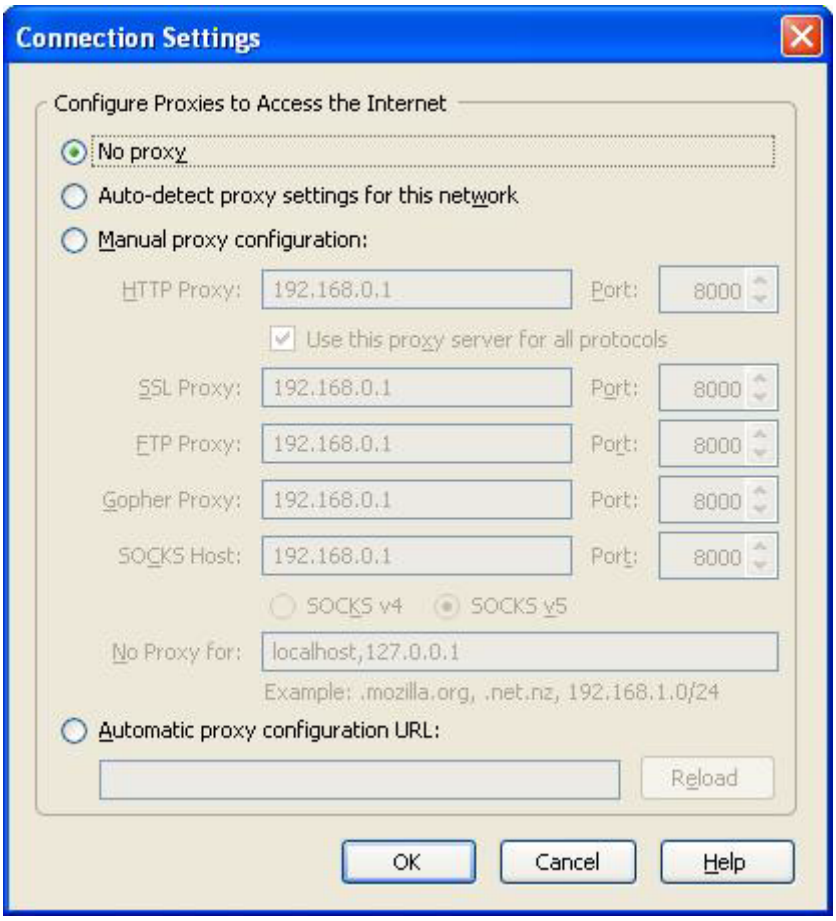

Figure A-3 · Selecting No Proxy Option

7. Click **OK.**

To disable the proxy server in Internet Explorer, follow the steps below:

1. Open **Internet Explorer.**
2. Select **Tools** > **Options**.

3. Click the **Connections** tab (Figure A-4).

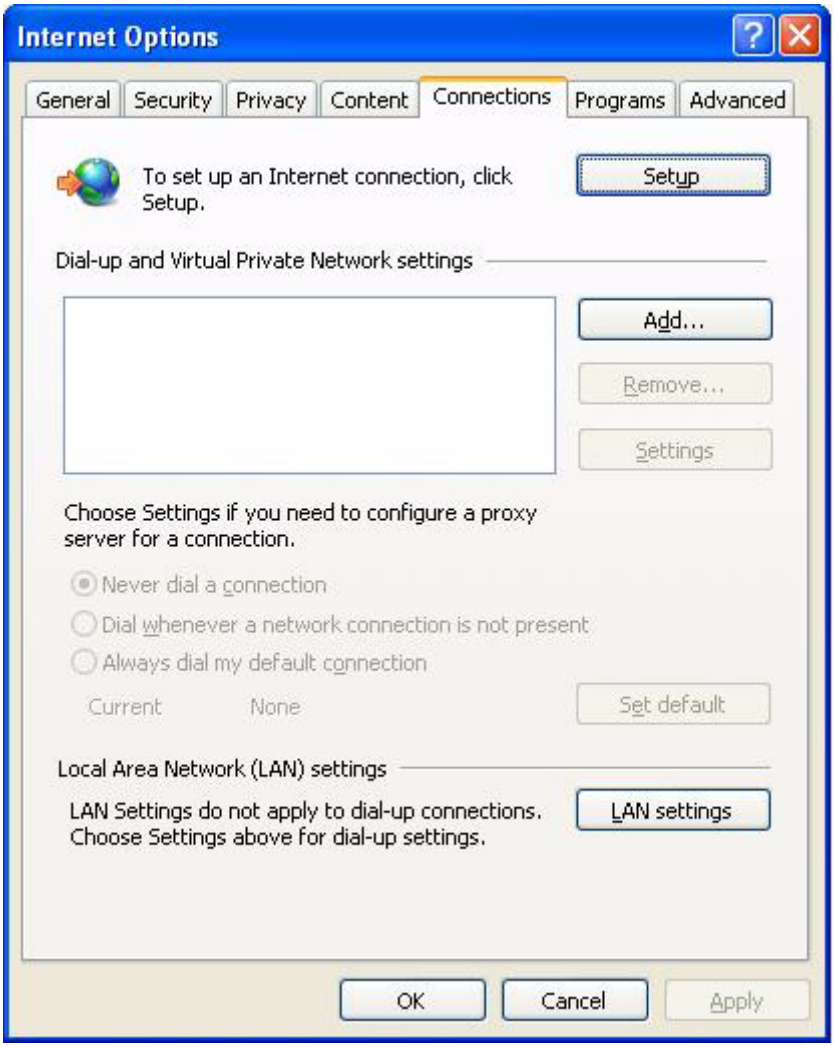

Figure A-4 · Tools > Options > Connection

4. Click the **LAN Settings** button (Figure A-5).

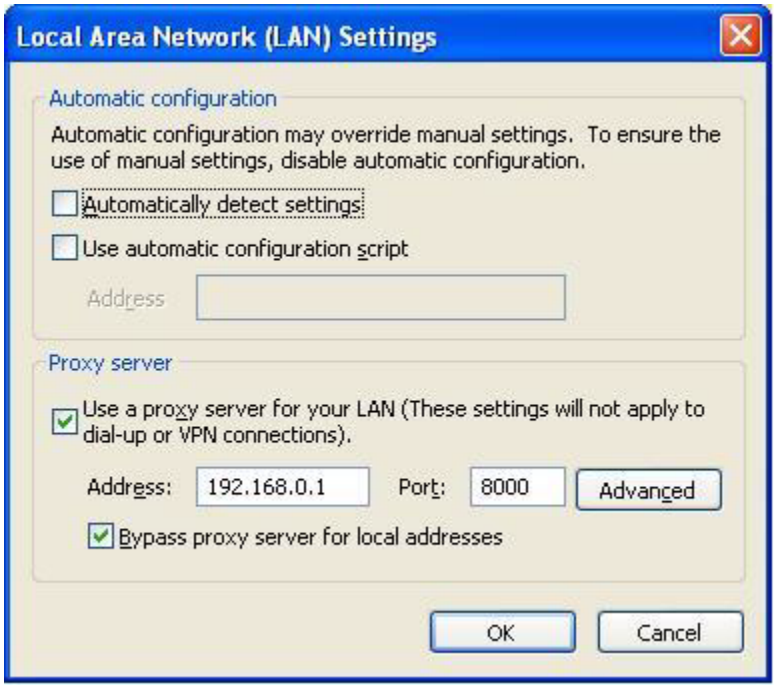

Figure A-5 · Local Area Network Settings

5. Clear the check box for "**Use a proxy server for your LAN**...." (Figure A-6).

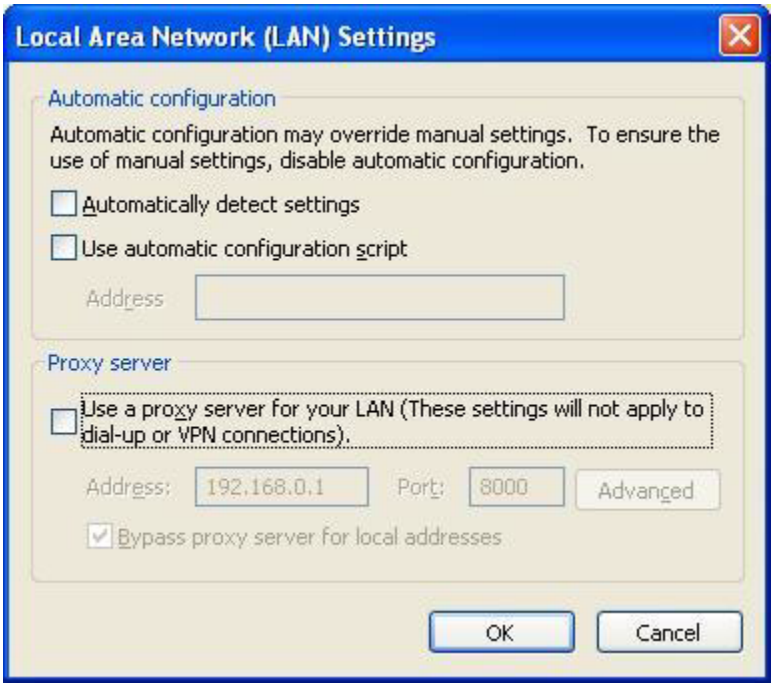

Figure A-6 · Clearing Check Box for "Use a proxy server for your LAN"

6. Click **OK**.

B

Product Support

Actel backs its products with various support services including Customer Service, a Customer Technical Support Center, a web site, an FTP site, electronic mail, and worldwide sales offices. This appendix contains information about contacting Actel and using these support services.

Customer Service

Contact Customer Service for non-technical product support, such as product pricing, product upgrades, update information, order status, and authorization.

From Northeast and North Central U.S.A., call **650.318.4480**
From Southeast and Southwest U.S.A., call **650. 318.4480**
From South Central U.S.A., call **650.318.4434**
From Northwest U.S.A., call **650.318.4434**
From Canada, call **650.318.4480**
From Europe, call **650.318.4252** or **+44 (0) 1276 401 500**
From Japan, call **650.318.4743**
From the rest of the world, call **650.318.4743**
Fax, from anywhere in the world **650.318.8044**

Actel Customer Technical Support Center

Actel staffs its Customer Technical Support Center with highly skilled engineers who can help answer your hardware, software, and design questions. The Customer Technical Support Center spends a great deal of time creating application notes and answers to FAQs. So, before you contact us, please visit our online resources. It is very likely we have already answered your questions.

Actel Technical Support

Visit the Actel Customer Support website (www.actel.com/support/search/default.aspx) for more information and support. Many answers available on the searchable web resource include diagrams, illustrations, and links to other resources on the Actel web site.

Website

You can browse a variety of technical and non-technical information on Actel's home page, at www.actel.com.

Contacting the Customer Technical Support Center

Highly skilled engineers staff the Technical Support Center from 7:00 A.M. to 6:00 P.M., Pacific Time, Monday through Friday. Several ways of contacting the Center follow:

Email

You can communicate your technical questions to our email address and receive answers back by email, fax, or phone. Also, if you have design problems, you can email your design files to receive assistance. We constantly monitor the email account throughout the day. When sending your request to us, please be sure to include your full name, company name, and your contact information for efficient processing of your request.

The technical support email address is tech@actel.com.

Phone

Our Technical Support Center answers all calls. The center retrieves information, such as your name, company name, phone number and your question, and then issues a case number. The Center then forwards the information to a queue where the first available application engineer receives the data and returns your call. The phone hours are from 7:00 A.M. to 6:00 P.M., Pacific Time, Monday through Friday. The Technical Support numbers are:

650.318.4460
800.262.1060

Customers needing assistance outside the US time zones can either contact technical support via email (tech@actel.com) or contact a local sales office. Sales office listings can be found at www.actel.com/company/contact/default.aspx.

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