Xilinx Zynq®-7000 All Programmable SoC Mini-ITX Development Kit Getting Started Guide

Version 1.0

LIT# 5174-zynq-mini-itx-getting-started-guide-V1

Contents

1 About this Guide

This guide provides detailed information for getting started with the Xilinx® Zynq®-7000 All Programmable SoC Mini-ITX Development Kit. Follow the detailed instructions in this document to begin development right away.

1.1 Additional Documentation

Additional documents for the Xilinx Zynq-7000 All Programmable SoC are available for download at http://www.xilinx.com/support/documentation/zynq.htm

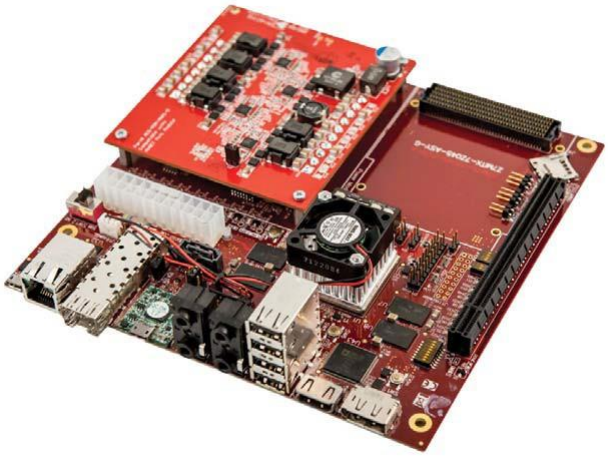
1.2 Additional Support Resources

To search the database of silicon and software questions and answers or to create a technical support case in WebCase, see the Xilinx website at: http://www.xilinx.com/support

2 Introduction

The Xilinx Zynq Mini-ITX Development Kit provides a complete development platform for designing and verifying applications based on the Xilinx Zynq-7000 All Programmable SoC family. Available with the Zynq XC7Z045-2FFG900 or the XC7Z100-2FFG900 device in a small Mini-ITX form factor, the kit enables designers to prototype high-performance designs with ease, while providing expandability and customization through the FMC HPC expansion slot. The Zynq Mini- ITX development board features consist of

- Xilinx XC7Z045/XC7Z100-2FFG900
- 1GB PS DDR3 SDRAM
- 1GB PL DDR3 SDRAM
- 32MB of QSPI Flash
- 8KB of I2C EEPROM
- Real-Time Clock
- 10/100/1000 Ethernet Interface
- USB-UART Interface
- microSD Card Interface
- USB 2.0 4-Port Hub
- PCIe x4 Root-Port (x16 physical Slot)
- SATA-III Interface
- FMC HPC Slot (VADJ of 1.8V, 2.5V, or 3.3V)
- SFP Socket
- LVDS Touch Panel Interface
- HDMI Interface
- Audio Codec
- User LEDs and Switches
- Programmable LVDS Clock Source (GTX reference clock)
- 200 MHz LVDS Oscillator (system clock)
- JTAG Header
- ARM® Processor PJTAG Header
- Digilent USB-JTAG Module (JTAG-SMT2)



3 Zynq Mini-ITX Development Kit Contents

3.1.1 What's Inside the Box

Avnet offers three versions of the Zynq Mini-ITX kit, the Board Kit, the Base Kit and the System Kit. The following describes what is included in each kit.

3.1.2 Zynq Mini-ITX Board Kit

- Zynq Mini-ITX development board
  - Zynq XC7Z045-2FFG900 or XC7Z100-2FFG900 device
  - Power module
- Getting Started Guide
- Downloadable documentation and reference design

3.1.3 Zynq Mini-ITX Base Kit

- Zynq Mini-ITX development board
  - Zynq XC7Z045-2FFG900 or XC7Z100-2FFG900 device
  - Power module
  - FMC adapter
- USB A-mini-B cables (2)
- Ethernet cable
- microSD Card
- Vivado Design Edition software (device locked to XC7Z045-2FFG900 or XC7Z100-2FFG900)
- Getting Started Guide
- Downloadable documentation and reference design
- 200W ATX power supply with US, UK, and Europe AC cord

3.1.4 Zynq Mini-ITX System Kit

- Mini-ITX Chassis
  - Zynq Mini-ITX development board
    - Zynq XC7Z045-2FFG900 or XC7Z100-2FFG900 device
    - Power module
    - FMC adapter
  - 200W ATX power supply with US, UK, and Europe AC cord
  - 500GB SATA-III hard drive
- USB A-mini-B cables (2)
- Ethernet cable
- microSD Card
- Vivado Design Edition software (device locked to XC7Z045-2FFG900 or XC7Z100-2FFG900)
- Getting Started Guide
- Downloadable documentation and reference design

3.2 What's available online

- License for Vivado Design Suite
  - http://www.xilinx.com/support/licensing_solution_center.htm
  - http://www.xilinx.com/tools/faq.htm
- Development Kit home page with Documentation and Reference Designs
  - www.zedboard.org/product/mini-itx
- Technical Support
  - http://xilinx.com/support

4 Getting Started with Zynq Mini-ITX Development Kit

This Zynq Mini-ITX Development Kit comes with two demos programmed into the on-board QSPI Flash and the microSD Card. You can run these demos by simply setting up the board and turning the power on.

5 Demo Hardware Requirements

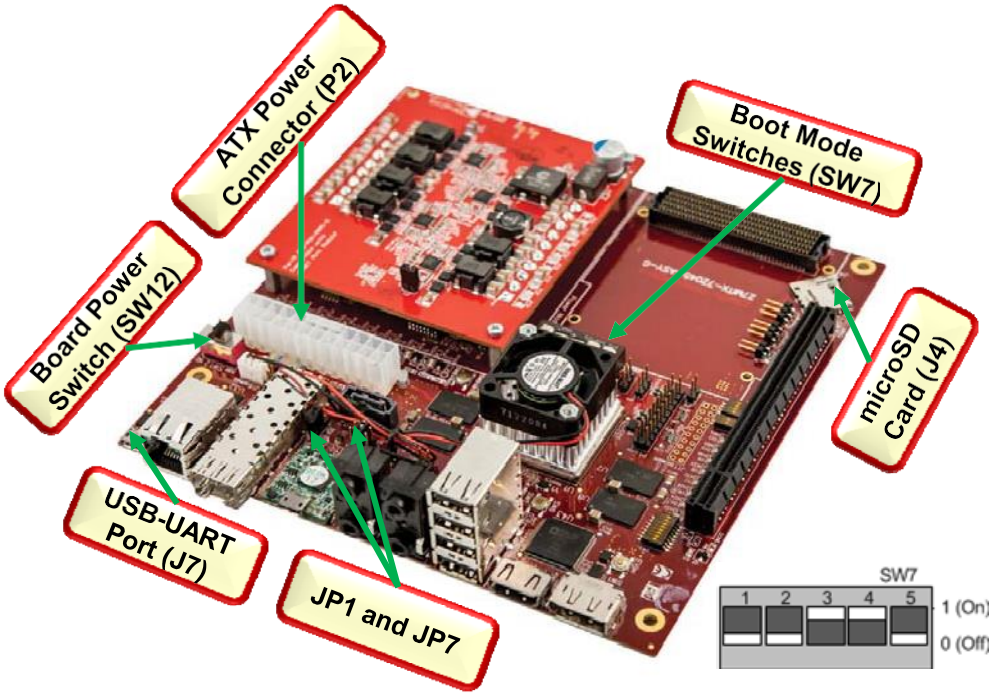
The required hardware for running the demos are

- Avnet Zynq Mini-ITX Development Board
- Power supply Module
- ATX power supply
- USB A-mini-B cable
- RJ45 Cable
- microSD Card

6 Setting up the Board

Please perform the following steps to setup the Zynq Mini-ITX development board.

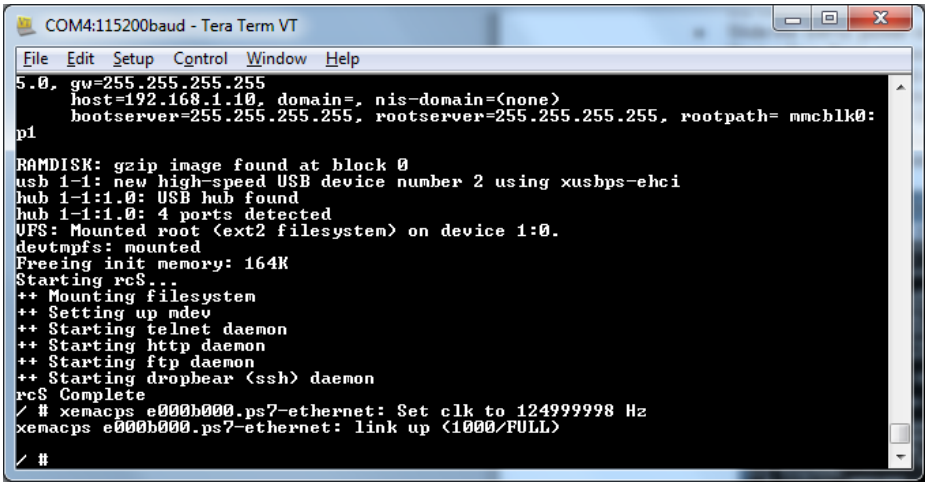
1. Install a jumper on JP1 pins 1-2.
2. Install a jumper on JP7 pins 3-4.
3. Install a jumper on JP9.
4. Connect the USB A-mini-B cable to J7 and the USB port of the PC (USB-UART connection).
5. If not already installed, install the power module onto the Mini-ITX board via J8, J9, and J10 connectors.
6. Connect the ATX power supply to P2 connector.
7. Connect the Ethernet cable to the RJ45 connector on the board and the Gigabit Ethernet port of the PC.
8. Start a Tera Term session and set the serial port parameters to 115200 baud rate, 8 bits, 1 stop bit, no parity and no flow control (please refer to the Setting up the Host PC section at the end of this document for installing the software driver for the USB-UART port and setting up the UART).
9. Set the IP address of your PC to **192.168.1.1** with subnet mask of **255.255.255.0**.



7 Running the Embedded Linux Demo

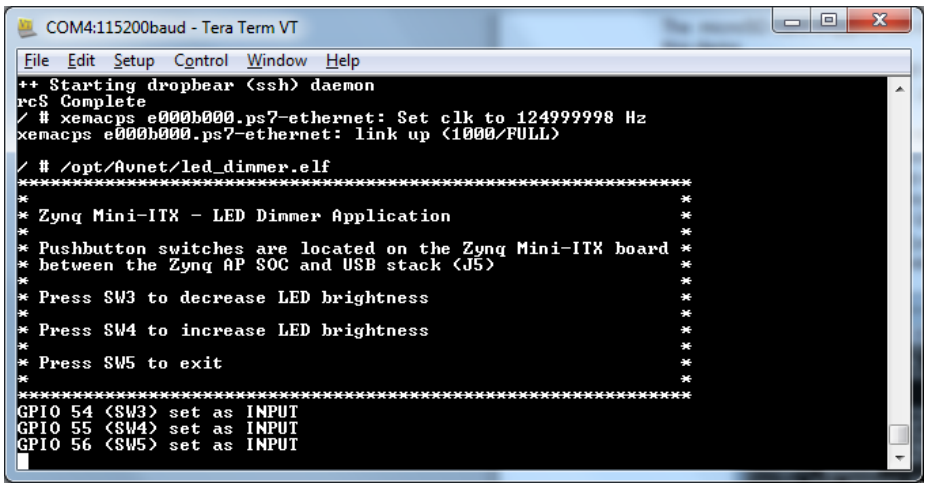
The microSD card shipped with the Zynq Mini-ITX kit includes an Embedded Linux demo.
To run this demo

- Insert the microSD card in to the microSD card socket on the Zynq Mini-ITX board (J4).
- Set the mode switch (SW7, positions 1-5) to 00110 on the Zynq Mini-ITX board to boot from the microSD Card.
- Slide the SW12 power switch to the ON position on the Mini-ITX board.
- Linux will boot on the Zynq Mini-ITX board and you should see the following in the Tera Term terminal. Hit the return key to get the Linux prompt as shown in the following figure.



Enter the following command at the Linux prompt and follow the on-screen instructions to run the LED demo.

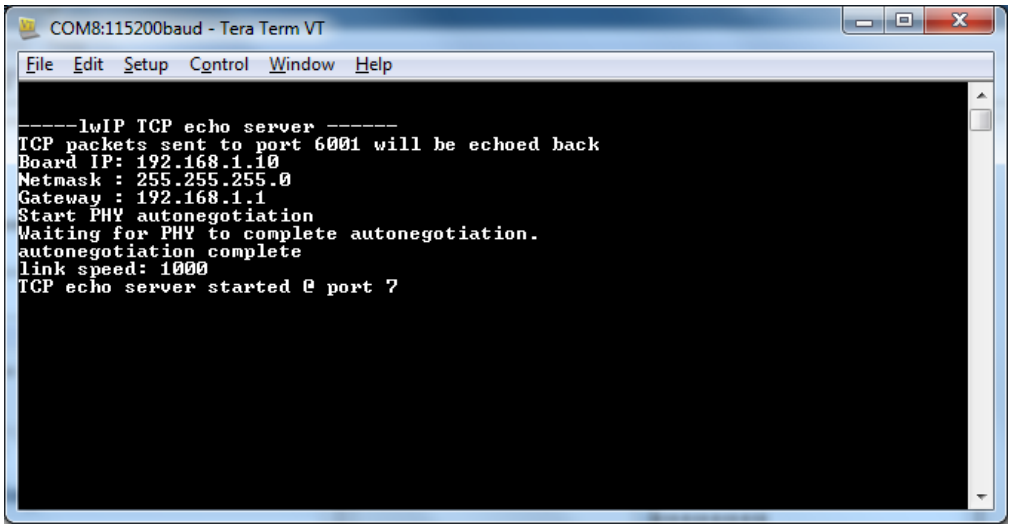
/opt/Avnet/led_dimmer.elf



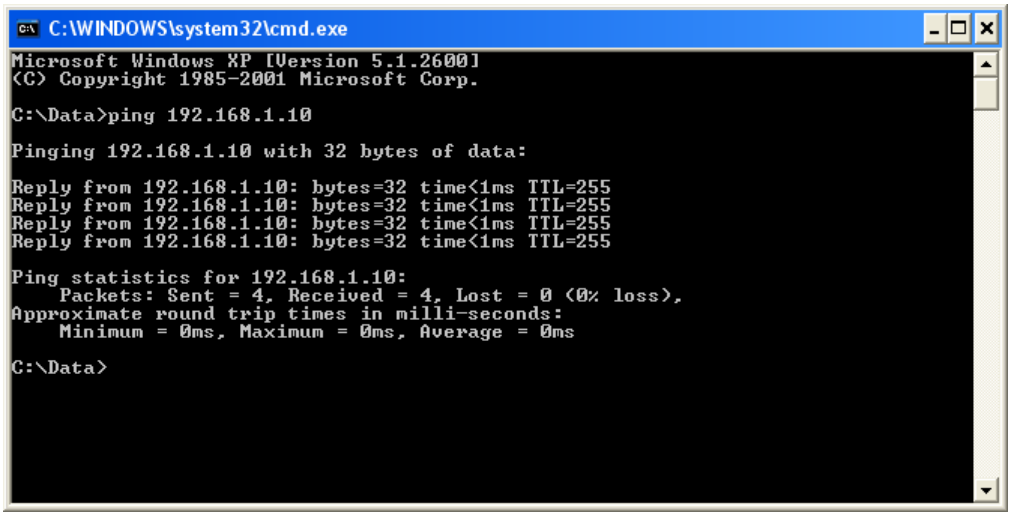
8 Running the Echo Server Demo

The Zynq Mini-ITX kit is shipped with a bare-metal Echo Server demo stored in the on-board QSPI Flash. To run this demo

- Slide the SW12 power switch to the OFF position on the board.
- Set the boot mode switch (SW7, positions 1-5) on the board to 00010 (QSPI boot mode).
- Slide the SW12 power switch to the ON position.
- The Echo Server demo will run on the Zynq Mini-ITX board and you should see the following in the Tera Term terminal.

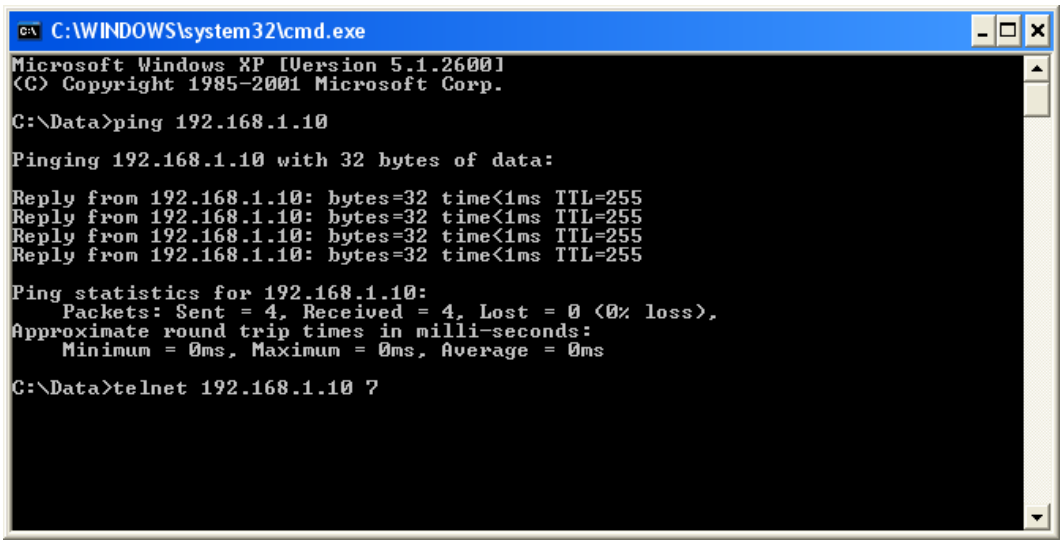


- Open a command window and ping the board as shown below. If the Ethernet connection is working, you should see 4 replies back as shown. Enter the following at the prompt.
  ping 192.168.1.10



– To connect to the echo server, use the telnet utility program. Type the following telnet command as shown in following screenshot and hit the return key.

telnet 192.168.1.10 7



When the echo server works properly, any data sent to the board is echoed in response. Some telnet clients immediately send the character to the server and echo the received data back instead of waiting for the carriage return. Simply type a few characters and see them echoed back on the terminal.

9 Next Steps

Now that you have run through the demos and installed Vivado Design Edition, you are ready to create custom systems for the Zynq-7000 All Programmable SoC. You can start by downloading various reference designs for this board from the Avnet web site at www.zedboard.org/product/mini-itx.

10 Getting Help and Support

For questions regarding products within your Product Entitlement Account, send an e- mail message to your regional customer services representative

- Canada, USA and South America - isscs_cases@xilinx.com
- Europe, Middle East, and Africa - eucases@xilinx.com
- Asia Pacific including Japan - apaccase@xilinx.com

For technical support including the installation and use of your product license file you may contact Xilinx Online Technical Support at http://www.xilinx.com/support. On this site you will also find the following resources for assistance:

- Software, IP and Documentation Updates
- Access to Technical Support Web Tools
- Searchable Answer Database with Over 4,000 Solutions
- User Forums
- Training - Select instructor-led classes and recorded e-learning options

Contact Avnet Support for any questions regarding the Zynq Mini-ITX Kit reference designs or kit hardware

www.zedboard.org/product/mini-itx

11 Setting up the Host PC

This section describes how to install the USB drivers on the host PC for the USB-UART connection to the Zynq Mini-ITX board.

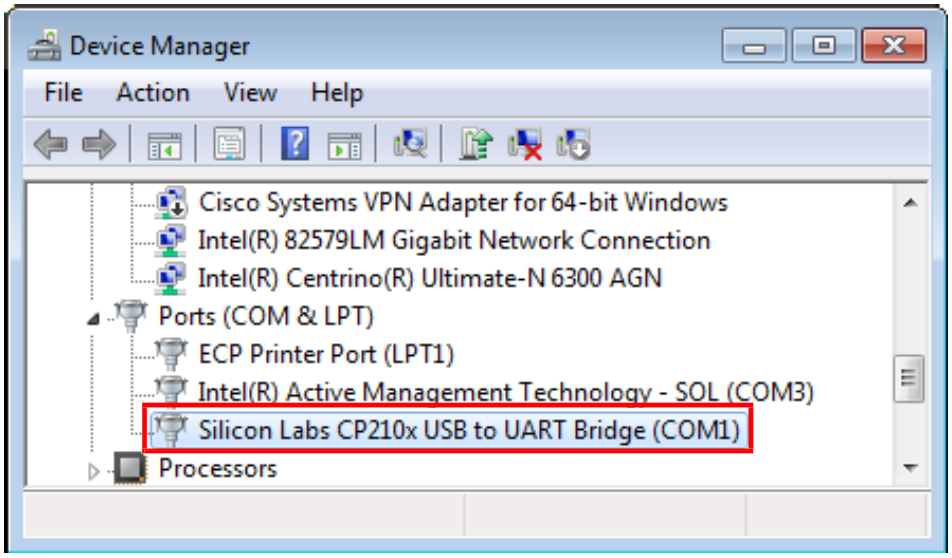
12 Install the USB UART Drivers

Download and install the Silicon Laboratories CP210x VCP drivers on the host computer. The drivers are available for download at http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx

13 Configure the Host Computer COM Port

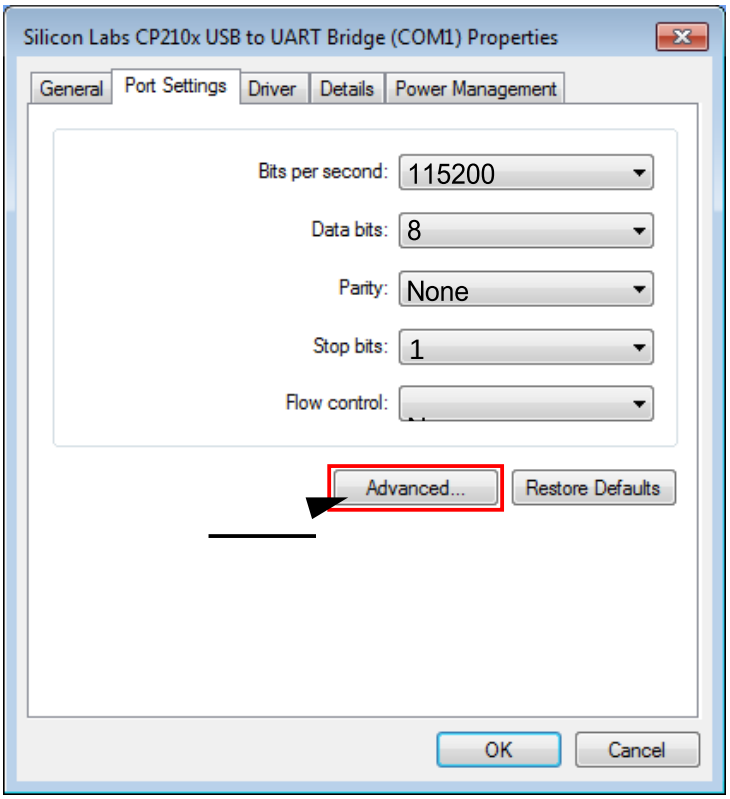
The Reference designs use a terminal program to communicate between the host computer and the Mini-ITX board. To configure the host computer COM port for this purpose:

1. Connect the Mini-ITX board to the host computer via the J7 USB-UART port and power up the board.
2. Open the host computer Device Manage as shown in the following figure. In the Windows task bar, click Start, click Control Panel, and then click Device Manager.

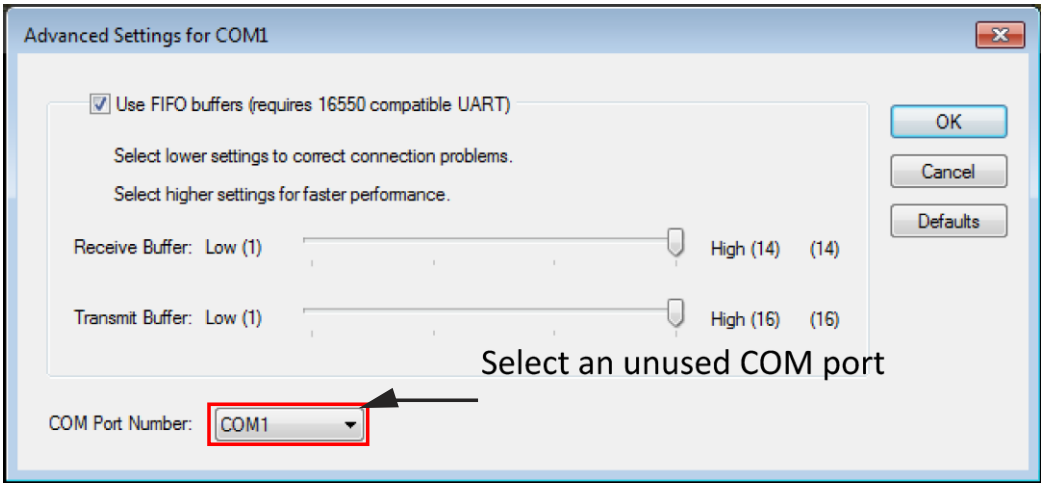


3. Open UART properties. Expand Ports (COM & LPT), right-click Silicon Labs CP210x USB to UART Bridge, and then click Properties.

4. In the properties window, select the Port Settings tab; verify the settings match the values shown in the following figure. Click on the Advanced button to continue.



5. Select an unused COM Port Number and then click OK. The following figure shows COM1 as the selected COM port number.



6. Click OK in the properties window, close the Device Manager and the Control Panel.

14 Install the Terminal Program

Download and install the TeraTerm Pro terminal program on the host computer. TeraTerm Pro is available for download at http://ttssh2.sourceforge.jp/index.html.en. To communicate with the Mini-ITX board, configure the New Connection and Serial Port settings as shown in the following figure. These settings must match the host computer COM port settings shown in the previous section.