AVNET®
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Avnet Technical Training Course

**Developing Zynq Hardware
With Xilinx Vivado Design
Suite – Lab 0**
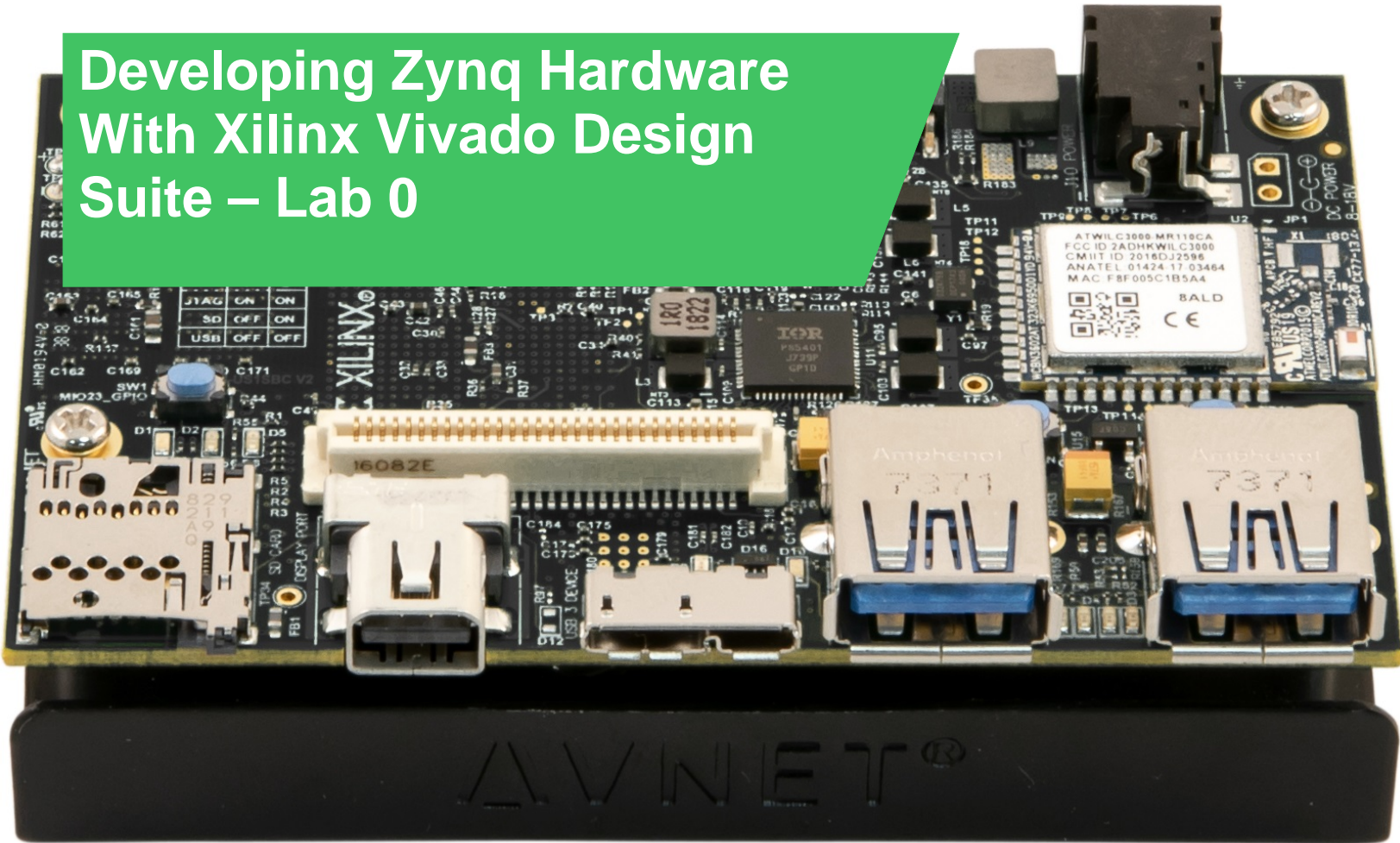
Tools:	2019.1
Training Version:	v12
Date:	July 2019

Lab Setup

To complete all of the Avnet TTC labs, the following software and hardware setups are required.

Software

The recommended software for this Avnet TTC is:

- O/S supported by Xilinx® Vivado® Design Suite 2019.1

    - See UG973 v2019.1 *Release Notes* for the supported list

    - Ubuntu Linux LTS 16.04.01 – Running in a Virtual Machine

- Xilinx Vivado Design Suite 2019.1 (available for download free of charge from Xilinx website)

- MiniZed users
    - Windows 7 and 10 supports the FTDI USB-to-UART bridge without any extra drivers installed – This is required even as we are using a virtual machine to enable pass through
- Adobe Reader for viewing PDF content
    - Adobe Reader X or later recommended

Lab Instruction Notes

Throughout all the Speedway labs, a generalized instruction is given. If you're comfortable completing the task based on that instruction, feel free to do so. If not, step-by-step instructions are provided.

Technical Support

For technical support with any of the labs, please contact your local Avnet FAE or visit the support forum for MiniZed:

<div align="center">

www.minized.org/forum

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Additional technical support resources are listed below.

Evaluation Kit home pages with Documentation and Reference Designs

<div align="center">

www.minized.org

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Xilinx technical support

You may contact your local Avnet FAE or Xilinx Online Technical Support at www.support.xilinx.com . 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

Avnet technical support

Contact your Avnet FAE or the forums for any additional questions regarding the MiniZed, reference designs, kit hardware, or if you are interested in designing any of the kit devices into your next design.

Lab 0 Overview

This lab will provide appropriate guidance for setting up a suitable development platform using the Xilinx Vivado WebPACK 2019.1 tools.

Lab 0 Objectives

When you have completed Lab 0, you will know how to do the following:

- Install appropriate target development board USB-UART drivers under Windows
- Obtain and extract the appropriate Avnet TTC training files archive

Experiment 1: Set up Virtual Machine

There is a total minimum of about 16GB of downloading that needs to occur. The download and installation time will take longer than the actual work time to setup the tools.

Assuming all goes well, it is estimated that you will spend about 1 hour of time performing the hands on steps (that doesn't include the time waiting for the downloads and automated installations).

It is estimated that the downloading and waiting for tools to install will take on average 1-4 hours depending upon your internet speed to the tool's servers.

Please plan accordingly! The steps do not need to be done all at one contiguous sitting.

Prepare your PC, Install the Tools

1. Verify Your BIOS Virtualization Settings

Installation of a 64-bit guest operating system is only recommended on a 64-bit host operating system. Also, virtualization technology (AMD-V or VT-x) must be supported by the processor and enabled in the BIOS.

On Lenovo T420 laptops, Virtualization Technology BIOS settings must be enabled in order to run a guest OS in 64-bit mode, change these settings in the **BIOS Security → Virtualization** settings menu.

On HP Z210 workstations, Virtualization Technology BIOS settings must be enabled in order to run a guest OS in 64-bit mode, change these settings in the **BIOS Security → System Security** settings by setting VTx and VTd to Enabled and accepting with F10 then saving the updated settings.

Windows™ 7 machines that are deployed with Bitlocker™ and other PC protection software require special attention when changing BIOS settings. Bitlocker™ software looks at the BIOS settings and if they change you may need contact your IT support desk for a security code to unlock the system.

2. Read and Execute the Installation Guide, Install the VM

The installation guide is long and ominous looking. Do not despair, if you use the Virtual Machine that has been pre-made for the PetaLinux class much of the work has already been done for you.

Unfortunately Xilinx will not allow pre-installed tools to be distributed along with the pre-made Virtual Machine. This is due to licensing policies and export control requirements.

IMPORTANT TIME SAVER: If you are going to use the highly recommended pre-made VM, when you read and execute the installation instructions we have highlighted the necessary sections in yellow. If a section header is highlighted, you must execute the entire section up to the next section header. If you desire to do it all from scratch you will need to follow all of the sections.

- o Follow the directions within the accompanying VirtualBox Installation Guide PDF in order to properly setup the Virtual Machine used for the remaining PetaLinux Avnet TTC training lab activities.

o Download the Pre-made Virtual Box (Highly suggested vs starting from scratch, the instructions document both)

The download is 2GB, unzipped it will become 6GB. Once the tools are installed it will grow larger than 60GB when running the class labs. You will also need to leave your host OS some space, you should have ideally at least 100GB initially free if you are installing on the host OS's hard disk.

The login information for this virtual machine is:

User: **training**
Password: **avnet**

Note: Unzip this to where you are planning to execute the VM from. This can be a different hard drive than where the VirtualBox software is installed.

DOWNLOAD LINK FOR PRE-BUILT VM FILE (2GB size):
http://avnet.me/Ubuntu_16_04_Virtual_Box_2019_1

DOWNLOAD LINK FOR LAB FILES in a compressed "tarball"
http://avnet.me/ZynqHW_Avnet_TTC_2019_1

Please read the installation guide and setup your own Ubuntu Virtual Machine using the pre-made Avnet TTC VM.

Equipment Checklist
You MUST bring the following with you to the training, they will not be provided:

- ✓ Your laptop/PC with the tools pre-installed via the prior instructions!
- ✓ Two micro-USB cables.
- ✓ USB Flash drive. You will be copying a Linux image from your Flash drive onto the MiniZed eMMC memory. FAT32 or FAT Format is the only format that will work!
- ✓ If your Flash drive and/or micro-USB cable are extra wide, a Type A USB extension.
- ✓ TE Connectivity HTU21D Humidity and Temperature Pmod Sensor.

The typical lab activity will make use of MiniZed with two USB cables and Flash drive plugged in (Note the small space between USB devices) and so this hardware is required to successfully complete the hands-on labs of this course.

Experiment 2: Setting Up Avnet TTC Lab Files

This experiment provides guidance on how to setup the Avnet TTC lab files relating to the corresponding courses.

MiniZed users attending the **Developing Zynq-7000 AP SoC Software** course will need to extract the contents of the **ZynqSW_2019_1_student.zip** file archive to the following folder:

home/training/AvnetTTC/ZynqSW/2019_1/

MiniZed users attending the **Developing Zynq-7000 AP SoC Hardware** course will need to extract the contents of the **ZynqHW_2019_1_student.zip** file archive to the following folder:

home/training/AvnetTTC/ZynqHW/2019_1/

Extracting the archives to the appropriate folders is required in order to follow course lab document instructions.

Experiment 3 General Instruction:

Extract the Avnet TTC lab file archives relating to the corresponding courses to the appropriate local folders.

Experiment 4 Step-by-Step Instructions:

1. Users attending the **Developing Zynq-7000 AP SoC Software** course will need to extract the contents of the **ZynqSW_2019_1_student.zip** file archive to the following folder:

   home/training/AvnetTTC/

Appropriate paths are included within the archive which will create a sub-folder structure containing lab instructions, slides, solution files, and support documents under the **Home/training/AvnetTTC/ZynqSW/2019_1/** folder:

Figure 1 – Zynq Software Course Files Extracted

2. Users attending the **Developing Zynq-7000 AP SoC Hardware** course will need to extract the contents of the **ZynqHW_2019_1_student.zip** file archive to the following folder:

    home/training/AvnetTTC/

    Appropriate paths are included within the archive which will create a sub-folder structure containing lab instructions, slides, solution files, and support documents under the **home/training/AvnetTTC/ZynqHW/2019_1/** folder:

Figure 2 – Zynq Hardware Course Files Extracted

Revision History

Date	Version	Revision
12 Nov 13	01	Initial Release
20 Nov 13	02	Updated instructions on Cypress persistent USB-UART Driver
30 Nov 13	03	Updated instructions, not yet published
24 Mar 15	04	Update to 2014.4
10 Aug 16	05	Updated to 2016.2
22 May 17	06	Updated to 2017.1, added MiniZed/Rebranded
17 Jan 18	07	Updated to 2017.4
Oct 2019	08	Updated to 2019.1

Resources

www.minized.org

www.microzed.org

www.picozed.org

www.zedboard.org

www.em.avnet.com/drc

www.xilinx.com/zynq

www.xilinx.com/sdk

www.xilinx.com/vivado