

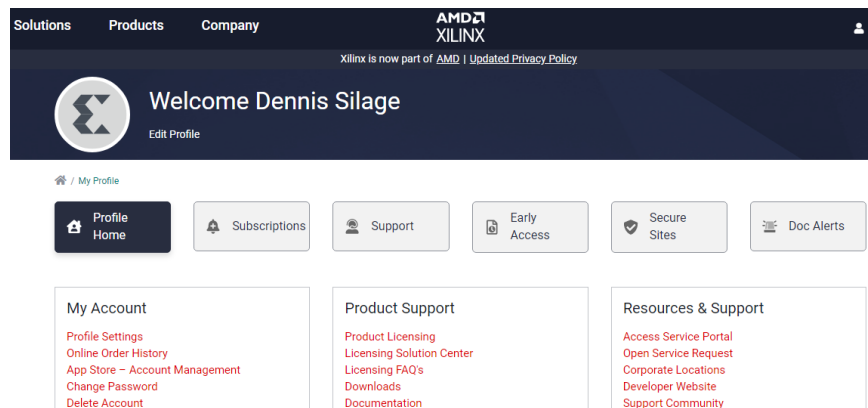
# Xilinx Zynq System-on-Chip Design Workshop

Dennis Silage, PhD  
[silage@temple.edu](mailto:silage@temple.edu)

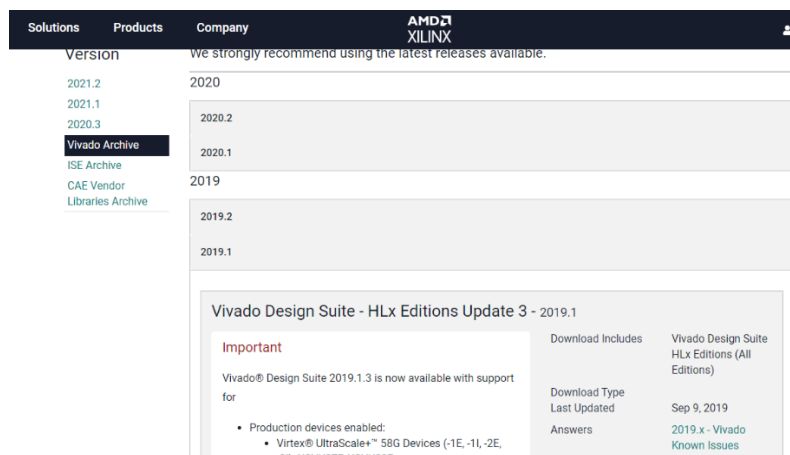
## 1. Installation of Xilinx Vivado SDK

The Workshop employs the Xilinx Vivado HLx WebPACK version 2019.1 and not any current versions for two reasons. The tutorial projects in *The Zynq Book* are directly compatible and this earlier version utilizes significantly less storage.

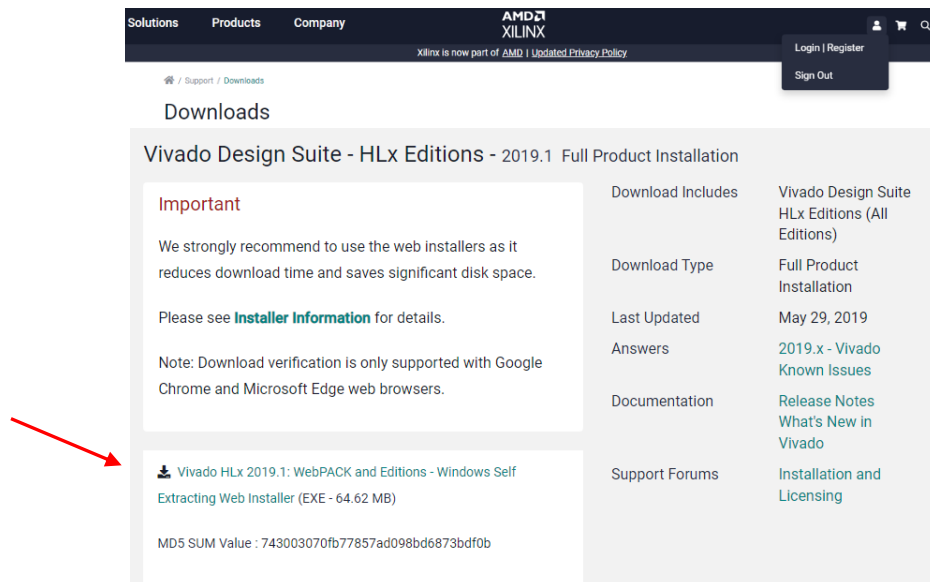
The installation process begins at: <https://www.xilinx.com/support/download.html>. Even though Vivado HLx WebPACK is free, you will be required to register with Xilinx (now part of AMD since the start of 2022).



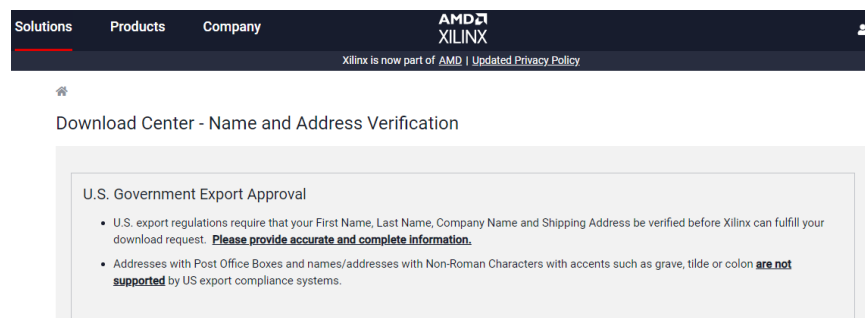
Next, select *Vivado Archive* and the *2019.1* version.



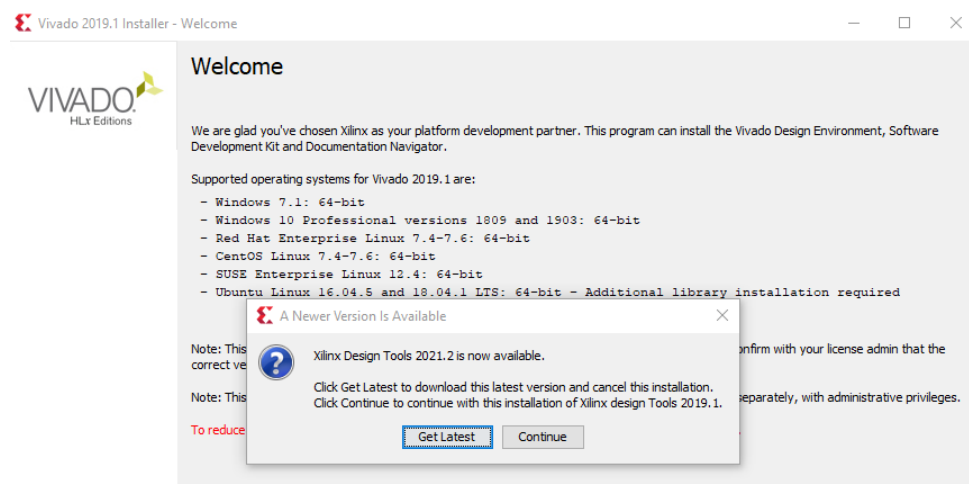
Scroll down and select the Vivado HLx 2019.1 Webpack and Editions Windows self-extracting Web installer.



You will be asked to verify your registration name and address for export control.



The Welcome screen opens and select *Continue* and not *Get Latest* version since 2019.1 is to be installed.



The *Select Install Type* screen requires you to input your *User ID* (usually your email) and the *Password* you entered when registering. Select *Download and Install Now* for an easier installation.

Vivado 2019.1 Installer - Select Install Type

**Select Install Type**

Please select install type and provide your Xilinx.com user ID and password for authentication.

**User Authentication**

Please provide your Xilinx user account credentials to download the required files.  
If you don't have an account, [please create one](#). If you forgot your password, you can [reset it here](#).

User ID:

Password:

☒ **Download and Install Now**

Select your desired device and tool installation options and the installer will download and install just what is required. Downloaded installation files will be saved for future use. NOTE: Future installs using these downloaded files will be restricted to the options selected during this install. For access to all options later, choose "Download Full Image".

☐ **Download Full Image (Install Separately)**

The installer will download an image containing all devices and tool options for later installation. Use this option if you wish to install a full image on a network drive or allow different users maximum flexibility when installing.

You are required to agree to all three terms on the *Accept License Agreements* screen.

Vivado 2019.1 Installer - Accept License Agreements

**Accept License Agreements**

Please read the following terms and conditions and indicate that you agree by checking the I Agree checkboxes.

**Xilinx Inc. End User License Agreement**

By checking "I Agree" below, or OTHERWISE ACCESSING, DOWNLOADING, INSTALLING or USING THE SOFTWARE, I AGREE on behalf of licensee to be bound by the agreement, which can be viewed by [clicking here](#).

☒ **I Agree**

**WebTalk Terms And Conditions**

By checking "I Agree" below, I also confirm that I have read [Section 13 of the terms and conditions](#) above concerning WebTalk and have been afforded the opportunity to read the WebTalk FAQ posted at <https://www.xilinx.com/products/design-tools/webtalk.html>. I understand that I am able to disable WebTalk later if certain criteria described in Section 13(c) apply. If they don't apply, I can disable WebTalk by uninstalling the Software or using the Software on a machine not connected to the internet. If I fail to satisfy the applicable criteria or if I fail to take the applicable steps to prevent such transmission of information, I agree to allow Xilinx to collect the information described in Section 13(a) for the purposes described in Section 13(b).

☒ **I Agree**

**Third Party Software End User License Agreement**

By checking "I Agree" below, or OTHERWISE ACCESSING, DOWNLOADING, INSTALLING or USING THE SOFTWARE, I AGREE on behalf of licensee to be bound by the agreement, which can be viewed by [clicking here](#).

☒ **I Agree**

On the *Select Edition to Install* screen select the free *Vivado HL WebPACK*.

Vivado 2019.1 Installer - Select Edition to Install

**Select Edition to Install**

Select an edition to continue installation. You will be able to customize the content in the next page.

☒ **Vivado HL WebPACK**

Vivado HL WebPACK is the no cost, device limited version of Vivado HL Design Edition. Users can optionally add Model Composer and System Generator for DSP to this installation.

☐ **Vivado HL Design Edition**

Vivado HL Design Edition includes the full complement of Vivado Design Suite tools for design, including C-based design with Vivado High-Level Synthesis, implementation, verification and device programming. Complete device support, cable drivers and Documentation Navigator are included. Users can optionally add Model Composer to this installation.

☐ **Vivado HL System Edition**

Vivado HL System Edition is a superset of Vivado HL Design Edition with the addition of System Generator for DSP. Complete device support, cable drivers and Documentation Navigator are included. Users can optionally add Model Composer to this installation.

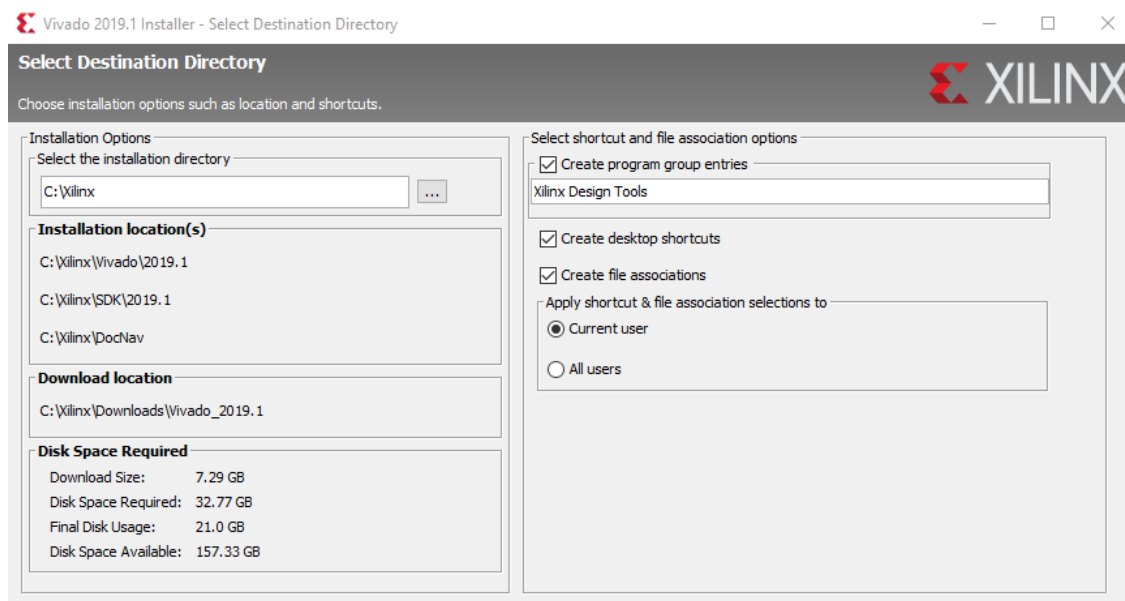
☐ **Documentation Navigator (Standalone)**

Xilinx Documentation Navigator (DocNav) provides access to Xilinx technical documentation both on the Web and on the Desktop. This is a standalone installation without Vivado Design Suite.

On the *Vivado HL WebPACK* screen *Devices* section only select SoCs and only the *Zynq-7000* as shown. This selection will decrease the size and time to install the software and is all that is needed for this Workshop.



Finally, on the *Select Destination Directory* select *C:\Xilinx*. The installation will prompt you if no such directory exists and will create one.

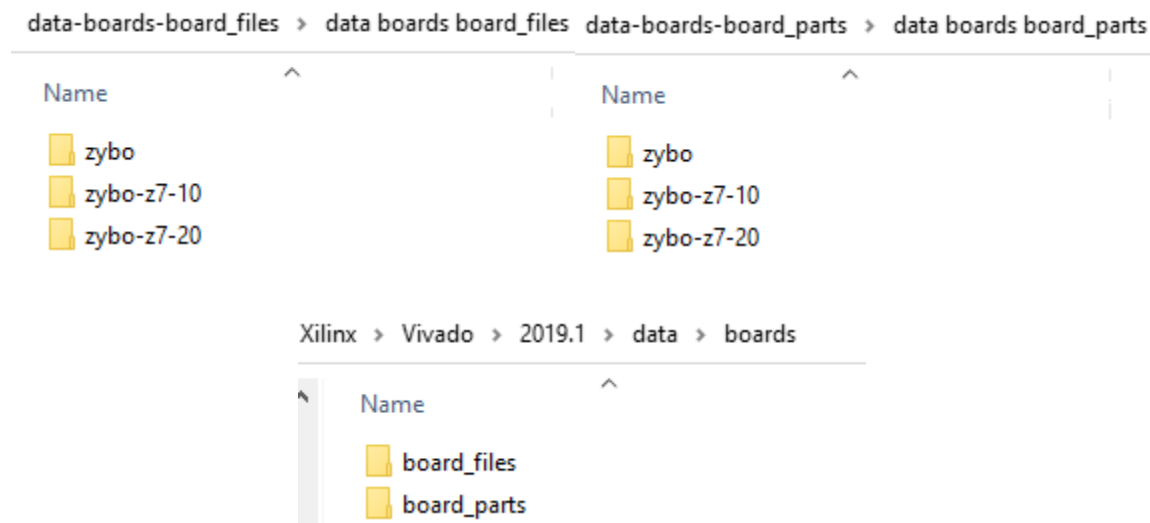


The software download and installation are quite lengthy and depends upon your connection speed and processor. There are progress bars which indicate the completion of each stage.



## 2. Installation of Board Support

Download and unzip the folders *data-board-board\_files* and *data-board-board\_parts* from the Workshop website [sites.temple.edu/silage/workshops/](http://sites.temple.edu/silage/workshops/) and move their subfolders to the folder *C:\Xilinx\Vivado\data\boards\board\_files* and *....\board\_parts*, as shown below. These are the board support for the original Zybo and two versions of the Zybo Z7 (Z7-10 and Z7-20).



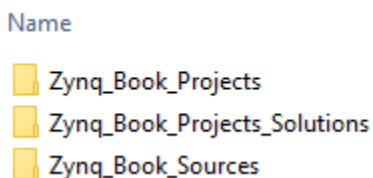
## 3. Installation of the Zynq Book Reference, Tutorial and Sources

Download *The\_Zynq\_Book* (reference) and *The\_Zynq\_Book\_Tutorial* pdf from the Workshop website [sites.temple.edu/silage/workshops/](http://sites.temple.edu/silage/workshops/) and install then in a convenient location like *Documents/Zynq Book*.

Download and unzip the *Zynq\_Book\_Sources* (C files) from the Workshop website [sites.temple.edu/silage/workshops/](http://sites.temple.edu/silage/workshops/) and install as the folder *C:\Zynq\_Book\_Sources*. Also create a folder *C:\Zynq\_Book\_Projects* with no entries that will be used in the Workshop.

## 4. Installation of Workshop Project Solutions

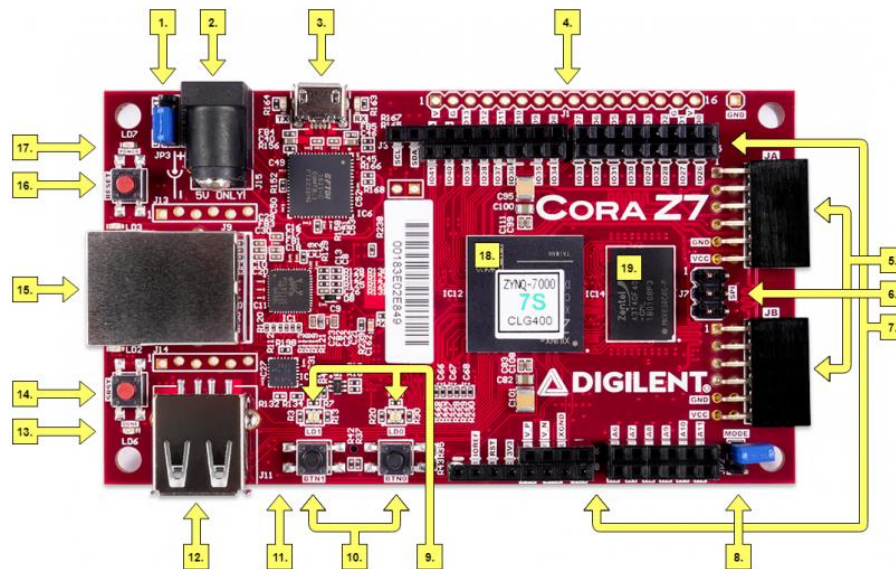
Download and unzip the complete Tutorial project solutions *Zynq\_Book\_Project\_Solutions* from the Workshop website [sites.temple.edu/silage/workshops/](http://sites.temple.edu/silage/workshops/) to a created folder *C:\Zynq\_Book\_Projects\_Solutions*.



## 5. Digilent Zybo Z7 and Cora Z7-07S Reference Manuals

The reference manuals for the Digilent Zybo Z7 for the Workshop and the Cora Z7-07S are available on the Workshop website [sites.temple.edu/silage/workshops/](https://sites.temple.edu/silage/workshops/).

The Cora-Z7-07S development board is a lower cost version of the Zybo Z7 with less peripherals, a single core Zynq processing systems and less Zynq programmable logic. However, there are no supplies of this board until nominally September 2022. A more expensive dual-core version, the Cora Z7-10 which has the same Zynq device as the Zybo Z7, is currently available in limited quantities. However, Digilent lists it as *end-of-life* but the Cora-Z707S is not affected.



Callout	Description	Callout	Description
1	Power select jumper (Ext. supply / USB)	11	microSD card slot (underside of board)
2	Power jack (for optional ext. supply)	12	USB host port
3	Shared USB JTAG / UART port	13	FPGA programming DONE LED
4	Unloaded expansion header	14	Processor subsystem reset button
5	Pmod connectors	15	Ethernet port
6	SPI header (Arduino/ChipKIT compatible)	16	Power on reset button
7	Arduino/ChipKIT shield connectors	17	Power good LED
8	Programming mode jumper (JTAG / microSD)	18	Zynq-7000
9	User tri-color LEDs	19	DDR3L memory
10	User push buttons		