UltraZed™-EV Starter Kit
Getting Started
Version 1.3
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1 About this Guide
This guide provides detailed information for getting started with the Avnet UltraZed-EV™ Starter Kit powered by the Xilinx Zynq® UltraScale+™ MPSoC. Follow the detailed instructions in this document to begin development right away.

1.1 Additional Documentation
Additional documents for the Xilinx Zynq® UltraScale+™ MPSoC devices are available for download at:


1.2 Additional Support Resources
To search the database of silicon and software questions and answers or to create a technical support case in Web Case, see the Xilinx website at:

http://www.xilinx.com/support
2 Introduction
The UltraZed-EV™ Starter Kit consists of the UltraZed-EV System-on-Module (SOM) and Carrier Card bundled to provide a complete system for prototyping and evaluating systems based on the Xilinx powerful Zynq® UltraScale+™ MPSoC EV device family.

UltraZed-EV SOM
UltraZed-EV™ SOM is a high performance, full-featured, System-On-Module (SOM) based on the Xilinx Zynq® UltraScale+™ MPSoC EV family of devices. Designed in a small form factor, the UltraZed-EV SOM on-board dual system memory, high-speed transceivers, Ethernet, USB, and configuration memory provides an ideal platform for embedded video processing systems. The UltraZed-EV provides easy access to 152 user I/O pins, 26 PS MIO pins, 4 high-speed PS GTR transceivers along with 4 GTR reference clock inputs, and 16 PL high-speed GTH transceivers along with 8 GTH reference clock inputs through three I/O connectors on the backside of the module.

Designers can simply design their own carrier card, plug-in UltraZed-EV SOM, and start their application development with a proven Zynq UltraScale+ MPSoC sub-system. Available with the Zynq UltraScale+ MPSoC XCZU7EV-FBVB900 device, the UltraZed-EV SOM enables designers to build multimedia, automotive ADAS, surveillance, and other embedded vision applications with confidence and ease. The MPSoC EV device with its integrated H.264 / H.265 video codec unit is capable of simultaneous encode and decode up to 4Kx2K (60fps). For more information, please refer to the UltraZed-EV SOM Product Brief on the www.ultrazed.org website.

UltraZed-EV Carrier Card
The UltraZed-EV Carrier Card supports the UltraZed-EV™ System-on-Module (SOM), providing easy access to the full 152 user I/O, 26 PS MIO, 4 PS GTR transceivers, and 16 GTH transceivers available from the UltraZed-EV SOM via three Micro Headers. Two 200-pin Micro Headers on the carrier card mate with the UltraZed-EV SOM, connecting 152 of the UltraZed-EV Programmable Logic (PL) I/O along with 16 GTH transceivers to FMC HPC slot, LVDS Touch Panel interface, SFP+ interface, HDMI In/Out, 3G-SDI In/Out, push button switches, DIP switches, LEDs, Xilinx SYSMON, clock generators, and 2 Digilent Pmod™ compatible interfaces.

The UltraZed-EV Carrier Card also uses a 120-pin Micro Header to gain access to the UltraZed-EV SOM Processing System (PS) MIO and GTR transceiver pins as well as USB 2.0 and Gigabit Ethernet interfaces. The UltraZed-EV SOM PS MIO and GTR pins are used on the UltraZed-EV Carrier Card to implement the microSD card, PMOD, USB 2.0/3.0, Gigabit Ethernet, SATA host, Display Port, PCIe Root Port, dual USB-UART, user LED and switch, and MAC Address device interfaces.

The UltraZed-EV Carrier Card also provides several power rails to the UltraZed-EV SOM including the 12V main input voltage, user selectable bank voltages for the PL I/O (VCCOs), and the necessary voltages for the GTR and GTH transceivers. The UltraZed-EV Carrier Card is a great vehicle for validating the UltraZed-EV SOM and provides an excellent starting point for creating your own UltraZed-EV custom carrier card. For more information, please refer to the UltraZed-EV Carrier Card Product Brief on the www.ultrazed.org website.
2.1 UltraZed-EV SOM Features

- Xilinx XCZU7EV-1FBVB900 device
- PS DDR4 SDRAM (4GB, in x64 configuration)
- PL DDR4 SDRAM (1GB, in x16 configuration)
- 300 MHz LVDS system clock
- Dual QSPI Flash (64MB)
- I2C EEPROM (2Kb)
- eMMC Flash (8GB, x8)
- USB 2.0 ULPI PHY
- Gigabit Ethernet PHY
- I2C 8-bit I/O expander
- 2-channel I2C switch/mux
- PS reference clock input
- On-board voltage regulators
- Power-On Reset (POR) circuit
- Small 4-position boot mode DIP switch
- 3 JX micro-header connectors (2 x 200-pin, 1 x 120-pin) providing the following connections to the Carrier Cards
  - 152 user PL I/O pins
  - 26 user PS MIO pins (one full MIO bank)
  - 4 PS GTR transceivers
  - 4 PS GTR reference clock inputs
  - 16 PL GTH transceivers
  - 8 PL GTH reference clock inputs
  - PS JTAG interface
  - PL SYSMON interface
  - USB 2.0 connector interface
  - Gigabit Ethernet RJ45 connector interface
  - PMBus interface
  - SOM PS VBATT battery input
  - Carrier Card I2C interface
  - SOM Reset input
  - Carrier Card interrupt input
  - Carrier Card Reset output
  - Power Good output
  - SOM input voltages and output sense pins
2.2 UltraZed-EV Carrier Card Features

- Single UltraZed-EV SOM slot
- microSD card connector
- PS PMOD header
- Dual USB-UART
- DisplayPort connector
- USB 2.0/3.0 connector
- SATA 3.0 host interface
- PCIe Gen2 x1 Root Port
- RJ45 connector
- 2 PL PMOD headers
- PL user DIP and Push switches
- PL user LEDs
- PS user LED
- PMBus header
- PS VBATT battery
- SOM reset switch
- Differential clock generator
- Digilent USB-JTAG module
- PC4 JTAG header
- I2C MAC Address device
- LVDS Touch Panel interface
- USB connector (for dual USB-UART)
- HDMI In/Out Interfaces
- 3G-SDI In/Out Interfaces
- Dual SFP+ interfaces
- FMC HPC slot
- 3 JX micro connectors (2 x 200-pin, 1 x 120-pin) providing the following connections to the UltraZed-EV SOM:
  - 152 user PL I/O pins
  - 26 user PS MIO pins (one full MIO bank)
  - 4 PS GTR transceivers
  - 4 PS GTR reference clock inputs
  - 16 PL GTH transceivers
  - 8 PL GTH reference clock inputs
  - PS JTAG interface
  - PL SYSMON interface
  - USB 2.0 connector interface
  - Gigabit Ethernet RJ45 connector interface
  - PMBus interface
  - SOM PS VBATT battery input
  - Carrier Card I2C interface
  - SOM Reset input, SOM Power Good output, and Carrier Card Reset output
  - Carrier Card interrupt input
  - Power and Ground pins
2.3 UltraZed-EV Starter Kit Contents

What’s Inside the Box:
- Hardware:
  - UltraZed-EV SOM
  - UltraZed-EV Carrier Card
  - One Ethernet and two USB A-micro-B Cables
  - 12V Power Supply (US/UK/Euro AC cords)
  - UltraZed-EV SOM Mounting Hardware
  - microSD Card (8GB)

- Software Tools:
  - Voucher for Vivado Design Edition License (device locked to the ZU7EV)

What’s Available Online:
- License for Vivado Design Suite
  - [http://www.xilinx.com/support/licensing_solution_center.htm](http://www.xilinx.com/support/licensing_solution_center.htm)
- Development Kit home page with Documentation and Reference Designs
  - www.ultrazed.org/product/ultrazed-ev-starter-kit
- Technical Support
  - [http://xilinx.com/support](http://xilinx.com/support)
3 Getting Started with UltraZed-EV Starter Kit

3.1 The UltraZed-EV Starter kit is shipped with a simple demo stored in the SOM’s QSPI and eMMC Flash devices. You can run this demo by simply setting up the board and turning the power on.

3.2 Avnet UltraZed-EV Starter Kit Setting up the Hardware

Please perform the following steps to setup the UltraZed-EV Starter Kit and install the serial port driver. NOTE: The jumpers on the boards are pre-configured at the factory for the below start-up mode. If the jumpers have been moved please refer to the appropriate User Guide document for proper jumper configuration.

- Plug the UltraZed-EV SOM onto the UltraZed-EV Carrier Card via JX1/JX2/JX3 connectors.
- Set the UltraZed-EV SOM SW2 Boot Mode switch (MODE[0:3] = SW2[1:4]) to OFF, ON, ON, and ON positions (Boot Mode set to QSPI, MODE[3:0] = 0x1).
- Install a jumper on the Carrier Card J20 pins 2-3.
- Connect the micro USB cable to J16 on the Carrier Card and the USB port of the PC. This will provide USB-UART connection to the board.
- Connect 12V power supply to J18 on the Carrier Card.
- Use Device Manager to determine the COM Port. Open a terminal program, configure it to 115200/8/n/1/n, connect to the COM Port.
- Slide the Carrier Card power switch (SW7) to the ON position.
- The out-of-box design will run and you will see the following on the UART terminal (please allow time for Linux to boot). You should also see the PS on-board user Red LED flashing.
3.3 Running the Out of Box Demo

The UltraZed-EV Starter kit is shipped with a simple demo stored in the SOM’s QSPI and eMMC Flash devices. To run this demo, set up the hardware as described in the previous section and then:

- Slide the SW7 power switch to the **ON** position on the Carrier Card.
- The out-of-box design will run and you will see the following on the UART terminal (please allow time for Linux to boot). You should also see the PS on-board user Red LED flashing.
- You may login as root with password root.

 OO& Other file downloads: If you would like to download the OOB SW demo, or any other reference designs, please go to www.ultrazed.org/product/ultrazed-EV to download files.

SD Card OOB execution: you may also run the Out of Box design from the microSD card located on the UltraZed-EV Carrier Card.

- Please go to www.ultrazed.org/product/ultrazed-EV and download the Out of Box boot image files as well as the README file.
- Follow the instructions in the README file to copy the boot image onto the Avnet supplied microSD card.
- Slide the SW7 power switch to the **OFF** position on the Carrier Card.
- Insert the microSD card into J7 microSD card slot on the Carrier Card.
- Set the UltraZed-EV SOM SW2 Boot Mode switch (MODE[0:3] = SW2[1:4]) to OFF, ON, OFF, and ON positions (Boot Mode set to SD Card, MODE[3:0] = 0x5).
- Slide the SW7 power switch to the **ON** position on the Carrier Card to boot from the microSD card and run the Out of Box demo.
4 Next Steps
Now that you have run through the demos, you are ready to create custom systems for the UltraZed-EV Starter Kit. You can start by downloading various reference designs for this kit from the Avnet website at www.ultrazed.org/product/ultrazed-EV.

5 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 UltraZed-EV Starter Kit reference designs or kit hardware

www.ultrazed.org/product/ultrazed-ev-starter-kit
6 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 UltraZed-EV Starter Kit.

6.1 Install the USB UART Drivers
Download and install the Silicon Laboratories CP210x VCP drivers on the host computer from the http://www.silabs.com/products/mcu/Pages/USBtoUARTBridgeVCPDrivers.aspx website.

6.2 Configure the Host Computer COM Port
The Reference designs use a terminal program to communicate between the host computer and the UltraZed-EV Starter Kit. To configure the host computer COM port for this purpose:

- Connect the UltraZed-EV Starter Kit to the host computer via the Carrier Card J16 USB-UART port and power up the board.
- Open the host computer Device Manager as shown in the following figure. In the Windows task bar, click Start, click Control Panel, and then click Device Manager.

- Open UART properties. Expand Ports (COM & LPT), right-click on Silicon Labs Dual CP210x USB to UART Bridge: Enhanced COM Port (COM17), and then click Properties. The COM port numbers that appear are based on your individual configuration. This example references COM17 and COM18, but your port numbers may be different. COM17 will be connected to the PS UART0 and COM18 will be connected to the PS UART1. In this tutorial, we will be using the COM17 PS UART0 as STDOUT and STDIN for the terminal connection.
– 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.

![Port Settings window](image)

– Select an unused COM Port Number and then click OK. The following figure shows COM17 as the selected COM port number.

![Advanced Settings for COM17](image)

– Click OK in the properties window, close the Device Manager and the Control Panel.
6.3 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 UltraZed-EV Starter Kit, 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. COM17 is shown in this example, as it is configured as UART0.

![New Connection Settings](image1)

![Serial Port Settings](image2)