Digilent Zybo Z7-10

Digilent Zybo Z7-10 Zynq-7000 ARM/FPGA SoC Development Board Instruction Manual

Model: Zybo Z7-10

Brand: Digilent

1. Overview

The Digilent Zybo Z7-10 is a feature-rich, ready-to-use embedded software and digital circuit development board. It provides a comprehensive set of multimedia and connectivity peripherals, making it a versatile single-board computer solution.

Built around the Xilinx Zynq-7000 AP SoC, the board integrates a 650MHz dual-core Cortex-A9 processor with a DDR3 memory controller and 8 DMA channels. This combination of processing system and programmable logic offers a powerful platform for various applications.

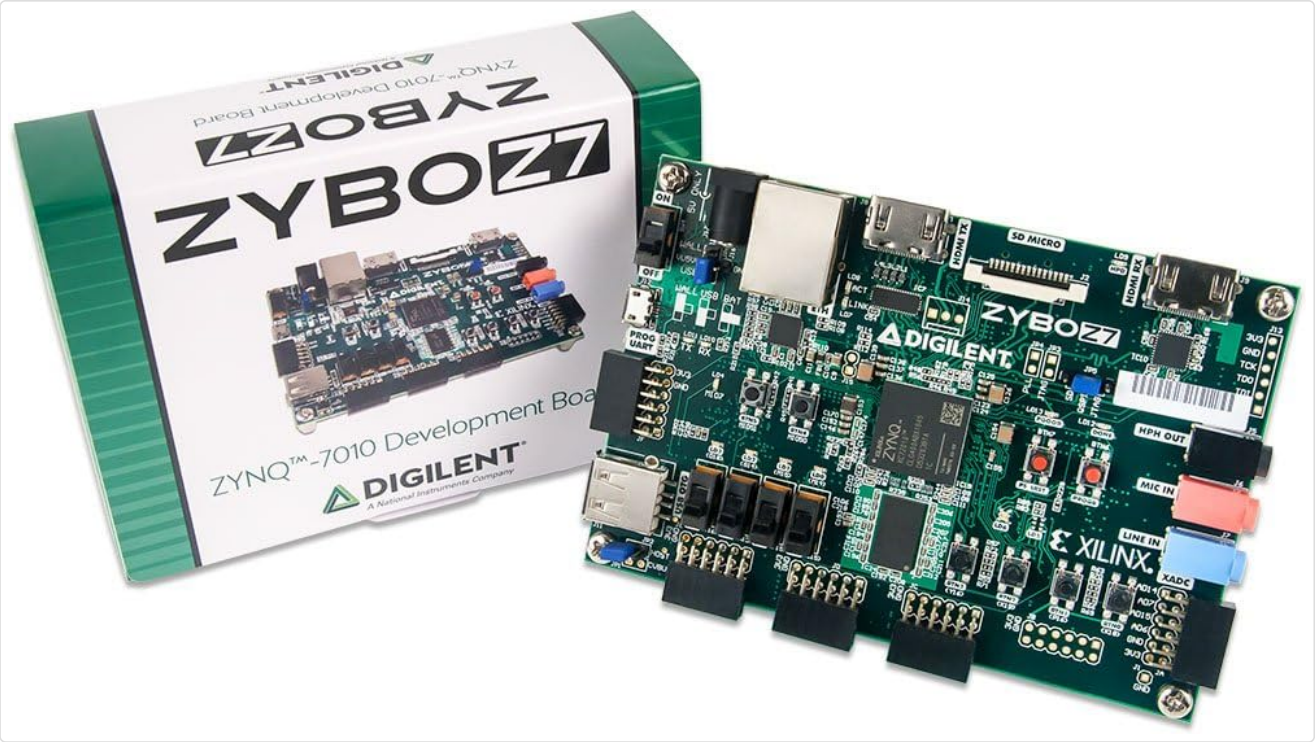


Figure 1: Digilent Zybo Z7-10 Development Board and its packaging.

2. Setup and Initial Configuration

To begin using your Zybo Z7-10 development board, follow these steps for proper setup:

1. **Power Connection:** Connect the board to a power source using either the USB port or a 5V barrel jack connector. Ensure the power supply meets the board's requirements.
2. **USB Connection:** For communication with a host computer, connect the board via a USB cable to an available USB port. This connection is typically used for programming and debugging.
3. **Video Output (Optional):** If your application requires video output, connect an HDMI display to the board's HDMI TX port.
4. **Audio Connections (Optional):** For audio input or output, connect appropriate audio devices to the MIC IN, LINE IN, or HPH OUT (headphone out) jacks.
5. **Pmod Connectors (Optional):** Utilize the six Pmod connector ports for expanding functionality with various peripheral modules.

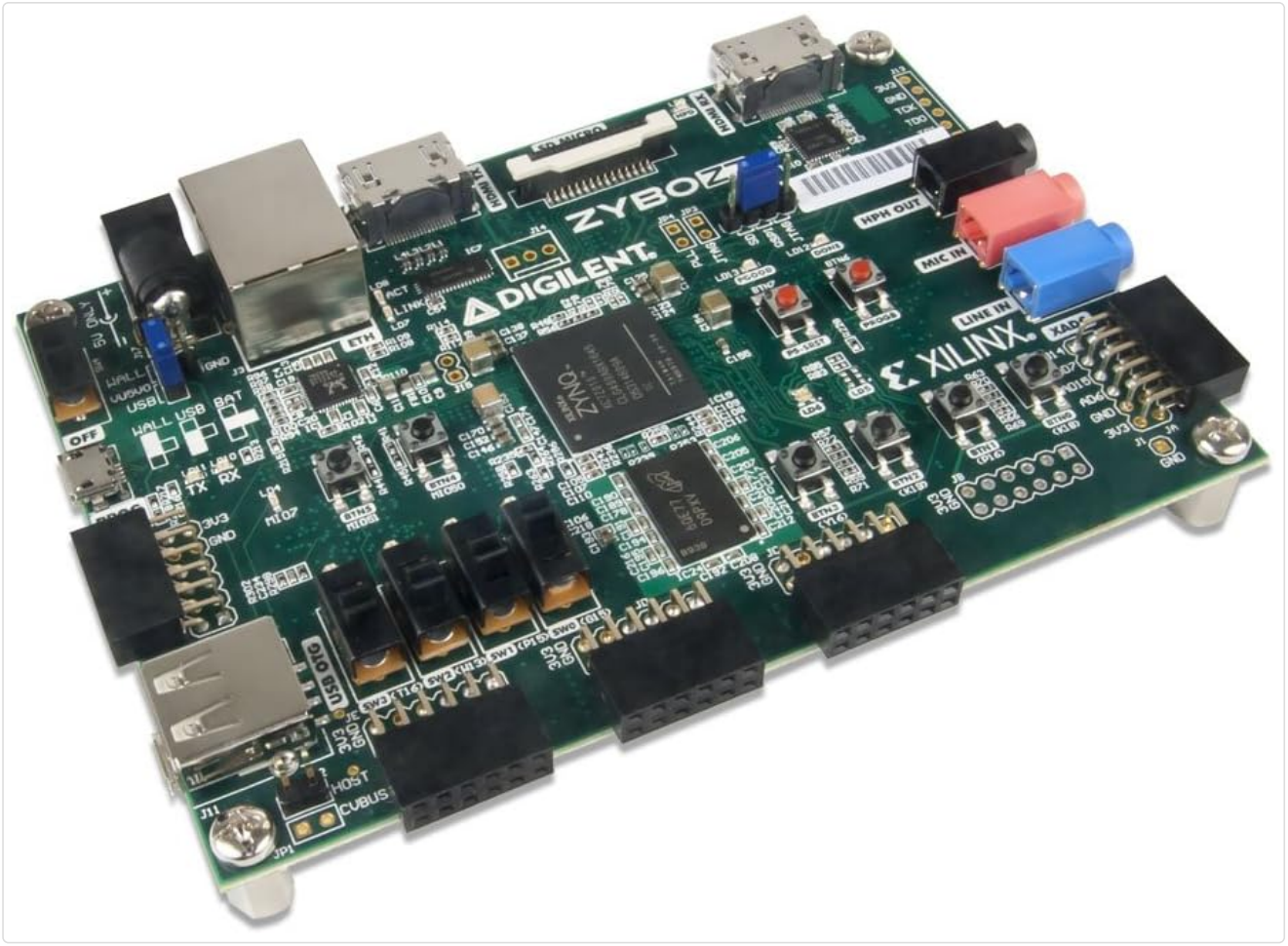


Figure 2: Side view of the Zybo Z7-10 board highlighting connectivity options.

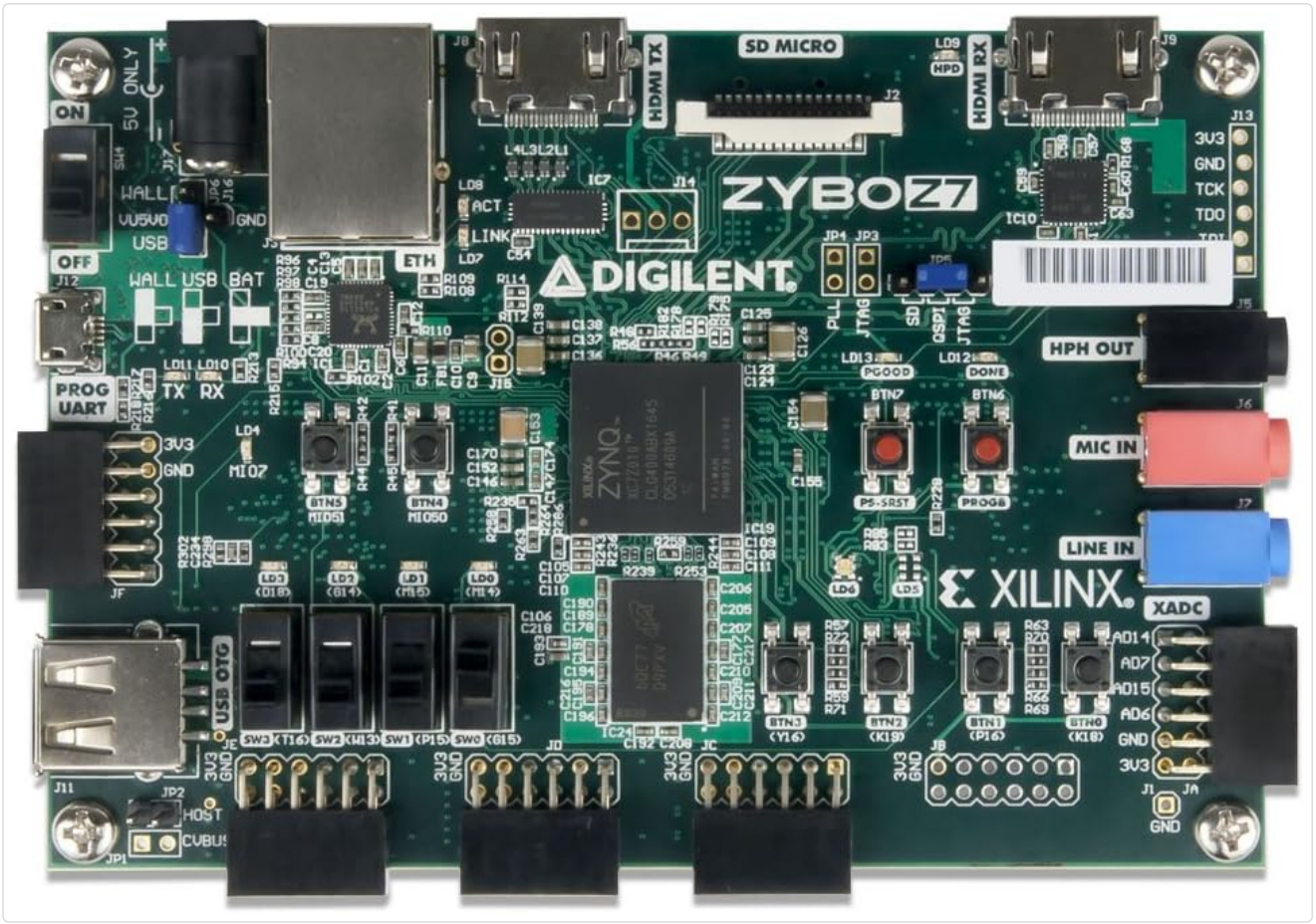


Figure 3: Top-down view of the Zybo Z7-10 board, detailing component layout.

3. Operating the Board

The Zybo Z7-10 offers various on-board user interfaces and extensive I/O for development:

- **User Interfaces:** The board includes 6 push buttons, 4 slide switches, 5 LEDs, and 2 RGB LEDs for direct user interaction and status indication.
- **FPGA I/O:** Over 30 FPGA I/O pins are available for custom connections and interfacing with external circuits.
- **Analog-to-Digital Conversion:** Four analog-capable 0-1.0V differential pairs connect to the XADC, enabling analog signal processing.

3.1. FPGA Programming

The Zynq-7000 AP SoC on the Zybo Z7-10 can be programmed via JTAG for volatile configuration or through the on-board QSPI flash memory for non-volatile storage of your designs. Development typically involves Xilinx Vivado Design Suite.

For detailed programming instructions and examples, refer to the official Digilent documentation and tutorials available on their website.

4. Technical Specifications

Feature	Detail
Processor	Xilinx Zynq-7000 AP SoC (XC7Z010-1CLG400C) with 650MHz dual-core ARM Cortex-A9
RAM	DDR3L, 1 GB installed size
Operating System	Linux (supported)
Wireless Type	802.11b
Item Weight	4 ounces
Product Dimensions	6 x 8 x 3 inches
Power Source	See product details (USB or barrel connector)
On-board User Interfaces	6 push buttons, 4 slide switches, 5 LEDs, 2 RGB LEDs
Expansion	6 Pmod connector ports, >30 FPGA I/O, 4 Analog capable 0-1.0V differential pairs to XADC

5. Maintenance and Care

To ensure the longevity and proper functioning of your Zybo Z7-10 board, observe the following maintenance guidelines:

- **Handling:** Always handle the board by its edges to avoid touching components, especially the FPGA chip, which can be sensitive to electrostatic discharge (ESD).
- **Storage:** Store the board in an anti-static bag when not in use, and keep it in a dry, dust-free environment.
- **Cleaning:** If necessary, gently clean the board with a soft, dry brush or compressed air to remove dust. Avoid using liquids or abrasive cleaners.
- **Power Off:** Always disconnect power before making or changing any connections to the board.

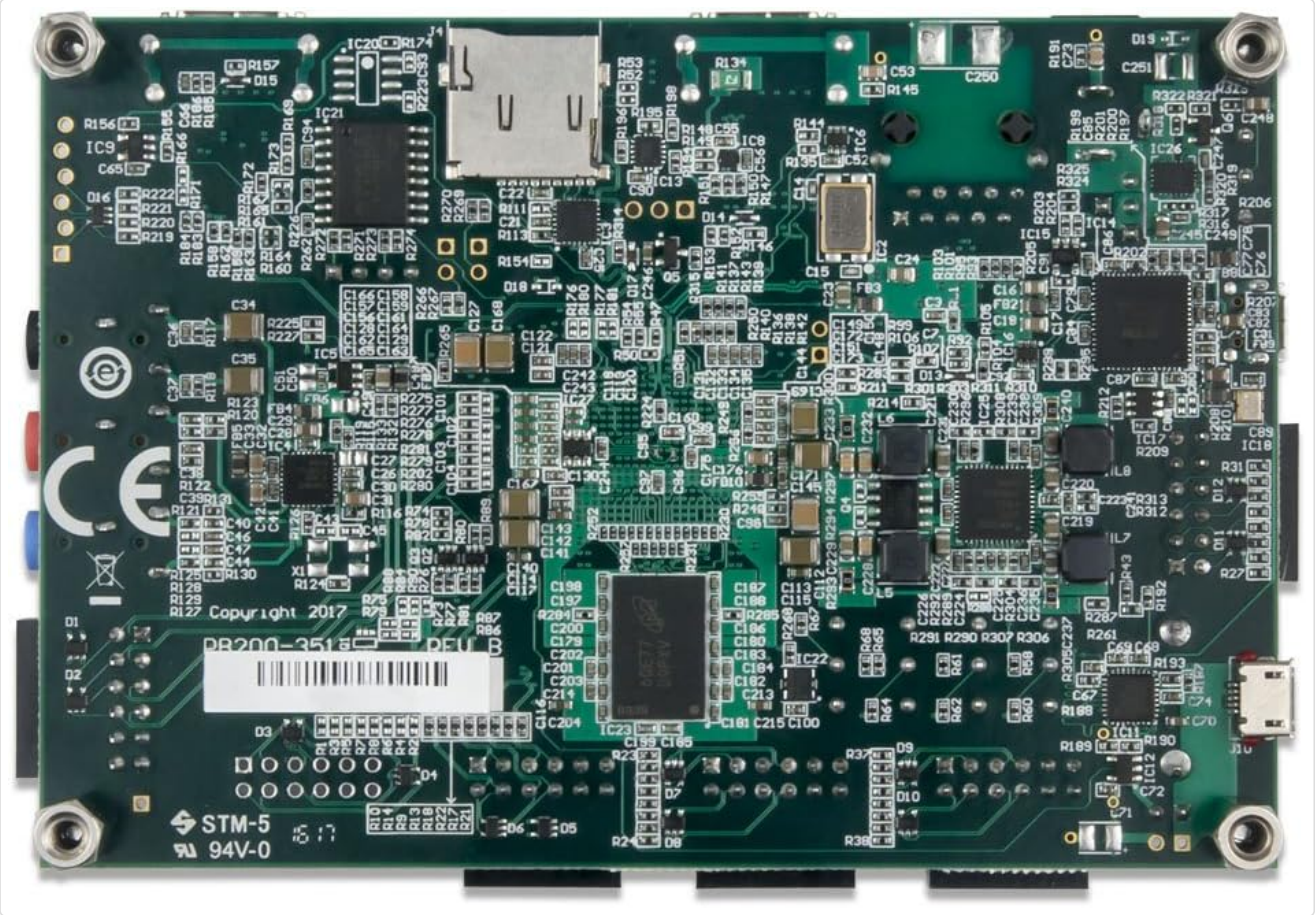


Figure 4: Bottom view of the Zybo Z7-10 board, showing mounting points.

6. Troubleshooting

If you encounter issues with your Zybo Z7-10 board, consider the following common troubleshooting steps:

- **No Power Indication:**
  - Verify that the power supply is correctly connected and providing the specified 5V.
  - Check the power cable for any damage.
- **USB Connection Issues:**

- Ensure the USB cable is securely connected to both the board and the host computer.
- Try a different USB port or cable.
- Install or update the necessary USB drivers for the Zynq device.

- **FPGA Not Programming:**
  - Confirm that the JTAG chain is correctly connected and recognized by your development software (e.g., Xilinx Vivado).
  - Ensure the correct bitstream or programming file is selected.
  - Check for any error messages in the development software console.

- **Software/Firmware Problems:**
  - Refer to Digilent's official support resources for specific software setup and known issues.
  - Ensure your development environment (e.g., Vivado) is up to date.

7. Warranty and Support

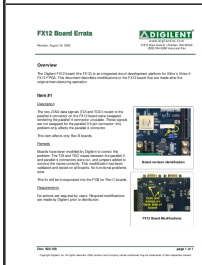
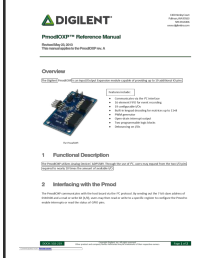
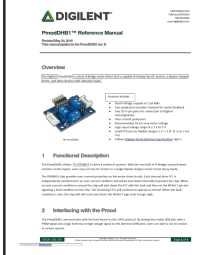
For warranty information, technical support, and additional resources, please visit the official Digilent website. Digilent provides extensive documentation, tutorials, and community forums to assist users with their development boards.

Manufacturer: Digilent

Online Resources: www.digilentinc.com

Related Documents - Zybo Z7-10

	Digilent Pmod 8LD Reference Manual - High-Brightness LED Module Detailed reference manual for the Digilent Pmod 8LD, a compact module featuring eight high-brightness green LEDs controlled via GPIO pins and BJTs for low-power logic-level operation.

	[Digilent CoolRunner-II Starter Board Reference Manual] A comprehensive reference manual for the Digilent CoolRunner-II Starter Board, a USB-powered development platform featuring a Xilinx CoolRunner-II CPLD, power supplies, oscillator, I/O devices, and expansion connectors.
	[Digilent FX12 Board Errata and Modifications] Official errata document from Digilent detailing modifications made to the FX12 development board, specifically addressing JTAG signal routing issues on Rev B boards.
	[Digilent PmodIOXP Input/Output Expansion Module Reference Manual] This reference manual details the Digilent PmodIOXP, an Input/Output expansion module designed to provide up to 19 additional I/O pins. It highlights features such as I²C communication, a 16-element FIFO, built-in keypad decoding, and PWM generation, along with functional descriptions, interfacing details, pinout, and physical dimensions.
	[Digilent PmodDHB1 Dual H-Bridge Motor Driver Reference Manual] Reference manual for the Digilent PmodDHB1, a dual H-bridge motor driver capable of controlling two DC motors or a bipolar stepper motor, featuring over-current protection and quadrature encoder feedback.
	[Digilent PmodRS485 Reference Manual] This reference manual provides detailed information on the Digilent PmodRS485, a high-speed RS-485 communication module offering signal and power isolation for robust data transfer in noisy environments. It covers features, functional description, interfacing, pinouts, and physical dimensions.