

SCFPGA PA200T-FL-KFB

SCFPGA Artix-7 FPGA Development Board PA200T-FL-KFB User Manual

Model: PA200T-FL-KFB | Brand: SCFPGA

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1. INTRODUCTION

This manual provides comprehensive instructions for the SCFPGA Artix-7 FPGA Development Board, model PA200T-FL-KFB. It covers the board's features, technical specifications, setup procedures, operational guidelines, maintenance tips, and troubleshooting information. This board is designed for various computing tasks and logic-intensive workloads, offering flexible FPGA options and comprehensive high-speed interfaces.

2. PRODUCT OVERVIEW

The SCFPGA Artix-7 FPGA Development Board is a versatile platform featuring Xilinx Artix-7 FPGAs. It offers multiple FPGA options, including XC7A75T, XC7A100T, and XC7A200T, providing up to 215,360 logic cells and 740 DSP slices. The board is equipped with a range of high-speed interfaces and expansion capabilities, making it suitable for diverse applications from data transmission to industrial control.

2.1 Key Features

- **Multiple FPGA Options:** Choose from Artix-7 XC7A75T, XC7A100T, or XC7A200T for flexible computing tasks.
- **Comprehensive High-Speed Interfaces:** Includes 2x SFP, SATA, HDMI, USB to UART/JTAG, Gigabit Ethernet, and a 40P expansion port.
- **FMC LPC Interface:** Equipped with an FMC LPC connector supporting 72 IOs for integration with high-performance modules.
- **Industrial-Grade Design:** Operates reliably in harsh environments (-40°C to +85°C) with 1GB DDR3 and 256Mb QSPI Flash.
- **Multiple Boot Modes:** Supports JTAG/QSPI startup and SD card boot, along with onboard user keys, LEDs, and MIPI CSI input.

2.2 Board Components

The following diagram illustrates the main components and interfaces of the Artix-7 FPGA Development Board.

Figure 1: Labeled diagram of the SCFPGA Artix-7 FPGA Development Board PA200T-FL-KFB. Key components include 12V Power Input, Power Switch, SATA Interface, 40P Expansion Port, User Key, User LED, Reset Key, SFP x2, Gigabit Ethernet, USB to JTAG, USB to UART, HDMI Output, Artix-7 FPGA (75T/100T/200T), SD Card Slot, MIPI Interface, and FMC LPC (72 IOs).

Figure 2: Detailed view of the full board's key features and interfaces.

Figure 3: Key features of the core Artix-7 module.

Figure 4: System block diagram of the Artix-7 FPGA Development Board.

3. SPECIFICATIONS

This section details the technical specifications of the SCFPGA Artix-7 FPGA Development Board.

3.1 Core Board Main Parameters

Figure 5: Core Board Main Parameters.

3.2 Interfaces and Function

Figure 6: Interfaces and Functionality.

3.3 General Specifications

- **Item Model Number:** PA75T-FL/ PA100T-FL/ PA200T-FL-KFB
- **RAM Memory Technology:** DDR3
- **Operating Temperature:** -40°C to +85°C (Industrial Grade)
- **PCB Technology:** Black Matte, Immersion Gold Process

4. SETUP

Follow these steps to set up your SCFPGA Artix-7 FPGA Development Board.

4.1 Power Connection

1. Ensure the power switch on the board is in the OFF position.
2. Connect the provided 12V/1A power adapter to the 12V Power Input port on the board.
3. Plug the power adapter into a suitable electrical outlet.
4. Flip the power switch to the ON position. The power LED should illuminate.

4.2 Initial Connection (USB to UART/JTAG)

1. Connect a USB cable from your computer to the USB to UART port for serial communication.
2. For programming and debugging, connect another USB cable from your computer to the USB to JTAG port.
3. Install necessary drivers for the USB-to-UART/JTAG bridge on your computer if prompted.

4.3 Boot Mode Configuration

The board supports JTAG and QSPI startup modes. The default boot mode is QSPI.

- **QSPI Boot:** The FPGA will load configuration data from the onboard 256Mb QSPI Flash memory upon power-up.
- **JTAG Boot:** For direct programming and debugging via JTAG, ensure your development environment (e.g., Xilinx Vivado) is configured to use the JTAG interface.
- **SD Card Boot:** The board also supports booting from an SD card. Insert a properly prepared SD card into the SD Card Slot before powering on the board.

5. OPERATING INSTRUCTIONS

This section provides guidelines for operating the Artix-7 FPGA Development Board.

5.1 General Usage

- After successful setup, you can begin developing and deploying your FPGA designs using Xilinx development tools.
- Refer to the Xilinx documentation for detailed information on FPGA programming and design flow.

5.2 Interfacing with Ports

- **SFP Ports:** Use the two SFP ports for high-speed optical or copper data transmission.
- **SATA Interface:** Connect SATA devices for storage or high-speed data transfer.
- **HDMI Output:** Connect to an HDMI display for video output.
- **Gigabit Ethernet:** Use the Gigabit Ethernet port for network connectivity.
- **FMC LPC Connector:** Integrate high-performance FMC modules (e.g., ADC/DAC, RF, image processing) via the 72 I/Os.
- **40P Expansion Port:** Connect Puzhi Modules (AD/DA, Camera, LCD) or other custom peripherals. This port provides 3.3V power supply, 5V power supply, 6 Ground pins, and 32 I/Os.
- **MIPI CSI Input:** Connect MIPI CSI compatible camera modules.

5.3 User Keys and LEDs

- The board includes user-programmable keys and LEDs for custom input/output and status indication.
- The Reset Key can be used to reset the FPGA.

6. MAINTENANCE

Proper maintenance ensures the longevity and reliable operation of your development board.

6.1 Environmental Conditions

- Operate the board within the specified temperature range of -40°C to +85°C.
- Avoid exposing the board to excessive moisture, dust, or corrosive environments.
- Ensure adequate ventilation to prevent overheating, especially during intensive operations.

6.2 Cleaning

- Before cleaning, disconnect all power and cables from the board.
- Use a soft, dry, anti-static cloth to gently wipe the board.
- For stubborn dirt, use a small amount of isopropyl alcohol on a cotton swab, ensuring the board is completely dry before reconnecting power.

- Avoid using harsh chemicals or abrasive materials.

7. TROUBLESHOOTING

This section addresses common issues you might encounter with the development board.

7.1 Power Issues

- **No Power LED:** Check if the 12V/1A power adapter is correctly connected and plugged into a working outlet. Ensure the power switch is ON.
- **Intermittent Power:** Verify all power connections are secure. Try a different power outlet or adapter if available.

7.2 Connection Issues

- **USB to UART/JTAG Not Recognized:** Ensure USB cables are properly connected. Install or update the necessary drivers on your computer. Try a different USB port or cable.
- **FPGA Programming Failure:** Verify JTAG chain integrity. Ensure your development software is correctly configured for the Artix-7 device and JTAG programmer. Check power supply stability.

7.3 Functional Issues

- **Peripheral Not Working:** Check connections to the peripheral. Verify that the FPGA design correctly interfaces with the specific port (e.g., SFP, SATA, HDMI, FMC, 40P Expansion). Consult the peripheral's documentation.
- **System Instability:** Ensure your FPGA design is stable and does not exceed the board's power or thermal limits. Check for short circuits or incorrect voltage levels on expansion ports.

8. WHAT'S IN THE BOX

The standard package for the SCFPGA Artix-7 FPGA Development Board includes the following items:



Figure 7: Shipment List.

- FPGA development board (PA200T-FL-KFB)
- Cooling Fan (if included in specific package)
- 12V/1A Power Adapter
- Type C Cables (x2)
- Heat Sink
- 8GB SD Card
- SD Card Reader

9. DIMENSIONS

The physical dimensions of the SCFPGA Artix-7 FPGA Development Board are as follows:



Figure 8: Board Form Factors.

- **Board Dimensions:** 5.12 inches (130 mm) x 3.54 inches (90 mm)
- **Core Board Dimensions:** 2.36 inches (60 mm) x 1.77 inches (45 mm)
- **Package Dimensions:** 6.3 x 5.12 x 1.97 inches

- **Item Weight:** 7 ounces

Figure 9: Detailed Form Factors including thickness.

10. APPLICATIONS

The SCFPGA Artix-7 FPGA Development Board is suitable for a wide range of applications due to its flexible FPGA options and comprehensive interfaces.

Figure 10: Example Applications.

- Image Processing
- Medical Equipment
- Industrial Control
- Power Monitoring
- Machine Vision
- Intelligent AI

11. WARRANTY AND SUPPORT

For warranty information, technical support, or further assistance, please contact SCFPGA directly through their official channels or the retailer from whom the product was purchased. Keep your purchase receipt for warranty claims.

ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question