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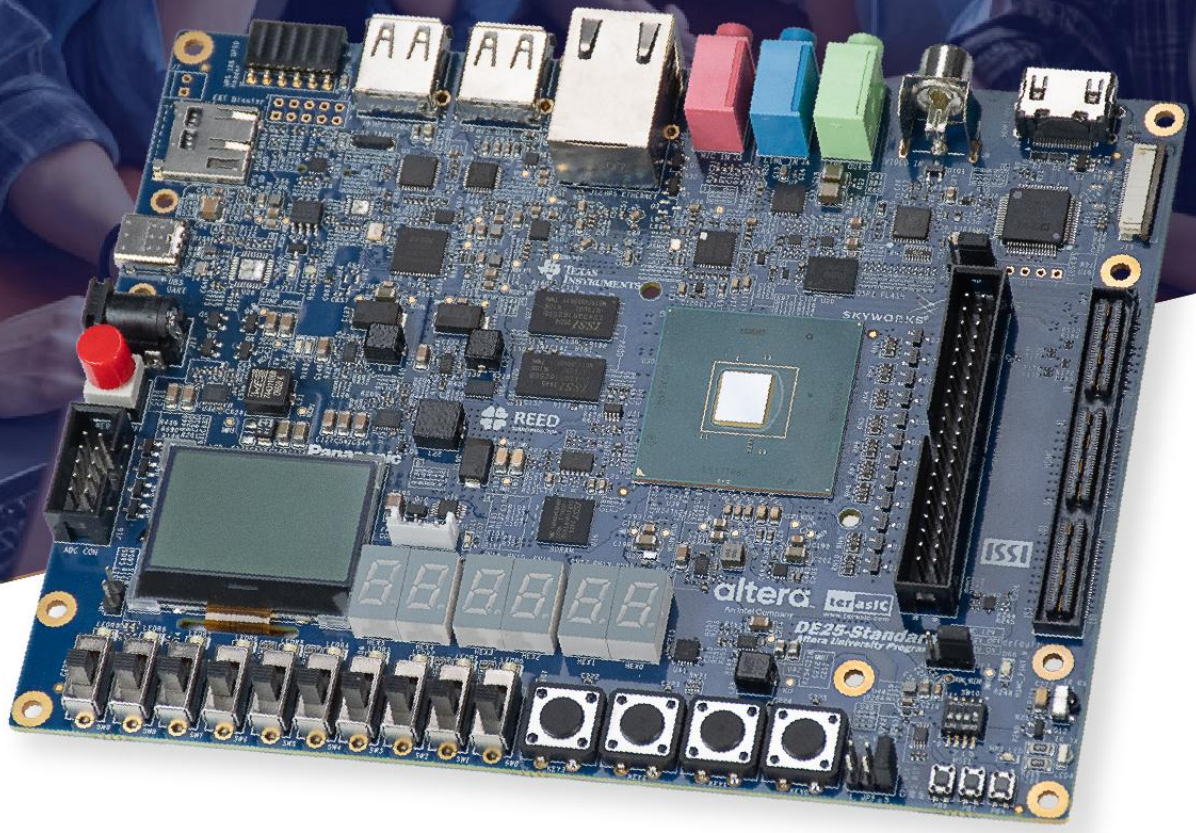
DE25-Standard Development Kit



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Getting Started Guide

CONTENTS

Chapter 1

About this Guide

The DE25-StandardGetting Started Guide contains a quick overview of the hardware and software setup including step-by-step procedures from installing the necessary software tools to use the board. The main topics that this guide covers are listed below:

- Software Installation: Installing Quartus Pro v25.1 and Ashling RiscFree IDE
- Development Board Setup: Powering on the DE25-Standard
- Perform FPGA System Test: Downloading a FPGA SRAM Object File (.sof)

For instructions on how to boot the HPS from a Micro SD card with the Linux image and use the UART interface to communicate with a Host PC, please refer to :
DE25_Standard_Linux_Booting_Started_Guide.pdf.

Chapter 2

Software Installation

2.1 Introduction

The DE25-Standard rev.c board is equipped with an integrated Altera USB Blaster III circuit. To ensure proper operation, you must install the correct driver. The necessary driver is included with Quartus Prime 25.1 Pro and later versions. We recommend installing Quartus Prime 25.1 or a newer version to ensure the on-board USB Blaster III is recognized and functions correctly for programming and debugging.

This section explains how to install the following software:

- Intel Quartus Prime Pro v25.1 software
- Ashling* RiscFree* IDE for Altera

Note: 64-bit OS required

2.2 Installing Quartus Prime software

For a more efficient and customized installation experience, we strongly recommend using the Intel® Quartus® Prime Installer (online installer) to install the Quartus Prime Design Suite.

Unlike downloading a single, large file containing all components, the online installer is a lightweight tool that allows you to precisely select only the components you need during the installation process.

You can download the Intel® Quartus® Prime Installer from the following URL (see **Figure 2-1**):
Intel® Quartus® Prime Pro Edition Design Software Version 25.1 for Windows

Figure 2-2 shows the Quartus Prime Installer. Please make sure to check the following options:

- Quartus Prime Pro Edition Software
- Agilex 5 device support
- Ashling RiscFree IDE for Altera

Also, confirm the installation directory.

In the "After-install actions" section, check the following:

- Install UART FTDI driver: This installs the HPS UART interface driver for the DE25-Standard.
- Install USB Blaster III driver: This enables proper use of the JTAG interface on the DE25-Standard.

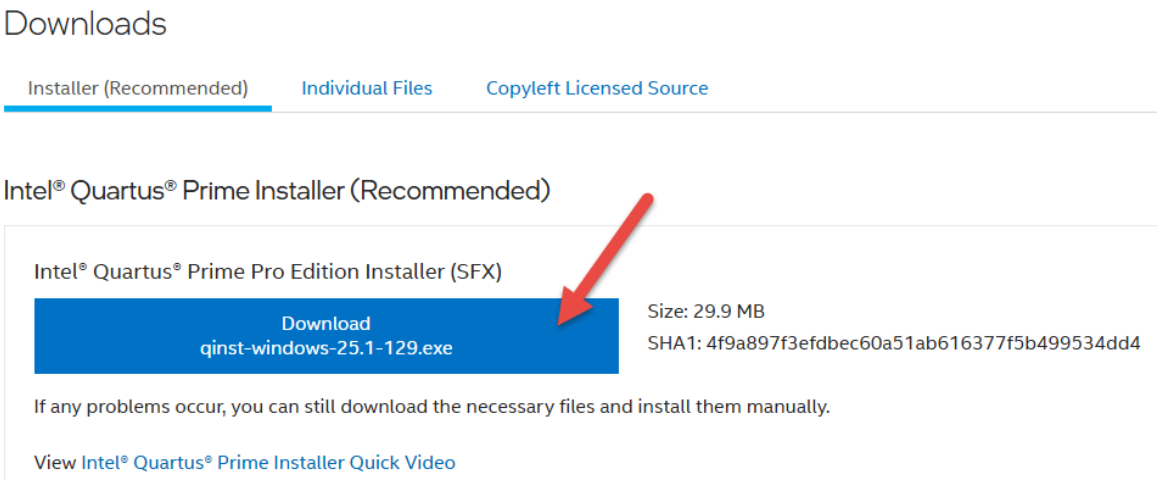

Figure 2-1 Download Quartus Installer

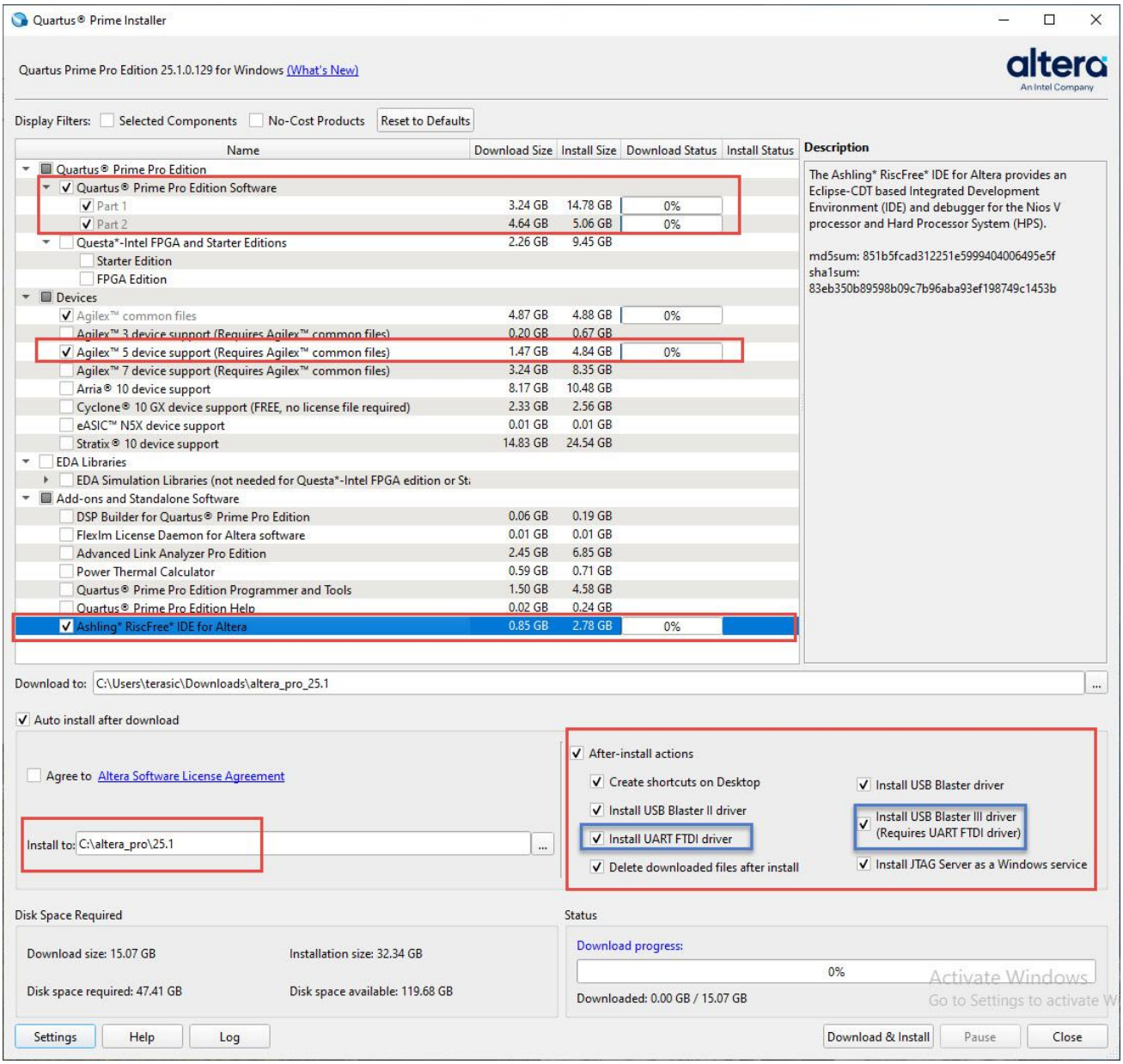

Figure 2-2 Quartus Installer

After Quartus has been downloaded and installed, an installation completion window, as shown in **Figure 2-3**, will appear.

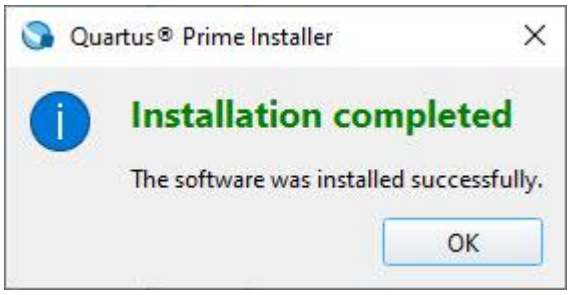

Figure 2-3 Quartus install completed

Next, the Quartus installer will then prompt you to install several necessary drivers.

Please pay special attention to the UART FTDI driver (see **Figure 2-4**) and the Altera USB Blaster III driver (see **Figure 2-5**).

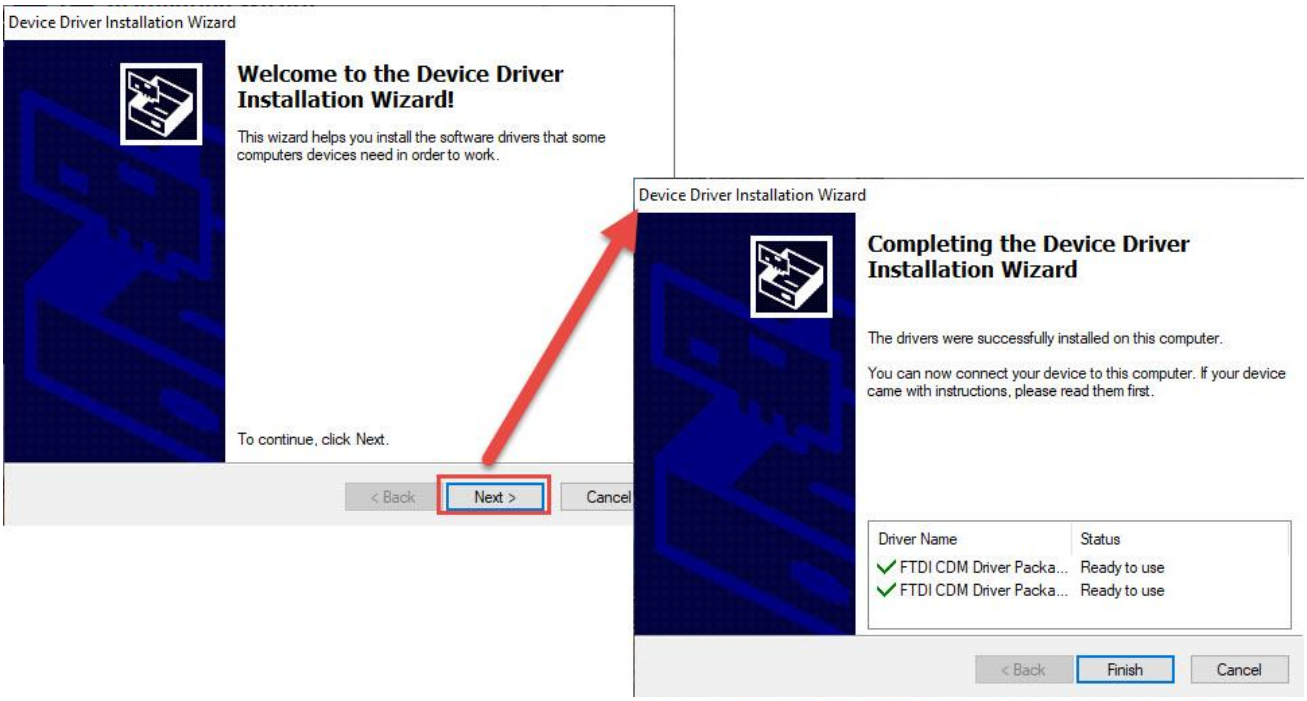

Figure 2-4 Install UART FTDI driver

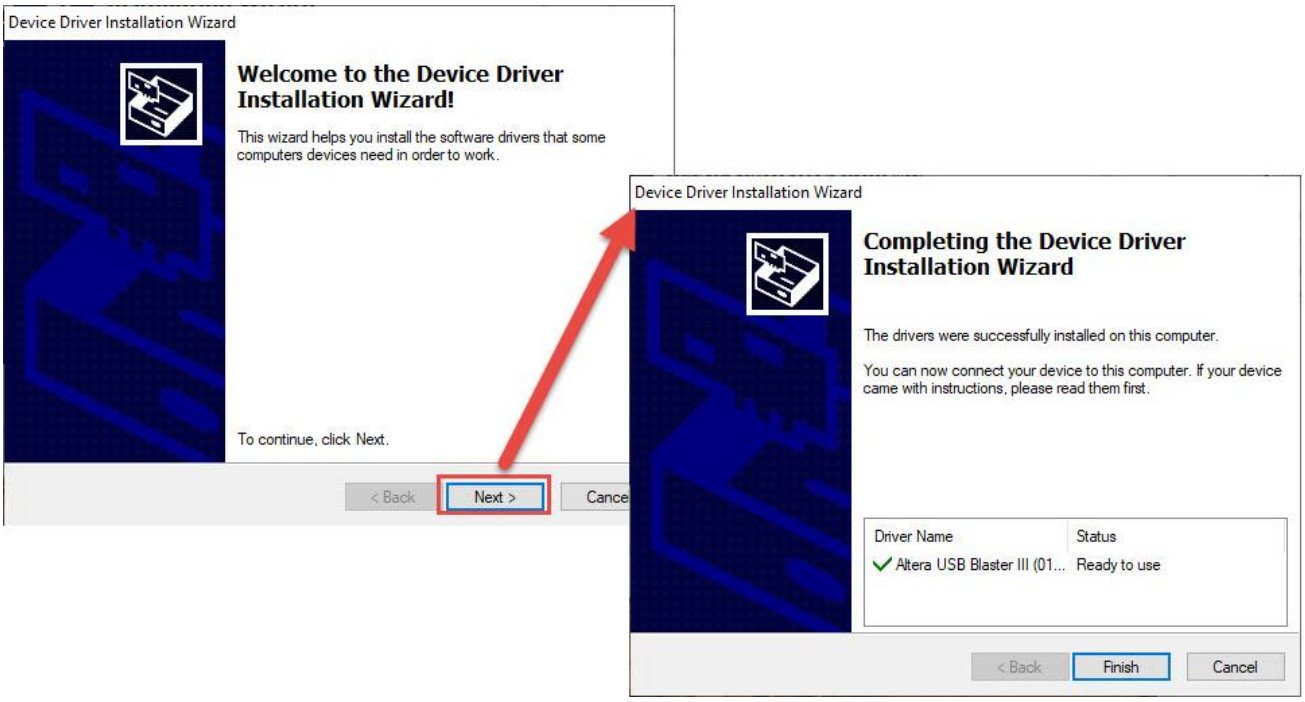

Figure 2-5 Install Altera USB Blaster III driver

2.3 Free No-Cost Licenses for Intel® Agilex™ 5 Devices

The DE25-Standard, powered by Altera Agilex 5 FPGA, enables developers to access Intel Quartus Pro Edition software at no cost — no additional license purchase required. Developers can leverage full design and compilation capabilities of Quartus Pro without incurring licensing fees.

For details on how to acquire the free license, please refer to Intel's official guide: Acquiring Free No-Cost Licenses for Intel® Agilex™ 5 Devices

Chapter 3

Development Board Setup

3.1 Introduction

The instructions in this section explain how to set up the DE25-Standard board. The following pictures show the board overview of the board.

3.2 MSEL Settings

■ AS Mode(Default)

The board hardware setting (MSEL[2:0])is set as 001 (See **Figure 3-1**), the FPGA is configured from QSPI flash.

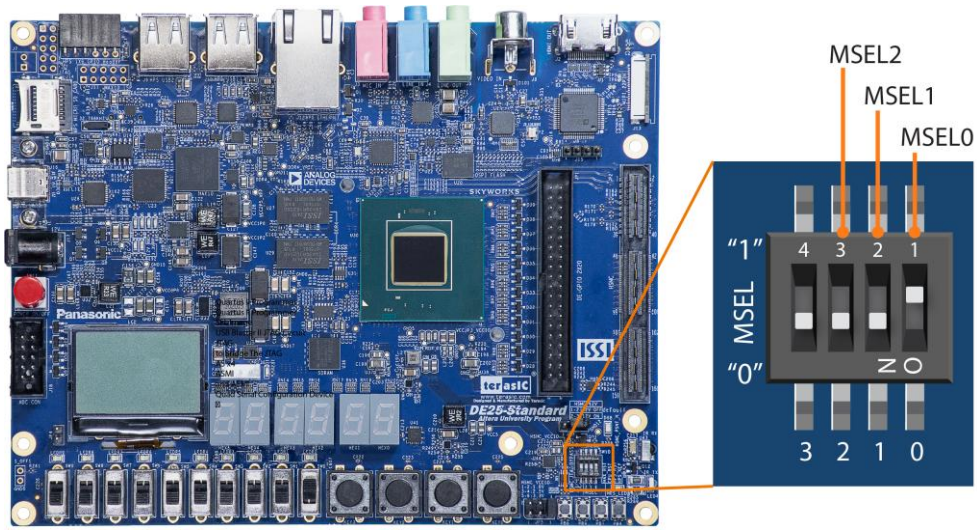

Figure 3-1 FPGA Configuration Mode Switch in AS Mode

3.3 DE25-Standard board Configuration Mode

DE25-Standard board supports two kinds of configuration modes:

1. **JTAG program**: in IEEE standard, JTAG is Joint Test Action Group, with this mode, the configuration bit stream is downloaded directly into the Agilex 5 FPGA. The FPGA will retain this configuration until its power is turned off.
2. **AS program**: Active Serial programming, the configuration bit stream is downloaded into the

QSPI configuration device. The QSPI is non-volatile storage, the code is retained even when the power supply to the DE25-Standard board is turned off. When the board's power is turned on, the configuration data in the QSPI device is automatically loaded into the Agilex 5 FPGA.

3.4 USB Blaster III and Power Input

Figure 3-2 shows USB Blaster III and Power DC Jack on DE25-Standard board.

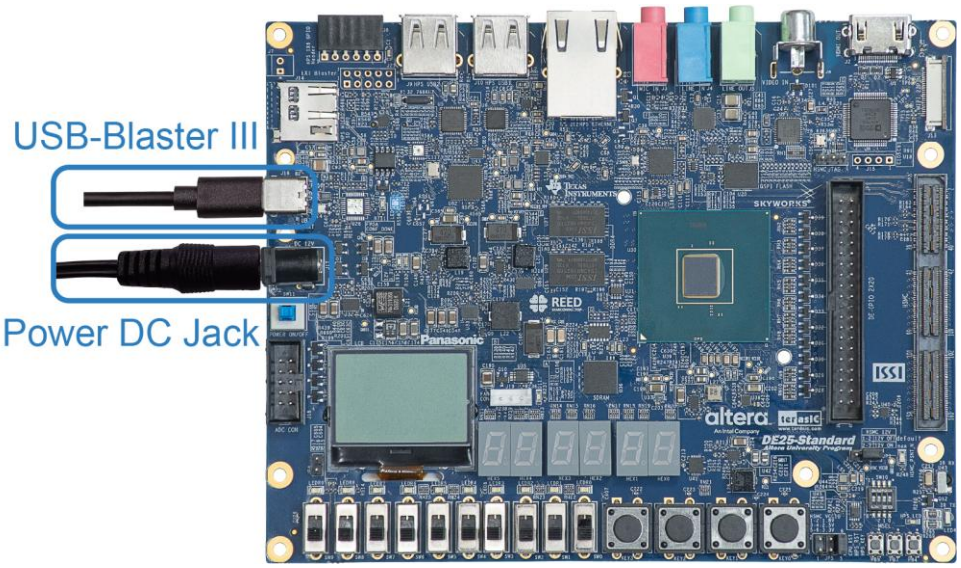

Figure 3-2 USB Blaster III and Power Jack on DE25-Standard board

Chapter 4

Performing a FPGA System Test

4.1 Introduction

This chapter shows how to download a FPGA SRAM Object File(.sof) to DE25-Standard board.

4.2 Downloading a FPGA SRAM Object File

The Quartus Prime Programmer is used to configure the FPGA with a specific .sof file. Before configuring the FPGA, ensure that the Quartus Prime Pro v25.1 software and the USB-Blaster III driver are installed on the host computer. Normally you should see USB Blaster III in PC Device Manager, as shown in **Figure 4-1**.

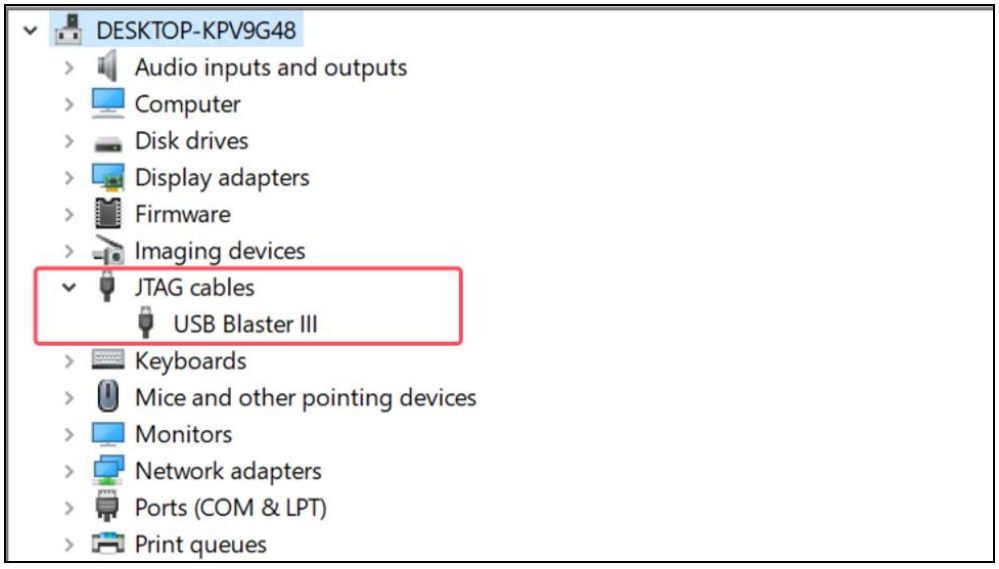

Figure 4-1 USB Blaster III shown in PC Device Manager

There is only one device (FPGA) on the JTAG Chain of DE25-Standard board, the following shows the programming flow with JTAG mode step by step.

1. Connect your computer to the DE25-Standard board by plugging the Type-C USB cable into the USB Blaster III connector of DE25-Standard and power up the board (details shown in section 3.4**)**
2. Open the Quartus Prime software and select Tools > Programmer. The Programmer window will appear as shown in **Figure 4-2**.

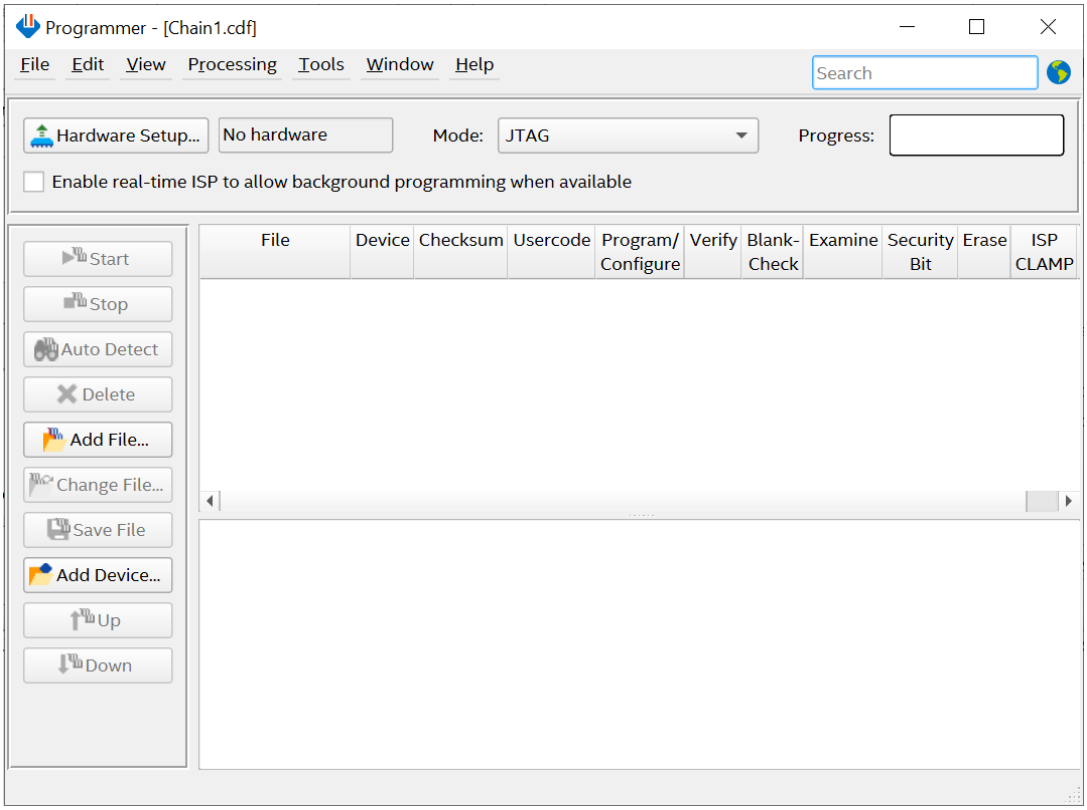

Figure 4-2 Quartus Programmer window

3. Click **Hardware Setup**.
4. Select **DE25-Standard[USB-1]** under **Currently selected hardware**, and click **Close** as shown in **Figure 4-3**.

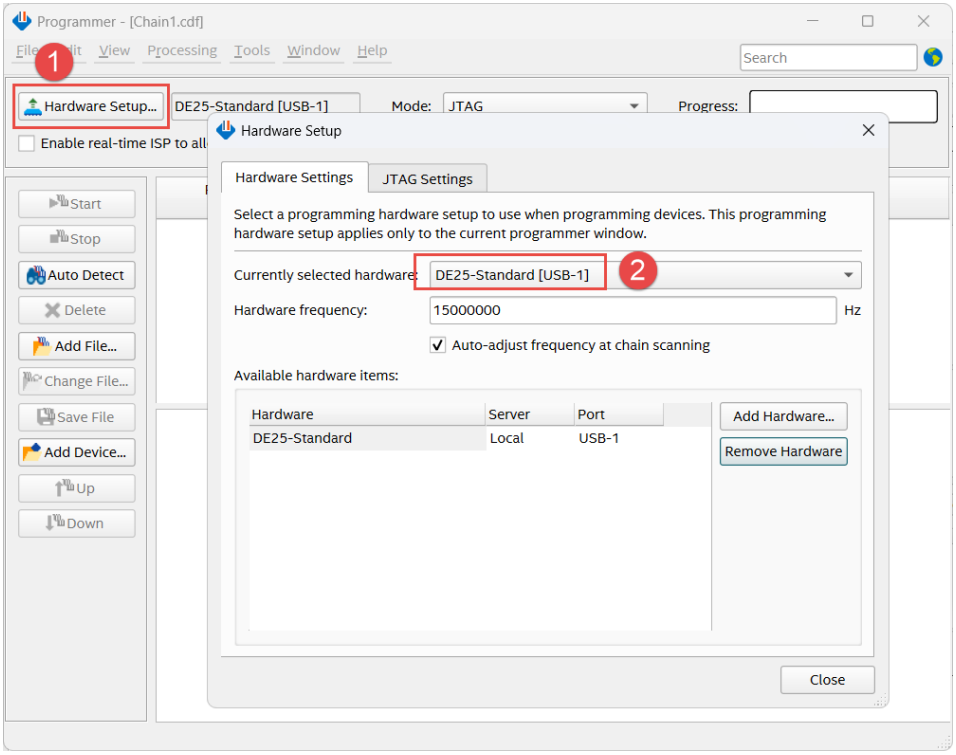

Figure 4-3 Hardware Setup

If the USB-Blaster III does not appear under hardware options list, please confirm if the USB-Blaster III driver has been correctly installed, and the Type-C USB cable has been properly connected between the DE25-Standard board and host computer.

5. Click “Auto Detect”, as shown in **Figure 4-4**.

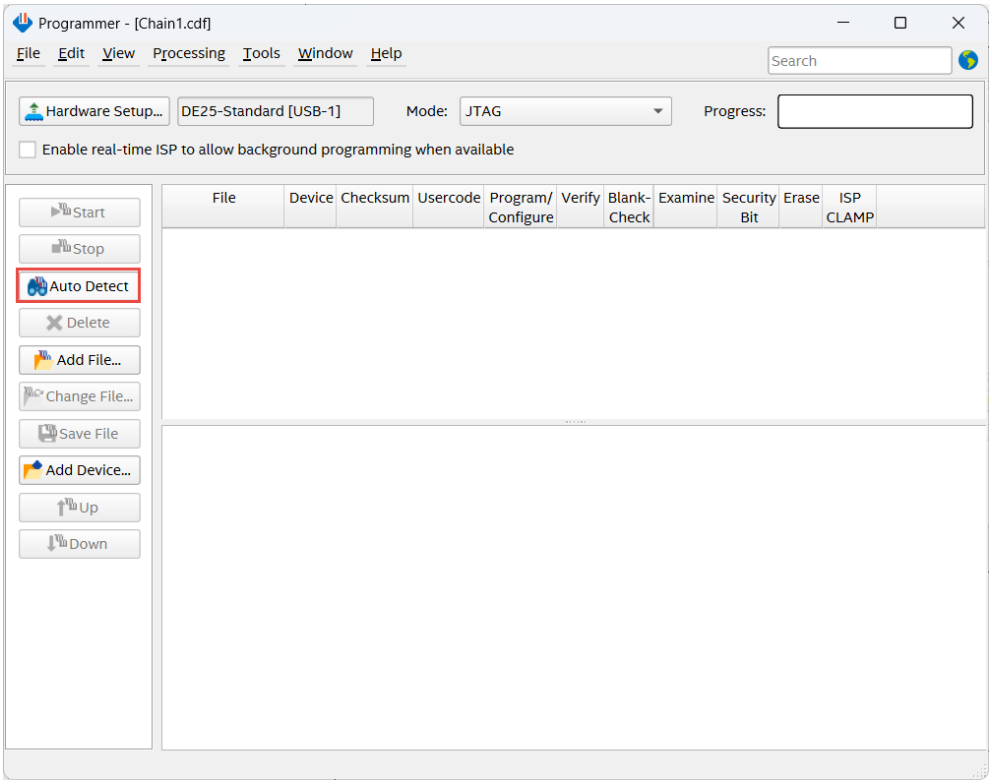

Figure 4-4 Auto detect FPGA device

6. The FPGA device and QSPI flash of DE25-Standard board are detected under Programmer, as shown in **Figure 4-5**. Note :The user will see the **QSPI flash** on the JTAG chain because the FPGA configuration mode is set to **AS** mode.

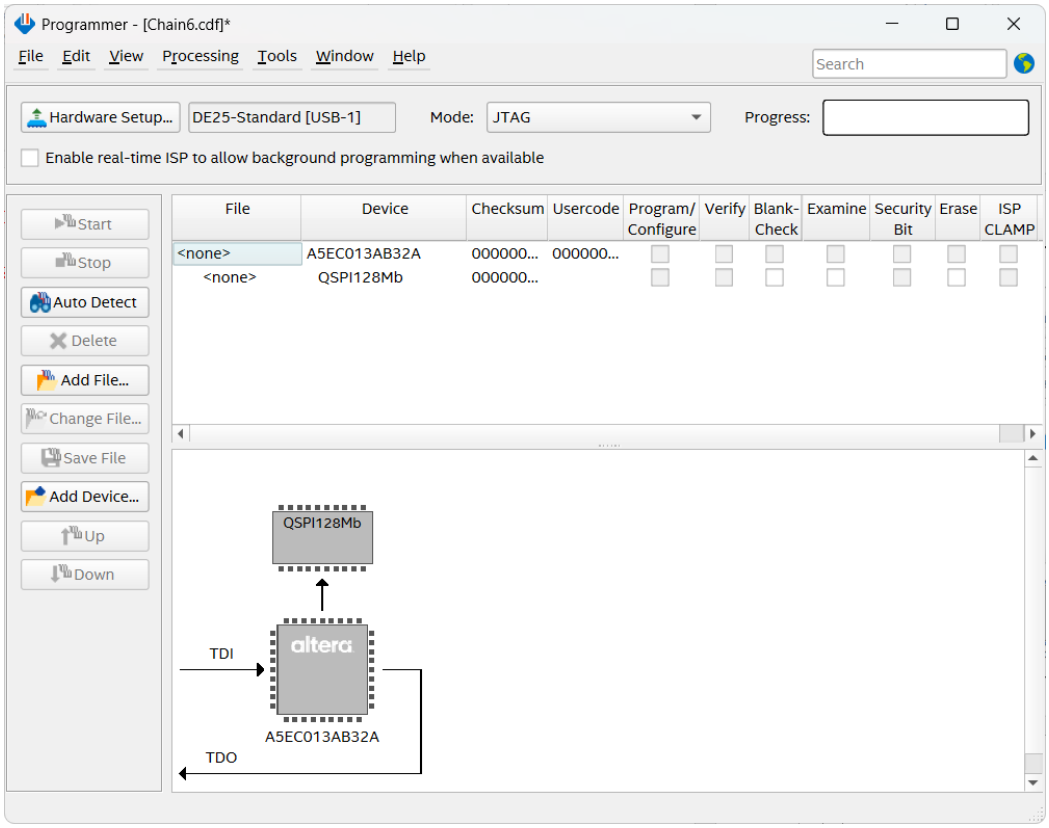

Figure 4-5 JTAG Chain on DE25-Standard board

7. Click the FPGA device, then click **Change File** button to open the **Select New Programming File** window. Browse to select golden_top.sof in the **Select New Programming File** window as shown in **Figure 4-6.**

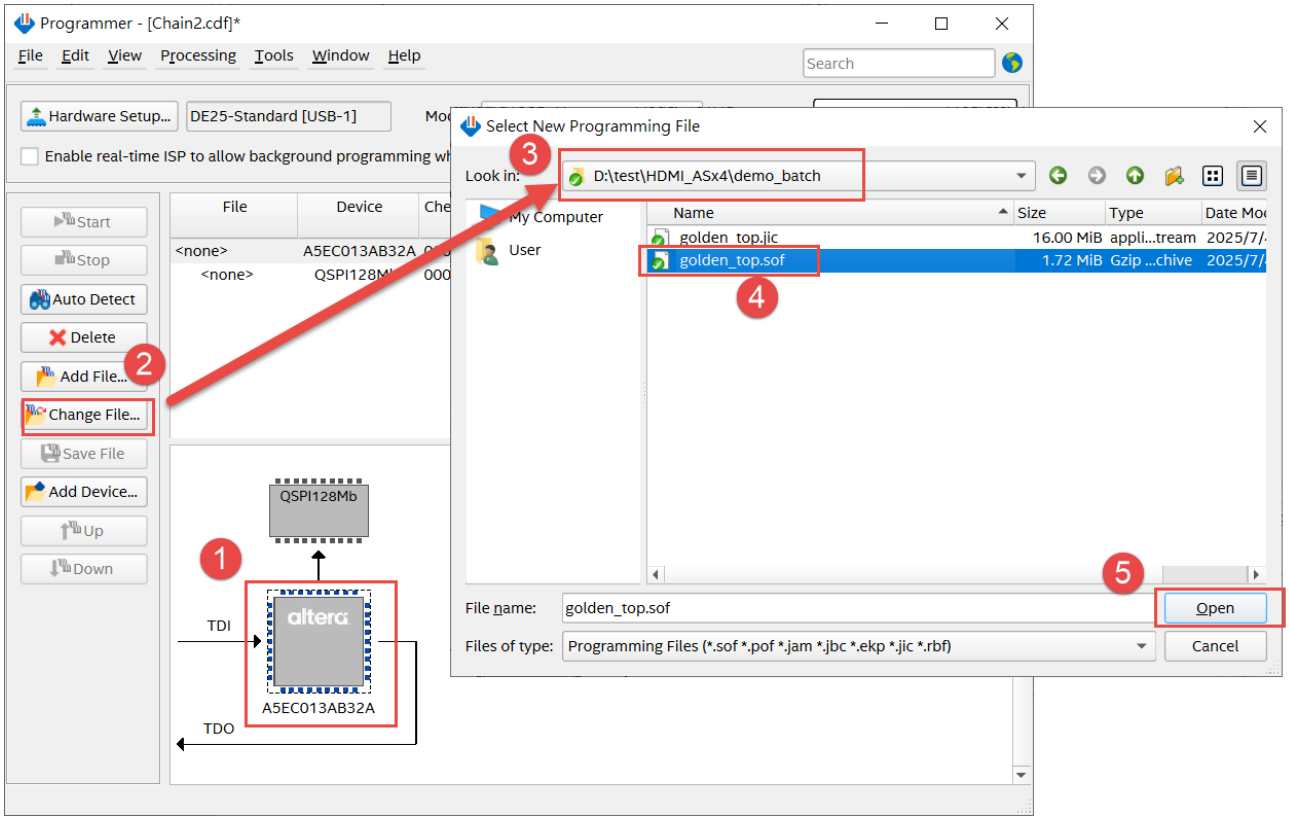

Figure 4-6 Select golden_top.sof file

8. Click “Program/Configure” check box, and then click “Start” button to download .sof file into FPGA, as shown in **Figure 4-7**.

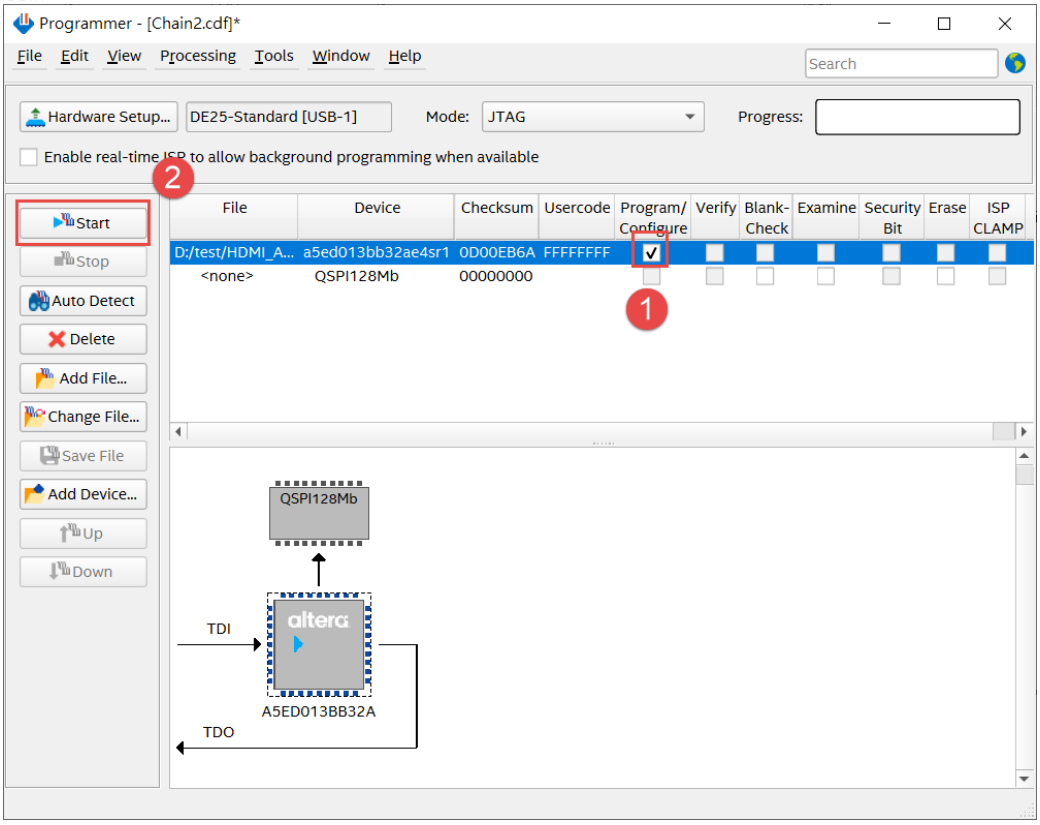

Figure 4-7 Download .sof file

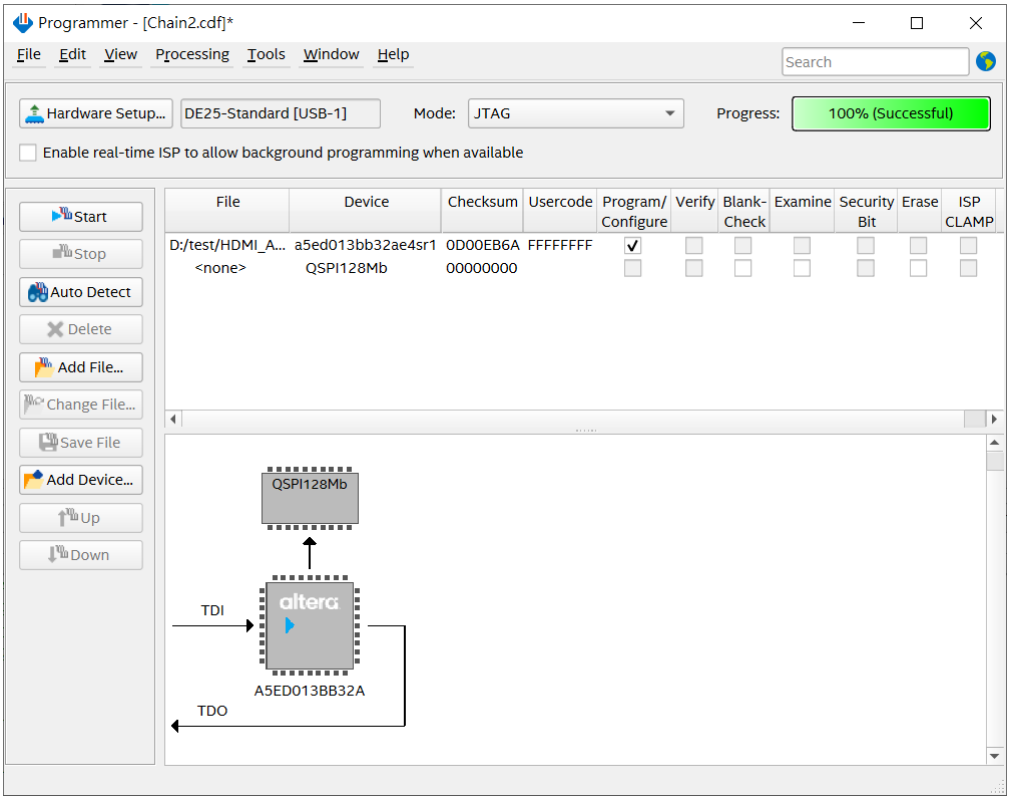

Figure 4-8 Download .sof successfully

Additional Information

Contact Terasic

Users can refer to the following table for technical support and more information of Terasic and our product:

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Website	www.terasic.com
Address	9F., No.176, Sec.2, Gongdao 5th Rd, East Dist, Hsinchu City, 30070. Taiwan, 30070

Revision History

Date	Version	Changes
2025.06	V1.0	First Version