



Gowin USB Download Cable

User Guide

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1 About This Guide

1.1 Purpose

This guide includes two parts:

1. Introduce the features, functions, signal definitions of PL-USB-Cable etc.;
2. How to install, download and use PL-USB-Cable. For simplification, PL-USB-Cable is hereinafter referred to as a cable.

1.2 Supported Products

The cable in the guide applies to all Gowin FPGA products.

1.3 Related Documents

The latest user guides are available on the GOWINSEMI Website. You can find the related documents at www.gowinsemi.com:

1. GW1N series of FPGA Products Data Sheet
2. GW1N series of FPGA Products Package and Pinout
3. Gowin FPGA Products Programming and Configuration User Guide
4. GW2A series of FPGA Products Data Sheet
5. GW2A series of FPGA Products Package and Pinout

1.4 Abbreviations and Terminology

The abbreviations and terminology used in this manual are as shown in Table 1-1 below.

Table 1-1 Abbreviations and Terminologies

Abbreviations and Terminology	Full Name
FPGA	Field-Programmable Gate Array
USB	Universal Serial Bus

1.5 Support and Feedback

Gowin Semiconductor provides customers with comprehensive technical support. If you have any questions, comments, or suggestions, please feel free to contact us directly using the information provided below.

Website: www.gowinsemi.com

E-mail: support@gowinsemi.com

+Tel: +86 755 8262 0391

2 Introduction

Gowin USB download cable is mainly used to download the bit stream file generated by Gowin Yunyuan software to Gowin FPGA chip or external storage device.

2.1 Appearance and Composition

The cable picture is shown in Figure 2-1.

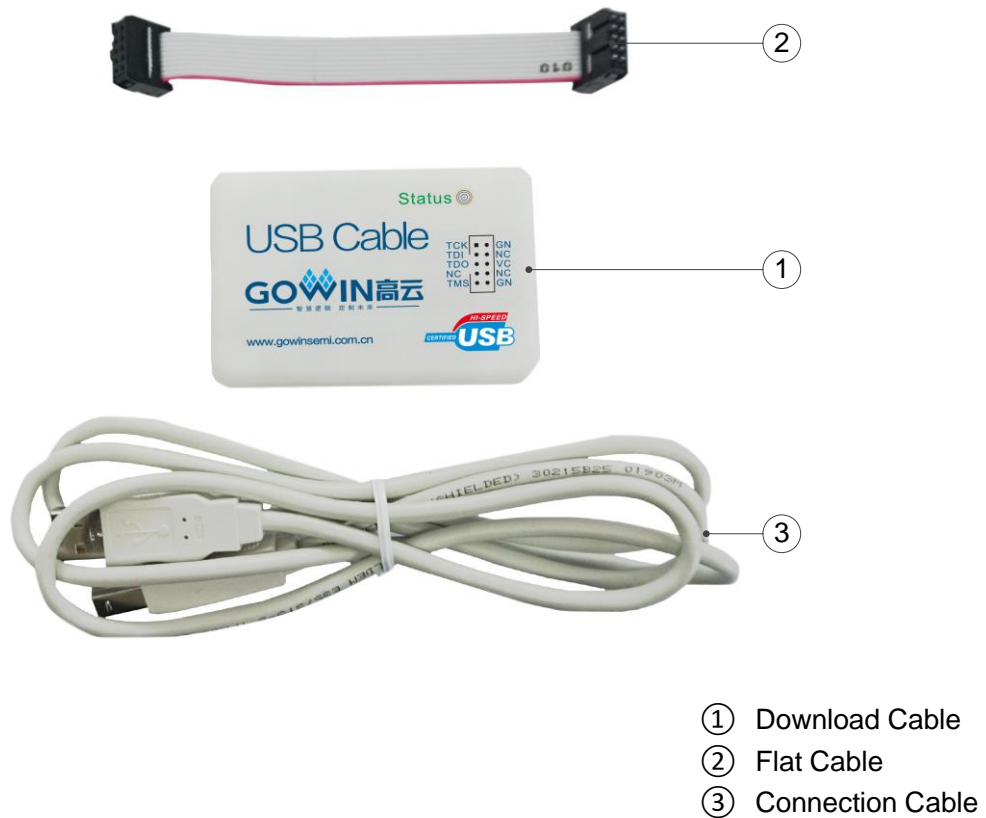
Figure 2-1 Cable View



As shown in Figure 2-2, in addition to the download cable ①, a flat cable ② and a connection cable ③ are also contained in Gowin USB cable Box. The list is as follows:

1. One PL-USB-Cable
2. One 10 Pin cable
3. One USB-A to USB-B type connection cable

Figure 2-2 Box List

**Note!**

The red line in cable ② is Pin1(TCK).

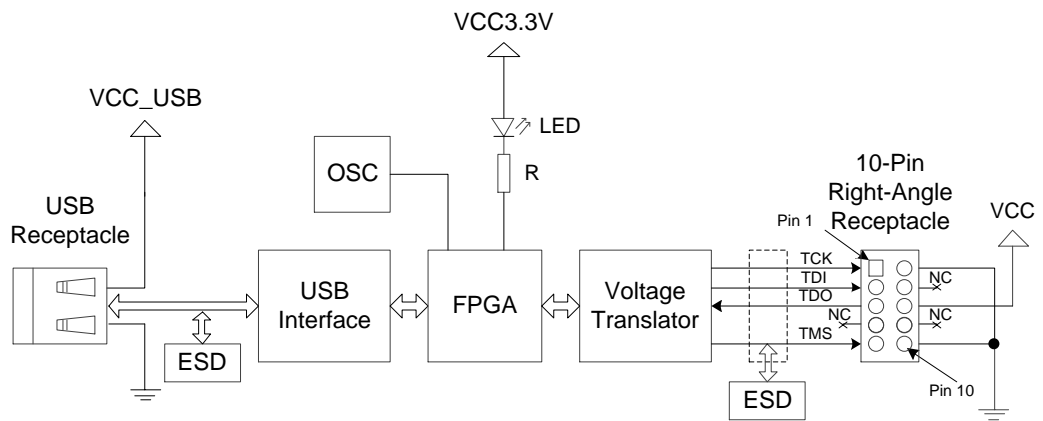
2.2 Features

- Support Windows and Linux operating systems;
- Support all series of Gowin FPGA products;
- Download the bitstream file of the internal SRAM, on-chip Flash, and off-chip Flash via JTAG.
- The USB interface supports USB1.0, USB2.0;
- The USB interface supports DC +5V power supply;
- The JTAG interface supports 1.2V~3.3V programming download;
- The Max. speed can be up to 30Mbps for the JTAG interface.
- LED power supply, download instructions;
- Conform to RoHS standard.

2.3 Functional Block Diagram

The functional block diagram of the cable mainly includes USB interface socket, ESD, OSC, USB interface circuit, FPGA, LED, level conversion circuit and JTAG socket. The USB download cable supports JTAG download of all series of Gowin FPGA products, downloading bitstream files from FPGA SRAM, on-chip Flash, and off-chip Flash. It also supports Gowin online logic analyzer.

Figure 2-3 Cable Functional Block Diagram



2.4 Signal Definition

Table 2-1 JTAG Interface Signal Definition

Pin No.	Signal Name	I/O	Description
1	TCK	O	Clock signal
2	GND		GND
3	TDI	O	Data sent to the device
4	NC	--	
5	TDO	I	Data received from the device
6	VCC		Input VCC on the device
7	NC	--	
8	NC	--	
9	TMS	O	Control signal of state machine
10	GND		GND

Table 2-2 Signal Definition of USB Interface

Pin No.	Signal Name	I/O	Description
1	VCC_USB	I	Input power on USB
2	USB_D+	I/O	Differential data on USB interface
3	USB_D-	I/O	Differential data on USB interface
4	GND		GND

2.5 AC/DC Characteristic

The limit working parameters of the cable and the recommended working parameters of VCC are introduced as follows. It is recommended to use advised working conditions to ensure reliably operation of the cable.

Table 2-3 Limit Operating Parameters

Item	Description	Min.	Max.	Unit
VCC	Device-side power supply	-0.3	4.6	V
VCC_USB	USB-side power supply	-0.5	6.0	V
I _o	Output current	-50	50	mA
I _i	Input current	-50	50	mA

Table 2-4 Recommended Operating Parameters Based on VCC

Item	I/O	Min.	Max.	Unit
VCC	3.3	3.0	3.6	V
	2.5	2.375	2.625	V
	1.8	1.71	1.89	V
	1.5	1.43	1.57	V
	1.2	1.14	1.26	V

2.6 ESD Features

Comply with IEC 61000-4-2 standard.

ESD protection $\pm 15\text{kV}$ for contacting discharge and $\pm 8\text{kV}$ for air discharge.

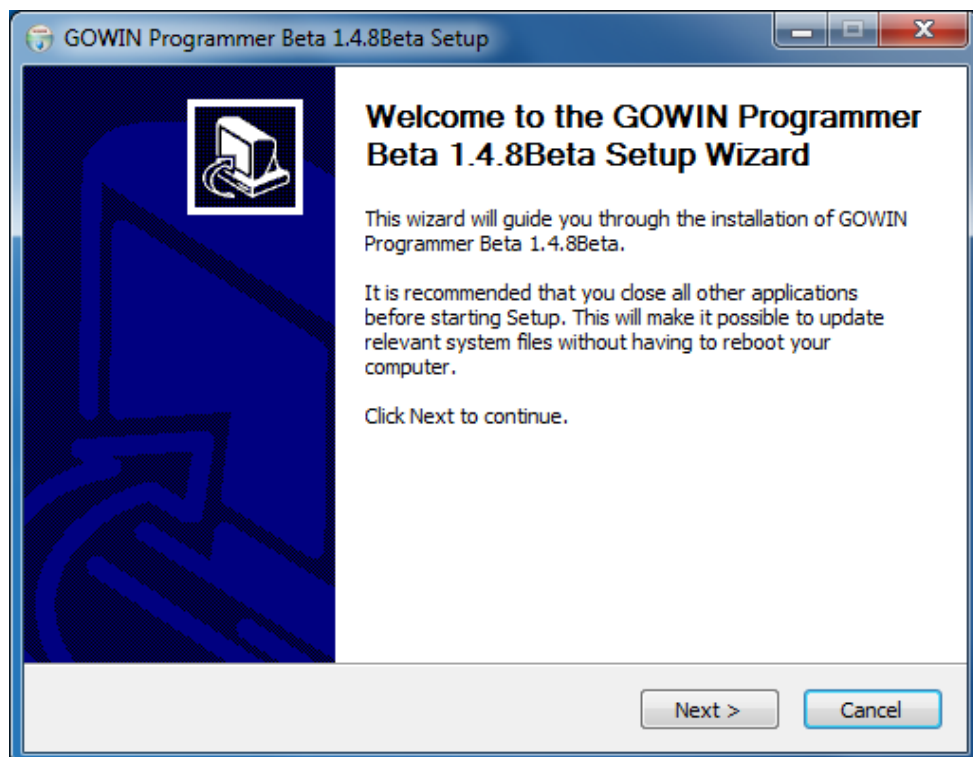
3 Cable Driver

3.1 Windows

Before using the cable, you need to install the driver on your Windows system. Download the Programmer installer on the support and download interface of www.gowinsemi.com.

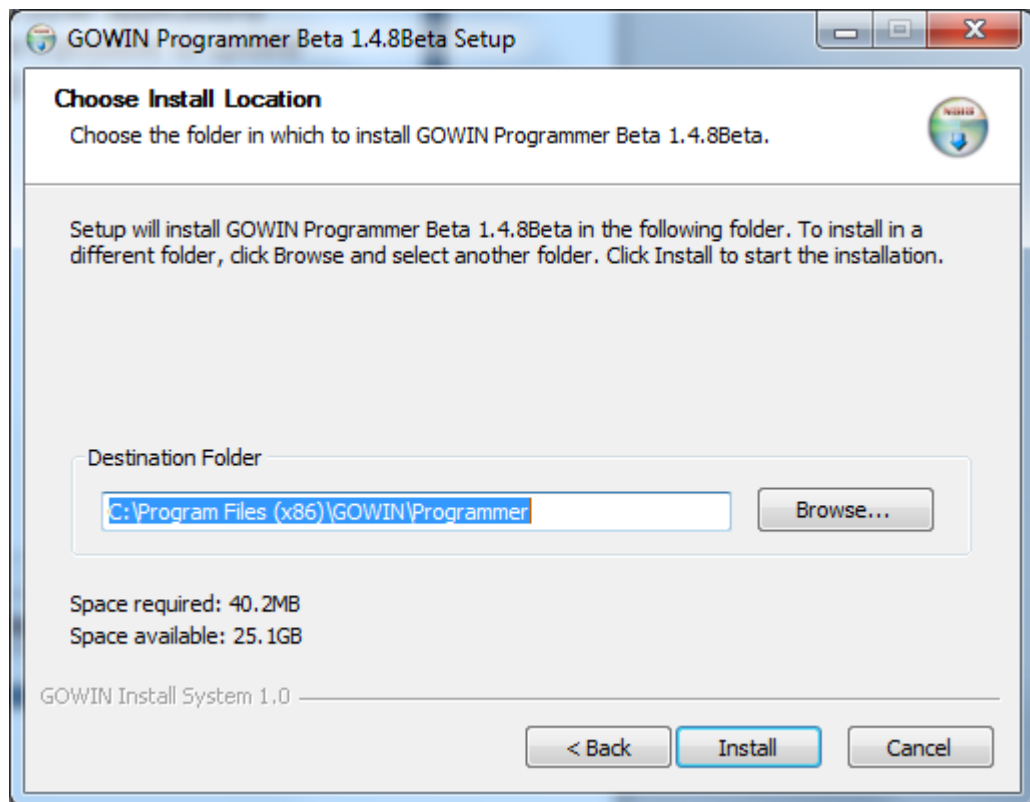
1. Click the installation file after finishing download. The interface pops up, as shown in Figure 3-1.

Figure 3-1 Installing and Starting Programmer



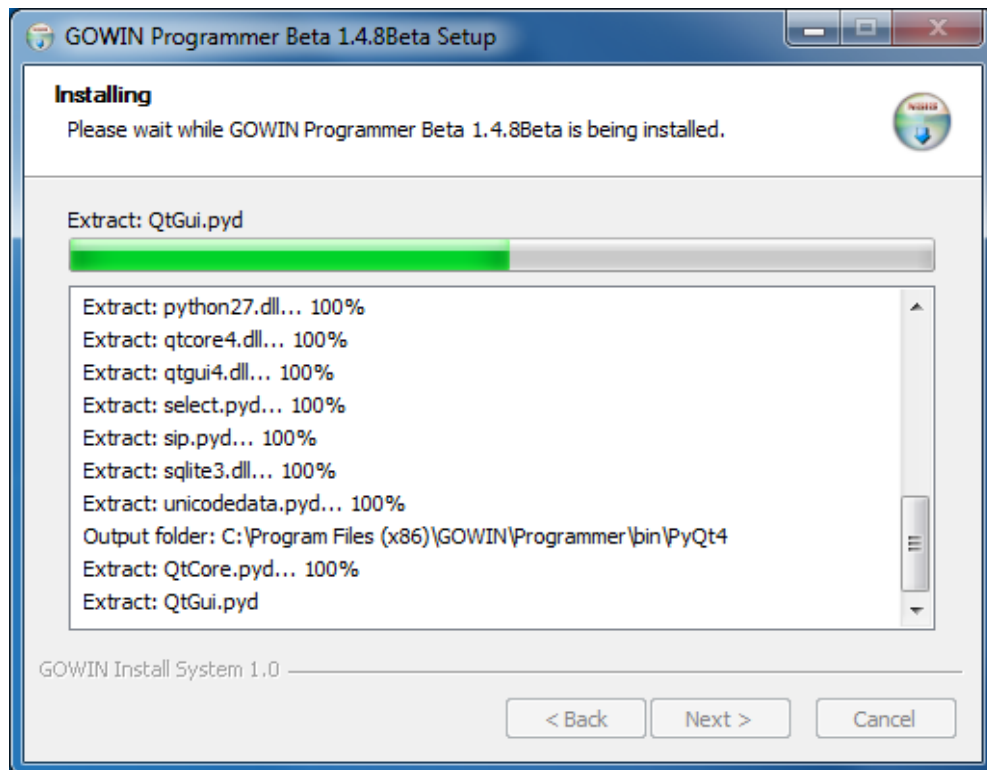
2. Click "Next>" to install Programmer, as shown in Figure 3-2.

Figure 3-2 Programmer Installation List Selection



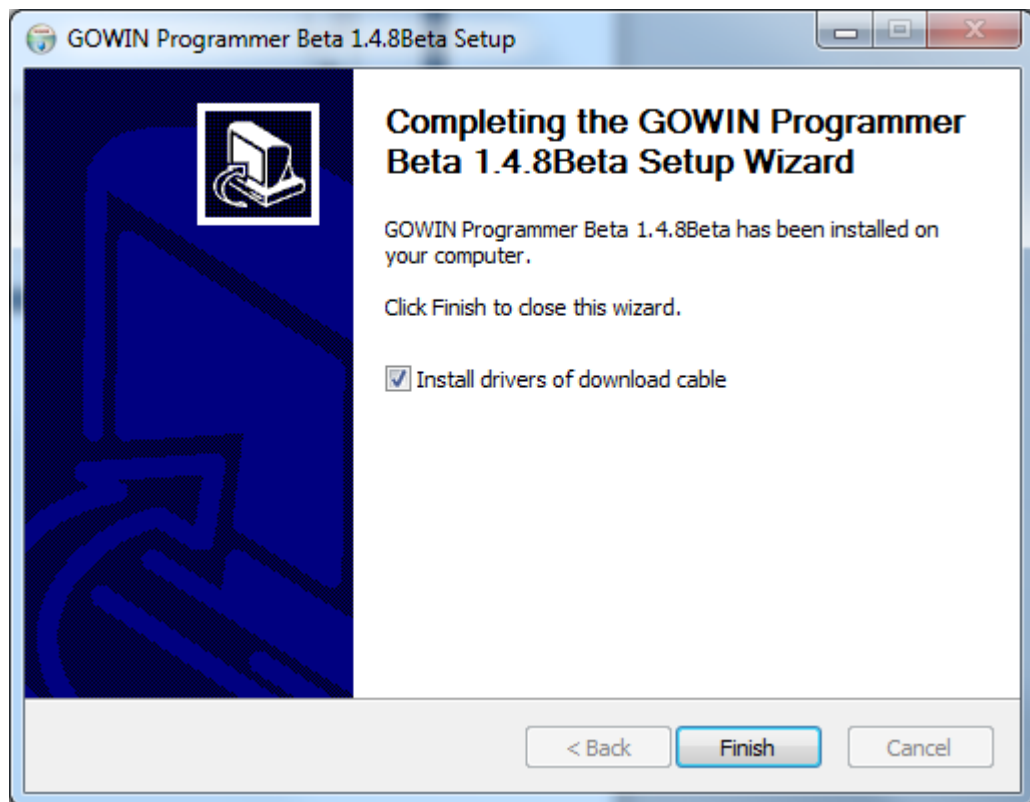
3. Install via clicking "Install" after selecting the installation list, as shown in Figure 3-3.

Figure 3-3 Programmer Installing



4. Click "Finish" to install Programmer, as shown in Figure 3-4.

Figure 3-4 Fishing Installing Programmer



5. After installing Programmer, click "Extract" to start extracting the cable driver, as shown in Figure 3-5. The interface of extracting the cable driver is as shown in Figure 3-6.

Figure 3-5 Start to Unpack Cable Driver

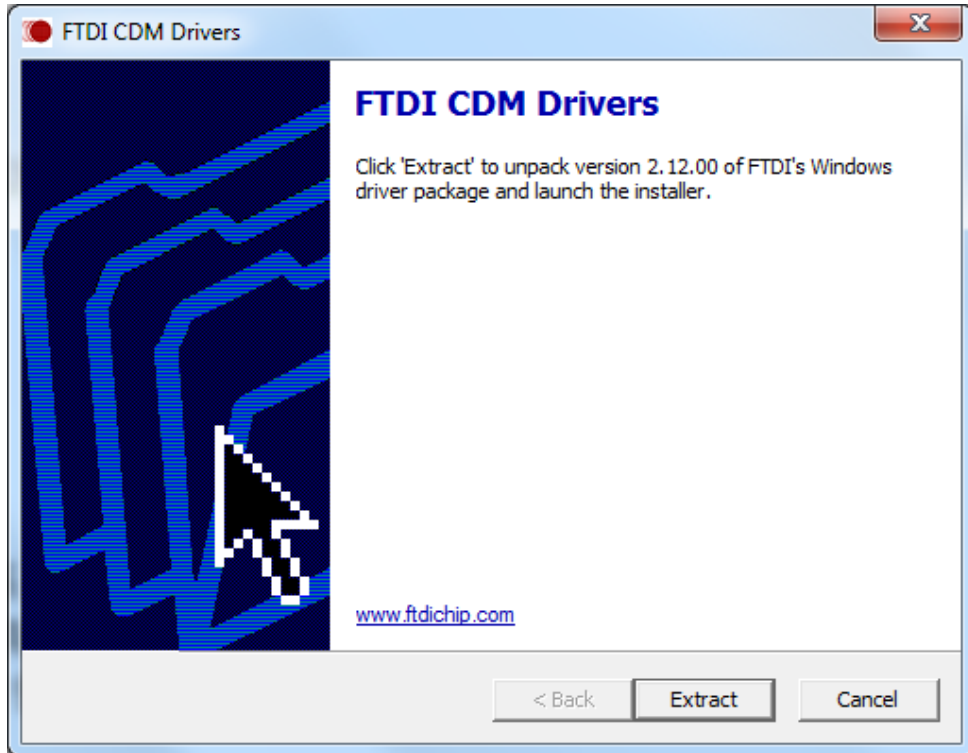
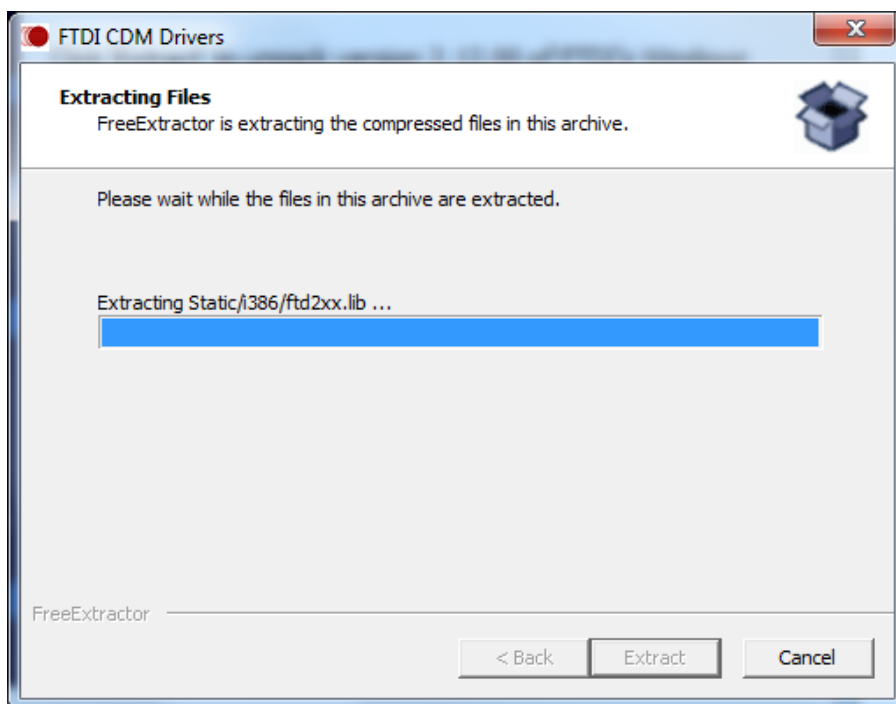
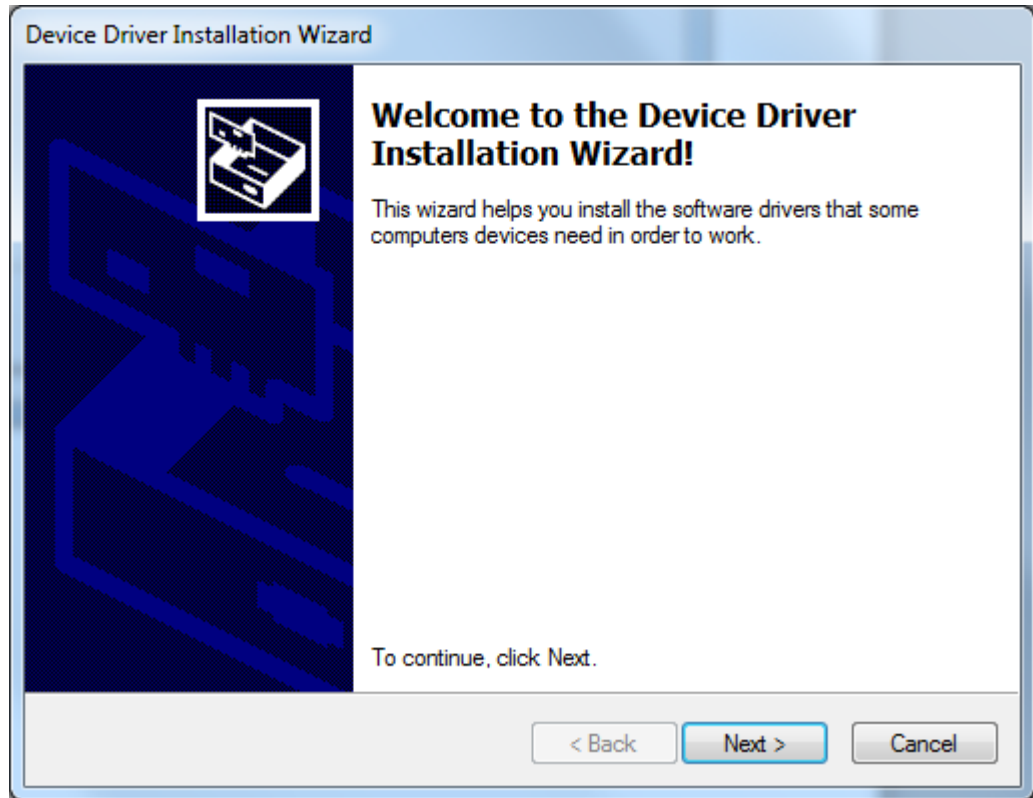


Figure 3-6 Cable Driver Unpacking



6. After finish unpacking, click "Next>" to the next step, as shown in Figure 3-7.

Figure 3-7 Finish Installing Cable Driver



7. Select "I accept this agreement" and click "Next>" to install, as shown in Figure 3-8. The cable driver installation interface is as shown in Figure 3-9.

Figure 3-8 Agreement License

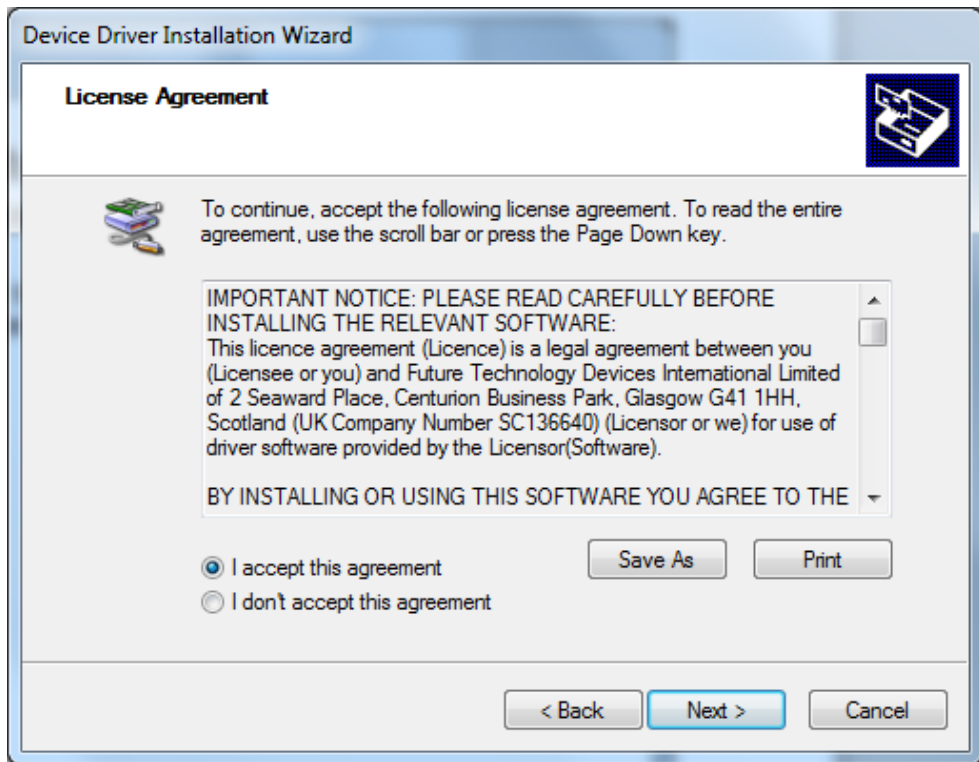
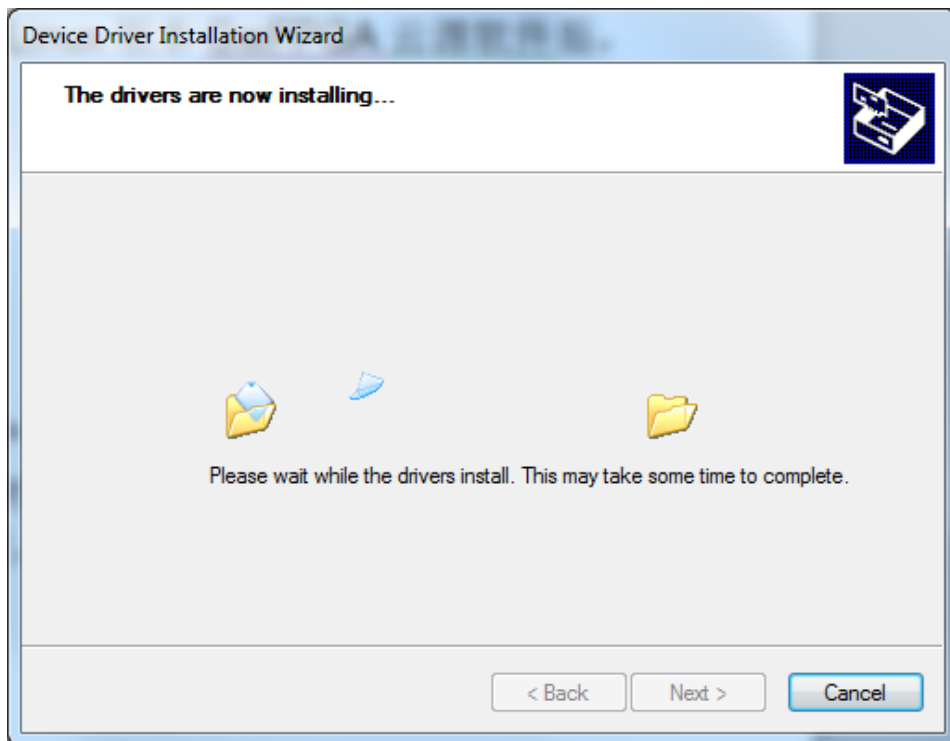
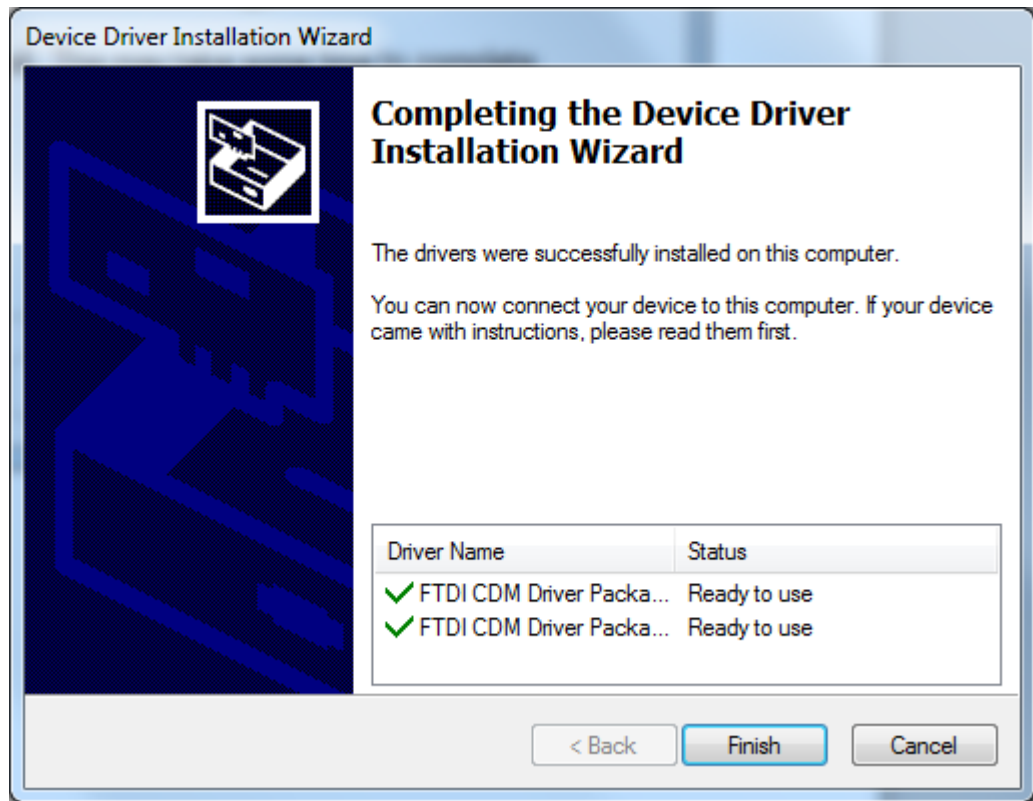


Figure 3-9 Installing Cable Driver



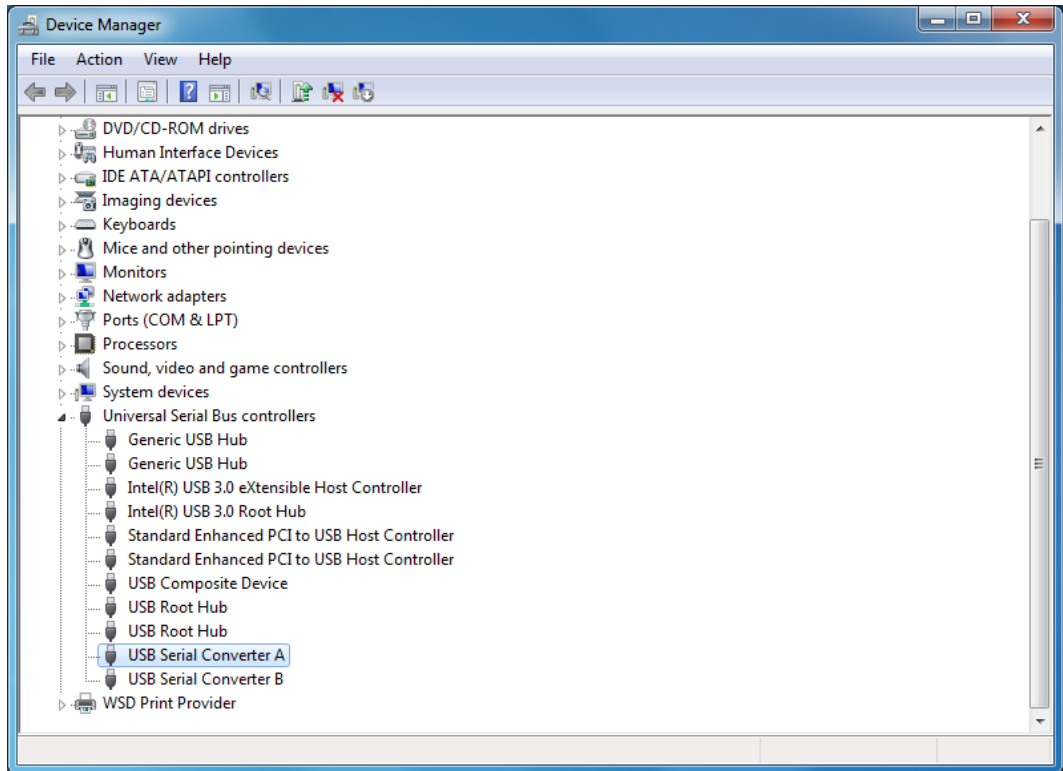
- 8. Click "Finish" to finish installing the cable driver, as shown in Figure 3-10.

Figure 3-10 Finish Installing Cable Driver



- 9. The “USB Serial Converter A” is appeared at the end of the Universal Serial Bus controllers after the USB download cable is connected to the PC, which means that the cable driver is installed successfully and you can download / configure the FPGA through the download cable, as shown in Figure 3-11.

Figure 3-11 Cable Driver Interface on PC



3.2 Linux

The cable driver is not required to be installed. You can use the USB download cable after downloading the Linux version of Gowin Yunyuan software.



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