

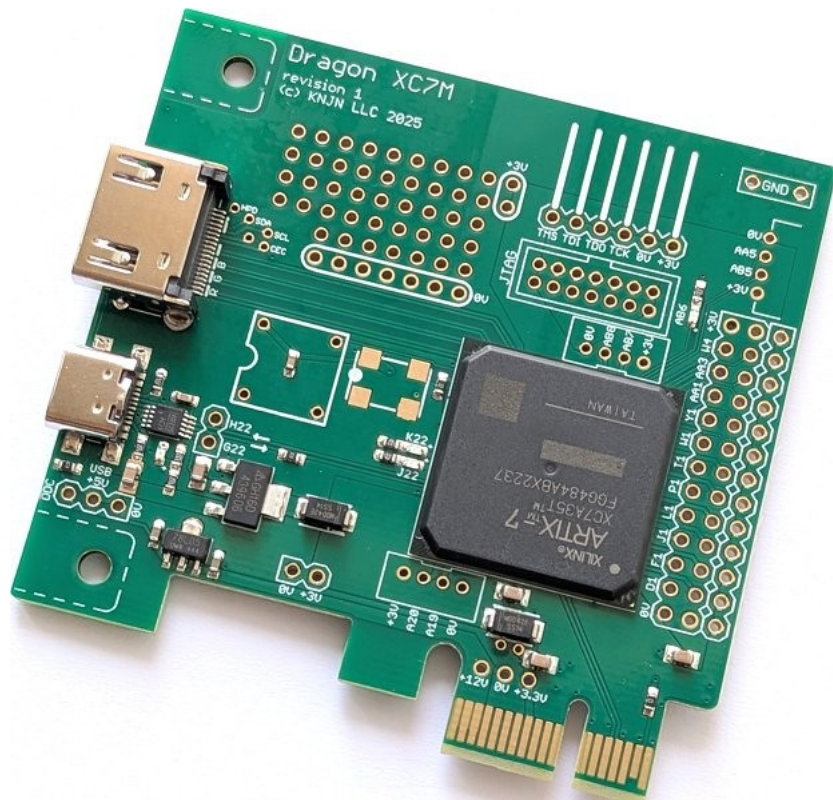
Dragon XC7M FPGA development board

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<https://www.knjin.com/>

This document applies to the following board.

- Dragon XC7M revision 1



Document last revision **March 14, 2025**

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1 Introduction

1.1 Features

- Xilinx/AMD XC7A35T FPGA, 28 general purposes IOs and 3 LEDs
- PCI Express
- HDMI output
- USB-C with CH340 serial interface
- DIL-8, SMD5x7 and SMD3x2 optional clock oscillators
- JTAG

1.2 FPGA configuration

The FPGA is configured using either a Xilinx/AMD cable or KNJN JTAG cable.

- Xilinx/AMD: use a [DLC10](#) cable or compatible.
- KNJN: use the KNJN JTAG cable for Dragon XC7M ([KNJN item#5165](#))

1.3 FPGA software

Download and install the latest [Vivado](#) software.

When using the KNJN JTAG cable, we also provide [FPGAconf](#).

1.4 Board power

The board can be powered in multiple ways.

1. PCI express
2. USB-C
3. KNJN JTAG cable
4. External lab power supply, either 3.3V or 5V

1.5 Purchase

Want one? Go to KNJN's [PCI FPGA development boards](#) shopping page.

2 Vivado

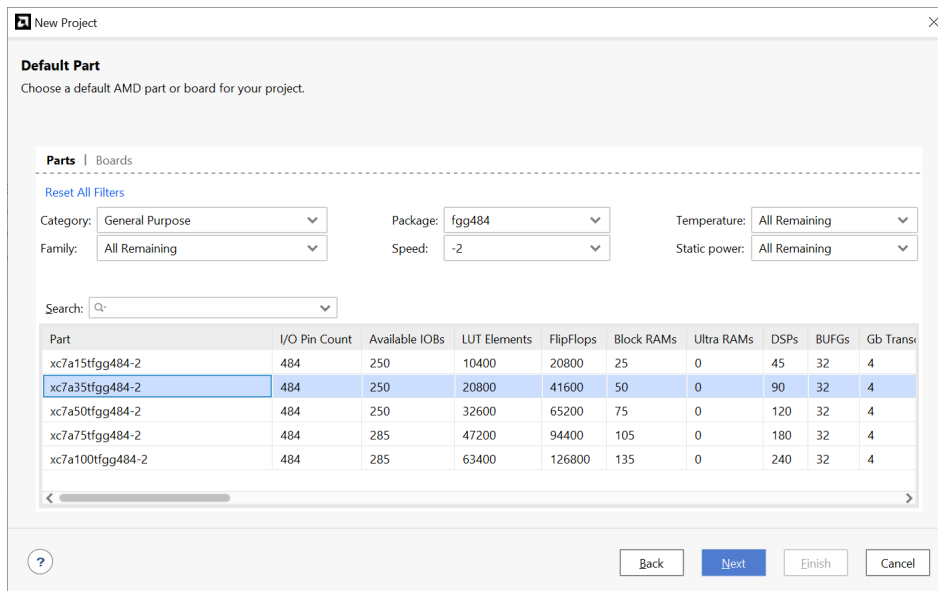
2.1 Vivado installation

Install the free version of Vivado.

<https://www.xilinx.com/support/download/index.html/content/xilinx/en/downloadNav/vivado-design-tools.html>

2.2 Vivado project

When creating a new Vivado project, select XC7A35T in FGG484 package.



3 FPGAconf

FPGAconf is a software used with the KNJN JTAG cable.

3.1 USB driver

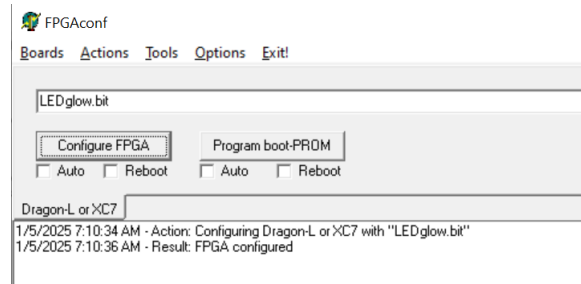
The KNJN JTAG cable comes with a USB driver. The driver is signed and compatible with Windows 10/11.

1. Plug-in the KNJN JTAG cable in your PC's USB port.
2. Go to the Device Manager and find the new unrecognized device in the USB section. Click on "Update Driver" and select the driver folder.

3.2 FPGA configuration

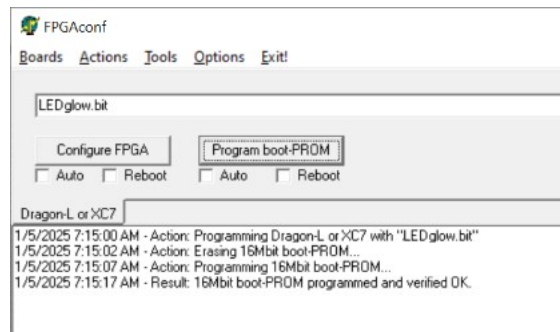
Run FPGAconf.

In the "Boards" menu, select "Dragon-L or XC7 (JTAG)". Then select a bitfile and click on "Configure FPGA".



3.3 Boot-PROM programming

Select a bitfile and click on "Program boot-PROM".



4 HDMI

The HDMI source code is a port from <https://github.com/hdl-util/hdmi>

5 PCI Express

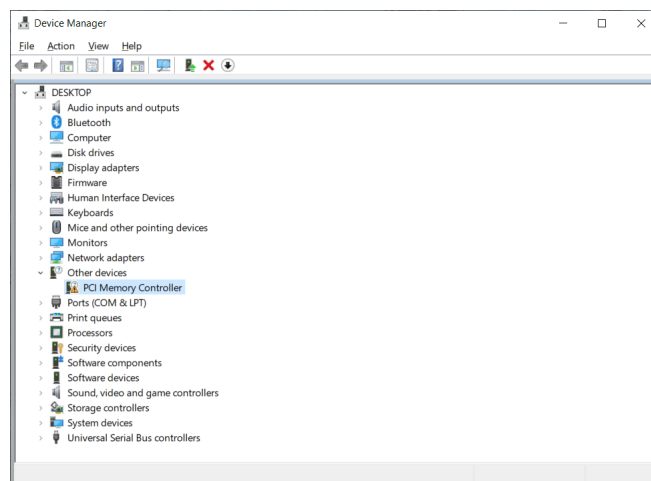
The simplest way to get started is with the PIO example.

<https://www.youtube.com/watch?v=1YgvijNfLYY>

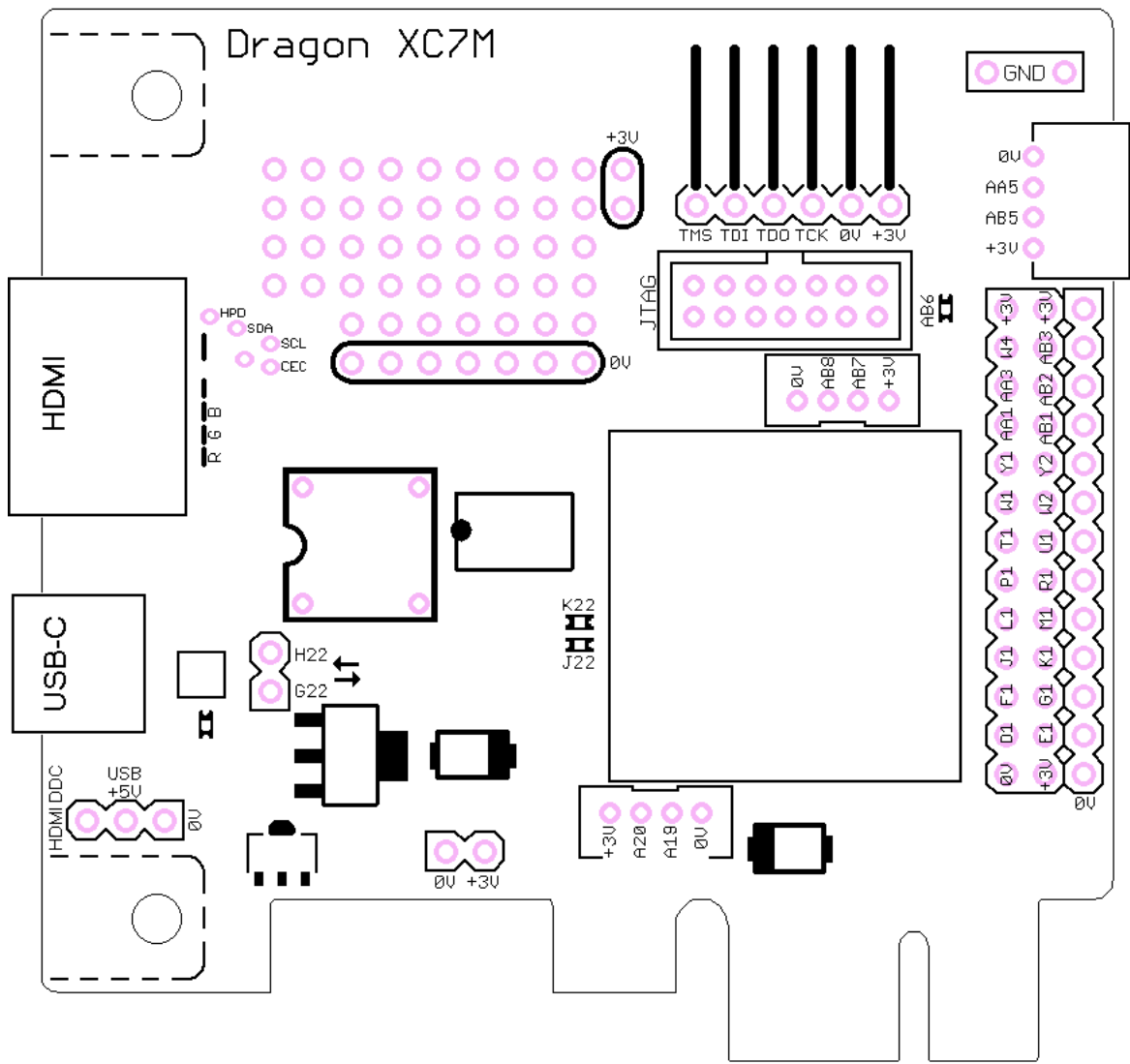
1. Create a PIO example project with a XC7A35TFGG484-2
2. Add these lines to the XDC file

```
set_property PACKAGE_PIN A8 [get_ports pci_exp_rxn[0]]
set_property PACKAGE_PIN A4 [get_ports pci_exp_txn[0]]
set_property CFGBVS VCC0 [current_design]
set_property CONFIG_VOLTAGE 3.3 [current_design]
set_property BITSTREAM.GENERAL.COMPRESS true [current_design]
set_property BITSTREAM.CONFIG.UNUSEDPIN pullup [current_design]
set_property BITSTREAM.CONFIG.SPI_BUSWIDTH 2 [current_design]
set_property BITSTREAM.CONFIG.CONFIGRATE 50 [current_design]
```

and compile the design to get a bit file.
3. Program the bit file in the boot-PROM.
4. Insert the Dragon board into a PCI express socket of your test PC (while the PC is un-powered). Boot the test PC. The board should be recognized by your OS.



6 Board layout



Check also "Dragon XC7M IO schematic.pdf" in the board's startup-kit.

7 Useful items

Item name	KNJN item#
KNJN USB JTAG cable for Dragon XC7M	5165
Xilinx style JTAG 2x7 shrouded connector for use with DLC10	2189
DIL-8 oscillator socket	2187
Oscillators DIL-8 or SMD5x7	7000~7999