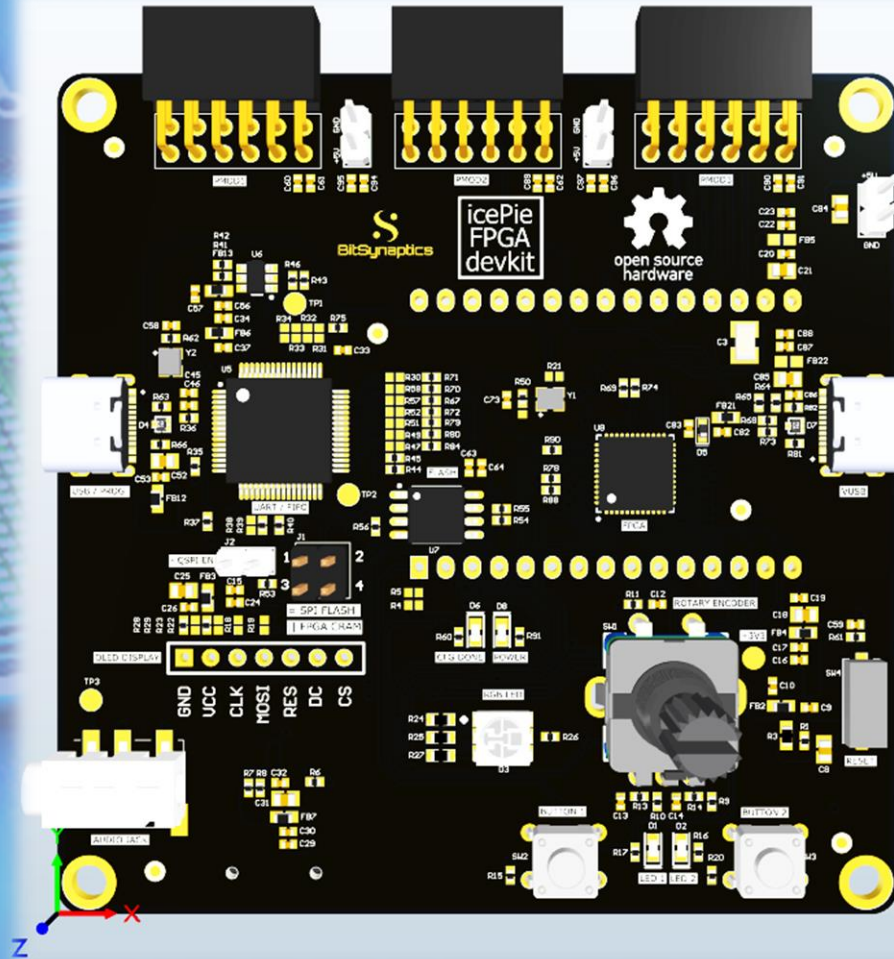


Unravelling the Silicon Revolution

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Windows Install Guide for APIO and ice40 Toolchains

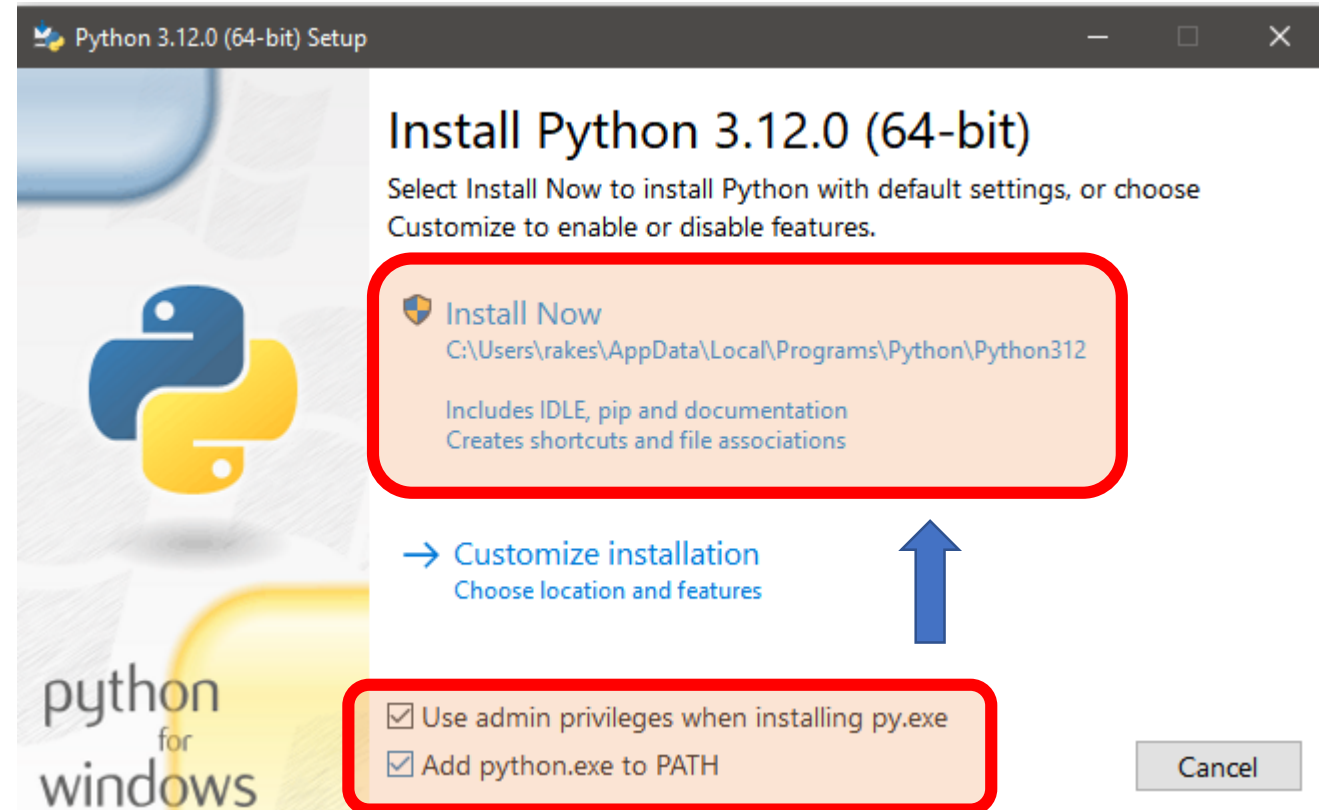
- Step 1: Install Python for Windows
 - <https://www.python.org/downloads/>

Download the latest version for Windows

Download Python 3.12.0

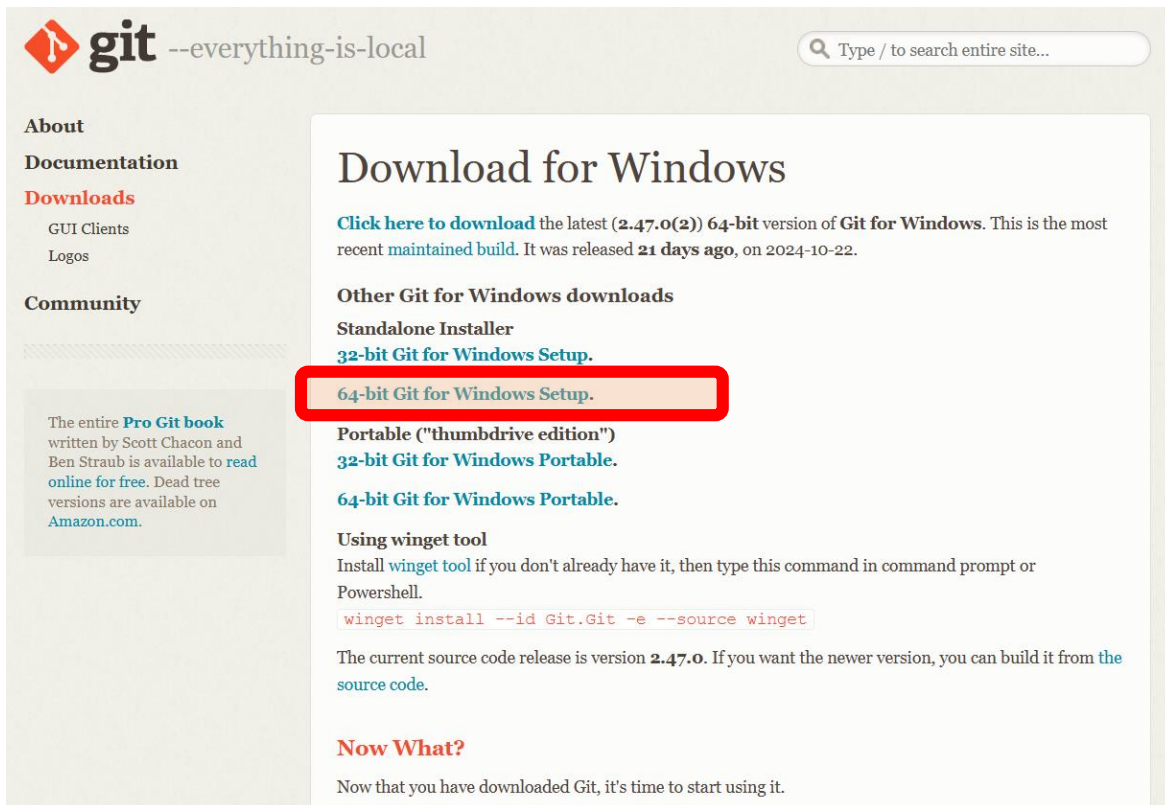
Looking for Python with a different OS? Python for Windows,
Linux/UNIX, macOS, Other

Want to help test development versions of Python 3.13? Prereleases,
Docker images



Windows Install Guide for APIO and ice40 Toolchains

- Step 2: Install Git for Windows
 - <https://git-scm.com/downloads/win>



The screenshot shows the Git website's 'Download for Windows' page. The page title is 'Download for Windows'. It features a search bar at the top right. The main content area lists download options for Windows. The '64-bit Git for Windows Setup' link is highlighted with a red box. Below this, there are links for '32-bit Git for Windows Setup', '32-bit Git for Windows Portable', and '64-bit Git for Windows Portable'. The 'Using winget tool' section provides instructions on how to install Git using the winget command. The 'Now What?' section states that after downloading Git, it's time to start using it.

git --everything-is-local

Type / to search entire site...

Download for Windows

Click here to download the latest (2.47.0(2)) 64-bit version of Git for Windows. This is the most recent maintained build. It was released 21 days ago, on 2024-10-22.

Other Git for Windows downloads

Standalone Installer

- 32-bit Git for Windows Setup.
- 64-bit Git for Windows Setup.**
- 32-bit Git for Windows Portable.
- 64-bit Git for Windows Portable.

Using winget tool

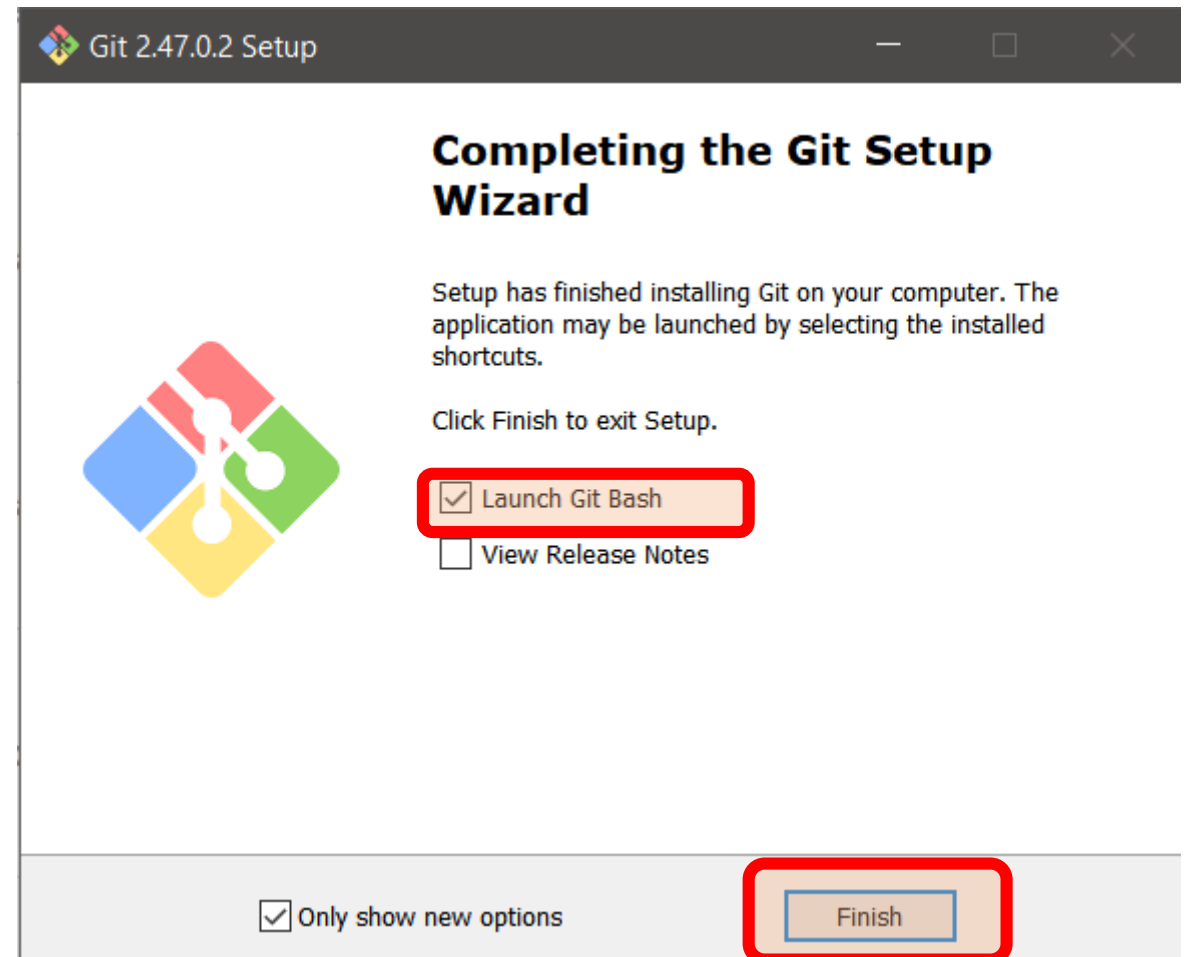
Install winget tool if you don't already have it, then type this command in command prompt or Powershell.

```
winget install --id Git.Git -e --source winget
```

The current source code release is version 2.47.0. If you want the newer version, you can build it from the source code.

Now What?

Now that you have downloaded Git, it's time to start using it.



The screenshot shows the Git 2.47.0.2 Setup Wizard window. The window title is 'Git 2.47.0.2 Setup'. The main heading is 'Completing the Git Setup Wizard'. The text states: 'Setup has finished installing Git on your computer. The application may be launched by selecting the installed shortcuts.' Below this, it says 'Click Finish to exit Setup.' There are two checkboxes: 'Launch Git Bash' (checked) and 'View Release Notes' (unchecked). The 'Launch Git Bash' checkbox is highlighted with a red box. At the bottom, there is a checkbox for 'Only show new options' (checked) and a 'Finish' button, which is also highlighted with a red box.

Git 2.47.0.2 Setup

Completing the Git Setup Wizard

Setup has finished installing Git on your computer. The application may be launched by selecting the installed shortcuts.

Click Finish to exit Setup.

☒ Launch Git Bash

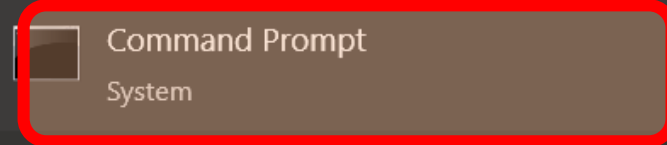
☐ View Release Notes

☒ Only show new options






Finish




Best match







Apps

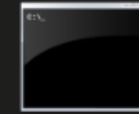
-  **acs.cmd** >
-  **adc_to_socket.cmd** >
-  **KiCad 8.0 Command Prompt** >
-  **Win64 OpenSSL Command Prompt** >
-  **Minimal ADB and Fastboot** >

Settings

-  **Replace Command Prompt with Windows PowerShell in the Win + X** >






Search the web

-  **cmd** - See more search results >
-  **cmd prompt** >
-  **cmdrf** >
-  **cmd kerala** >

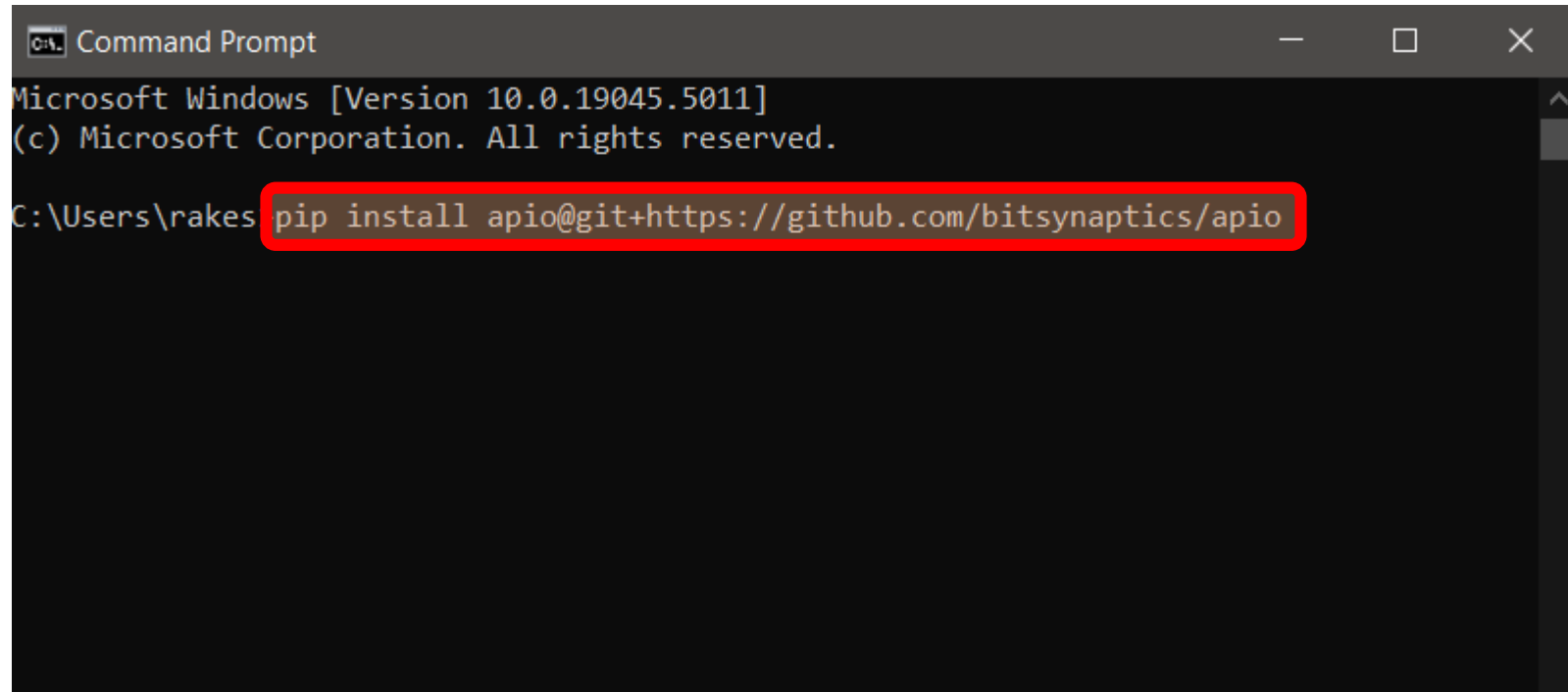


Command Prompt

System

-  **Open**
-  **Run as administrator**
-  **Open file location**
-  **Pin to Start**
-  **Pin to taskbar**

- Step 2: Install apio using pip tool



A screenshot of a Windows Command Prompt window. The title bar reads "Command Prompt". The window content shows the following text: "Microsoft Windows [Version 10.0.19045.5011]" and "(c) Microsoft Corporation. All rights reserved." The current directory is "C:\Users\rakes". The command "pip install apio@git+https://github.com/bitsynaptics/apio" is entered and highlighted with a red rectangular box.

```
Microsoft Windows [Version 10.0.19045.5011]
(c) Microsoft Corporation. All rights reserved.

C:\Users\rakes pip install apio@git+https://github.com/bitsynaptics/apio
```

Using pip, install apio toolset

```
pip install apio@git+https://github.com/bitsynaptics/apio
```

Command Prompt

C:\Users\rakes>pip install apio

Collecting apio

Obtaining dependency information for apio from <https://files.pythonhosted.org/packages/2c/7a/5ea390dac8e009e2def144c8718f15cb92183656c3a461821cfad7b94b80/apio-0.8.4-py3-none-any.whl.metadata>

Using cached apio-0.8.4-py3-none-any.whl.metadata (11 kB)

Collecting click==8.1.3 (from apio)

Using cached click-8.1.3-py3-none-any.whl (96 kB)

Collecting semantic_version==2.9.0 (from apio)

Using cached semantic_version-2.9.0-py2.py3-none-any.whl (15 kB)

Collecting requests==2.28.2 (from apio)

Using cached requests-2.28.2-py3-none-any.whl (62 kB)

Collecting colorama==0.4.6 (from apio)

Using cached colorama-0.4.6-py2.py3-none-any.whl (25 kB)

Collecting pyserial==3.5 (from apio)

Using cached pyserial-3.5-py2.py3-none-any.whl (90 kB)

Collecting wheel<1,>=0.35.0 (from apio)

Obtaining dependency information for wheel<1,>=0.35.0 from <https://files.pythonhosted.org/packages/fa/7f/4c07234086edbce4a0a446209dc0cb08a19bb206a3ea53b2f56a403f983b/wheel-0.41.3-py3-none-any.whl.metadata>

Using cached wheel-0.41.3-py3-none-any.whl.metadata (2.2 kB)

Collecting scons==4.2.0 (from apio)

Using cached SCons-4.2.0-py3-none-any.whl (4.2 MB)

Collecting charset-normalizer<4,>=2 (from requests==2.28.2->apio)

Obtaining dependency information for charset-normalizer<4,>=2 from https://files.pythonhosted.org/packages/b6/7c/8debebb4f90174074b827c63242c23851bdf00a532489fba57fef3416e40/charset_normalizer-3.3.2-cp312-cp312-win_amd64.whl.metadata

Using cached charset_normalizer-3.3.2-cp312-cp312-win_amd64.whl.metadata (34 kB)

Collecting idna<4,>=2.5 (from requests==2.28.2->apio)

Using cached idna-3.4-py3-none-any.whl (61 kB)

Collecting urllib3<1.27,>=1.21.1 (from requests==2.28.2->apio)

Obtaining dependency information for urllib3<1.27,>=1.21.1 from <https://files.pythonhosted.org/packages/b0/53/aa91e163dcfd1e5b82d8a890ecf13314e3e149c05270cc644581f77f17fd/urllib3-1.26.18-py2.py3-none-any.whl.metadata>

Using cached urllib3-1.26.18-py2.py3-none-any.whl.metadata (48 kB)

Collecting certifi>=2017.4.17 (from requests==2.28.2->apio)

Obtaining dependency information for certifi>=2017.4.17 from <https://files.pythonhosted.org/packages/4c/dd/2234eab22353ffc7d94e8d13177aaa050113286e93e7b40eae01fbf7c3d9/certifi-2023.7.22-py3-none-any.whl.metadata>

Using cached certifi-2023.7.22-py3-none-any.whl.metadata (2.2 kB)

Collecting setuptools (from scons==4.2.0->apio)

Obtaining dependency information for setuptools from <https://files.pythonhosted.org/packages/bb/26/7945080113158354380a12ce26873dd6c1ebd88d47f5bc24e2c5bb38c16a/setuptools-68.2.2-py3-none-any.whl.metadata>

Using cached setuptools-68.2.2-py3-none-any.whl.metadata (6.3 kB)

Using cached apio-0.8.4-py3-none-any.whl (70 kB)

Using cached wheel-0.41.3-py3-none-any.whl (65 kB)

Using cached certifi-2023.7.22-py3-none-any.whl (158 kB)

Using cached charset_normalizer-3.3.2-cp312-cp312-win_amd64.whl (100 kB)

Using cached urllib3-1.26.18-py2.py3-none-any.whl (143 kB)

Downloading setuptools-68.2.2-py3-none-any.whl (807 kB)

----- 807.9/807.9 kB 1.3 MB/s eta 0:00:00

Installing collected packages: pyserial, wheel, urllib3, setuptools, semantic_version, idna, colorama, charset-normalizer, certifi, scons, requests, click, apio

Successfully installed apio-0.8.4 certifi-2023.7.22 charset-normalizer-3.3.2 click-8.1.3 colorama-0.4.6 idna-3.4 pyserial-3.5 requests-2.28.2 scons-4.2.0 semantic_version-2.9.0 setuptools-68.2.2 urllib3-1.26.18 wheel-0.41.3

[notice] A new release of pip is available: 23.2.1 -> 23.3.1

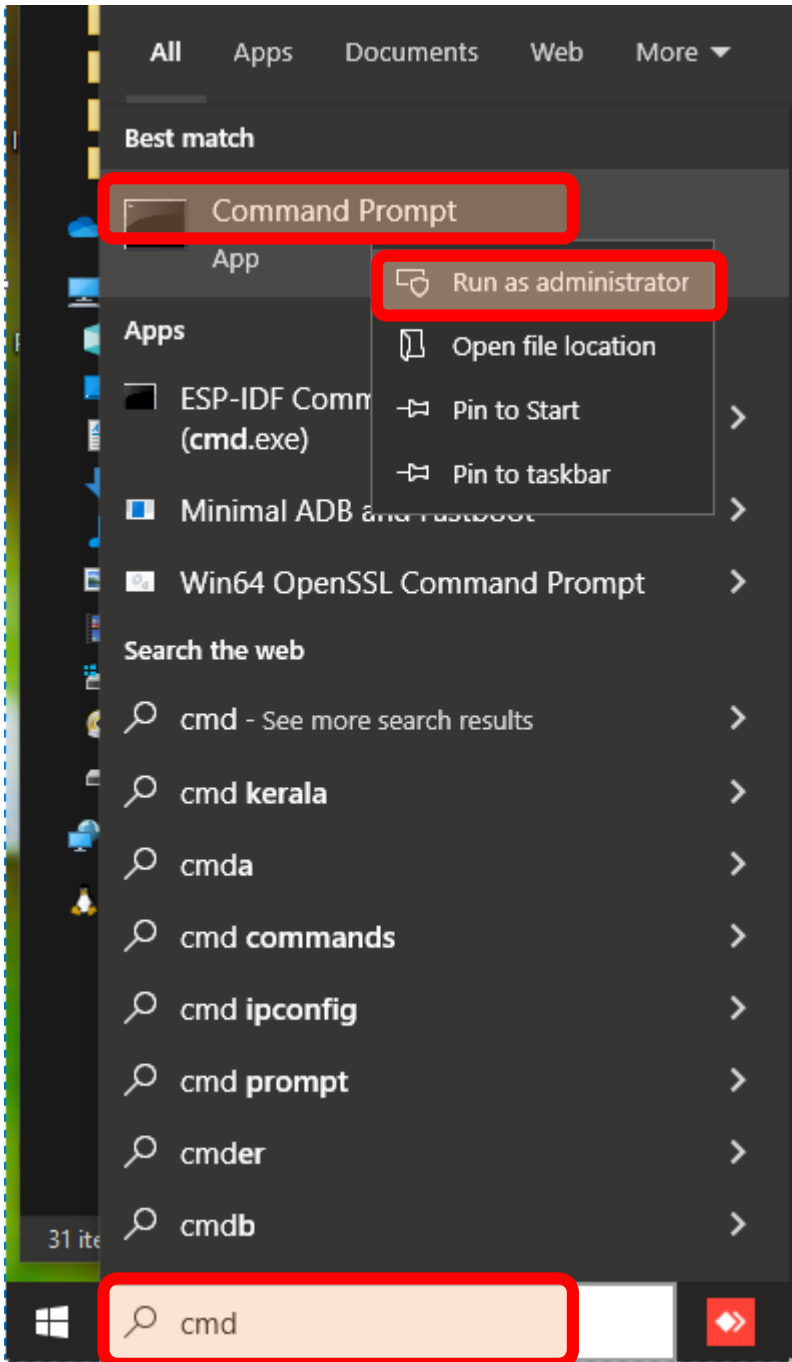
[notice] To update, run: C:\Users\rakes\AppData\Local\Programs\Python\Python312\python.exe -m pip install --upgrade pip

C:\Users\rakes>

- Step 3: Install drivers and toolchains using apio

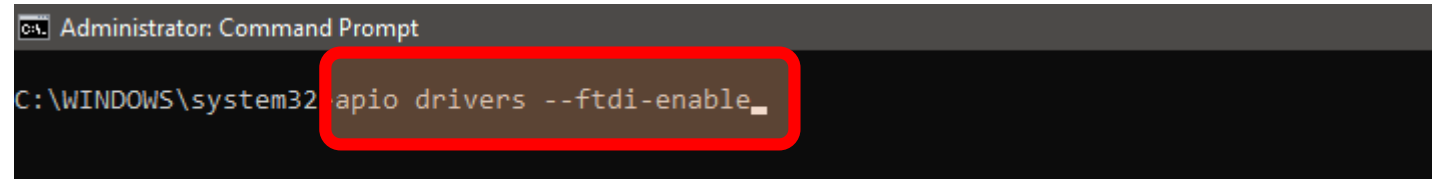
```
Command Prompt
C:\Users\rakes>apio install -a_
```

```
Command Prompt
C:\Users\rakes>apio install -a
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
(DEBUG) Home_dir: C:\Users\rakes\.apio
File version.txt downloaded!
Version: 1.1.0
Installing drivers package:
platform_download_url: https://github.com/FPGAwards/tools-drivers/releases/download/v1.1.0/tools-drivers-windows_amd64-1.1.0.tar.gz
Already installed. Version 1.1.0
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
(DEBUG) Home_dir: C:\Users\rakes\.apio
File version.txt downloaded!
Version: 0.0.35
Installing examples package:
platform_download_url: https://github.com/FPGAwards/apio-examples/releases/download/0.0.35/apio-examples-0.0.35.zip
Download apio-examples-0.0.35.zip
Downloading [#####] 100%
Unpacking [#####] 100%
Package 'examples' has been successfully installed!
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
(DEBUG) Home_dir: C:\Users\rakes\.apio
File version.txt downloaded!
Version: 3.3.77
Installing gtwave package:
platform_download_url: https://github.com/FPGAwards/tool-gtwave/releases/download/v3.3.77/tool-gtwave-windows_amd64-3.3.77.tar.gz
Already installed. Version 3.3.77
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
(DEBUG) Home_dir: C:\Users\rakes\.apio
File version.txt downloaded!
Version: 0.0.8
Installing oss-cad-suite package:
platform_download_url: https://github.com/FPGAwards/tools-oss-cad-suite/releases/download/v0.0.8/tools-oss-cad-suite-windows_amd64-0.0.8.tar.gz
Already installed. Version 0.0.8
C:\Users\rakes>
```



- Step 4: Enable FTDI Driver Configuration using Zadig tool

- 1) Type 'cmd' in the Windows Search Box
- 2) Right click on Command Prompt
- 3) Select '**Run as Administrator**'
- 4) Run '**apio drivers --ftdi-enable**'



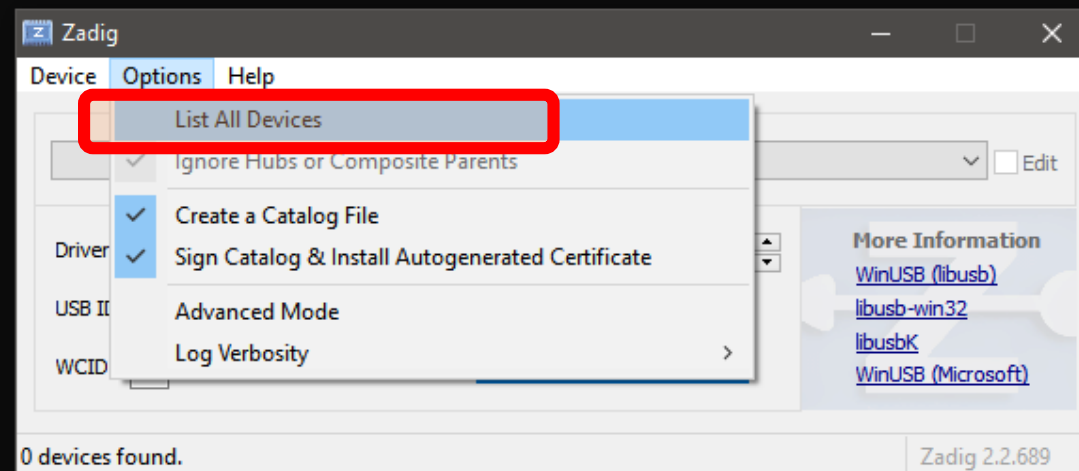
- icePie FPGA board needs to be connected to the USB port for running this step
- You may skip this step and continue to the next step if icePie FPGA board is not present

C:\Administrator: Command Prompt - apio drivers --ftdi-enable

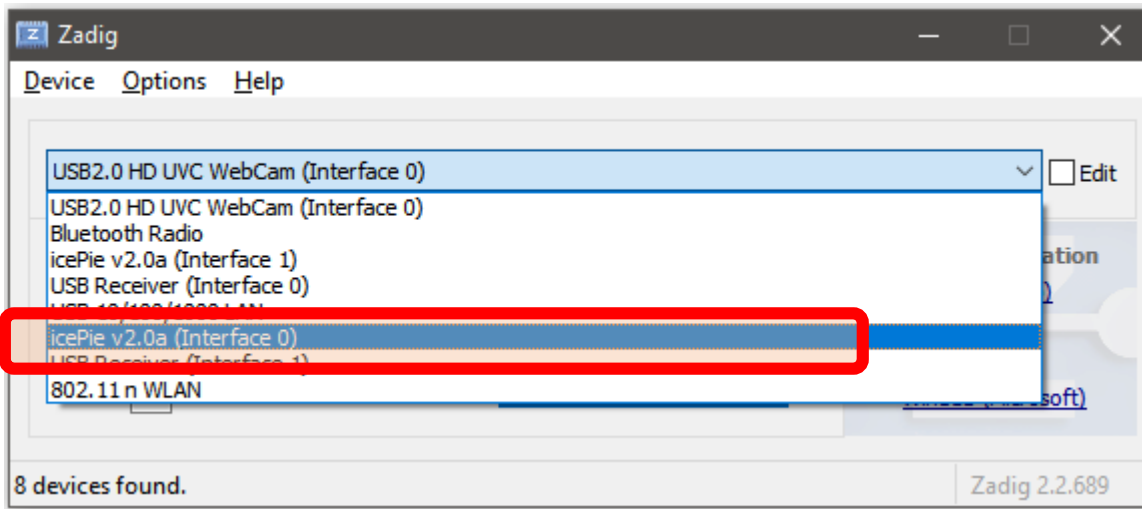
```
C:\WINDOWS\system32>apio drivers --ftdi-enable
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
(DEBUG) Home_dir: C:\Users\rakes\.apio
Launch drivers configuration tool
```

FTDI driver installation:
Usage instructions

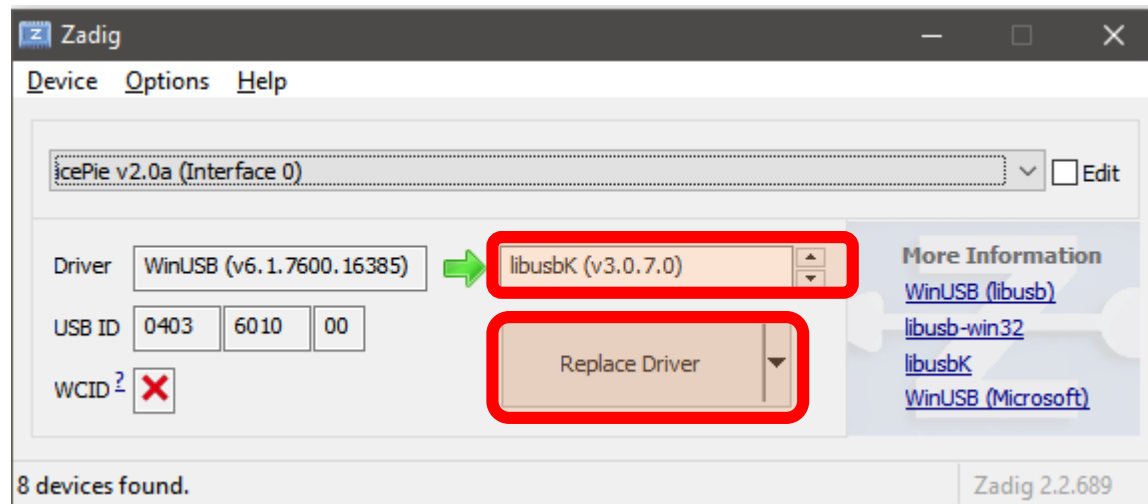
1. Connect the FTDI FPGA board
2. Select (Interface 0)
3. Replace driver by "libusbK"
4. Reconnect the board
5. Check `apio system --lsftdi`



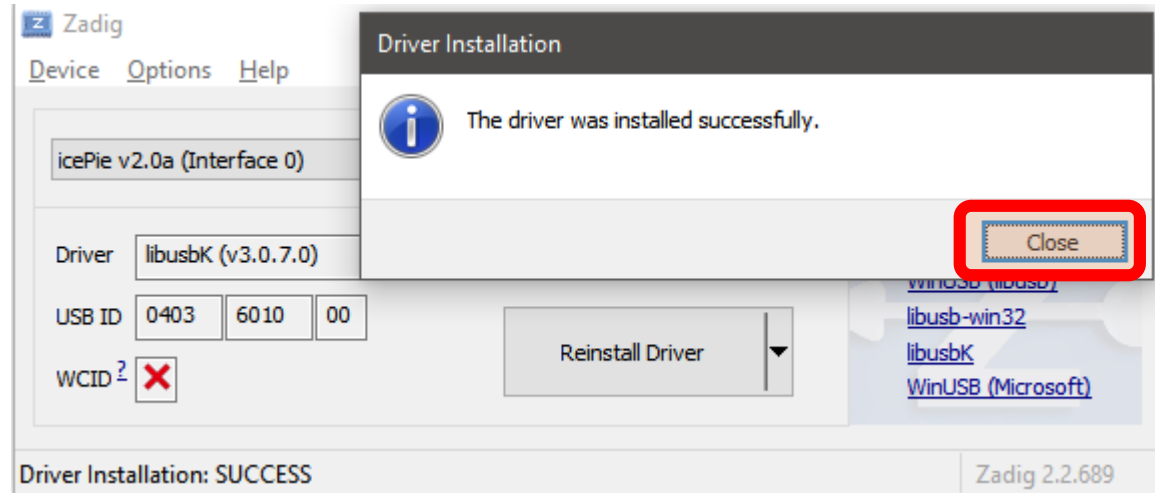
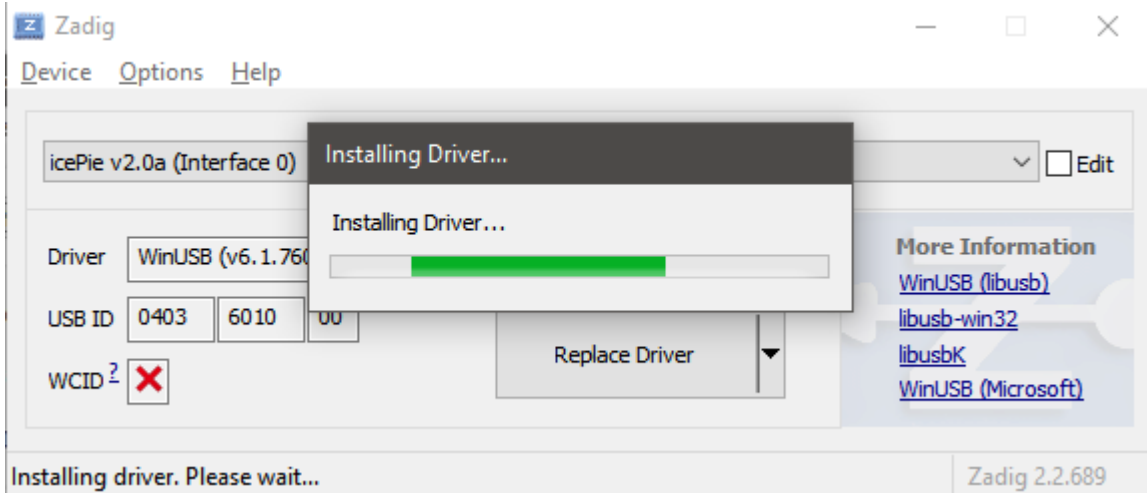
- icePie FPGA board needs to be connected to the USB port for running this step
- You may skip this step and continue to the next step if icePie FPGA board is not present



icePie v2.0a (Interface 0)
X not (Interface 1)



- 1) Select **libusbK (v3.0.7.0)**
- 2) Click **Replace Driver**



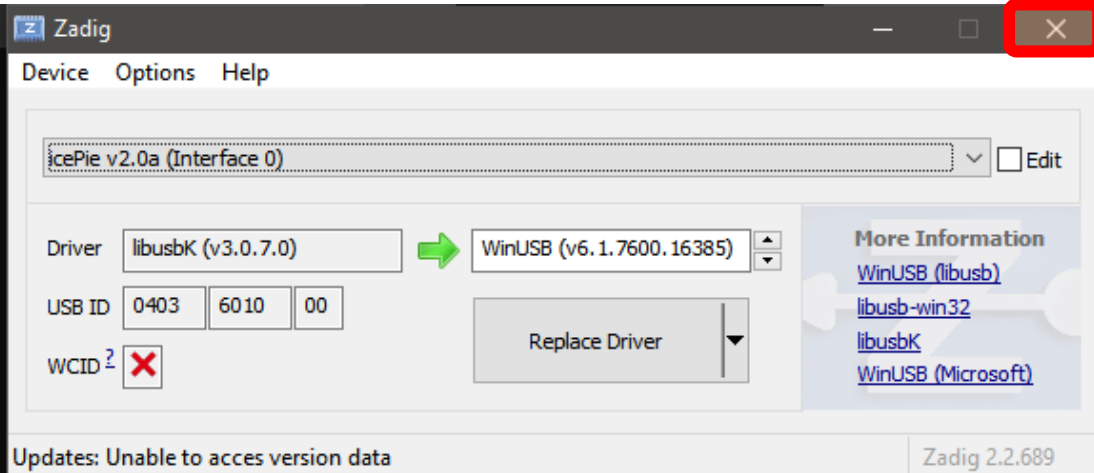
```
Administrator: Command Prompt - apio drivers --ftdi-enable

C:\WINDOWS\system32>apio drivers --ftdi-enable
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
(DEBUG) Home_dir: C:\Users\rakes\.apio
Launch drivers configuration tool

FTDI driver installation:
Usage instructions

1. Connect the FTDI FPGA board
2. Select (Interface 0)
3. Replace driver by "libusbK"
4. Reconnect the board
5. Check `apio system --lsftdi`

FTDI drivers configuration finished
```



- Step 6: Downloading icepie-examples...

```
Command Prompt
C:\Users\rakes>mkdir Documents\workshop
C:\Users\rakes>cd Documents\workshop
C:\Users\rakes\Documents\workshop>dir
Volume in drive C is OS
Volume Serial Number is 02ED-4C66

Directory of C:\Users\rakes\Documents\workshop

13-11-2023  23:23    <DIR>          .
13-11-2023  23:23    <DIR>          ..
               0 File(s)                0 bytes
               2 Dir(s)  23,434,715,136 bytes free

C:\Users\rakes\Documents\workshop>git clone https://github.com/bitsynaptics/icePie-examples
Cloning into 'icePie-examples'...
remote: Enumerating objects: 108, done.
remote: Counting objects: 100% (108/108), done.
remote: Compressing objects: 100% (71/71), done.
remote: Total 108 (delta 45), reused 87 (delta 35), pack-reused 0
Receiving objects: 100% (108/108), 342.78 KiB | 595.00 KiB/s, done.
Resolving deltas: 100% (45/45), done.
```

- Create **Documents\workshop** directory
- Clone icepie-examples repository:

`git clone https://github.com/bitsynaptics/icePie-examples`

- Step 7: Running Blinky

Command Prompt

```
C:\Users\rakes\Documents\workshop\icePie-examples>cd 1-blink
```

```
C:\Users\rakes\Documents\workshop\icePie-examples\1-blink>apio build
```

```
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
```

```
(DEBUG) Home_dir: C:\Users\rakes\.apio
```

```
[Mon Nov 13 23:31:15 2023] Processing icePie
```

```
yosys -p "synth_ice40 -json hardware.json" -q blink.v
```

```
nextpnr-ice40 --up5k --package sg48 --json hardware.json --asc hardware.asc --pcf icePie.pcf -q
```

```
icepack hardware.asc hardware.bin
```

```
===== [SUCCESS] Took 3.81 seconds =====
```

```
C:\Users\rakes\Documents\workshop\icePie-examples\1-blink>apio upload
```

```
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
```

```
(DEBUG) Home_dir: C:\Users\rakes\.apio
```

```
(DEBUG) Profile path: C:\Users\rakes\.apio\profile.json
```

```
[Mon Nov 13 23:31:30 2023] Processing icePie
```

```
iceprog -d i:0x0403:0x6010:0 hardware.bin
```

```
init..
```

```
cdone: high
```

```
reset..
```

```
cdone: low
```

```
flash ID: 0xEF 0x40 0x18 0x00
```

```
file size: 104090
```

```
erase 64kB sector at 0x000000..
```

```
erase 64kB sector at 0x010000..
```

```
programming..
```

```
reading..
```

```
VERIFY OK
```

```
cdone: high
```

```
Bye.
```

```
===== [SUCCESS] Took 15.38 seconds =====
```

```
C:\Users\rakes\Documents\workshop\icePie-examples\1-blink>
```