Getting Started: Ubuntu on Windows 11 & FPGA USB Connection

1. Objective

This document explains the initial steps required to install Ubuntu on Windows 11 using Windows Subsystem for Linux (WSL) and connect an FPGA board to Ubuntu via USB for FPGA development and programming.

2. System Requirements

- Windows 11 (64-bit)
- Administrator access on Windows
- Internet connection
- VSDSquadron FPGA Mini (or compatible iCE40 FPGA board)
- USB cable

3. Installing WSL on Windows 11

Step 1: Open PowerShell as Administrator
Right-click Start → Windows Terminal (Admin)

Step 2: Install WSL with Ubuntu
Run the command:
wsl --install

This installs:
- WSL
- Virtual Machine Platform
- Ubuntu (default distribution)

Step 3: Restart your computer when prompted

4. Setting Up Ubuntu

Step 1: Launch Ubuntu from Start Menu

Step 2: Create a Linux username and password
(This password is used for sudo commands)

Step 3: Update Ubuntu packages
Run:

sudo apt update
sudo apt upgrade

5. Installing FPGA Toolchain (iCE40)

Install required packages:
sudo apt install -y yosys nextpnr-ice40 icepack iceprog usbutils build-essential

Verify installation:
yosys -V
nextpnr-ice40 --version

6. Connecting FPGA to Ubuntu via USB

Step 1: Connect FPGA board to Windows via USB cable

Step 2: Open PowerShell as Administrator

Step 3: List USB devices
usbipd list

Note the BUSID of the FPGA device (FTDI USB Serial Converter)

Step 4: Bind the device
usbipd bind --busid <BUSID>

Step 5: Attach device to WSL
usbipd attach --wsl --busid <BUSID>

7. Verifying FPGA Connection in Ubuntu

Open Ubuntu terminal and run:
lsusb

You should see:
Future Technology Devices International, Ltd FT232H

This confirms FPGA is visible to Ubuntu.

8. Common Issues & Fixes

• If usbipd is not found:
Install from Microsoft Store or GitHub (usbipd-win)

• If FPGA not detected:
Ensure correct BUSID
Ensure device is attached to WSL

• Permission issues:
Use sudo for iceprog

9. Ready for FPGA Development

At this stage:
• Ubuntu is running on Windows 11
• FPGA toolchain is installed
• FPGA board is accessible via USB

You are now ready to build, program, and debug FPGA designs.