# How to Compile Hardware for Ox64 on Ubuntu 22.04.2 LTS

This guide provides step-by-step instructions for compiling hardware for 0x64 using Buildroot Bouffalo on Ubuntu 22.04.2 LTS.

# **Prerequisites:**

- A system running Ubuntu 22.04.2 LTS.
- Terminal or command-line access.
- Essential tools and packages installed.

# **Compilation Steps:**

1. Setting up the Build Directory:

Open the terminal and create a new directory for the build:

mkdir buildroot\_bouffalo && cd buildroot\_bouffalo

# 2. Cloning Necessary Repositories:

Clone the primary Buildroot repository and the specific Buildroot Bouffalo repository:

git clone https://github.com/buildroot/buildroot
git clone https://github.com/openbouffalo/buildroot\_bouffalo

#### 3. Setting Up Overlay Path:

Define an environment variable for the Buildroot Bouffalo overlay path:

export BR\_BOUFFALO\_OVERLAY\_PATH=\$(pwd)/buildroot\_bouffalo

## 4. Navigating to Buildroot Directory:

Change directory into the cloned Buildroot folder:

cd buildroot

#### 5. Initial Configuration:

Apply the default configuration for Pine64 0x64:

make BR2\_EXTERNAL=\$BR\_BOUFFAL0\_OVERLAY\_PATH pine64\_ox64\_defconfig

#### 6. Configure Build Settings:

Use the menuconfig tool to adjust build settings:

make menuconfig

Note: Within menuconfig:

• Navigate to Target Architecture .

- Enable Single-precision Floating-point and Double-precision Floating-point .
- Set Target ABI to lp64d.



• Under Toolchain, enable Fortran support and OpenMP support.

- Toolchain -
Arrow keys navigate the menu. <enter> selects submenus&gt; (or empty submenus&gt;. Highlighted letters are hotkeys. Pressing <y> selects a feature, while <w> excludes a feature. Press <esc> to exit, <? > for Help,  for Search. Legend: [*] feature is selected [] feature is excluded</esc></w></y></enter>
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## 7. Compiling:

Initiate the build process:

make

*Note*: Before executing the make command, ensure your PATH variable doesn't have spaces.

# Output:

Upon successful completion, all the required files will be located in the buildroot/output/images directory.

# **Flashing Steps:**

## 1. Download and Extract the Image:

• Download your preferred image or get the compiled image from compilation steps.

#### 2. Obtaining DevCube:

• Download DevCube 1.8.3 from <u>BouffaloLab DevCube v1.8.3</u>.

# 3. Connect BL808 Board:

• Using a serial port, connect the BL808 board to your PC.

# 4. Setting BL808 to Programming Mode:

- Set the BL808 board to programming mode.
- Press the BOOT button while resetting or applying power.
- Release the BOOT button once done.

## 5. Configure DevCube:

- Launch DevCube and select the [BL808] option.
- Switch to the [MCU] page.
- Set the following configurations:
  - Select the UART port and set the baud rate to 2000000.
  - UART TX: GPIO 14.
  - UART RX: GPIO 15.
  - M0 Group[Group0] Image Addr: [0x58000000] followed by the path to m0\_lowload\_bl808\_m0.bin.
  - D0 Group[Group0] Image Addr: [0x58100000] followed by the path to d0\_lowload\_bl808\_d0.bin.
- $\circ$  Click 'Create & Download' and patiently wait for completion.

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## 6. IOT Page Configurations:

- Switch to the [IOT] page.
- Enable 'Single Download', set the Address to 0x800000, and choose [bl808-firmware.bin].

 $\circ$  Click 'Create & Download' once more and await completion.

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## 7. Flash to SD Card:

• Flash the extracted sdcard-pine64-\*.img.xz image or sdcard.img compiled above to your SD card with <u>Balena Etcher</u>.

# **Post-Flashing Steps:**

# Setting up 0x64 with the Flashed SD Card:

# 1. Insert the SD Card:

• Carefully insert the flashed SD card into the Ox64's card slot.

#### 2. Connecting to the Serial Console:

- $\circ$  For accessing the Linux console, use the serial console connection.
- Connect your interface to the Ox64's GPIO pins:
  - UART TX: GPIO 16.
  - UART RX: GPIO 17.
- Ensure your serial interface tool or software is set to the correct baud rate of 20000000.

## 3. Accessing the Linux Console:

- Once connected, power on the 0x64.
- Use your serial interface tool to access the Linux console. You should now see the boot logs and be presented with a command-line interface or shell prompt.

# 4. Logging In:

 $\circ$  To log in to the system, when prompted for the password, enter root .

Enjoy your Linux!