Software Installation Tutorial for Linux for HaHa v3.0 Board

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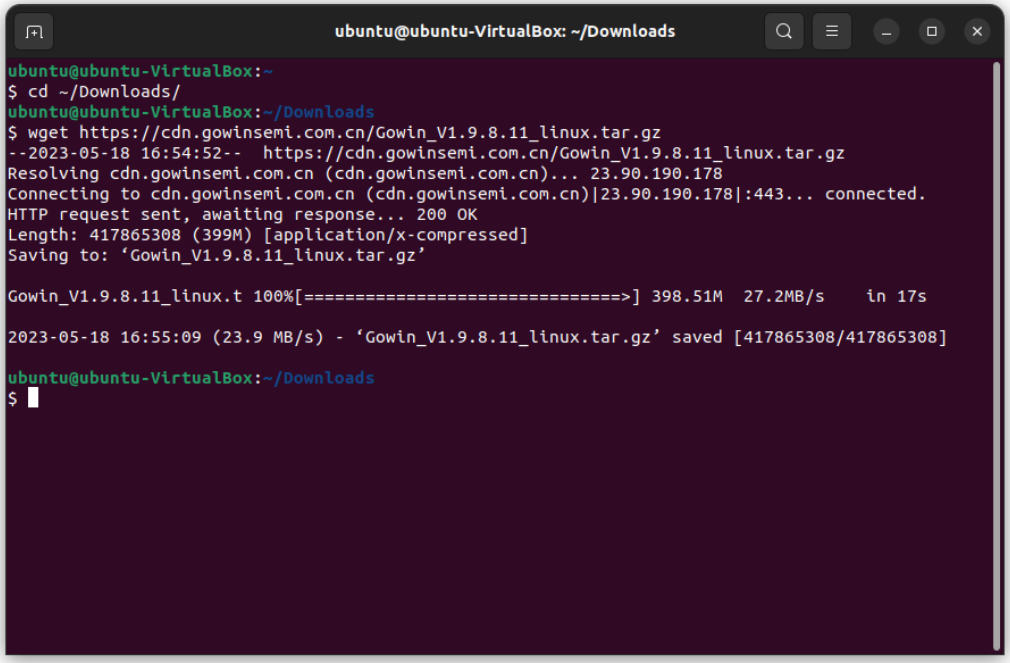
Install GOWIN FPGA Designer

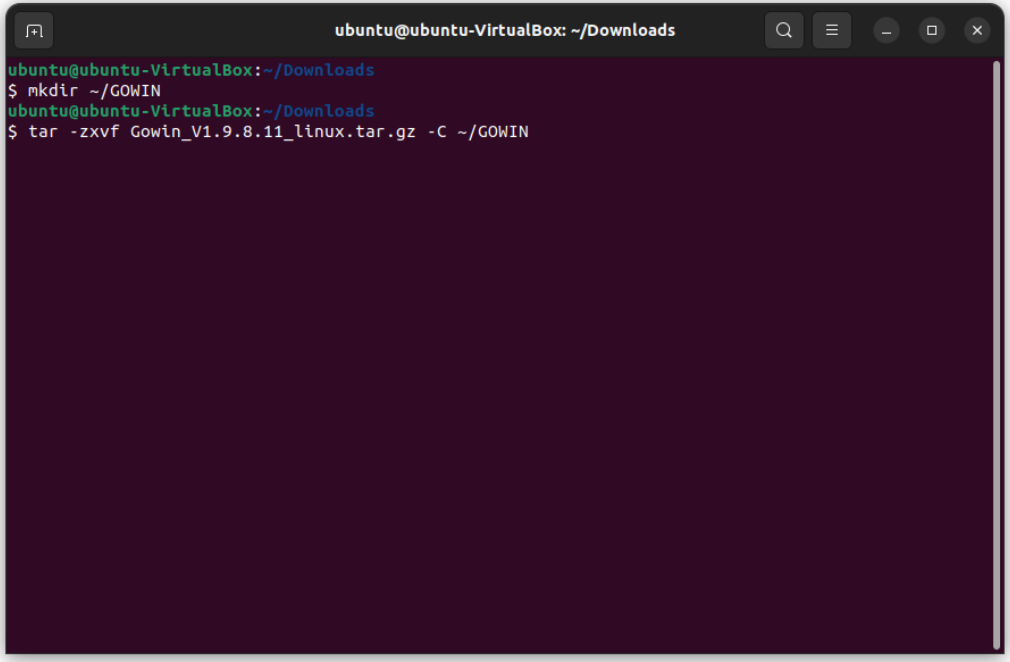
1. Get a free license to use GOWIN FPGA Designer using link [1]. Please note that this will take one or more business days. You will need your computer's Ethernet/Wi-Fi MAC address.
    a. Use the net-tools library in Terminal: `ifconfig`
2. Navigate to the *~/Downloads*. Then, download the tar file [2]. If you would like the latest version, go to link [3] and create a GOWIN account.

```
cd ~/Downloads/
wget https://cdn.gowinsemi.com.cn/Gowin_V1.9.8.11_linux.tar.gz
```



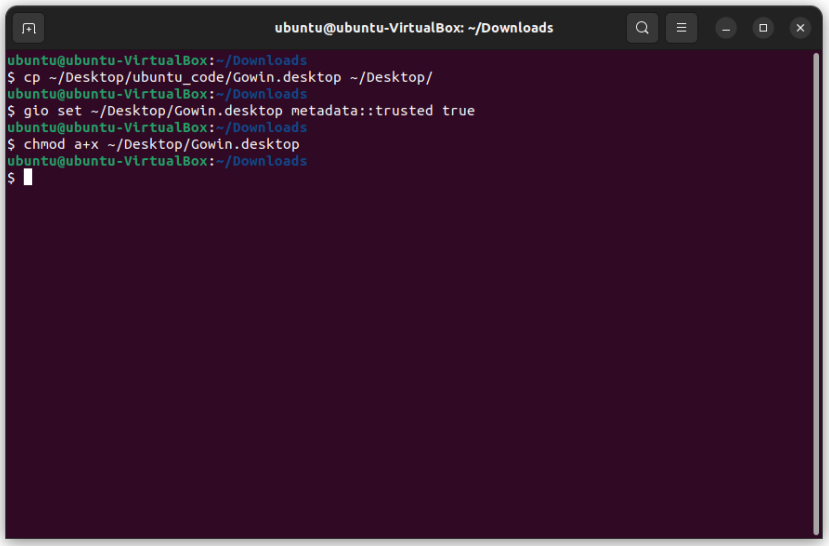
3. Create a directory in your home folder called *GOWIN*. Uncompress the tar file into that folder.

```
mkdir ~/GOWIN
tar -zxvf Gowin_V1.9.8.11_linux.tar.gz -C ~/GOWIN
```

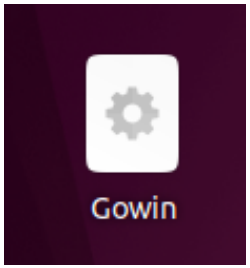


4. Copy the *Gowin.desktop* file from the ubuntu_code.zip file to *~/Desktop*. Set the executable as trusted and add the execution permission.

```
cp <path/to/Gowin.desktop> ~/Desktop/
gio set ~/Desktop/Gowin.desktop metadata::trusted true
chmod a+x Gowin.desktop
```

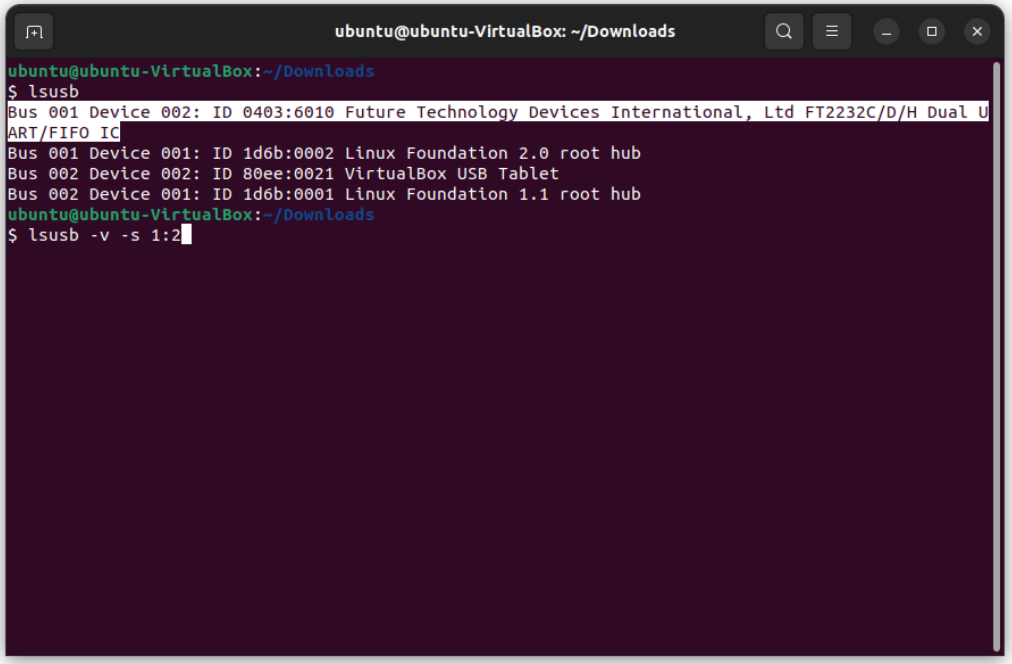


5. In your desktop, you will see this icon. You can use this to access the Gowin FPGA Designer software.



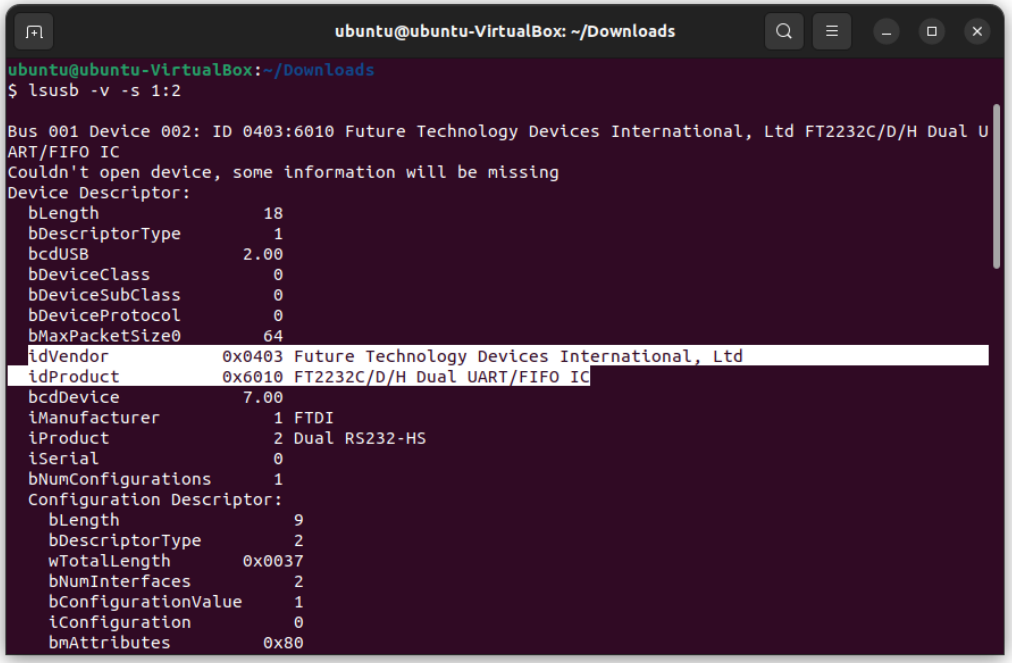
6. Plug in J14 of HaHa board to computer. If you are using VirtualBox, make sure to let the USB through the virtual machine.
   Run *lsusb* command. Look for "Future Technology Devices International, Ltd FT2232C/D/H Dual UART/FIFO IC"
   Take a note of the Bus and Device numbers for this USB Device.

lsusb



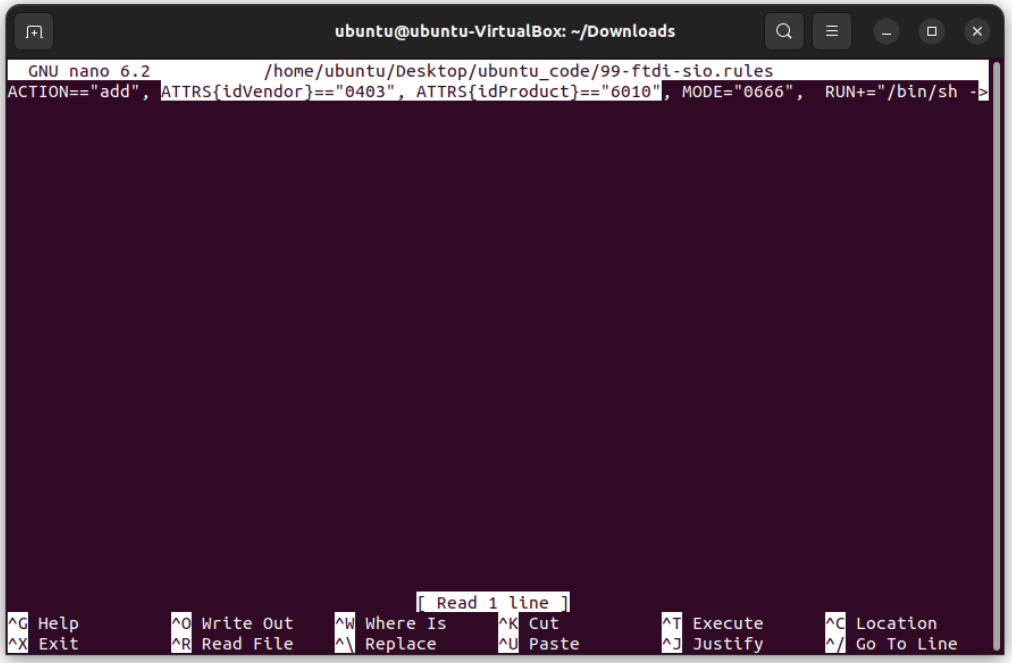
7. Run this *lsusb* command with extra flags. Replace the bus and device numbers. Take a note of the *idVendor* and *idProduct*.

```
lsusb -v -s <bus no>:<device no>
```



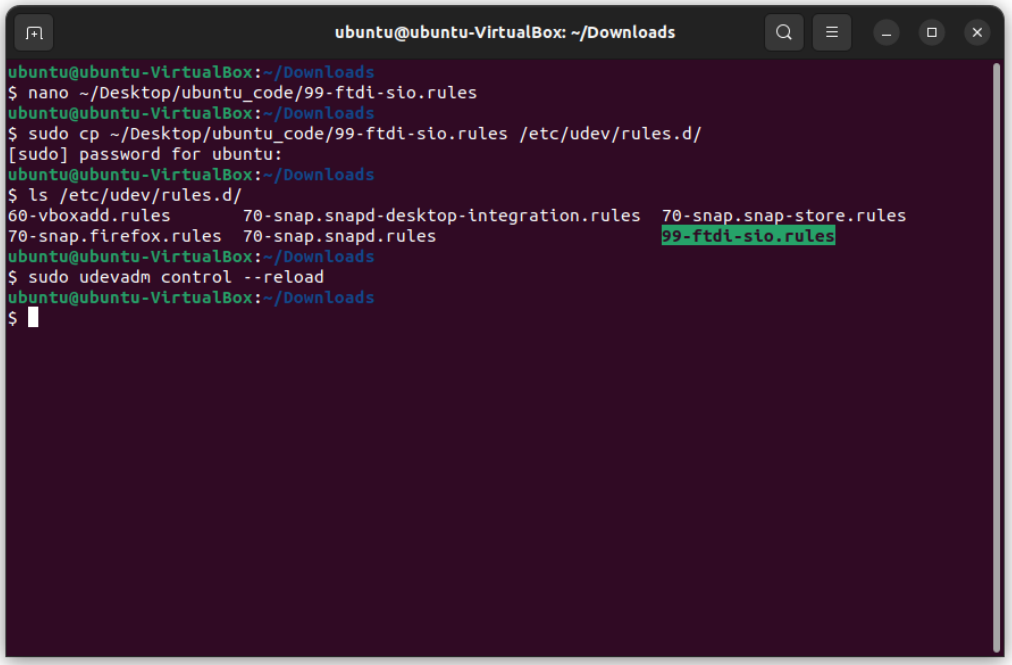
8. Look for the 99-ftdi-sio.rules file inside the ubuntu_code.zip file. Edit the Rules file using Nano to plug in the *idVendor* and *idProduct*.
   Note: The file may already contain the correct values. In this case, please double check the numbers.

```
nano <path/to/99-ftdi-sio.rules>
```



9. Copy the modified rules file to the Rules directory. Then, enable the USB rule for the GOWIN FPGA. Reboot your machine.

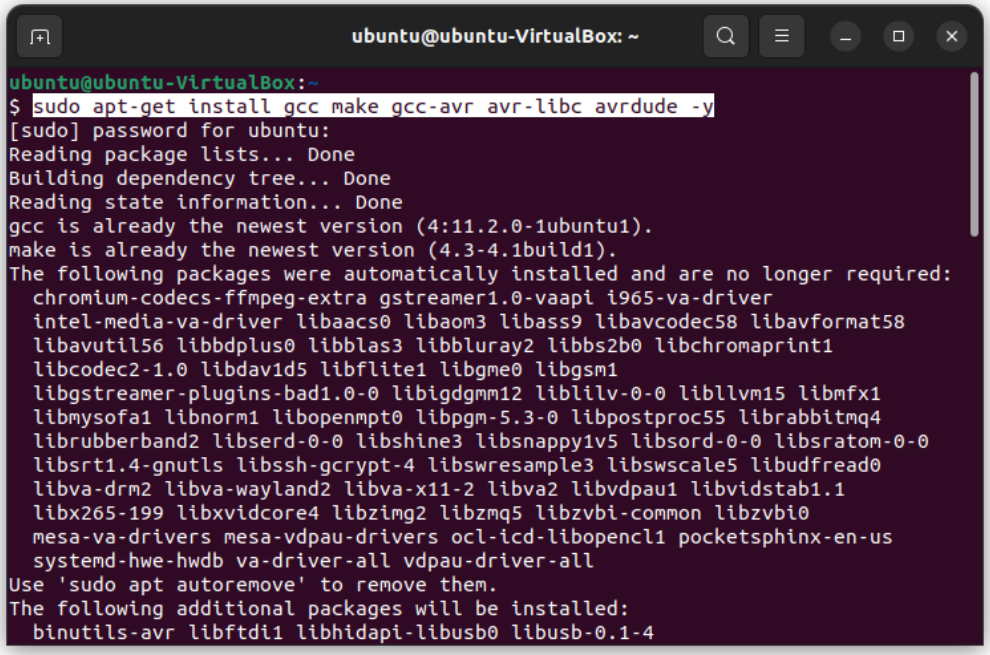
```
sudo cp <path/to/99-ftdi-sio.rules> /etc/udev/rules.d/
sudo udevadm control –reload
sudo reboot
```



Install Atmel Toolchain and Programmer

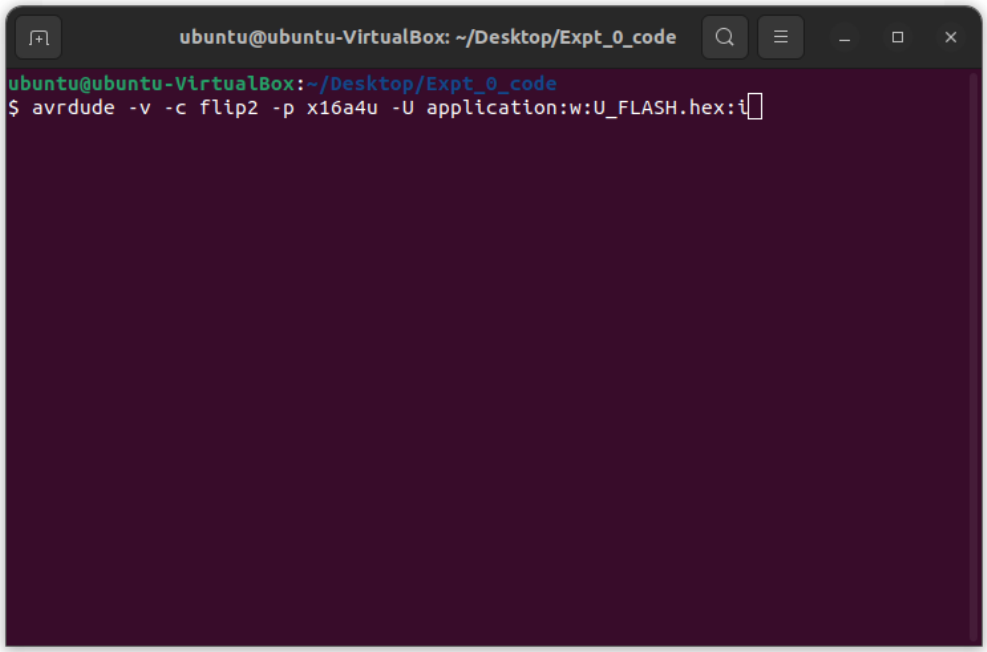
1. Install Atmel Toolchain and Programmer. That's it. The rest of the steps are additional guide.

```
sudo apt-get install gcc make gcc-avr avr-libc avrdude -y
```

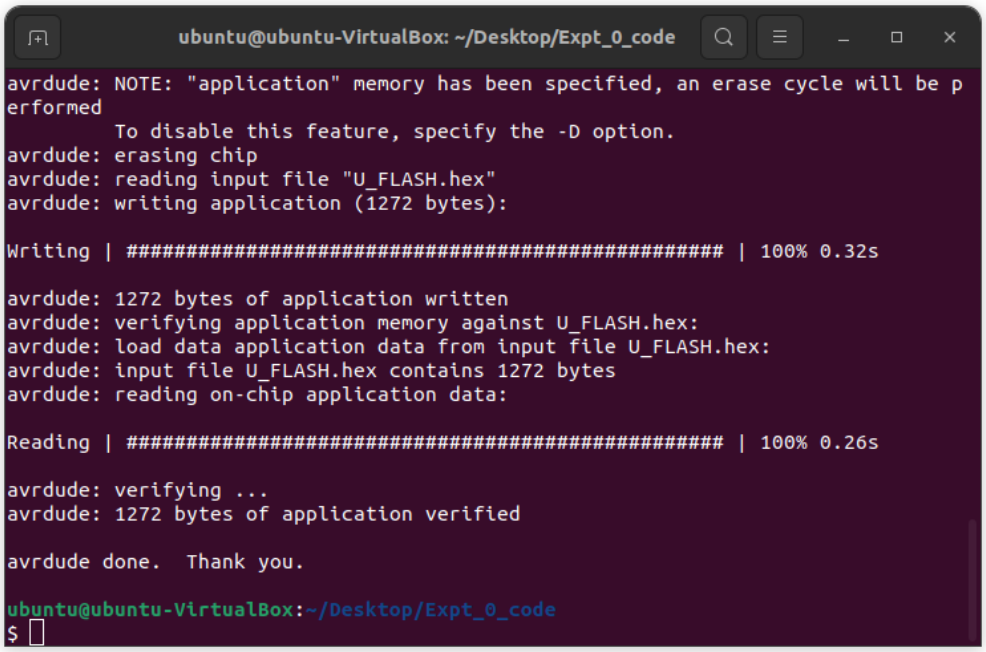


2. Make sure your HaHa v3.0 board is in programming mode. You can program using the command:

```
avrdude -v -c flip2 -p x16a4u -U application:w:<path/to/hex/file>:i
```

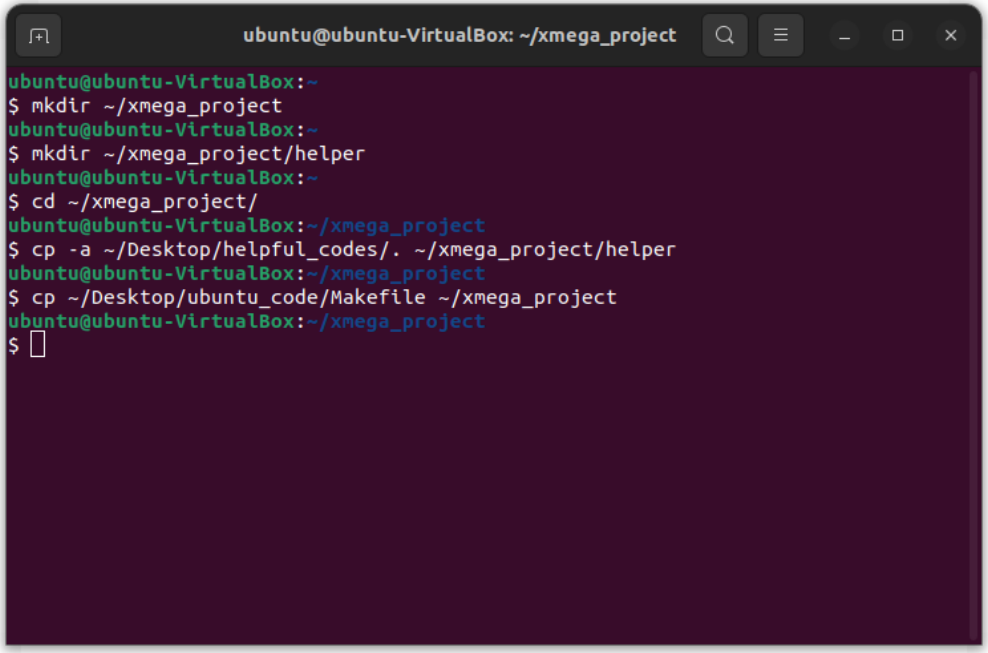


3. The program is successfully installed if it shows the following:



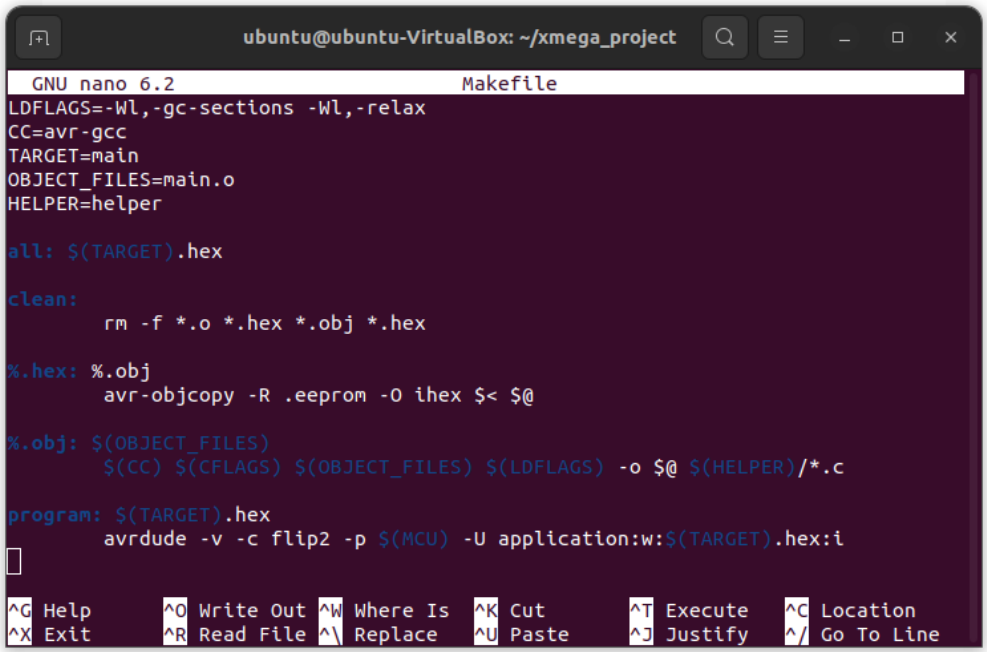
4. You can create a Xmega project folder wherever you like. Then, copy the Xmega helpful code inside the *helper/* directory inside the project folder. Copy the makefile inside the project folder.

```
mkdir ~/xmega_project
mkdir ~/xmega_project/helper
cd ~/xmega_project/
cp -a <path/to/helpful/codes>/. ~/xmega_project/helper
cp <path/to/Makefile> ~/xmega_project/
```



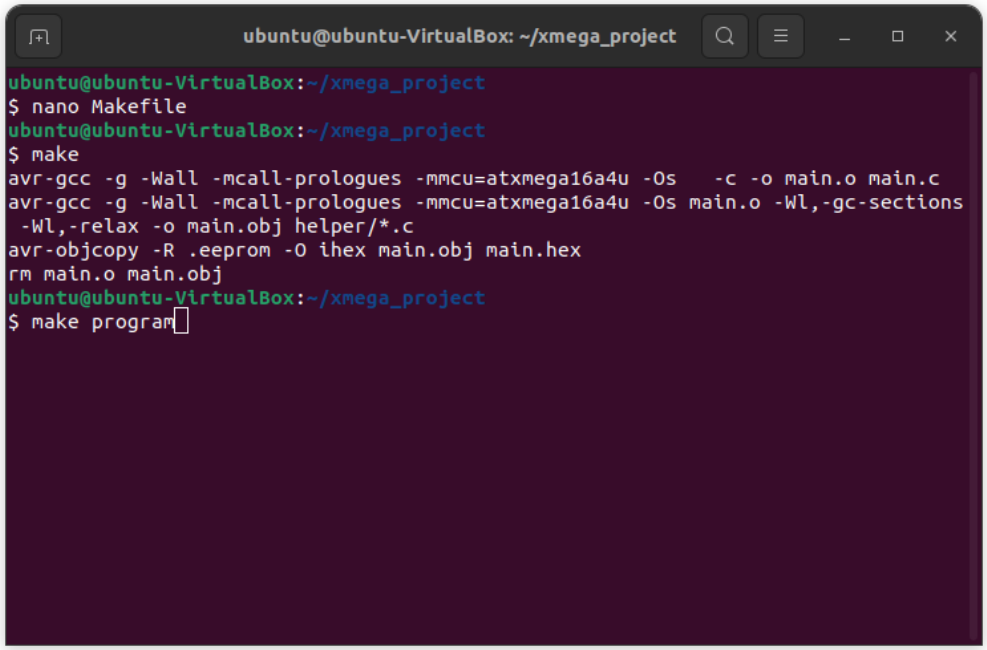
5. After this, make your code according to the experiment instructions. Then, make changes to the makefile as needed with new code.

nano Makefile



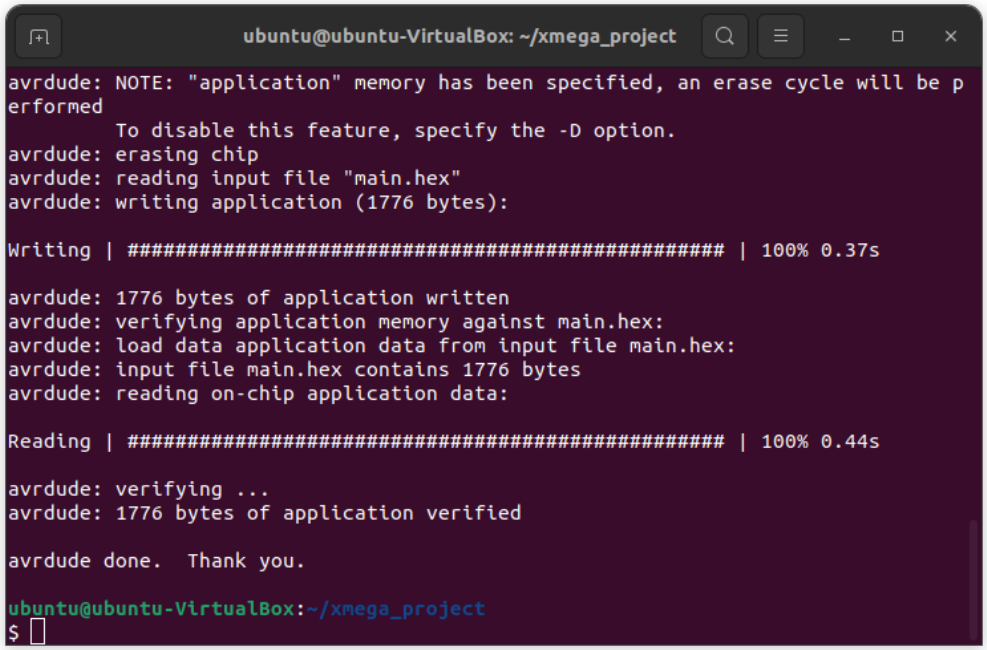
6. You can create the hex file using the *make* command. Then, you can program using *make program* command.

```
make
make program
```



7. The program is successfully installed if it shows the following:

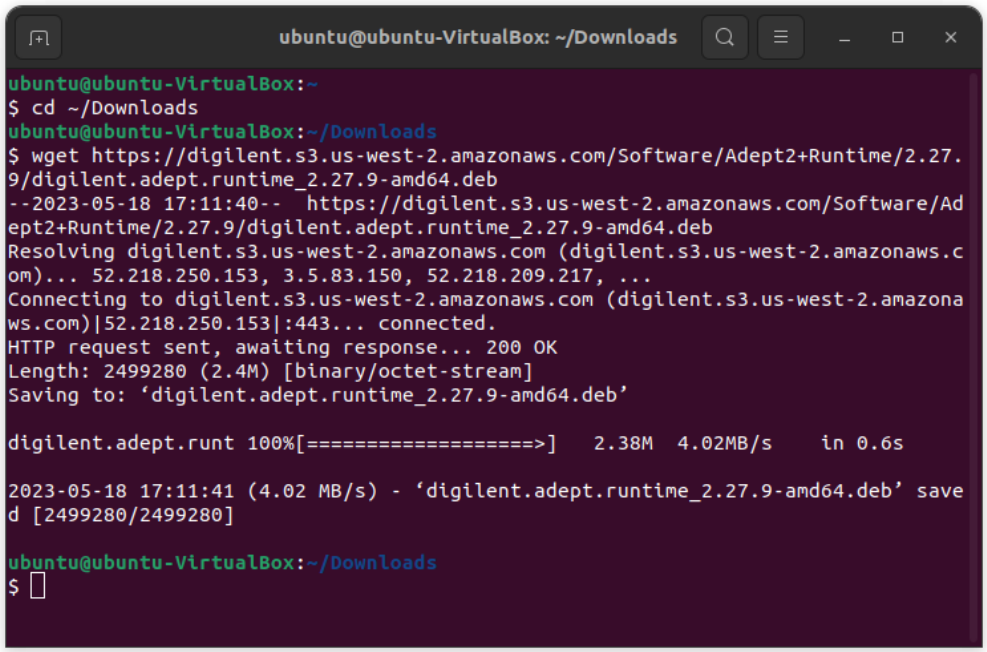
```
make
make program
```



Install Digilent Waveforms (Only if you have AD2 board)

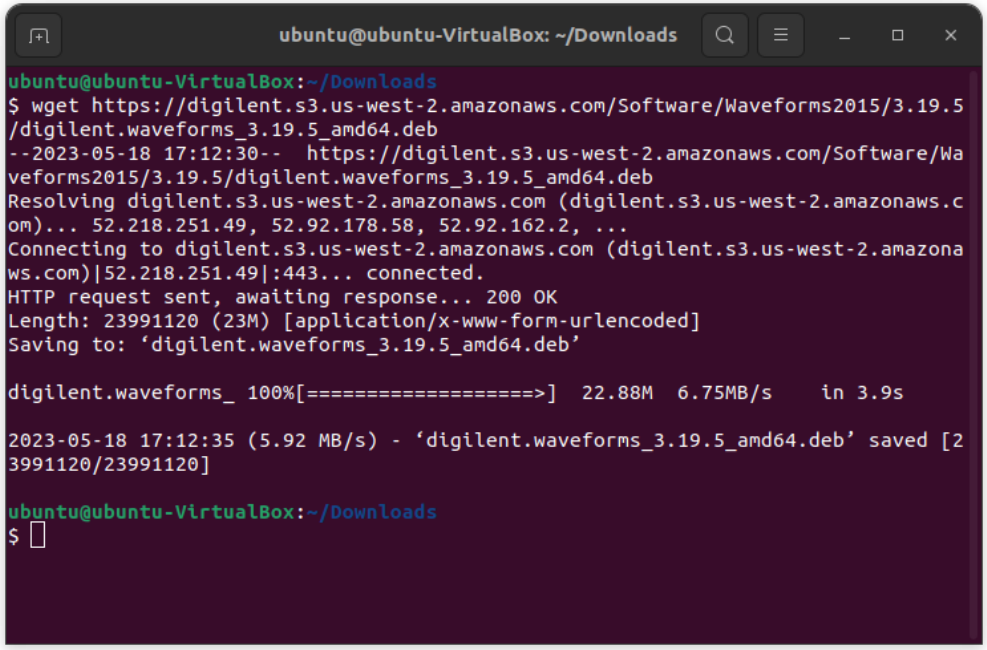
1. Navigate to the *~/Downloads*. Then, download the deb file for Adept Runtime [4]. If you would like the latest version, go to link [5].

```
cd ~/Downloads/
wget https://digilent.s3.us-west-
2.amazonaws.com/Software/Adept2+Runtime/2.27.9/digilent.adept.runtime_2.27.9-amd64.deb
```



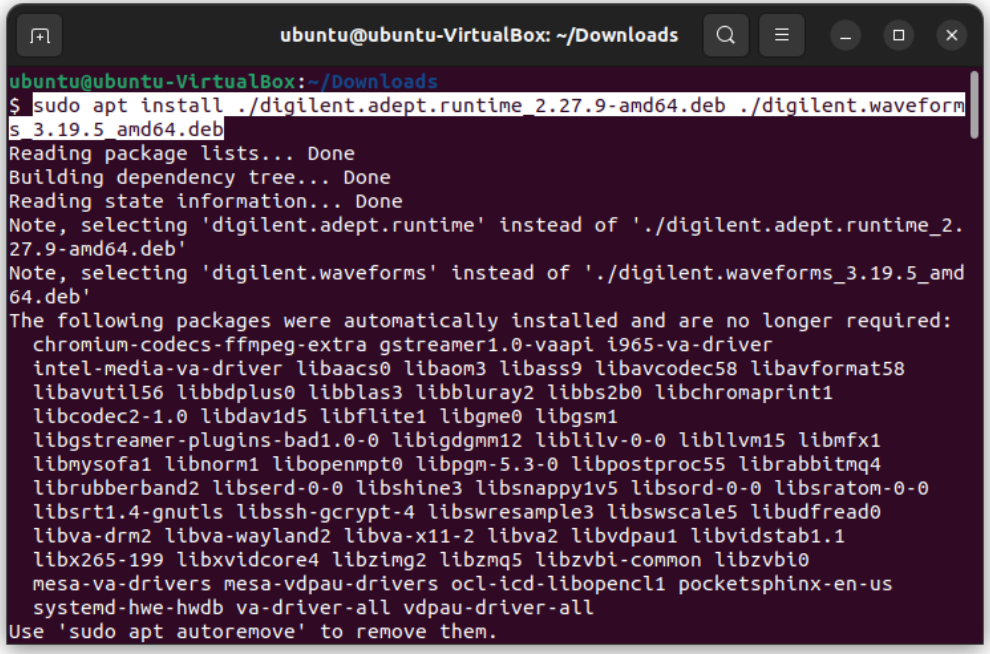
2. Download the deb file for Waveforms [6]. If you would like the latest version, go to link [7].

```
wget https://digilent.s3.us-west-
2.amazonaws.com/Software/Waveforms2015/3.19.5/digilent.waveforms_3.19.5_amd64.deb
```

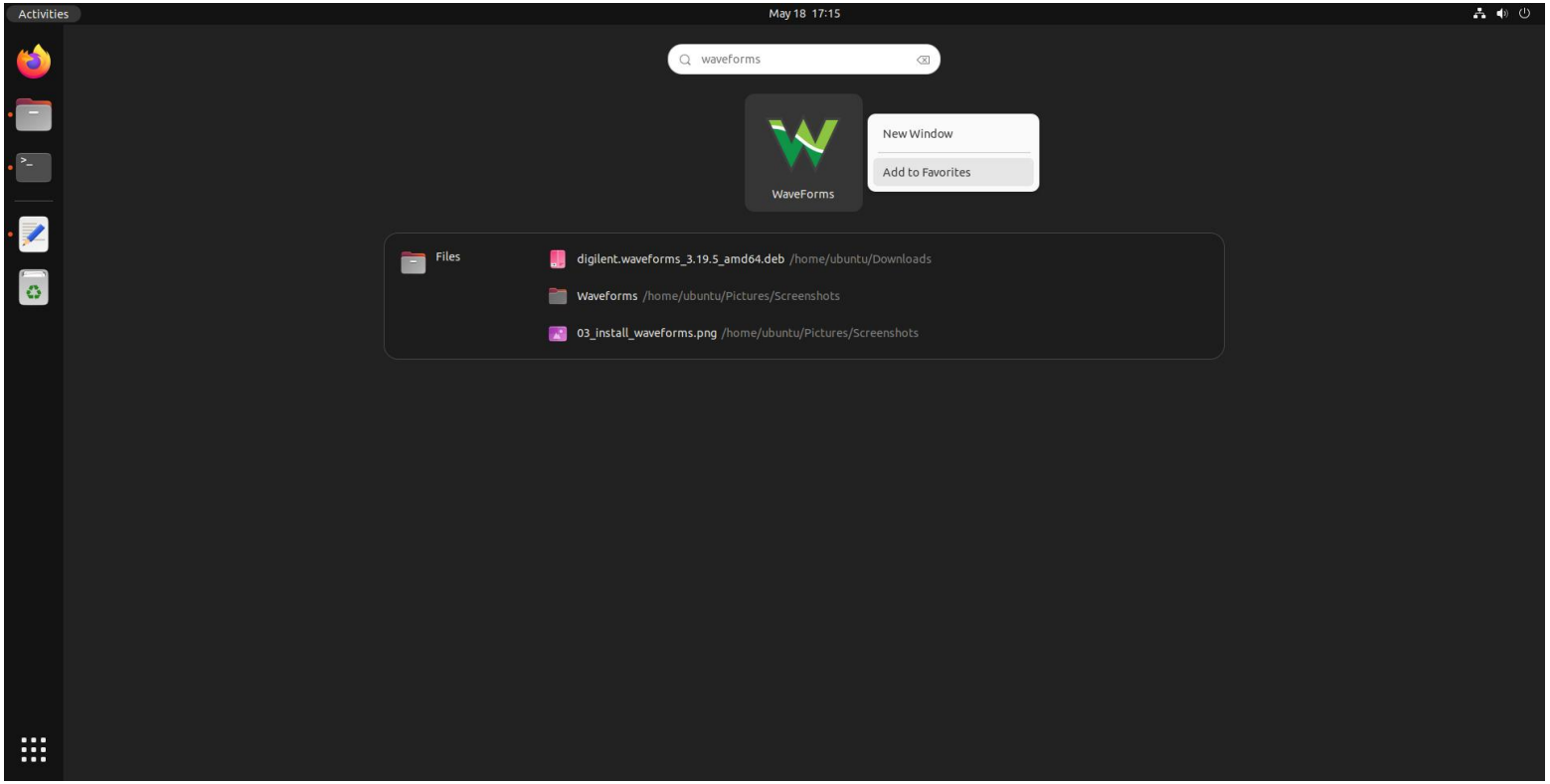


3. Install Waveforms using this command:

```
sudo apt install ./digilent.adept.runtime_2.27.9-amd64.deb ./digilent.waveforms_3.19.5_amd64.deb -y
```



4. The installation is complete. You can search for it in your machine.



References

[1] https://www.gowinsemi.com/en/support/license/

[2] https://cdn.gowinsemi.com.cn/Gowin_V1.9.8.11_linux.tar.gz

[3] https://www.gowinsemi.com/en/support/download_eda/

[4] https://digilent.s3.us-west-2.amazonaws.com/Software/Adept2+Runtime/2.27.9/digilent.adept.runtime_2.27.9-amd64.deb

[5] https://lp.digilent.com/complete-adept-runtime-download

[6] https://digilent.s3.us-west-2.amazonaws.com/Software/Waveforms2015/3.19.5/digilent.waveforms_3.19.5_amd64.deb

[7] https://lp.digilent.com/complete-waveforms-download