

*****Default*****

Raspberry Pi 64 bit OS
TensorFlow 2.8
TensorFlow Lite 2.10
Lazarus IDE (Ultibo Edition)
2.5.123-082722-64bit
Ultibo_Projects Bare Metal
Openocd
QEMU 6.2
Pico-SDK 1.4
Pico WIFI Development Environment
WireShark
nmap
Octave
MQTT
KiCad picoprobe-pcb
rp2040-freeros-projects
klt-feature-detect
minicom
pico-sdk C/C++
11/06/22

*****Default*****

All the documents and images used to document were done with the software on the Rpi

sudo su

cd /etc

```
cp hostname hostname.orig
diff hostname hostname.orig
1c1
< pi4-37
---
> raspberrypi
cp dphys-swapfile dphys-swapfile.orig
diff dphys-swapfile dphys-swapfile.orig
16c16
< CONF_SWAPSIZE=1000
---
> CONF_SWAPSIZE=100
```

fetch pkg installers

scp -r pi4-27:~/xx/my-projects-docs/pkg* .

dpkg -l | sort > pkgs.txt

```
cp pkg-install-scripts/ex* .
```

adds first set of packages

```
./extra_pkgs_64bit.sh
```

```
dpkg -l | sort > pkgs-a.txt
```

```
cp pkg-install-scripts/tensorflow/ex* .
```

adds 2nd set of packages

```
./extra-1.sh
```

```
dpkg -l | sort > pkgs-b.txt
```

```
./extra-2.sh
```

```
dpkg -l | sort > pkgs-c.txt
```

```
./extra-3.sh
```

```
dpkg -l | sort > pkgs-d.txt
```

```
./extra-4.sh
```

```
dpkg -l | sort > pkgs-e.txt
```

This is the software to program the picos with SWD

```
installed-openocd082722-228ede-64bit.img
```

```
openocd082722-228ede-64bit.img
```

Bare Metal for Raspbery Pi

```
ultibo2.5.123-082722-64bit.img
```

```
sudo unsquashfs -d ultibo ultibo2.5.123-082722-64bit.img
```

```
qemu-6.2.0-rpios-64bit.img
```

```
sudo unsquashfs -d qemu-6.2.0-rpios qemu-6.2.0-rpios-64bit.img
```

```
git clone https://github.com/develone/Ultibo_Projects.git
```

```
cd Ultibo_Projects/jpeg2000/src/
```

```
./compile_ultibo.sh
```

```
cd ../QEMU/
```

```
./libbuild.sh
```

```
vi ~/.local/share/applications/ultibo.desktop
```

[Desktop Entry]

Name=Lazarus IDE (Ultibo Edition)

Comment=A free pascal platform for bare metal development

Exec=/home/devel/ultibo/core/lazarus.sh

```
Icon=/home/devel/ultibo/core/images/icons/lazarus.ico
Terminal=false
Type=Application
Categories=Development;IDE;
X-Desktop-File-Install-Version=0.26
scrot -d 3 -s qemujpeg.png
scrot -d 3 -s qemujpeg-1.png
. ~/Ultibo_Projects/picoultibo.sh
/home/devel/ultibo/core:/home/devel/qemu-6.2.0-rpios/bin:/home/devel/local/openocd/bin:/home/
devel/picotool/build:/usr/local/sbin:/usr/local/bin:/usr/sbin:/usr/bin:/sbin:/bin:/usr/local/games:/
usr/games
```

```
./startqemu.sh
```

This is what is used to program pico's with SWD.

```
cd ~/
mkdir local
sudo unsquashfs -d local/openocd/ installed-openocd082722-228ede-64bit.img
Parallel unsquashfs: Using 4 processors
800 inodes (950 blocks) to write
```

```
[=====] 950/950
100%
```

```
created 800 files
created 33 directories
created 0 symlinks
created 0 devices
created 0 fifos
which openocd
/home/devel/local/openocd/bin/openocd
openocd -V
Open On-Chip Debugger 0.11.0-g228ede4-dirty (2022-08-27-19:45)
Licensed under GNU GPL v2
For bug reports, read
    http://openocd.org/doc/doxygen/bugs.html
openocd: invalid option -- 'V'
```

```
curl https://pyenv.run | bash
% Total    % Received % Xferd  Average Speed   Time    Time     Time  Current
           Dload  Upload  Total   Spent    Left   Speed
100 270 100 270  0  0  704    0 --:--:-- --:--:-- --:--:-- 703
Cloning into '/home/devel/.pyenv'...
remote: Enumerating objects: 1007, done.
remote: Counting objects: 100% (1007/1007), done.
remote: Compressing objects: 100% (436/436), done.
remote: Total 1007 (delta 581), reused 707 (delta 442), pack-reused 0
Receiving objects: 100% (1007/1007), 495.52 KiB | 3.02 MiB/s, done.
Resolving deltas: 100% (581/581), done.
Cloning into '/home/devel/.pyenv/plugins/pyenv-doctor'...
remote: Enumerating objects: 11, done.
remote: Counting objects: 100% (11/11), done.
```

remote: Compressing objects: 100% (9/9), done.
remote: Total 11 (delta 1), reused 5 (delta 0), pack-reused 0
Receiving objects: 100% (11/11), 38.72 KiB | 777.00 KiB/s, done.
Resolving deltas: 100% (1/1), done.
Cloning into '/home/devel/.pyenv/plugins/pyenv-installer'...
remote: Enumerating objects: 16, done.
remote: Counting objects: 100% (16/16), done.
remote: Compressing objects: 100% (13/13), done.
remote: Total 16 (delta 1), reused 7 (delta 0), pack-reused 0
Receiving objects: 100% (16/16), 5.88 KiB | 2.94 MiB/s, done.
Resolving deltas: 100% (1/1), done.
Cloning into '/home/devel/.pyenv/plugins/pyenv-update'...
remote: Enumerating objects: 10, done.
remote: Counting objects: 100% (10/10), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 10 (delta 1), reused 6 (delta 0), pack-reused 0
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (1/1), done.
Cloning into '/home/devel/.pyenv/plugins/pyenv-virtualenv'...
remote: Enumerating objects: 63, done.
remote: Counting objects: 100% (63/63), done.
remote: Compressing objects: 100% (55/55), done.
remote: Total 63 (delta 11), reused 28 (delta 1), pack-reused 0
Receiving objects: 100% (63/63), 38.44 KiB | 2.75 MiB/s, done.
Resolving deltas: 100% (11/11), done.
Cloning into '/home/devel/.pyenv/plugins/pyenv-which-ext'...
remote: Enumerating objects: 10, done.
remote: Counting objects: 100% (10/10), done.
remote: Compressing objects: 100% (6/6), done.
remote: Total 10 (delta 1), reused 6 (delta 0), pack-reused 0
Receiving objects: 100% (10/10), done.
Resolving deltas: 100% (1/1), done.

WARNING: seems you still have not added 'pyenv' to the load path.

```
# Load pyenv automatically by appending  
# the following to  
~/.bash_profile if it exists, otherwise ~/.profile (for login shells)  
and ~/.bashrc (for interactive shells) :
```

```
export PYENV_ROOT="$HOME/.pyenv"  
command -v pyenv >/dev/null || export PATH="$PYENV_ROOT/bin:$PATH"  
eval "$(pyenv init -)"
```

```
# Restart your shell for the changes to take effect.
```

```
# Load pyenv-virtualenv automatically by adding  
# the following to ~/.bashrc:
```

```
eval "$(pyenv virtualenv-init -)"
```

These steps save a lot of time installing a lot of python code.

```
tensorflow
test-1-2.8.img
sudo unsquashfs -d test-1-2.8 test-1-2.8.img
This setup virtual enviornment
```

```
cd test-1-28
```

```
devel@pi4-37:~/test-1-2.8 $ python3 -m venv env
devel@pi4-37:~/test-1-2.8 $ source env/bin/activate
(env) devel@pi4-37:~/test-1-2.8 $
```

```
devel@pi4-37:~/test-1-2.8 $ ipython3 Copy_of_train_hello_world_model.ipynb
```

```
0x01, 0x00, 0x00, 0x00, 0x1f, 0x00, 0x00, 0x00, 0x73, 0x65, 0x72, 0x76,
0x69, 0x6e, 0x67, 0x5f, 0x64, 0x65, 0x66, 0x61, 0x75, 0x6c, 0x74, 0x5f,
0x64, 0x65, 0x6e, 0x73, 0x65, 0x5f, 0x32, 0x5f, 0x69, 0x6e, 0x70, 0x75,
0x74, 0x3a, 0x30, 0x00, 0x02, 0x00, 0x00, 0x00, 0x01, 0x00, 0x00, 0x00,
0x01, 0x00, 0x00, 0x00, 0x0c, 0x00, 0x0c, 0x00, 0x00, 0x00, 0x00, 0x00,
0x04, 0x00, 0x08, 0x00, 0x0c, 0x00, 0x00, 0x00, 0x14, 0x00, 0x00, 0x00,
0x04, 0x00, 0x00, 0x00, 0x01, 0x00, 0x00, 0x00, 0x80, 0xff, 0xff, 0xff,
0xff, 0xff, 0xff, 0xff, 0x01, 0x00, 0x00, 0x00, 0x5d, 0x4f, 0xc9, 0x3c,
0x04, 0x00, 0x04, 0x00, 0x04, 0x00, 0x00, 0x00
};
unsigned int g_model_len = 2408;
(env) devel@pi4-37:~/test-1-2.8 $ exec $SHELL
```

```
tensorflow lite
sudo unsquashfs -d project-rpi-tflite project-rpi-tflite102222.img
```

```
add to the end of ~/.bashrc
```

```
export PICO_SDK_PATH=/home/devel/sdk/pico-sdk
export PATH="$HOME/.pyenv/bin:$PATH"
eval "$(pyenv init --path)"
eval "$(pyenv virtualenv-init -)"
```

```
mkdir sdk
```

```
cd sdk
```

This is when the repo is yours.

```
git clone git@github.com:develone/pico-sdk.git
```

With this you can not push changes.

```
git clone https://github.com/develone/pico-sdk.git
```

```
cd pico-sdk/
```

```
git submodule update --init
```

```
Submodule 'lib/cyw43-driver' (https://github.com/georgerobotics/cyw43-driver.git) registered for
path 'lib/cyw43-driver'
```

```
Submodule 'lib/lwip' (https://github.com/lwip-tcpip/lwip.git) registered for path 'lib/lwip'
```

```
Submodule 'tinysub' (https://github.com/hathach/tinysub.git) registered for path 'lib/tinysub'
```

```
Cloning into '/home/devel/sdk/pico-sdk/lib/cyw43-driver'...
```

```
Cloning into '/home/devel/sdk/pico-sdk/lib/lwip'...
Cloning into '/home/devel/sdk/pico-sdk/lib/tinyusb'...
Submodule path 'lib/cyw43-driver': checked out '195dfcc10bb6f379e3dea45147590db2203d3c7b'
Submodule path 'lib/lwip': checked out '239918ccc173cb2c2a62f41a40fd893f57faf1d6'
Submodule path 'lib/tinyusb': checked out '4bfab30c02279a0530e1a56f4a7c539f2d35a293'
```

```
cd ../../
```

This is when the repo is yours.

```
git clone git@github.com:develone/devel-pico-tflmicro.git
git clone https://github.com/develone/devel-pico-tflmicro.git
cd devel-pico-tflmicro
mkdir build
cd build
cmake -DPICO_BOARD=pico .. about 4 hours
Using PICO_SDK_PATH from environment ('/home/devel/sdk/pico-sdk')
PICO_SDK_PATH is /home/devel/sdk/pico-sdk
Defaulting PICO_PLATFORM to rp2040 since not specified.
Defaulting PICO platform compiler to pico_arm_gcc since not specified.
-- Defaulting build type to 'Release' since not specified.
PICO compiler is pico_arm_gcc
-- The C compiler identification is GNU 8.3.1
-- The CXX compiler identification is GNU 8.3.1
-- The ASM compiler identification is GNU
-- Found assembler: /usr/bin/arm-none-eabi-gcc
Build type is Release
PICO target board is pico.
Using board configuration from /home/devel/sdk/pico-sdk/src/boards/include/boards/pico.h
-- Found Python3: /usr/bin/python3.9 (found version "3.9.2") found components: Interpreter
TinyUSB available at /home/devel/sdk/pico-sdk/lib/tinyusb/src/portable/raspberrypi/rp2040;
enabling build support for USB.
cyw43-driver available at /home/devel/sdk/pico-sdk/lib/cyw43-driver
lwIP available at /home/devel/sdk/pico-sdk/lib/lwip
-- Configuring done
-- Generating done
-- Build files have been written to: /home/devel/devel-pico-tflmicro/build
make this will take about 4 hours
```

```
-rw-r--r-- 1 devel devel 1788264 Oct 25 22:10 libpico-tflmicro.a
-rw-r--r-- 1 devel devel 234456 Oct 25 21:46 libpico-tflmicro_test.a
```

```
./pico-sdk/src/rp2_common/boot_stage2/bs2_default.elf
./examples/micro_speech/command_responder_test.elf
./examples/micro_speech/audio_provider_mock_test.elf
./examples/micro_speech/audio_provider_test.elf
./examples/micro_speech/recognize_commands_test.elf
./examples/magic_wand/magic_wand.elf
./examples/magic_wand/gesture_output_handler_test.elf
./examples/magic_wand/magic_wand_test.elf
./examples/magic_wand/gesture_predictor_test.elf
./examples/hello_world/hello_world.elf
```

This is when the repo is yours.

```
git clone git@github.com:develone/my-projects-docs.git
git clone https://github.com/develone/my-projects-docs.git
```

This project uses cmake Important to understand cmake the source code is 1 level above build.

This is when the repo is yours.

```
git clone https://github.com/develone/pico-examples -b dev
cd pico-examples
mkdir build
```

This is when the repo is yours. -b dev is branch dev

```
git clone --recursive git@github.com:develone/rp2040-freertos-project.git -b dev
git clone --recursive https://github.com/develone/rp2040-freertos-project.git -b dev
cd rp2040-freertos-project/
mkdir build
cd build
```

```
cmake -DPICO_BOARD=pico ..
Using PICO_SDK_PATH from environment ('/home/devel/sdk/pico-sdk')
PICO_SDK_PATH is /home/devel/sdk/pico-sdk
Defaulting PICO_PLATFORM to rp2040 since not specified.
Defaulting PICO platform compiler to pico_arm_gcc since not specified.
-- Defaulting build type to 'Release' since not specified.
PICO compiler is pico_arm_gcc
-- The C compiler identification is GNU 8.3.1
-- The CXX compiler identification is GNU 8.3.1
-- The ASM compiler identification is GNU
-- Found assembler: /usr/bin/arm-none-eabi-gcc
Build type is Release
PICO target board is pico.
Using board configuration from /home/devel/sdk/pico-sdk/src/boards/include/boards/pico.h
-- Found Python3: /home/devel/test-1-2.8/env/bin/python3.9 (found version "3.9.2") found
components: Interpreter
TinyUSB available at /home/devel/sdk/pico-sdk/lib/tinyusb/src/portable/raspberrypi/rp2040;
enabling build support for USB.
cyw43-driver available at /home/devel/sdk/pico-sdk/lib/cyw43-driver
lwIP available at /home/devel/sdk/pico-sdk/lib/lwip
-- Configuring done
-- Generating done
-- Build files have been written to: /home/devel/rp2040-freertos-project/build
make
```

The elf files are loaded with openocd

```
. ~/Ultibo/picoultibo.sh
```

this program a file system performs either klt or dwt lifting step,

```
openocd -f interface/raspberrypi-swd.cfg -f target/rp2040.cfg -c "program test-read-crc16/test-read-crc16.elf verify reset exit"
```

```
ls ../doc lots of documentation
```

```
ls ../doc/rp2040-logic-analyzer/rp2040-logic-analyzer.pdf
```

```

qpdfview ../doc/rp2040-logic-analyzer/rp2040-logic-analyzer.pdf
./first_pwm/50_pwm.elf
./pico-lifting/pico-lifting.elf
./ultibo_blink/ultibo_blink.elf
./rp2040-logic-analyzer/rp2040-logic-analyzer.elf
./Scheduling/Scheduling.elf
./pico-sdk/src/rp2_common/boot_stage2/bs2_default.elf
./pico-littlefs/e-rw-r--r-- 1 devel devel 1788264 Oct 25 22:10 libpico-tflmicro.a
-rw-r--r-- 1 devel devel 234456 Oct 25 21:46 libpico-tflmicro_test.axample0.elf
./pico-littlefs/example2.elf
./pico-littlefs/example1.elf
./pico-ultibo/pico-ultibo.elf
./test-read/test-read.elf
./ProjectFiles/blink.elf
./klt-dwt-ultibo/klt-dwt-ultibo.elf
./2tasks/2tasks.elf
./2cores/multicore.elf
./pico-lifting-sf/hello_usb.elf
./test-read-crc16/test-read-crc16.elf
./Mutex/Mutex.elf
./HCSR04/HCSR04.elf
./Semaphore/Semaphore.elf
./klt-test/klt-test.elf

```

This needed for octave

```

.octaverc
graphics_toolkit("gnuplot");

```

```

https://github.com/develone/svd_rgb.git
cd svd_rgb/src/
devel@pi4-37:~/svd_rgb/src $ make
gcc -c -o obj/svd.o svd.c -I../include
gcc -c -o obj/disp_mat.o disp_mat.c -I../include
gcc -c -o obj/mul_mat.o mul_mat.c -I../include
gcc -c -o obj/pnmio.o pnmio.c -I../include
gcc -c -o obj/error.o error.c -I../include
gcc -c -o obj/mythread.o mythread.c -I../include
gcc -c -o obj/trans_mat.o trans_mat.c -I../include
gcc -c -o obj/master.o master.c -I../include
gcc -o master obj/svd.o obj/disp_mat.o obj/mul_mat.o obj/pnmio.o obj/error.o obj/mythread.o
obj/trans_mat.o obj/master.o -I../include -lm -lpthread

```

```
./master
```

```

octave
In a 2nd shell
scrot -d 3 -s redpgm.png

```

```
scrot -d 3 -s rcblu.png
```



```
scrot -d 3 -s rcblu-1.png
```

```
quit
```

```
git clone https://github.com/ArduCAM/pico-tflmicro.git
```

```
Cloning into 'pico-tflmicro'...
```

```
remote: Enumerating objects: 1812, done.
```

```
remote: Counting objects: 100% (106/106), done.
```

```
remote: Compressing objects: 100% (47/47), done.
```

```
remote: Total 1812 (delta 73), reused 59 (delta 59), pack-reused 1706
```

```
Receiving objects: 100% (1812/1812), 13.92 MiB | 14.64 MiB/s, done.
```

```
Resolving deltas: 100% (950/950), done.
```

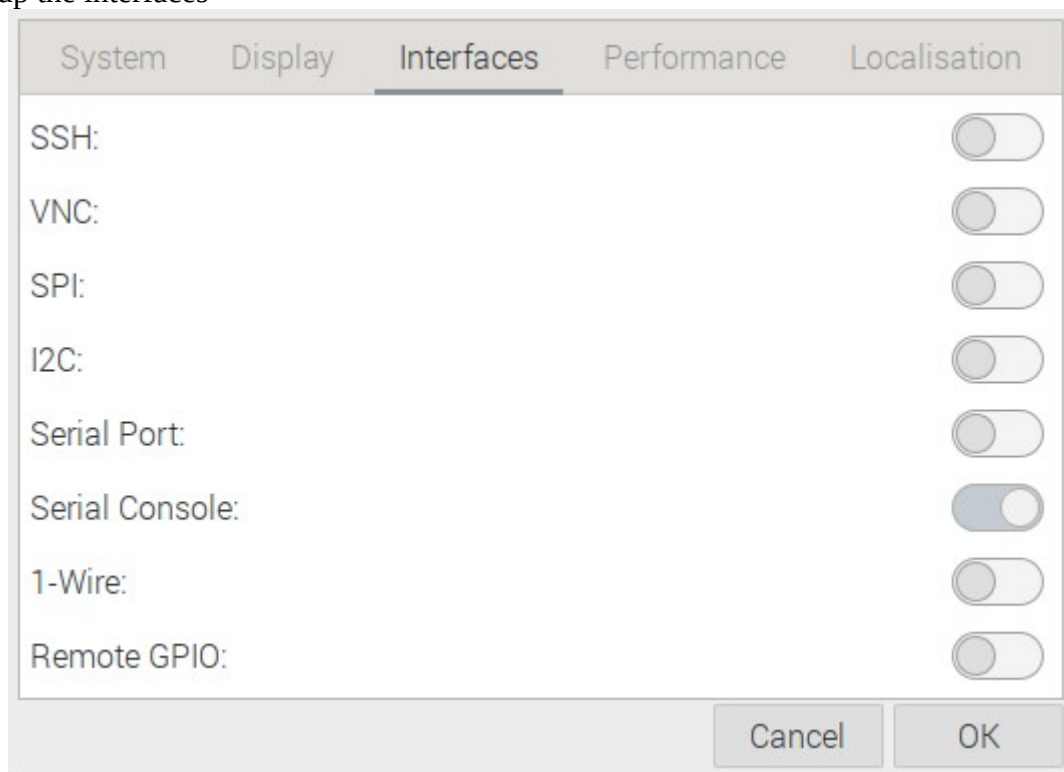
\$30.00 at Amazon

```
devel@pi4-37:~/pico-tflmicro/bin
```

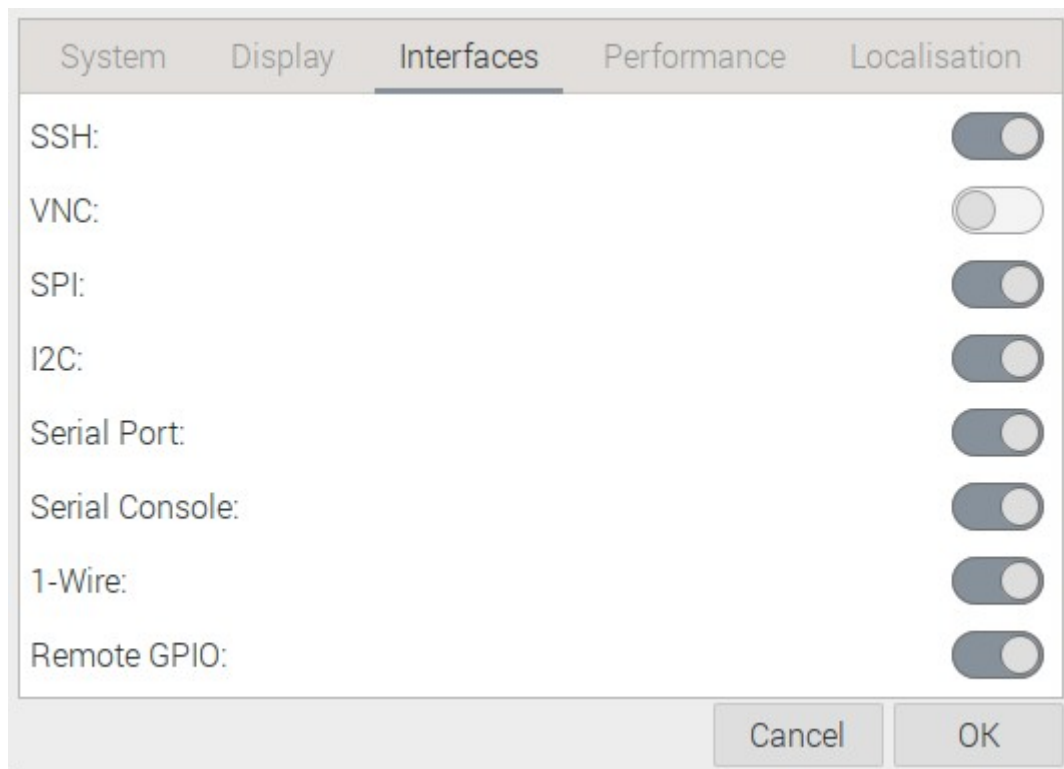
```
magic_wand_ble.uf2  person_detection_benchmark.uf2  pico4ml_ble_magic_wand.uf2
```

```
micro_speech.uf2  person_detection_int8.uf2  pico4ml_magic_wand.uf2
```

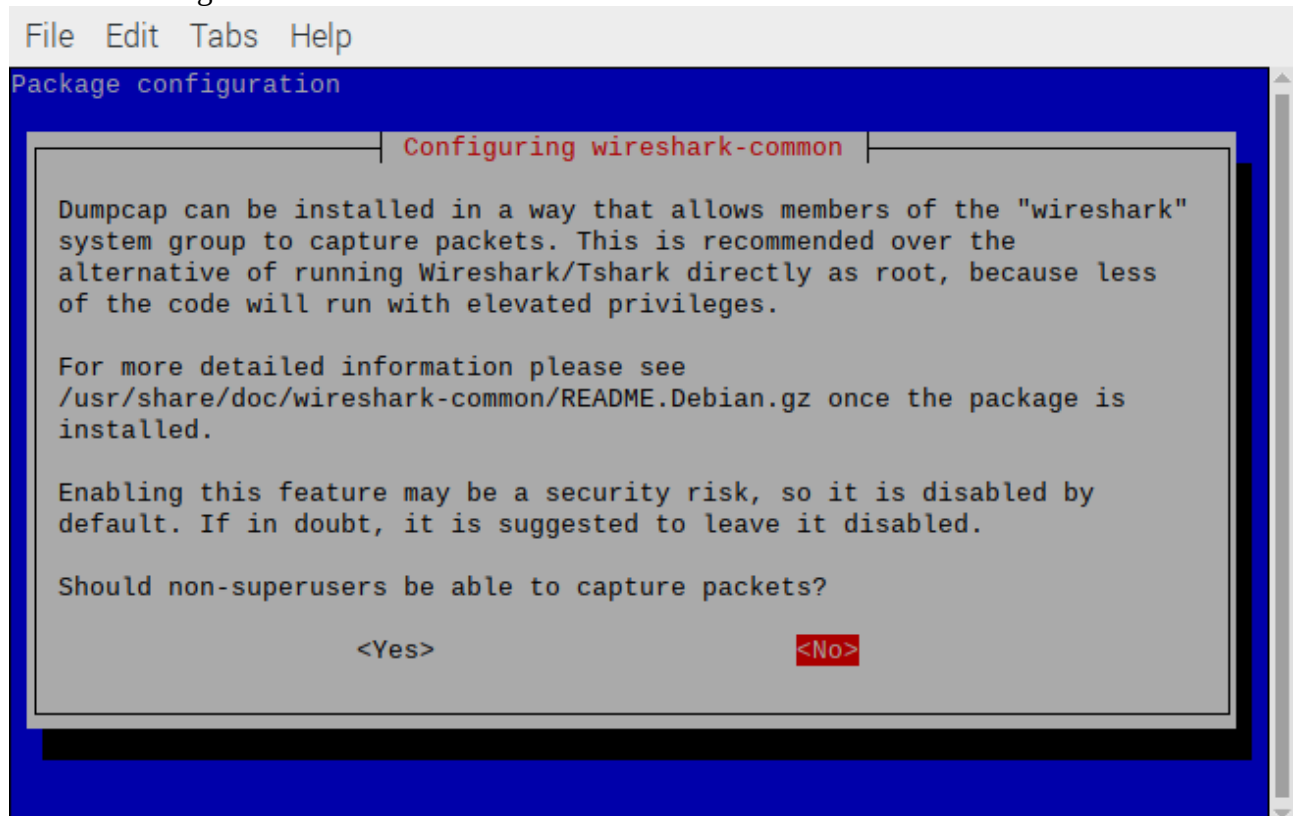
Setting up the interfaces



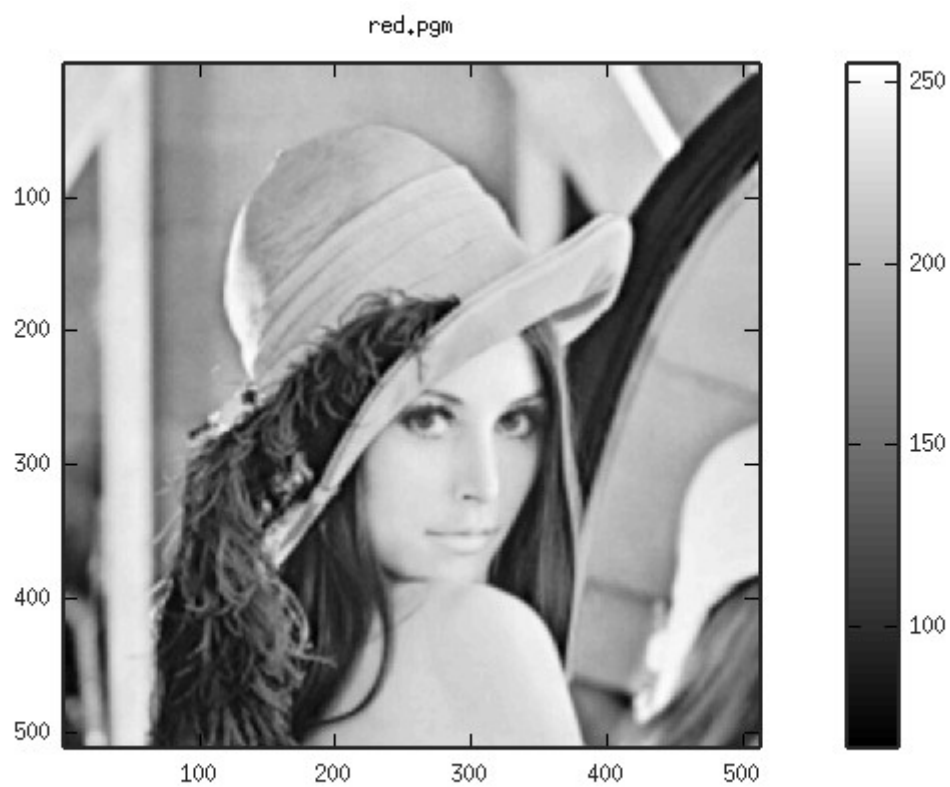
Setting up the interfaces



When installing

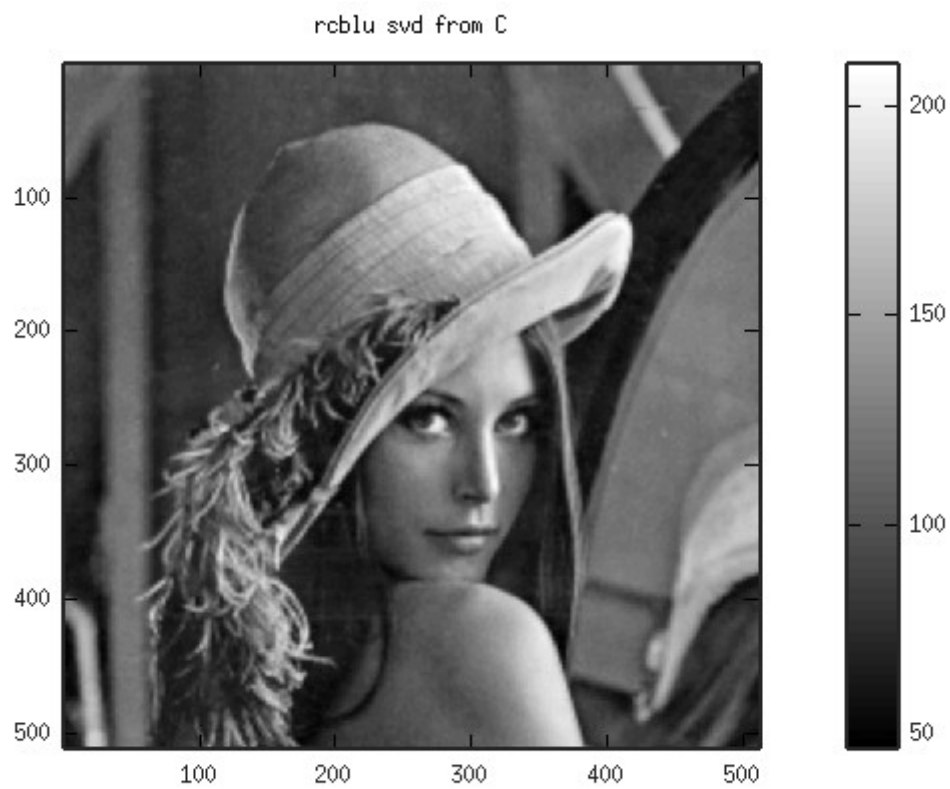


svd_rgb



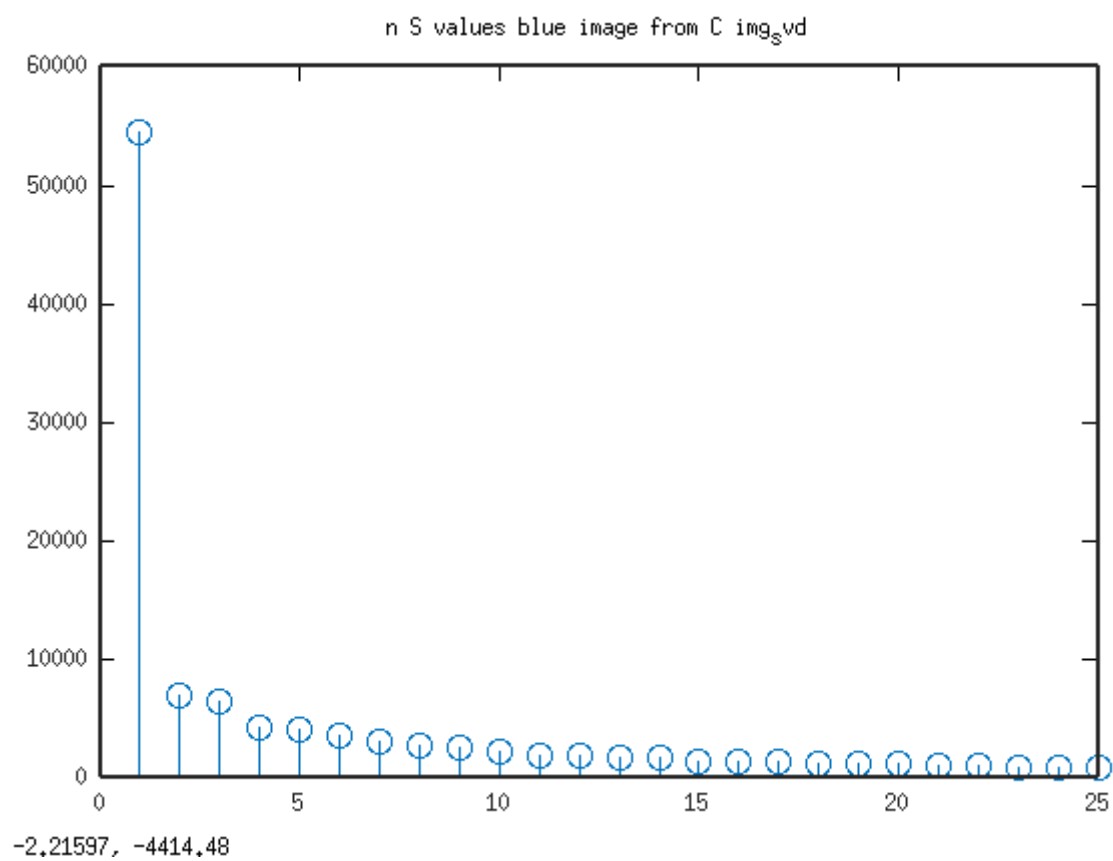
$\mu_2 = 230.686$

reconstructed



$\mu_2 = 23.8538$

svd



Arducam PicoML

GitHub - ArduCAM/pico ×Firefox Privacy Notice ×arducam pico4ml - Google ×

← → ↻

https://www.google.com/search?client=firefox-b-1-e&q=arducam+pico4ml

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About 10,100 results (0.43 seconds)

https://www.arducam.com › Raspberry Pi Pico

Arducam Pico4ML TinyML Dev Kit: RP2040 Board w

Arducam Pico4ML Specifications · Microcontroller: Raspberry Pi RP2040 · IMU: ICM-20948 (low power) · Mono channel microphone w/ direct PCM output · Camera Module: ...




https://www.arducam.com › pico4ml-an-rp2040-based-...

Pico4ML: Raspberry Pi RP2040 Based Board for Machine

...

Mar 5, 2021 — The single-board microcontroller – powered by Raspberry Pi's RP2040 chip – to support all Tensorflow Lite Micro tiny machine learning examples ...




https://www.amazon.com › Arducam-Pico4ML-TinyM...


Arducam Pico4ML TinyML Dev Kit, RP2040 Board w ...

Arducam Pico4ML is a microcontroller dev board based on the Raspberry Silicon (RP2040 chip), exclusively for running and training machine learning examples.
Camera Module: HiMax HM01B0, Up to ... Board Size: 2" x 0.83" (51mm x 21m...


★★★★★ Rating: 4.5 · 13 reviews · \$29.99



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SALE



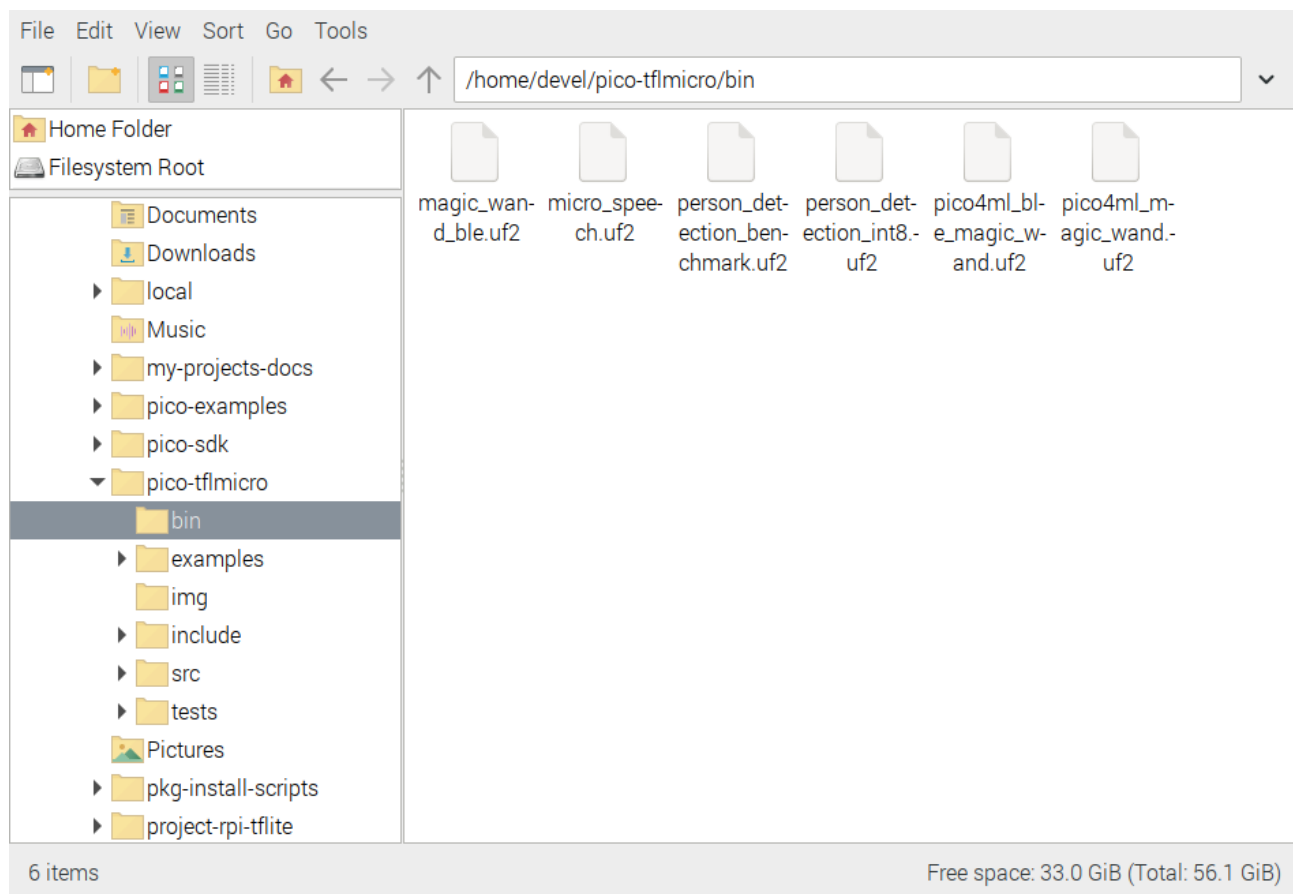
Arducam



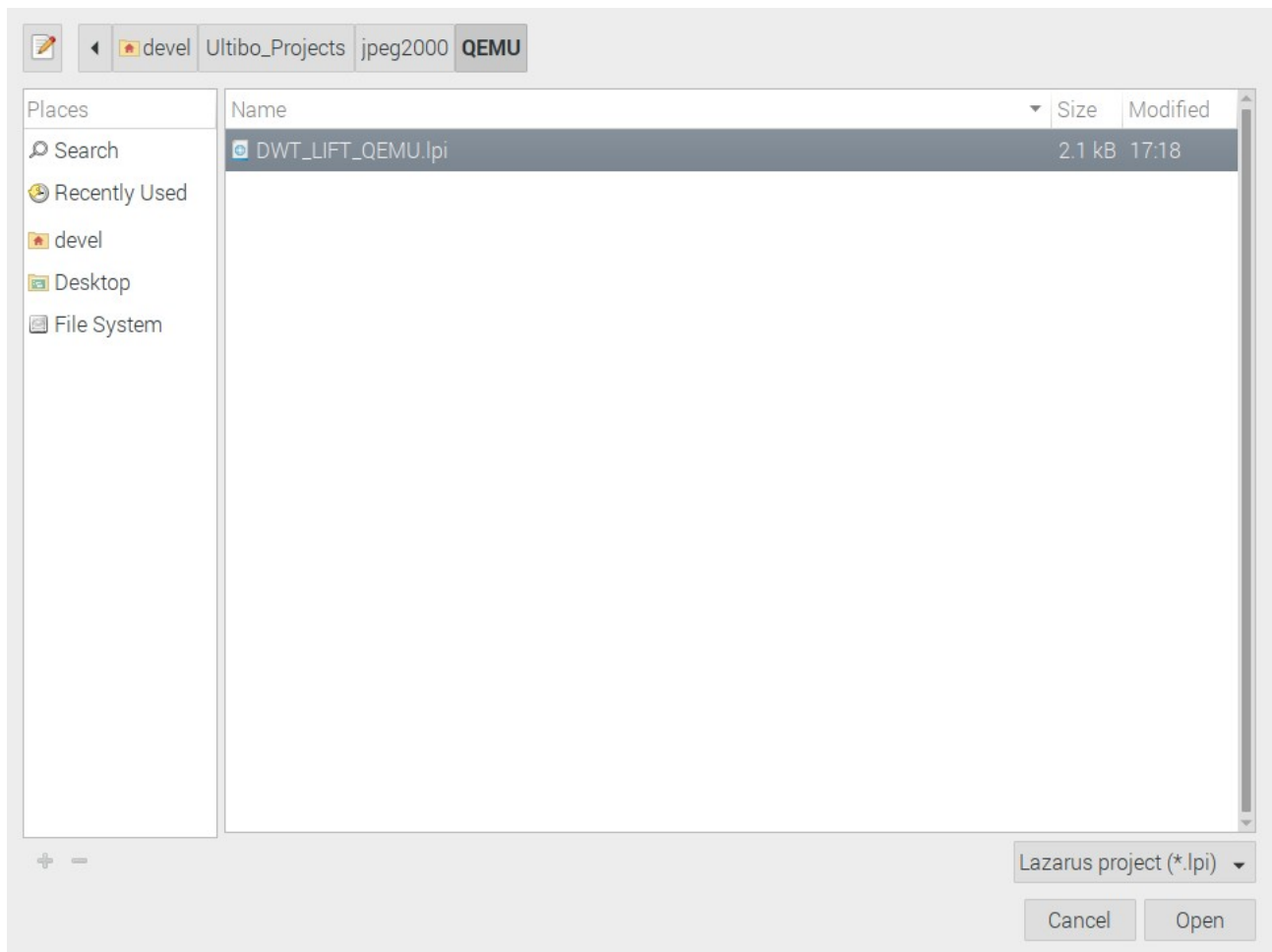
Arducam

>

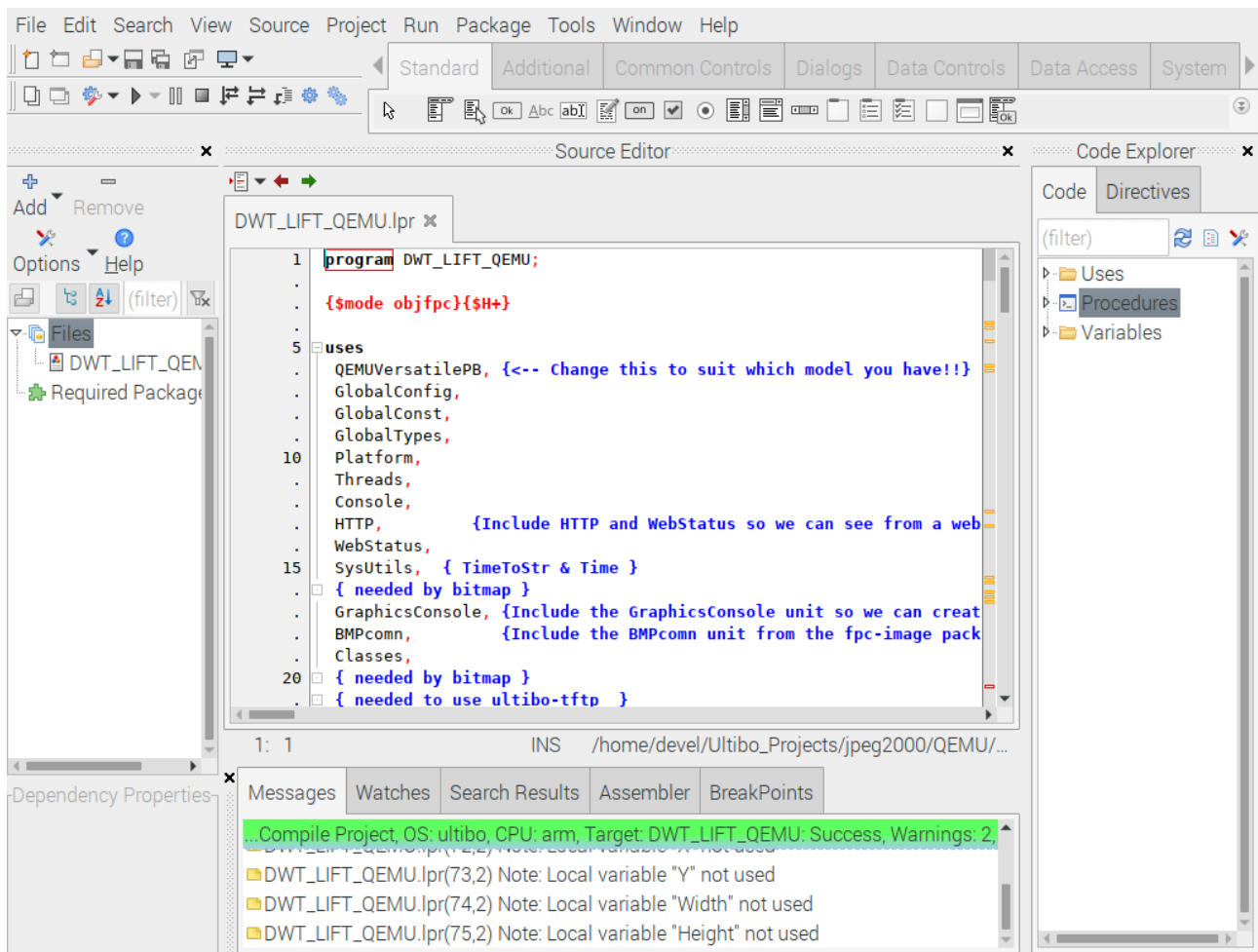
UF2



QEMU



QEMU



QEMU



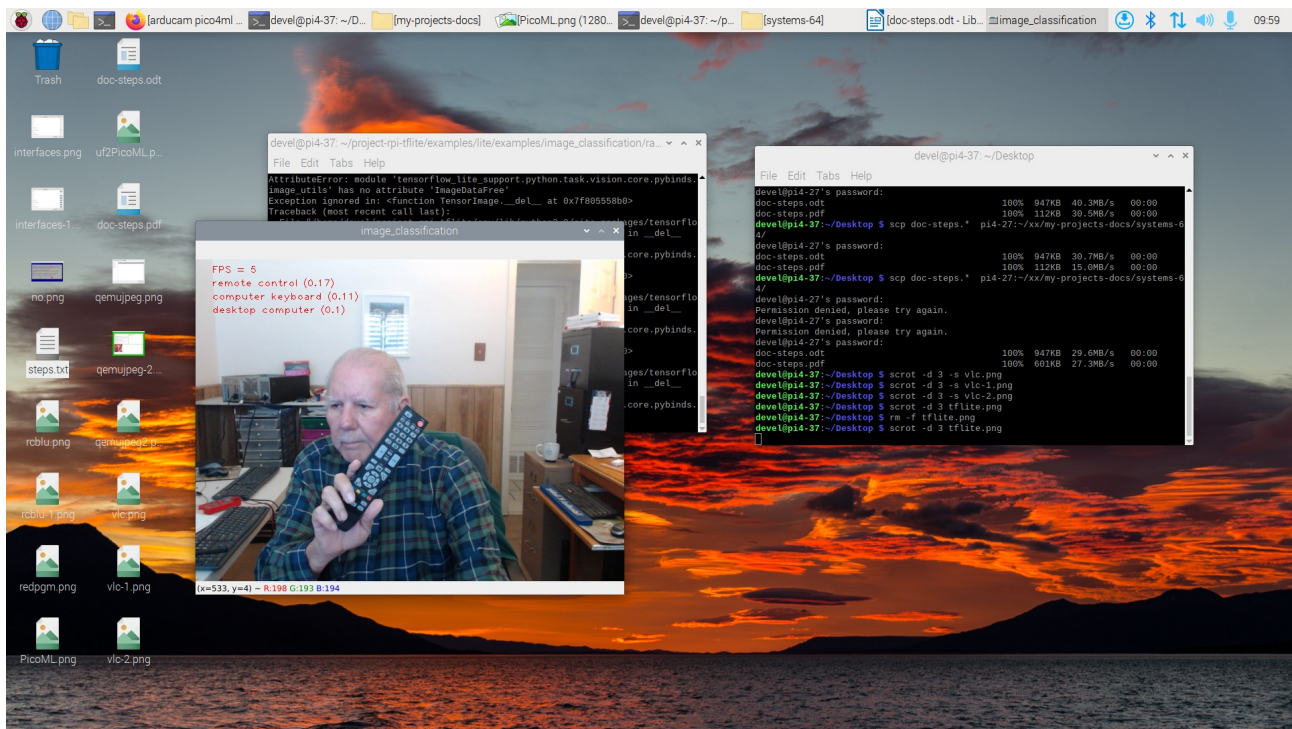
Starting here will be in an update.

```
cd ~/project-rpi-tflite/  
python3 -m venv env  
source env/bin/activate  
(env) devel@pi4-37:~/project-rpi-tflite $
```

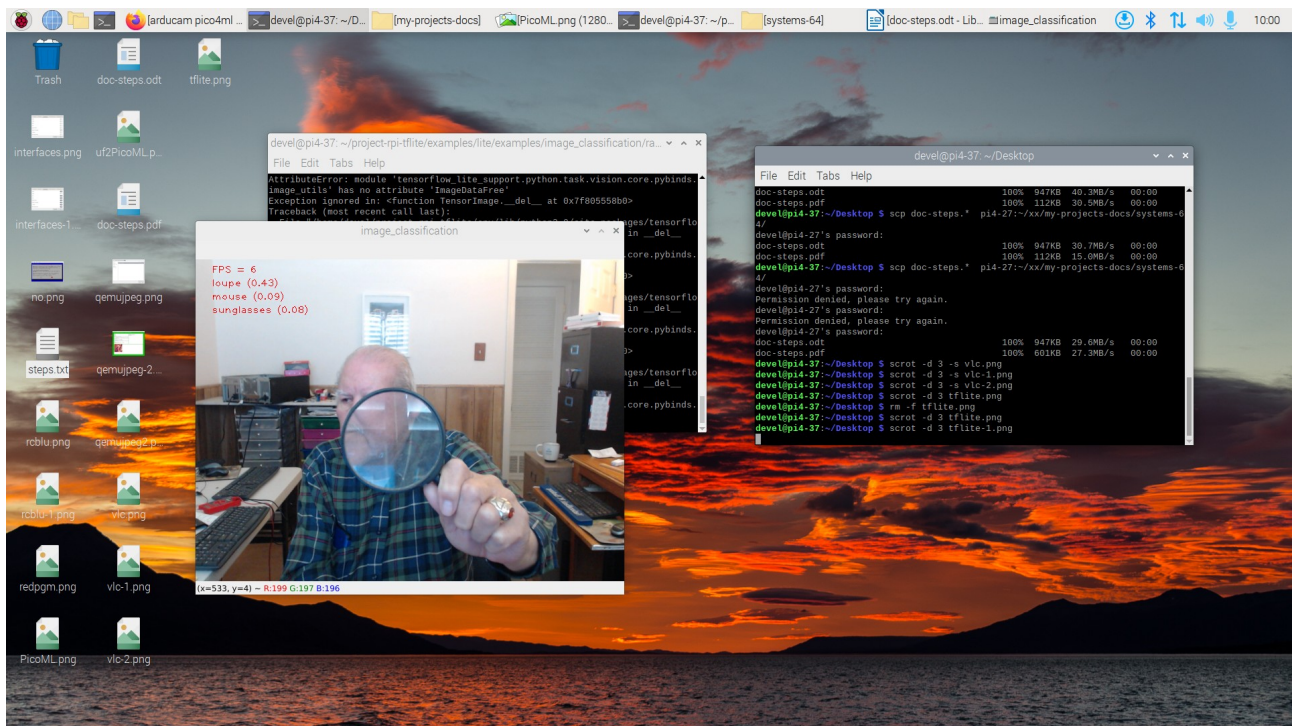
```
cd examples/lite/examples/image_classification/raspberry_pi/
```

```
python3 classify.py
```

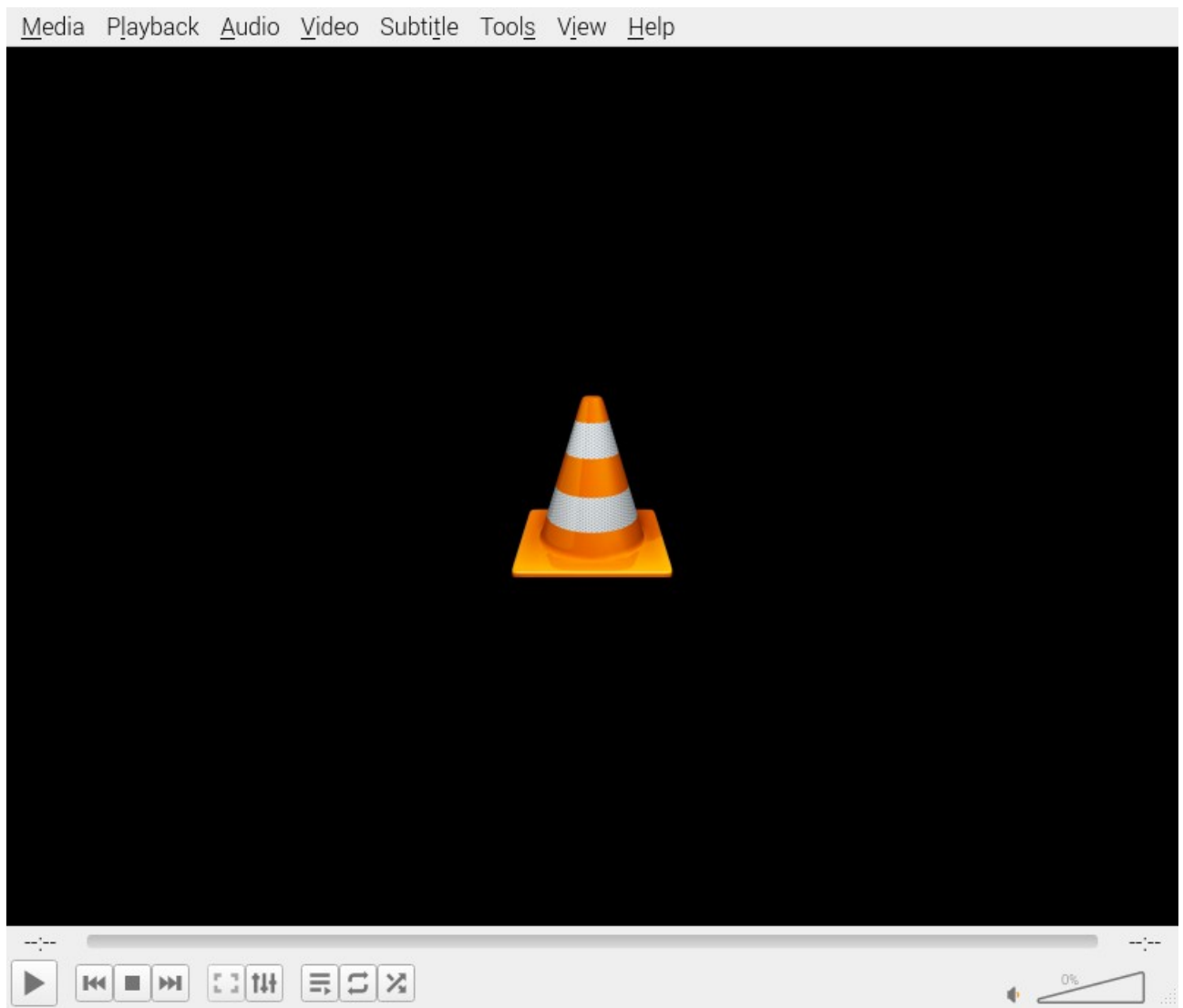
TensorFlow Lite detects remote control



TensorFlow Lite detects loupe



vlc & camera



selecting the video device

File

Disc

Network

Capture Device

Capture mode

Video camera

Device Selection

Video device name

/dev/video0

Audio device name

Options

Video standard

Undefined

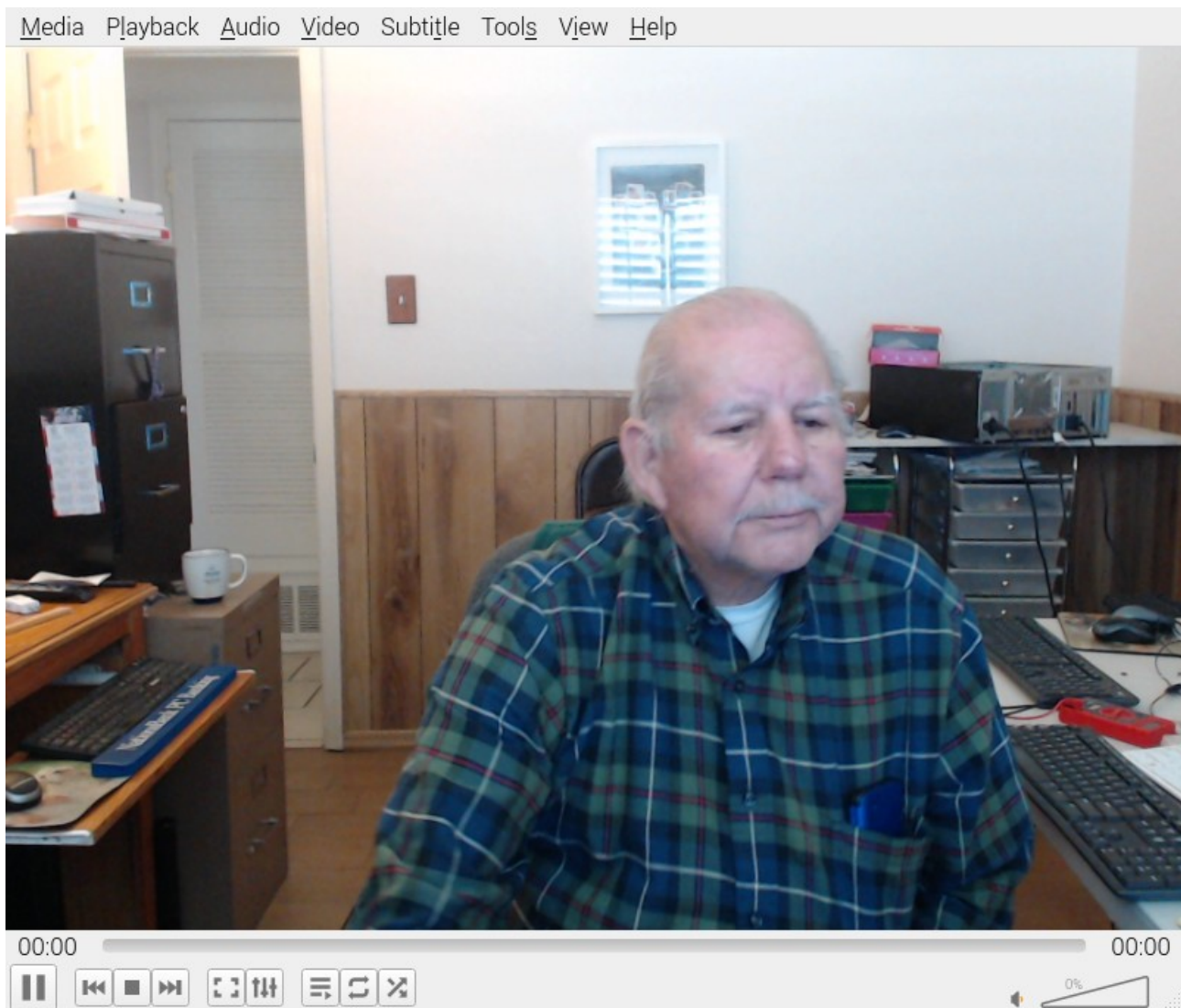
advanced options.

☐ Show more options

Play

Cancel

me in my lab



```
ps -ax | grep python3
xxxx pts/3  Sl+  39:15 python3 classify.py
kill -9 xxxx
```

version control

```
cd my-projects-docs/
devel@pi4-37:~/my-projects-docs $ git pull
hint: Pulling without specifying how to reconcile divergent branches is
hint: discouraged. You can squelch this message by running one of the following
hint: commands sometime before your next pull:
hint:
hint:  git config pull.rebase false # merge (the default strategy)
hint:  git config pull.rebase true  # rebase
hint:  git config pull.ff only      # fast-forward only
hint:
hint: You can replace "git config" with "git config --global" to set a default
hint: preference for all repositories. You can also pass --rebase, --no-rebase,
```

hint: or --ff-only on the command line to override the configured default per

hint: invocation.

remote: Enumerating objects: 9, done.

remote: Counting objects: 100% (9/9), done.

remote: Compressing objects: 100% (3/3), done.

remote: Total 5 (delta 2), reused 5 (delta 2), pack-reused 0

Unpacking objects: 100% (5/5), 7.61 MiB | 4.31 MiB/s, done.

From https://github.com/develone/my-projects-docs

078614e..6615ca9 master -> origin/master

Updating 078614e..6615ca9

Fast-forward

systems-64/doc-steps.odt | Bin 969808 -> 6580211 bytes

systems-64/doc-steps.pdf | Bin 615076 -> 1634728 bytes

2 files changed, 0 insertions(+), 0 deletions(-)

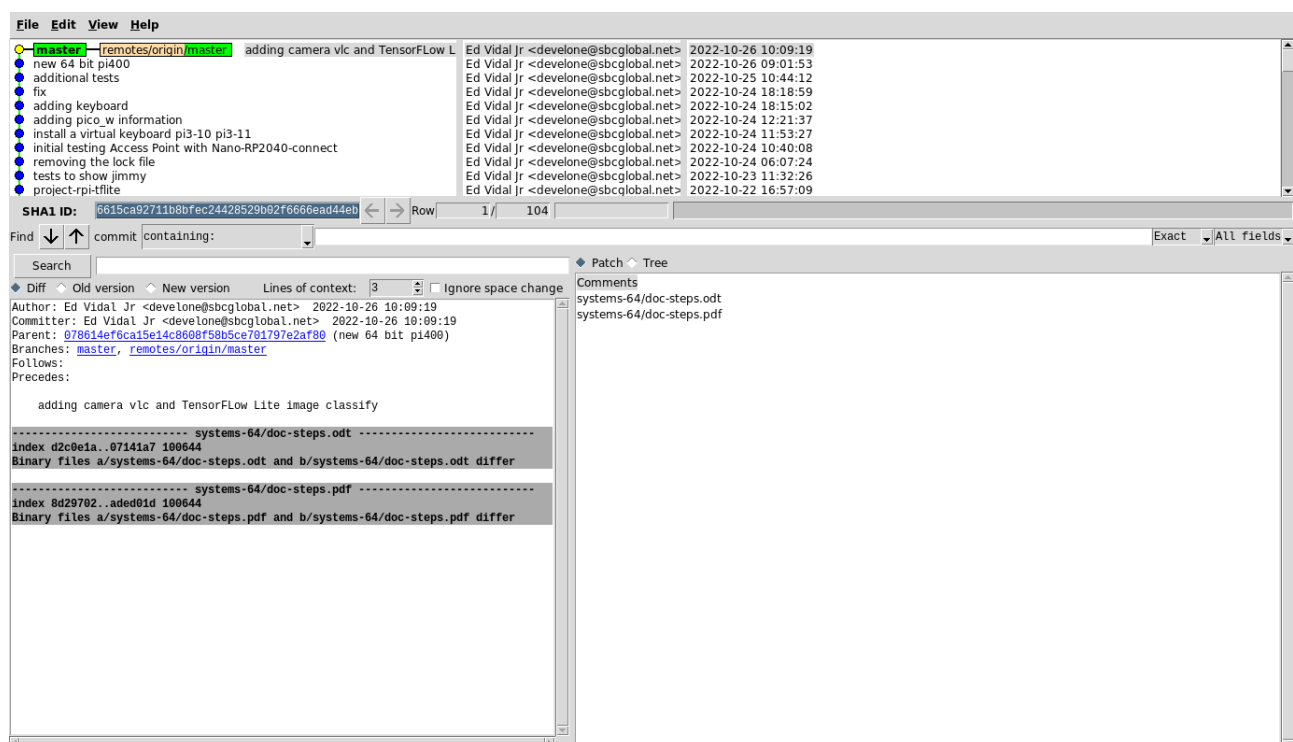
devel@pi4-37:~/my-projects-docs \$ diff systems-64/doc-steps.odt ~/Desktop/doc-steps.odt

devel@pi4-37:~/my-projects-docs \$ diff systems-64/doc-steps.pdf ~/Desktop/doc-steps.pdf

devel@pi4-37:~/my-projects-docs \$ gitk &

[1] 8231

gitk &



git log

commit 6615ca92711b8bfec24428529b02f6666ead44eb (HEAD -> master, origin/master, origin/HEAD)

Author: Ed Vidal Jr <develone@sbcglobal.net>

Date: Wed Oct 26 10:09:19 2022 -0600

adding camera vlc and TensorFlow Lite image classify

commit 078614ef6ca15e14c8608f58b5ce701797e2af80

Author: Ed Vidal Jr <develone@sbcglobal.net>

Date: Wed Oct 26 09:01:53 2022 -0600

new 64 bit pi400

commit 35f6add124a7fe0aac9fb65c697459f3b0dce72c

Author: Ed Vidal Jr <develone@sbcglobal.net>

Date: Tue Oct 25 10:44:12 2022 -0600

additional tests

commit f4b4834fb04e78d8cdda68075eb286c9d854c9e4

Author: Ed Vidal Jr <develone@sbcglobal.net>

Date: Mon Oct 24 18:18:59 2022 -0600

mkdir pi4-28

mkdir pi4-35

cd pi4-28

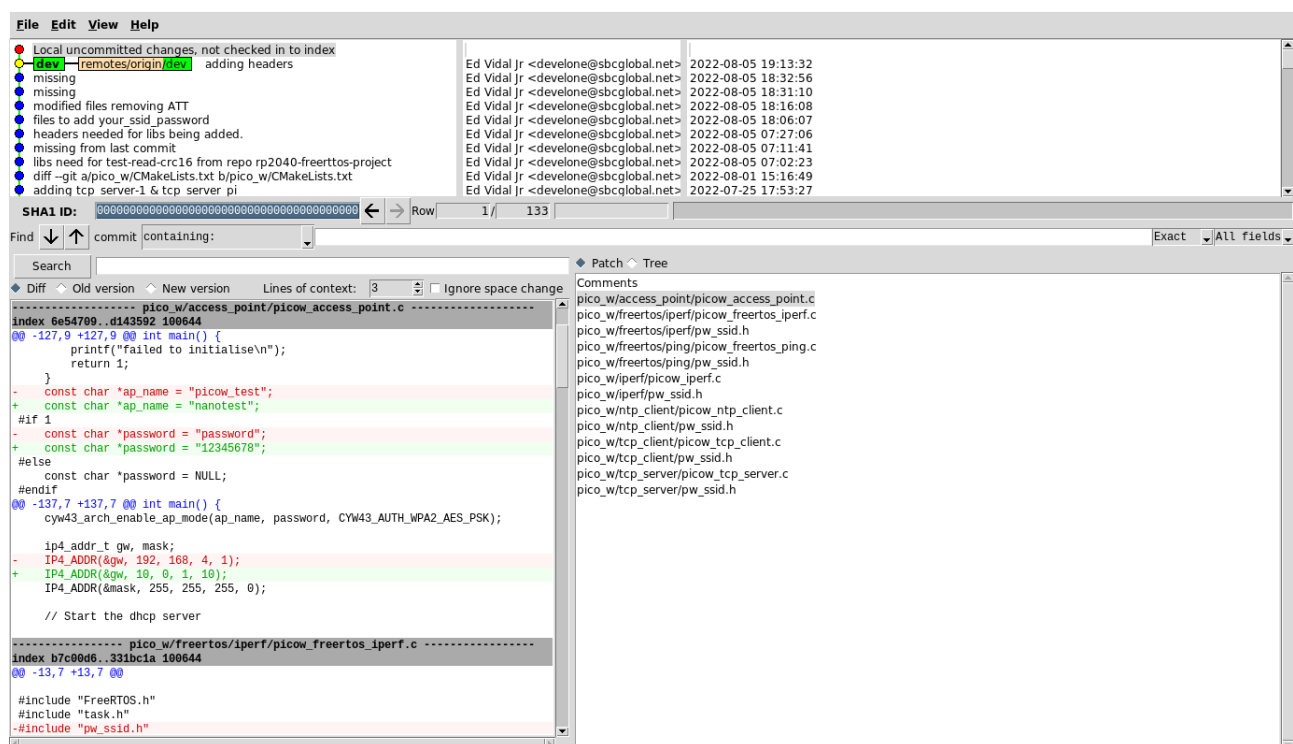
git clone <https://github.com/develone/pico-examples.git> -b dev

cd pico-examples/

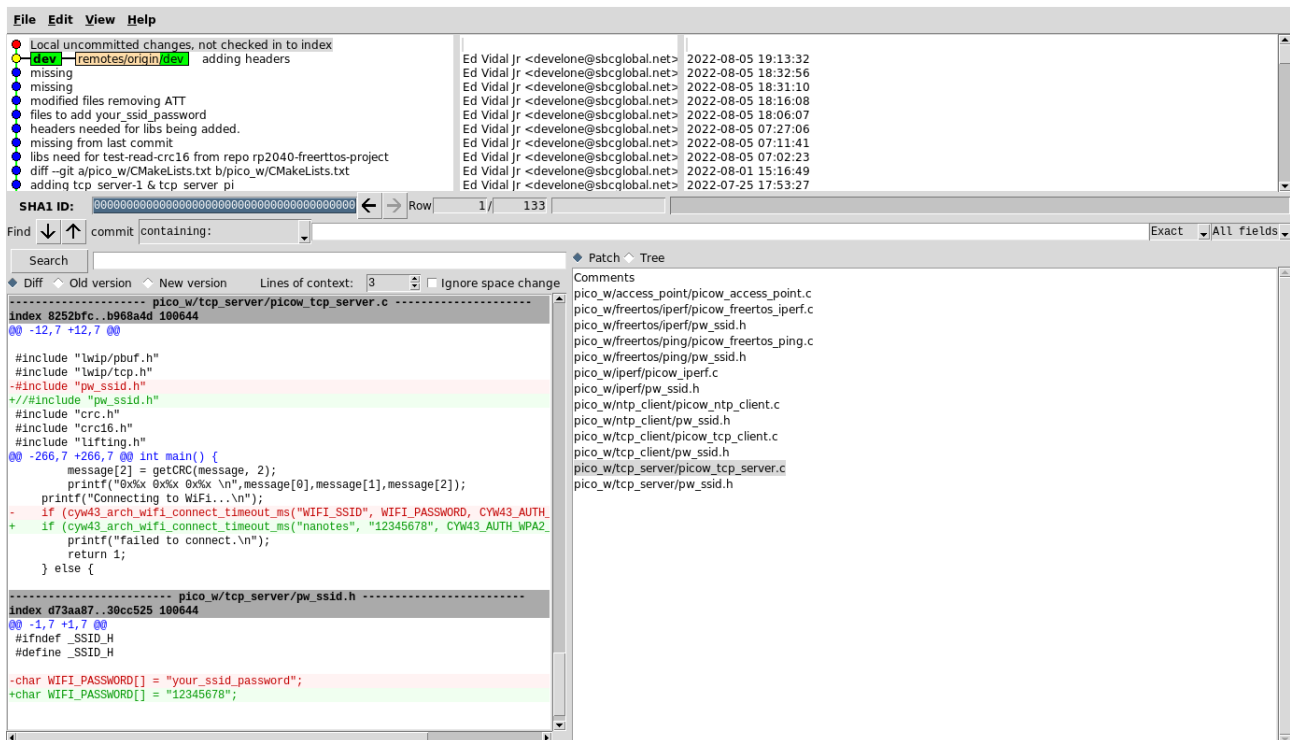
mkdir build

cd build

gitk &



tcp-server



```
cmake -DPICO_BOARD=pico_w -DTEST_TCP_SERVER_IP="10.0.1.13" -
DWIFI_SSID="nanotest" -DWIFI_PASSWORD="12345678" ..
```

Using PICO_SDK_PATH from environment ('/home/devel/sdk/pico-sdk')

PICO_SDK_PATH is /home/devel/sdk/pico-sdk

Defaulting PICO_PLATFORM to rp2040 since not specified.

Defaulting PICO platform compiler to pico_arm_gcc since not specified.

-- Defaulting build type to 'Release' since not specified.

PICO compiler is pico_arm_gcc

-- The C compiler identification is GNU 8.3.1

-- The CXX compiler identification is GNU 8.3.1

-- The ASM compiler identification is GNU

-- Found assembler: /usr/bin/arm-none-eabi-gcc

Build type is Release

PICO target board is pico_w.

Using CMake board configuration from /home/devel/sdk/pico-sdk/src/boards/pico_w.cmake

Using board configuration from /home/devel/sdk/pico-sdk/src/boards/include/boards/pico_w.h

-- Found Python3: /usr/bin/python3.9 (found version "3.9.2") found components: Interpreter

TinyUSB available at /home/devel/sdk/pico-sdk/lib/tinyusb/src/portable/raspberrypi/rp2040;

enabling build support for USB.

cyw43-driver available at /home/devel/sdk/pico-sdk/lib/cyw43-driver

lwIP available at /home/devel/sdk/pico-sdk/lib/lwip

Enabling build support for Pico W wireless.

Skipping Pico W FreeRTOS examples as FREERTOS_KERNEL_PATH not defined

-- Configuring done

-- Generating done

-- Build files have been written to: /home/devel/pi4-28/pico-examples/build

make

programmed a pico_w with the file

/home/devel/pi4-28/pico-examples/build/pico_w/access_point/picow_access_point_poll.uf2

minicom myusb0

This setup on /dev/ttyUSB0

```
File Edit Tabs Help

Welcome to minicom 2.8

OPTI+-----+
Port| A -   Serial Device       : /dev/ttyUSB0
    | B - Lockfile Location    : /var/lock
Pres| C -   Callin Program      :
    | D -   Callout Program    :
Star| E -   Bps/Par/Bits        : 115200 8N1
DHCP| F - Hardware Flow Control : No
    | G - Software Flow Control: No
    | H -   RS485 Enable       : No
    | I -   RS485 Rts On Send  : No
    | J -   RS485 Rts After Send: No
    | K -   RS485 Rx During Tx : No
    | L -   RS485 Terminate Bus: No
    | M - RS485 Delay Rts Before: 0
    | N - RS485 Delay Rts After: 0
    |
    |   Change which setting? █
    +-----+

CTRL-A Z for help | 115200 8N1 | NOR | Minicom 2.8 | VT102 | Offline | ttyUSB0
```

xx

```
File Edit Tabs Help

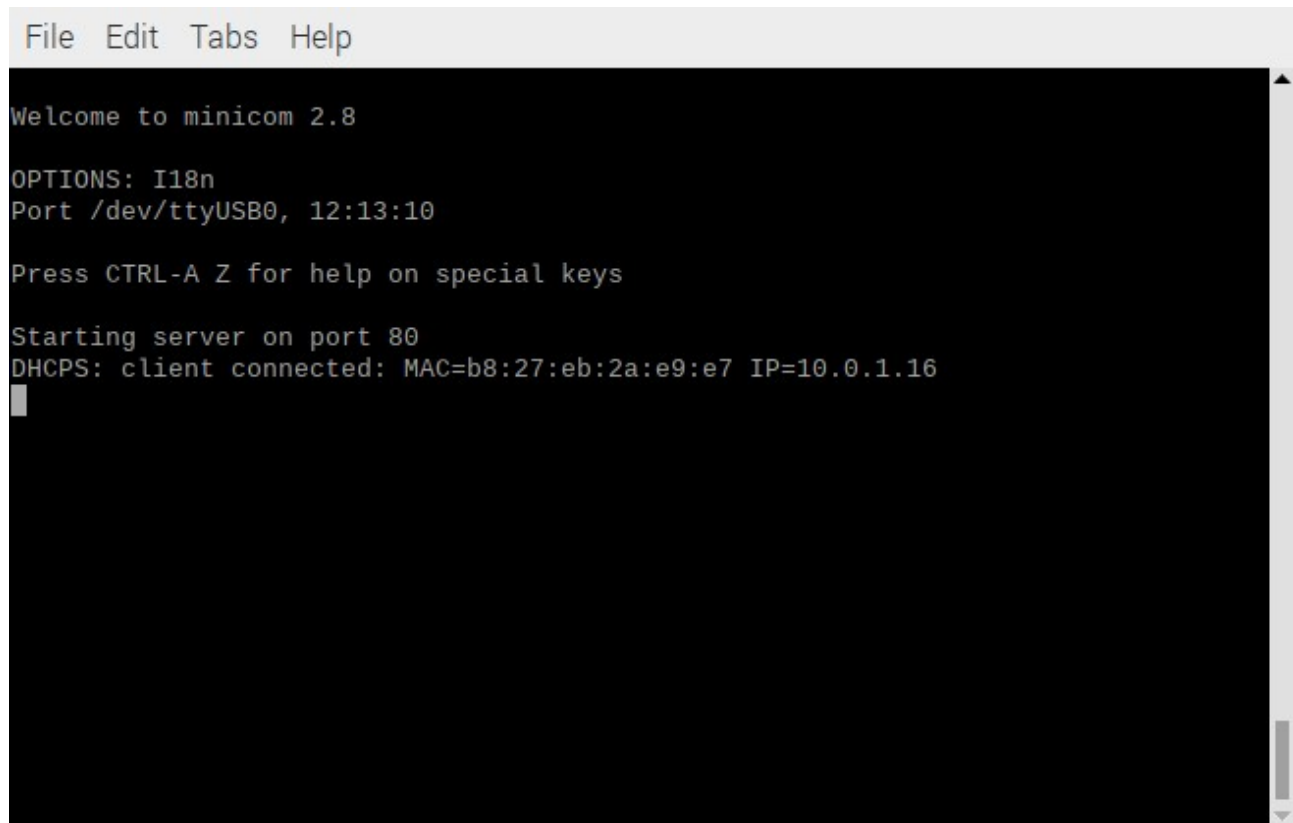
Welcome to minicom 2.8

OPTIONS: I18n
Port /dev/ttyUSB0, 12:13:10

Press CTRL-A Z for help on special keys

Starting server on port 80
█
```

This is when the remote pi3-11 is powered up



```
File Edit Tabs Help

Welcome to minicom 2.8

OPTIONS: I18n
Port /dev/ttyUSB0, 12:13:10

Press CTRL-A Z for help on special keys

Starting server on port 80
DHCP: client connected: MAC=b8:27:eb:2a:e9:e7 IP=10.0.1.16
█
```

cd pi4-35

This is for creating the 2nd pico_w software.

rsync -avl ../pi4-28/pico-examples .

cd pico-examples

rm -rf build

mkdir build

cd build

cmake -DPICO_BOARD=pico_w -DTEST_TCP_SERVER_IP="10.0.1.14" -
DWIFI_SSID="nanotest" -DWIFI_PASSWORD="12345678" ..

make

making a backup of the system

Mount the 64 Gb USB on another system.

As root use gparted

UN-mount the 2nd partition

first you shrink the partition

GParted
Edit
View
Device
Partition
Help

/dev/sdb (57.30 GiB) ▼

/dev/sdb2
28.86 GiB

unallocated
28.18 GiB

Partition	File System	Mount Point	Label	Size	Used	Unused	Flags
unallocated	unallocated			4.00 MiB	---	---	
/dev/sdb1	fat32	/media/dev...	boot	256.00 MiB	31.50 MiB	224.50 MiB	lba
/dev/sdb2	ext4		rootfs	28.86 GiB	24.50 GiB	4.37 GiB	
unallocated	unallocated			28.18 GiB	---	---	

→ Shrink /dev/sdb2 from 57.04 GiB to 28.86 GiB

1 operation pending

As the partition is being shrieked.

Depending on the number and type of operations this might take a long time.

Shrink /dev/sdb2 from 57.04 GiB to 28.86 GiB

resize2fs -p '/dev/sdb2' 30266368K

Completed Operations:

0 of 1 operations completed

► **Details**

Cancel

results are successful

Depending on the number and type of operations this might take a long time.

Completed Operations:

All operations successfully completed

► Details

Save Details

Close

[root@pi4-27:/media/devel/1b763776-4e1d-499c-9f24-a116a58c161f#](#)

df

Filesystem	1K-blocks	Used	Available	Use%	Mounted on
/dev/root	305602156	150970520	141834472	52%	/
devtmpfs	3878868	0	3878868	0%	/dev
tmpfs	4043732	0	4043732	0%	/dev/shm
tmpfs	1617496	2040	1615456	1%	/run
tmpfs	5120	4	5116	1%	/run/lock
/dev/sda1	258095	50707	207389	20%	/boot
tmpfs	808744	24	808720	1%	/run/user/1000
/dev/sdb1	306552464	141394184	149513388	49%	/media/devel/1b763776-4e1d-499c-9f24-a116a58c161f
/dev/sdc1	261108	31222	229886	12%	/media/devel/boot
/dev/sdc2	29719076	22959176	5513828	81%	/media/devel/rootfs

dd bs=16M if=/dev/sdc status='progress' of=pi4-37.img

61522051072 bytes (62 GB, 57 GiB) copied, 3427 s, 18.0 MB/s

3667+1 records in

3667+1 records out

61524148224 bytes (62 GB, 57 GiB) copied, 3427.2 s, 18.0 MB/s

dd bs=16M if=pi4-37.img status='progress' of=/dev/sdc

61524148224 bytes (62 GB, 57 GiB) copied, 5401 s, 11.4 MB/s

3667+1 records in

3667+1 records out

61524148224 bytes (62 GB, 57 GiB) copied, 5401.02 s, 11.4 MB/s

MQTT

pi4-38 & pi4-37

<https://mosquitto.org/documentation/authentication-methods/>

sudo apt-get install mosquitto mosquitto-clients

mosquitto

1667650417: mosquitto version 2.0.11 starting

1667650417: Using default config.
1667650417: Starting in local only mode. Connections will only be possible from clients running on this machine.
1667650417: Create a configuration file which defines a listener to allow remote access.
1667650417: For more details see <https://mosquitto.org/documentation/authentication-methods/>
1667650417: Opening ipv4 listen socket on port 1883.
1667650417: Opening ipv6 listen socket on port 1883.
1667650417: mosquitto version 2.0.11 running
1667651226: New connection from ::1:45558 on port 1883.
1667651226: New client connected from ::1:45558 as auto-D507A4C8-6C9D-557C-E95B-9C9FA6E9121F (p2, c1, k60).
1667651310: New connection from ::1:47850 on port 1883.
1667651310: New client connected from ::1:47850 as auto-8FD4E2A6-C70D-FBBD-A29E-675081C9DA76 (p2, c1, k60).
1667651334: Client auto-8FD4E2A6-C70D-FBBD-A29E-675081C9DA76 disconnected.
1667651379: New connection from ::1:55678 on port 1883.
1667651379: New client connected from ::1:55678 as auto-C3CC2EA9-8C6A-F7CB-6735-F7757782222D (p2, c1, k60).
1667651379: Client auto-C3CC2EA9-8C6A-F7CB-6735-F7757782222D disconnected.
1667651404: New connection from ::1:51540 on port 1883.
1667651404: New client connected from ::1:51540 as auto-C3C38D98-59AD-C162-1EE8-9AC0CD19F427 (p2, c1, k60).
1667651404: Client auto-C3C38D98-59AD-C162-1EE8-9AC0CD19F427 disconnected.
1667651411: New connection from ::1:51556 on port 1883.
1667651411: New client connected from ::1:51556 as auto-EE2DA2C4-0C40-B57A-2836-1FB8B088D143 (p2, c1, k60).
1667651411: Client auto-EE2DA2C4-0C40-B57A-2836-1FB8B088D143 disconnected.
1667651425: New connection from ::1:47258 on port 1883.
1667651425: New client connected from ::1:47258 as auto-00448448-E30D-465A-DA0B-F162B17D477E (p2, c1, k60).
1667651425: Client auto-00448448-E30D-465A-DA0B-F162B17D477E disconnected.
1667652597: Reloading config.

```
cp /usr/share/doc/mosquitto/examples/mosquitto.conf .
```

```
mosquitto_passwd -c /home/devel/mosquitto-pw testuser
```

```
password123
```

```
password123
```

```
less ~/mosquitto-pw
```

```
testuser:$7$101$7OIAauVb8Ow8mP6c$134ZYut+1qEracS7SWlsGXG7pndOKWvr/  
XeBWplTqgT9eShnEDkPBajQUOqPd1sVyt50RSOV4D85JDaYOlkW7A==
```

```
sudo diff mosquitto.conf /home/devel/mosquitto.conf
```

```
512d511
```

```
< allow_anonymous true
```

```
ps -ax | grep mosquitto
```

```
kill -HUP 2058
```

```
sudo cp mosquito.conf /etc/mosquitto/
```

First shell

```
mosquitto_sub -t 'testtopic' -u 'testuser' -P 'password123'
```

In another shell

```
mosquitto_pub -t 'testtopic' -m 'Hello World!' -u 'testuser' -P 'password123'
```

First shell

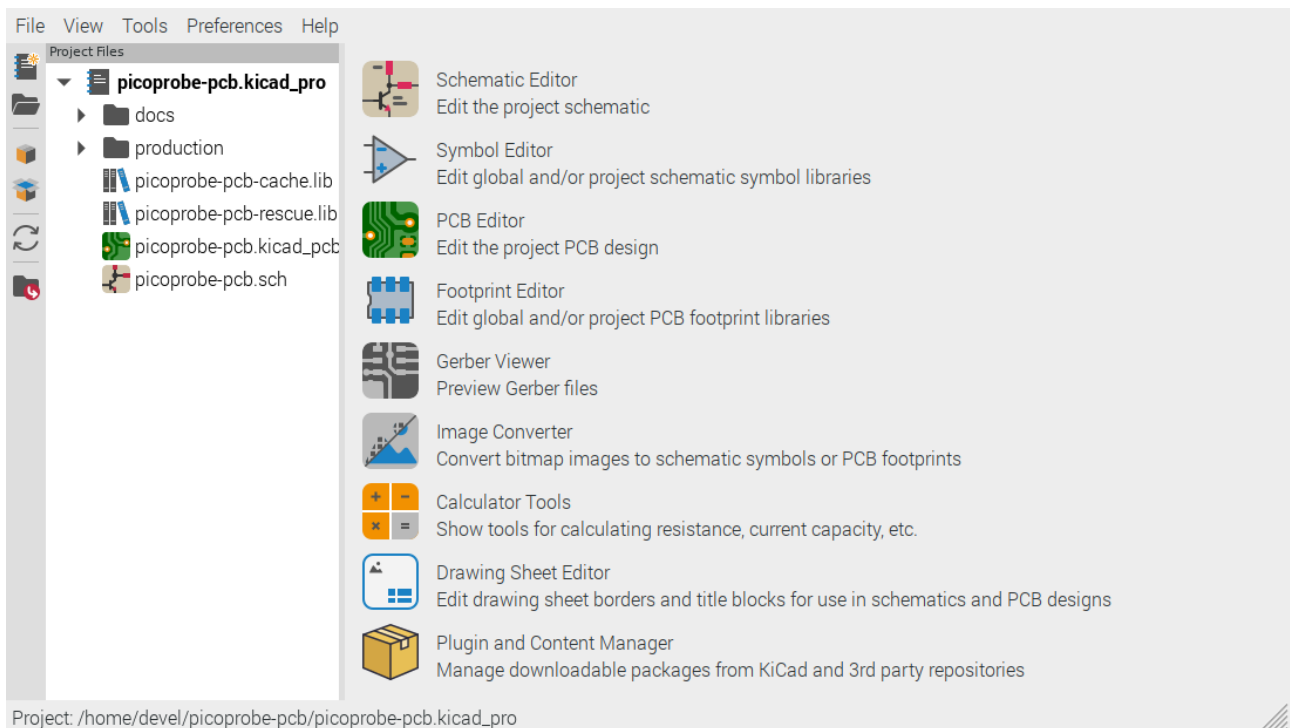
```
mosquitto_sub -t 'testtopic' -u 'testuser' -P 'password123'
```

Hello World!

KiCad

```
cd picoprobe-pcb/
```

```
kicad picoprobe-pcb.pro
```



PCB

