

➤ ScopeDog install on 64bit Raspian OS 'Bookworm' for Pi5

Install Bookworm 64bit Raspian OS (use Raspberry Pi Imager app). Use a SD card at least 16GB, A fast 32GB card is recommended from either Samsung or Sandisk.

Recommended to set the username as 'scopedog'

Insert SD card in Pi and boot. If using a previous build: (much better to start afresh though!)

Connect Pi to internet (use ethernet)

`sudo apt update`

`sudo apt upgrade`

If VNC required:

Exec `sudo raspi-config`, select advanced options, option A6, change from Wayland to X11

Then enable VNC from main menu/preferences/raspberry pi configuration/vnc

Set headless display resolution to something that suits whatever device you will use to VNC view the Pi desktop.

`reboot`

In Raspberry Pi configuration, enable Serial, disable serial console. Disable screen blanking.

Install support for the Phidget modules

```
curl -fsSL https://www.phidgets.com/downloads/setup_linux | sudo -E bash - &&\nsudo apt-get install -y libphidget22
```

`sudo apt-get install libphidget22-dev`

`sudo apt-get install libphidget22extra`

`sudo apt-get install libphidget22admin`

create using `sudo nano /etc/udev/rules.d/99-libphidget22.rules`, with the following contents:


All current and future Phidgets - Vendor = 0x06c2, Product = 0x0030 - 0x00af

`SUBSYSTEMS=="usb", ACTION=="add", ATTRS{idVendor}=="06c2", ATTRS{idProduct}=="00[3-a][0-f]", MODE="666"`

If needed during installation of files, to enable a file manager with sudo privileges

`sudo pcmanfm`

Create a virtual environment

`python -m venv /home/scopedog/venv-scopedog`  `system-site-packages` (note the double hyphen)

Activate it

`source venv-scopedog/bin/activate`

(later, if needed, just type 'deactivate' in the terminal to exit the virtual environment)

Install all the dependencies first whilst in the venv-scopedog environment

`pip install phidget22`

`sudo apt install python3-fitsio`

`pip install astropy`

`pip install pyfits`

'sudo apt-get install' the following

```
libcairo2-dev
libnetpbm11-dev
netpbm
libpng-dev
libjpeg-dev
zlib1g-dev
libbz2-dev
swig
libcfitsio-dev
```

Reboot the Pi & activate venv-scopedog

Download the latest **astrometry.net** from the GitHub

```
wget http://astrometry.net/downloads/astrometry.net-latest.tar.gz
tar xvzf astrometry.net-latest.tar.gz
```

Build **astrometry.net** execute

```
cd astrometry.net-0.9?
sudo make
sudo make py
sudo make extra
sudo make install
```

Get some astrometry index files, Can be found on the eFinder Google share

Add some index files to

```
/usr/local/astrometry/data
Suggest: index-4109.fits thru index-4113.fits
```

Add some catalog files to a new folder

Can be found on the eFinder Google share

Create /usr/local/astrometry/annotate_data (use sudo pcmanfm to get permissions)

Suggest:

```
abell-all.fits
brightstars.fits
hd.fits
hip.fits
```

Reboot and re-activate your venv

remove need for password during code execution

```
sudo visudo
then add following line to end
    <username> ALL = NOPASSWD: /bin/date
save & exit
```

sudo apt install imagemagick

sudo apt install python3-skyfield

sudo apt install python3-pil.imagetk

Install ASI camera support

Make sure you have activated venv-scopedog

Download 'ASI Camera SDK' 'Others' tab, then 'For Developers'

<https://www.zwoastro.com/software/>

Extract ASI_Linux_mac_SDK_V1.x.tar.bz2

Extract /lib

Copy folder armv8 and contents to a new folder /lib/zwoasi/

Copy asi.rules to ~/scopedog

Execute

```
cd /home/scopedog
```

```
sudo install asi.rules /lib/udev/rules.d
```

```
pip install zwoasi
```

Set up a folder in ramdisk.

```
sudo nano /etc/fstab
```

```
tmpfs /var/tmp tmpfs nodev,nosuid,size=100M 0 0
```

reboot

Copy all the files and folders from folder 'scopedog mk3ef bookworm' (from Google share) into /home/scopedog

Install web server

Copy contents of folder /home/scopedog/www to /var/www/html

```
sudo apt-get install apache2
```

If required make it auto start on power up

```
execute crontab -e
```

add to end

```
PATH=<copy your default venv-scopedog PATH into here>
```

```
@reboot sleep 10 && env DISPLAY=:0 venv-scopedog/bin/python
```

```
~/Solver/scopedogmk3.py run &
```

Make sure the desired copy of scopedogXXX_YY.py is saved in /scopedog and renamed scopedogmk3.py

Astrokeith

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