Raspberry pi 4 setup

Ubuntu Rpi4

Setup:

Raspberry Pi imager to install Ubuntu 20.04 LTS amd64

Use the setting cog wheel to add a hostname, username, password, wifi, and ssh

sudo dhclient -v

Wait a few seconds then ctrl+c

sudo reboot

Login

sudo apt update

Wait 2 min for the security to be installed automatically

sudo apt install tasksel

sudo tasksel

Select Ubuntu Desktop by pressing the spacebar

Press tab

Press spacebar

Then wait, it will take a little while to start and install

Login

Then

sudo apt-get install lightdm

Select lightdm

sudo reboot

Login

sudo vi /etc/netplan/50-cloud-init.yaml

Comment out current network using #

Type at the bottom of the file after the last comment (4 space Convention):

network:

ethernets:

eth0:

dhcp4: true

optional: true

Version: 2

‐---This Also Works if wanting to leave 50-cloud-init.yaml unchanged-----

sudo crontab -e

Type at the bottom of the file:

@reboot sudo killall wpa\_supplicant | sudo systemctl restart NetworkManager

NEXT:

sudo vi /boot/firmware/usercfg.txt

Add these lines:

dtparam=spi=on

dtoverlay=vc4-fkms-v3d

hdmi\_drive:0=1

hdmi\_group:0=2

hdmi\_mode:0=82

hdmi\_force\_hotplug=1

hdmi\_drive:1=1

hdmi\_group:1=2

hdmi\_mode:1=82

Next remote desktop install:

sudo apt-get update

sudo apt install net-tools

sudo apt-get install x11vnc

ip address show

x11vnc

Install vnc viewer on windows computer

connect to raspberry pi with its ip address

ctrl+c

sudo nano /lib/systemd/system/x11vnc.service

-----------------Write this code------------------

[Unit]

Description=x11vnc service

After=display-manager.service network.target syslog.target

[Service]

Type=simple

ExecStart=/usr/bin/x11vnc -forever -display :0 -auth guess -passwd MsR90!\*

ExecStop=/usr/bin/killall x11vnc

Restart=on-failure

[Install]

WantedBy=multi-user.target

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systemctl daemon-reload

systemctl enable x11vnc.service

systemctl start x11vnc.service

ctrl+c

systemctl status x11vnc.service

ctrl+c

Go to settings->privacy->Screen Lock

Blank Screen Delay set to 'Never'

Turn off:

Automatic Screen Lock

Lock Screen on Suspend

Show Notifications on Lock Screen

Then connect with windows pc

-------------------------UART-------------------------

sudo raspi-config

sudo vi /boot/config.txt

Type:

#enable\_uart=1

cmdline=cmdline.txt

dtoverlay=disable-bt

dtoverlay=uart5

Save the file

sudo vi /boot/cmdline.txt

(Not sure if needed) Type:

dwc\_otg.lpm\_enable=0 console=tty1 root=/dev/mmcblk0p2 rootfstype=ext4 elevator=deadline fsck.repair=yes rootwait

Maybe remove the 'console=tty1' line

Save file

sudo systemclt stop serial-getty@ttyS0.service

sudo systemclt disable serial-getty@ttyS0.service

sudo systemclt mask serial-getty@ttyS0.service

KERNEL=="ttyS0", SYMLINK+="serial0" GROUP="tty" MODE="0660"

KERNEL=="ttyAMA0", SYMLINK+="serial1" GROUP="tty" MODE="0660"

sudo udevadm control --reload-rules && sudo udevadm trigger

sudo adduser tjcc tty

Make sure the string 'console=serial0,115200' is not in the cmdline.txt file

Make sure 'dtoverlay=disable-bt' is right under 'cmdline=cmdline.txt' and above 'dtoverlay=uart5'

sudo reboot

sudo systemctl restart x11vnc.service

Wait 30 seconds before connecting

When making python file go and 'import serial' and the port used for serial.Serial is /dev/ttyAMA1 for uart5

Search pySerial for documentation on the import serial

---------------------------spi---------------------------

Next spi set up:

wget https://archive.raspberrypi.org/debian/pool/main/r/raspi-config/raspi-config\_20220301\_all.deb -P /tmp

sudo dpkg -i /tmp/raspi-config\_20220301\_all.deb

Install any dependency error

Then retry:

sudo dpkg -i /tmp/raspi-config\_20220301\_all.deb

sudo raspi-config

Interface option

Enable SPI

Check file for spi being added:

sudo nano /boot/config.txt

File should contain 'dtparam=spi=on'

sudo apt-get install libraspberrypi-bin

sudo dtoverlay spi1-3cs

ls -l /dev/spi\*

Check that there are 5 files

Bus 0 with 2 devices

Bus 1 with 3 devices

sudo apt-get install spi-tools

sudo apt-get install python3-dev

sudo apt-get install python3-pip

sudo pip install spidev

sudo apt-get install python3-rpi.gpio

sudo apt install gcc

sudo apt-get update --fix-missing

sudo apt install gcc

mkdir spi\_test

cd spi\_test/

wget https://raw.githubusercontent.com/raspberrypi/linux/rpi-3.10.y/Documentation/spi/spidev\_test.c

gcc -o spidev\_test spidev\_test.c

sudo ./spidev\_test -D /dev/spidev0.0

It should show that spi is working

mkdir rfid\_spi

cd rfid\_spi

git clone https://github.com/lthiery/SPI-py.git

ls

cd SPI-py/

ls

sudo python3 setup.py install

cd ..

ls

git clone https://github.com/pimylifeup/MFRC522-python.git

ls

cd MFRC522-python/

ls

sudo nano WriteCard.py

Write code from this YouTube Link:

https://www.youtube.com/watch?v=-qKep1OXxe8&list=LL&index=3

sudo python3 WriteCard.py

sudo nano CardRead.py

Write code from this YouTube Link:

https://www.youtube.com/watch?v=-qKep1OXxe8&list=LL&index=3

sudo python3 CardRead.py

ls -l /dev/spi\*

sudo crontab -e

Type:

@reboot sudo dtoverlay spi1-3cs

@reboot sudo chown tjcc:root /dev/spidev0.0

@reboot sudo chown tjcc:root /dev/spidev0.1

sudo shutdown now

-------------------ROS Noetic----------------------

follow directions on ros.org to install ROS noetic

Do the full desktop install

---------------Gmapping Lidar------------------

sudo apt install ros-noetic-slam-gmapping

download rplidar\_ros from github of robopeak

Setup Navigation Stack if the pi is going to be in full control

Setup rviz

Set up an odom topic publisher

Download from github robot\_pose\_ekf

Create a folder called catkin\_ws

Create a folder called src

Change directory to catkin\_ws

Type: catkin\_make

Place all files into ~/catkin\_ws/src

Then in the catkin\_ws type: catkin\_make

Creat a launch file to have all folders working together

--------------------pytesseract--------------------

pip install pytesseract

sudo apt updat

sudo apt install tesseract-ocr

sudo apt install libtesseract-dev