

HCS connected to Raspberry Pi demonstration scenario

Demonstration idea

The idea of the demonstration is to connect two HCS power supply to Raspberry Pi. A driver is installed into Raspberry Pi to connect USB device to Ethernet. The driver will map each USB port to TCP connect port. For example USB 1 is mapped to TCP port 4001. Then remote control software can connect to HCS power supply by using IP address of Raspberry Pi and port number for USB.

E.g. Raspberry Pi IP address : 192.168.1.100

USB port 1 map to TCP port 4001

The connection setup is 192.168.1.100:4001

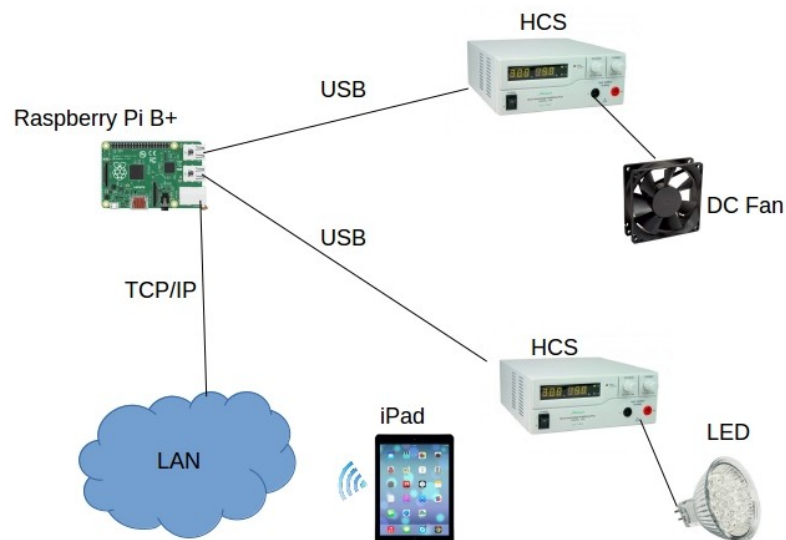
A load, which can be LED or DC FAN, is used to connect to power supply output so that the voltage and current reading can be recorded. We can use programming feature in our application to program different voltage and current for the output. Then the application can record variation of voltage and current.

The demonstration will use application on iPad which can set HCS output, get reading from it, has 20 steps programmed output and monitoring the output.

Demonstration setup

Equipments list

1. HCS power supply x 2
2. Raspberry Pi B+ model
3. 12V DC Fan
4. 12 LED (around 5W)
5. iPad with iOS 7 or above



Setup Raspberry Pi B+

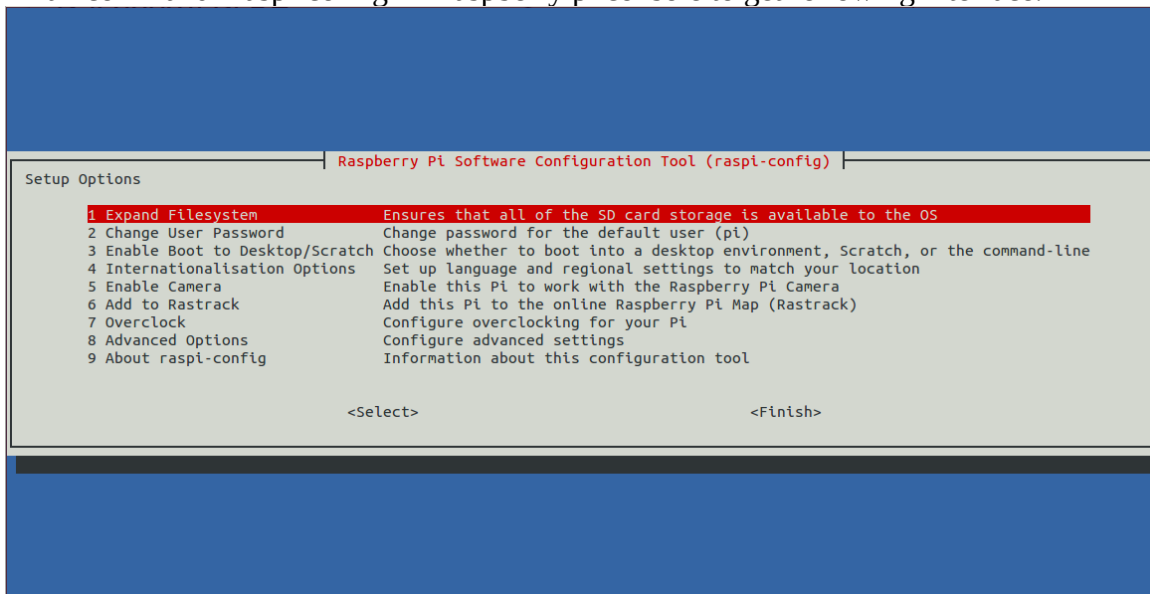
Software required :

- i. Raspbian – OS for Raspberry Pi
- ii. Manson driver for Raspberry Pi
- iii. Winscp – File transfer tools to transfer driver to Raspberry Pi

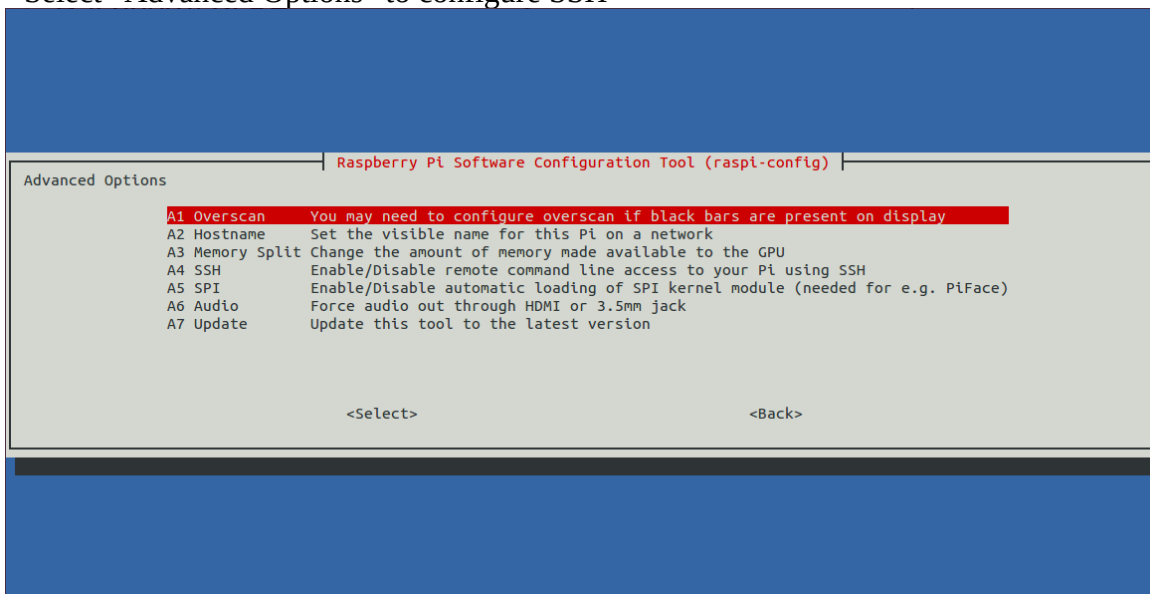
1. Install Raspbian into Raspberry Pi B+. The image can be download in link <https://www.raspberrypi.org/downloads> .

2. Configure SSH server in Raspberry Pi for file transfer from Windows.

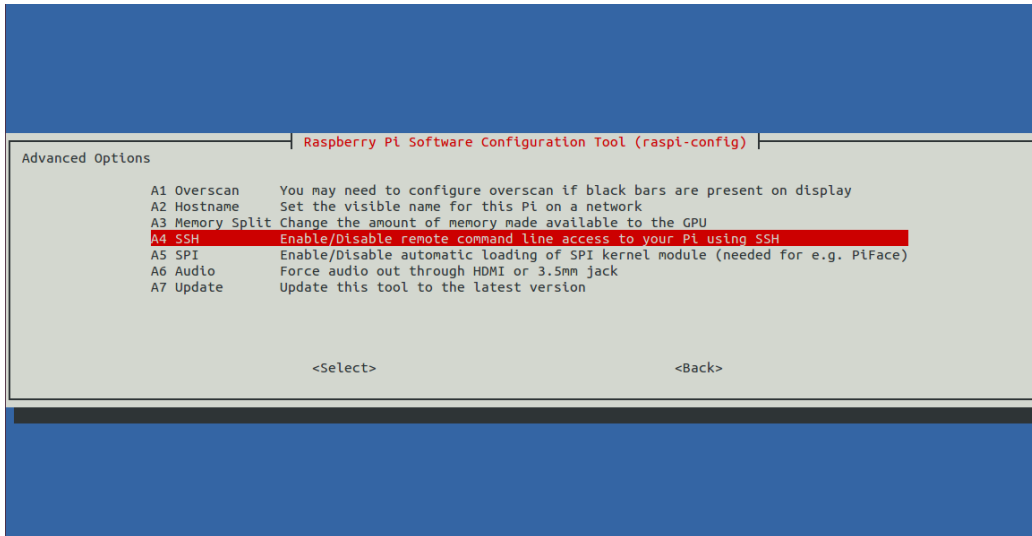
- Open terminal in Raspberry Pi.
- Run command “raspi-config” in raspberry pi console to get following interface.



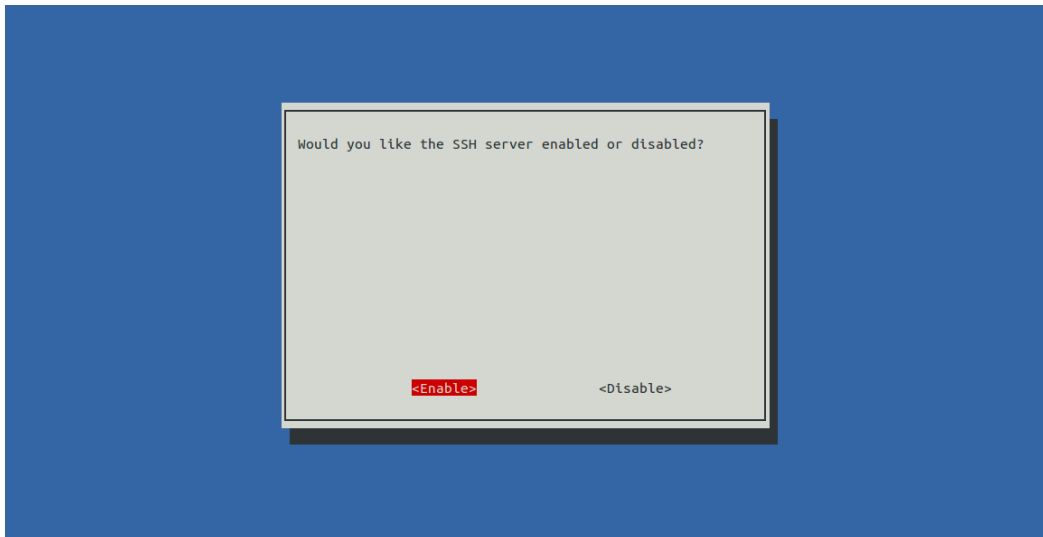
- Select “Advanced Options” to configure SSH



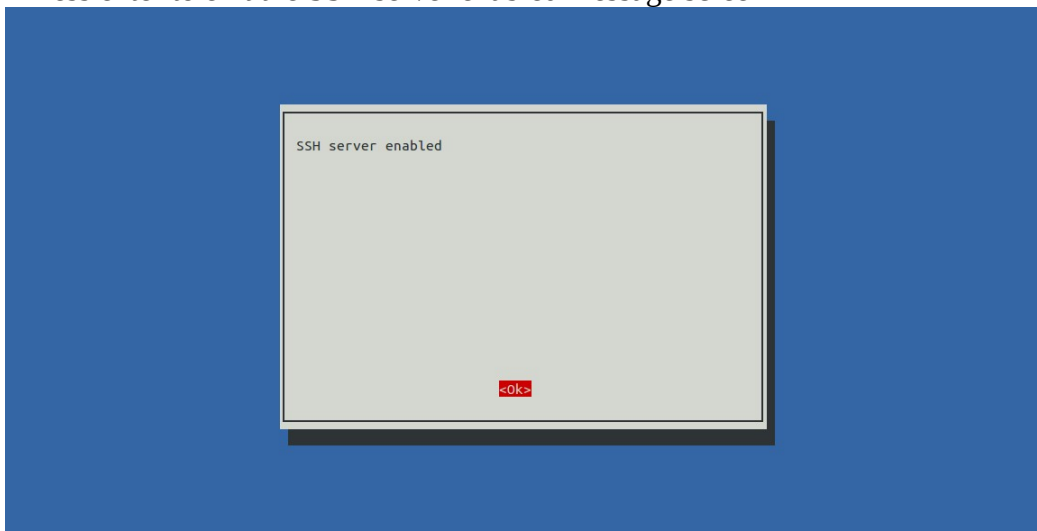
- Select “A4 SSH” to set SSH server



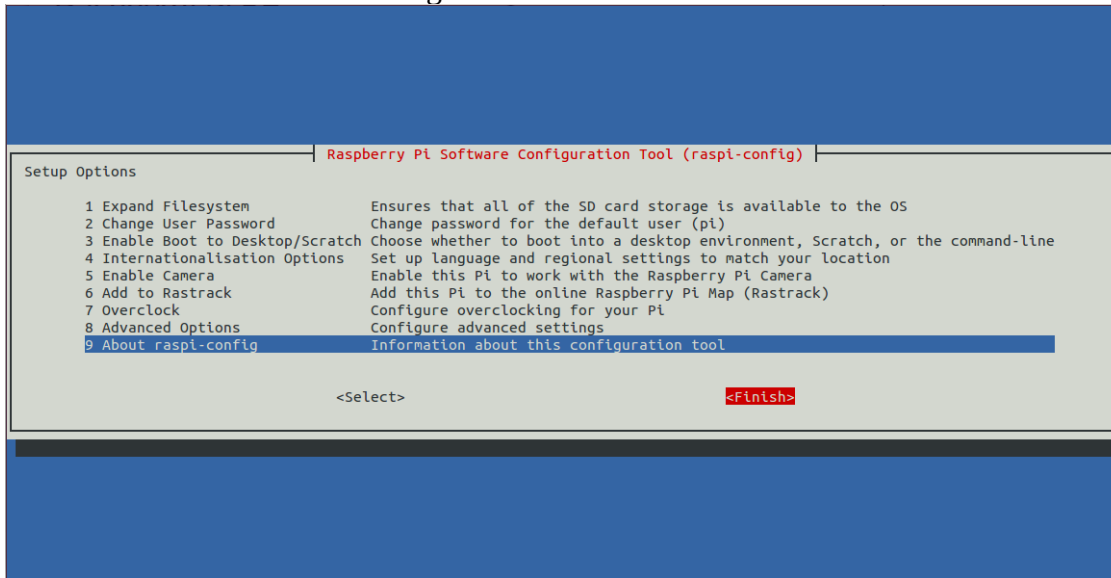
- Select “Enable” to enable SSH server



- Press enter to exit the SSH server enabled message screen



- Click “Finish” to exit this configuration menu



3. Configure Raspberry Pi to use static IP (Optional)

Raspberry Pi default is using DHCP. It is better to set static IP for raspberry pi so that it is easy configure iPad application to connect.

Open terminal in Raspberry Pi

- Run “sudo nano /etc/network/interfaces” to edit network configure file.

```
pi@raspberrypi ~ $ sudo nano /etc/network/interfaces
```



- You get following screen. You need to edit line “iface eth0 inet dhcp” to become “iface eth0 inet static”

```
GNU nano 2.2.6      File: /etc/network/interfaces

auto lo

iface lo inet loopback
iface eth0 inet dhcp

allow-hotplug wlan0
iface wlan0 inet manual
wpa-roam /etc/wpa_supplicant/wpa_supplicant.conf
iface default inet dhcp

[ Read 9 lines ]
^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spell
```

- Add IP address information. Change IP address match to your network.

```
address 192.168.1.156
netmask 255.255.255.0
network 192.168.1.0
broadcast 192.168.1.255
gateway 192.168.1.1
```

```
GNU nano 2.2.6      File: /etc/network/interfaces      Modified

auto lo

iface lo inet loopback
iface eth0 inet static
address 192.168.1.156
netmask 255.255.255.0
network 192.168.1.0
broadcast 192.168.1.255
gateway 192.168.1.1

allow-hotplug wlan0
iface wlan0 inet manual
wpa-roam /etc/wpa_supplicant/wpa_supplicant.conf
iface default inet dhcp

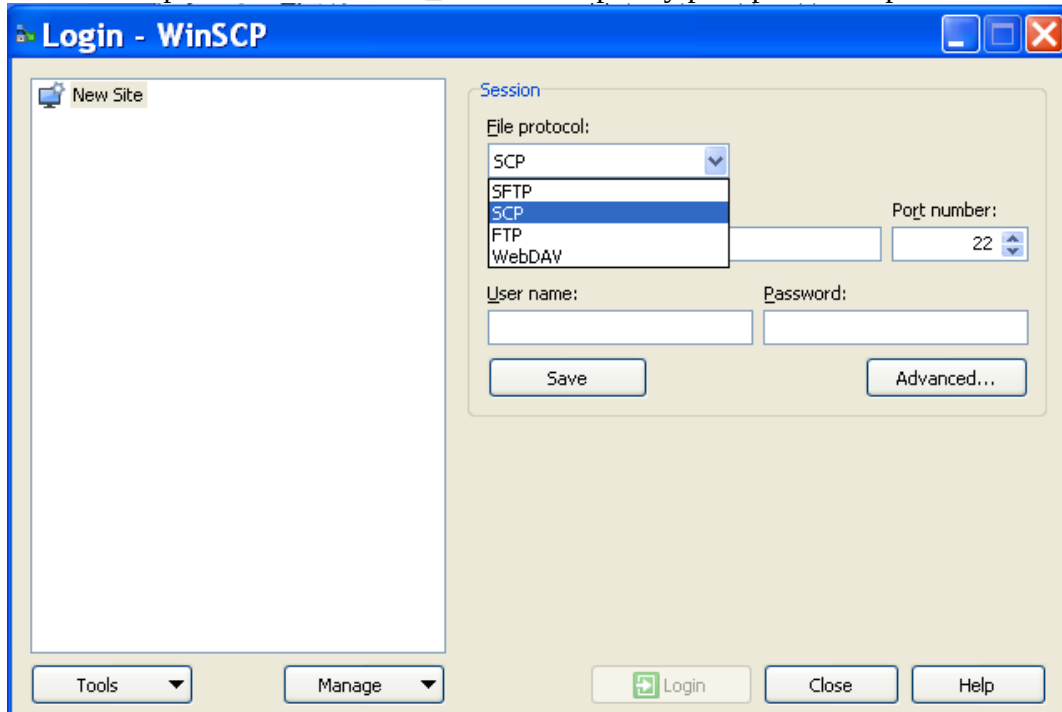
^G Get Help  ^O WriteOut  ^R Read File ^Y Prev Page ^K Cut Text  ^C Cur Pos
^X Exit      ^J Justify   ^W Where Is  ^V Next Page ^U UnCut Text ^T To Spell
```

- Press “Ctrl+x” to exit editor. Press “y” to save modified file.

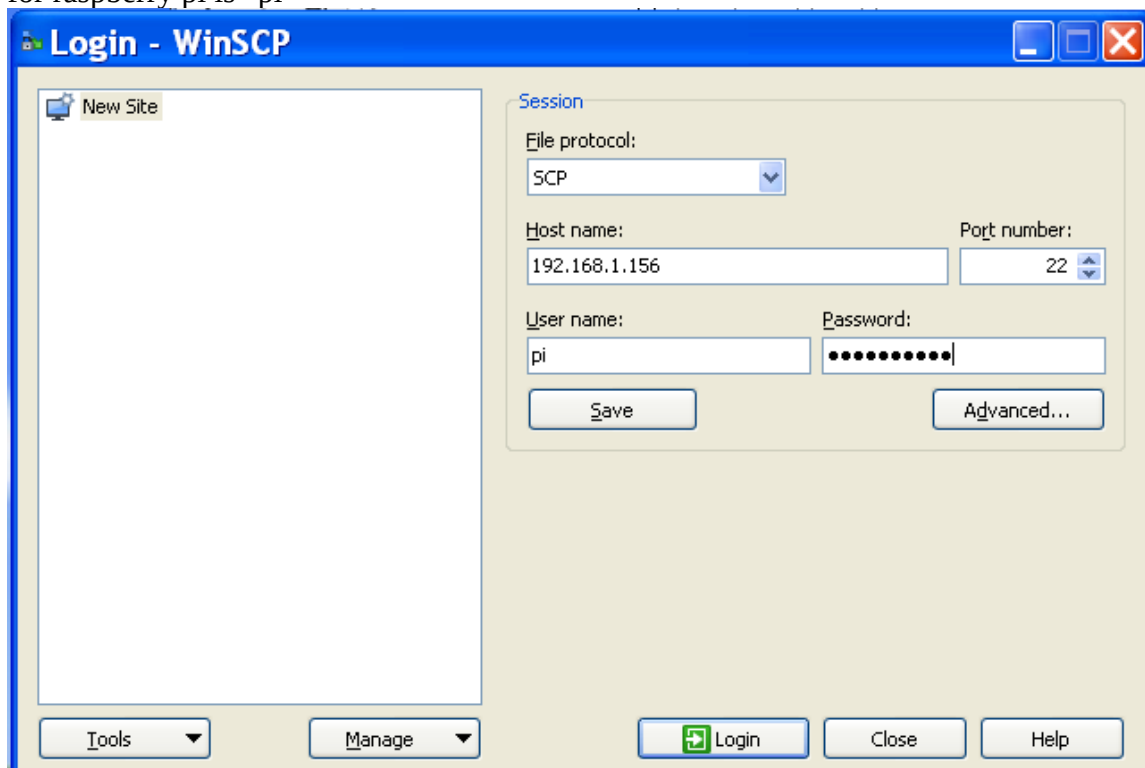
4. Restart Raspberry Pi

5. Upload driver to Raspberry Pi

- Use Winscp to transfer manson_driver to raspberry pi. Open Winscp and select SCP for file protocol.

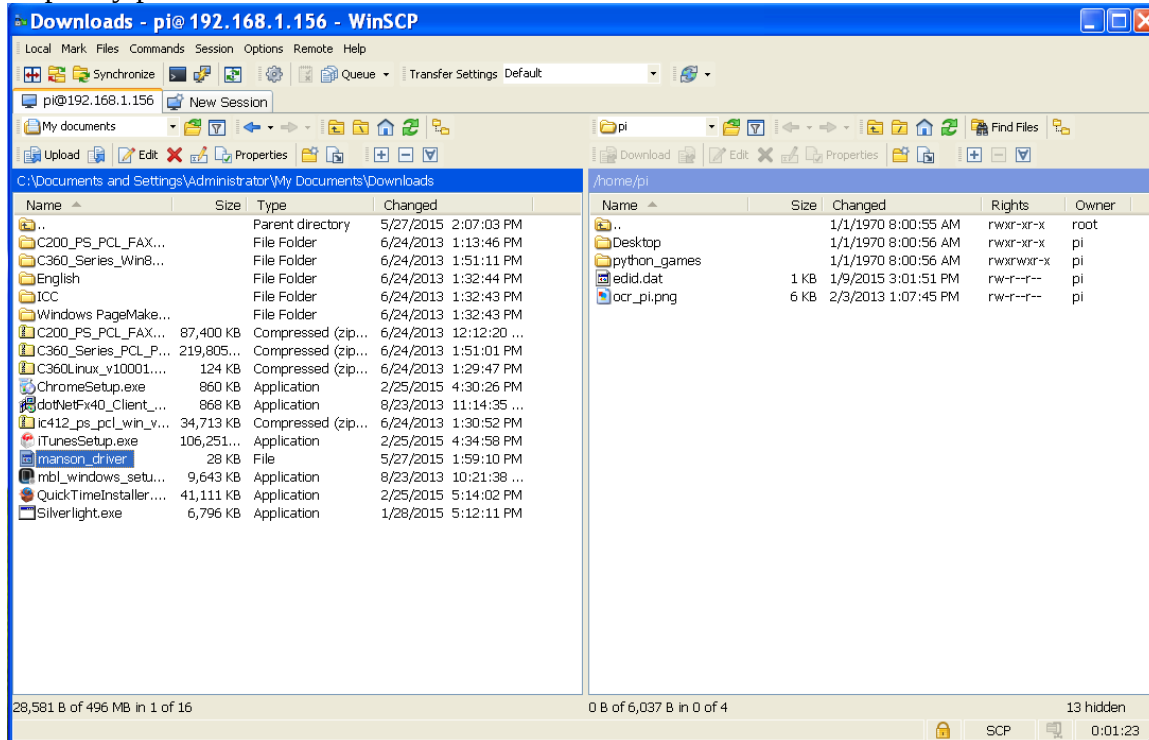


- Enter IP address for your raspberry pi. Enter User name and password as well. The default user name for raspberry pi is "pi"

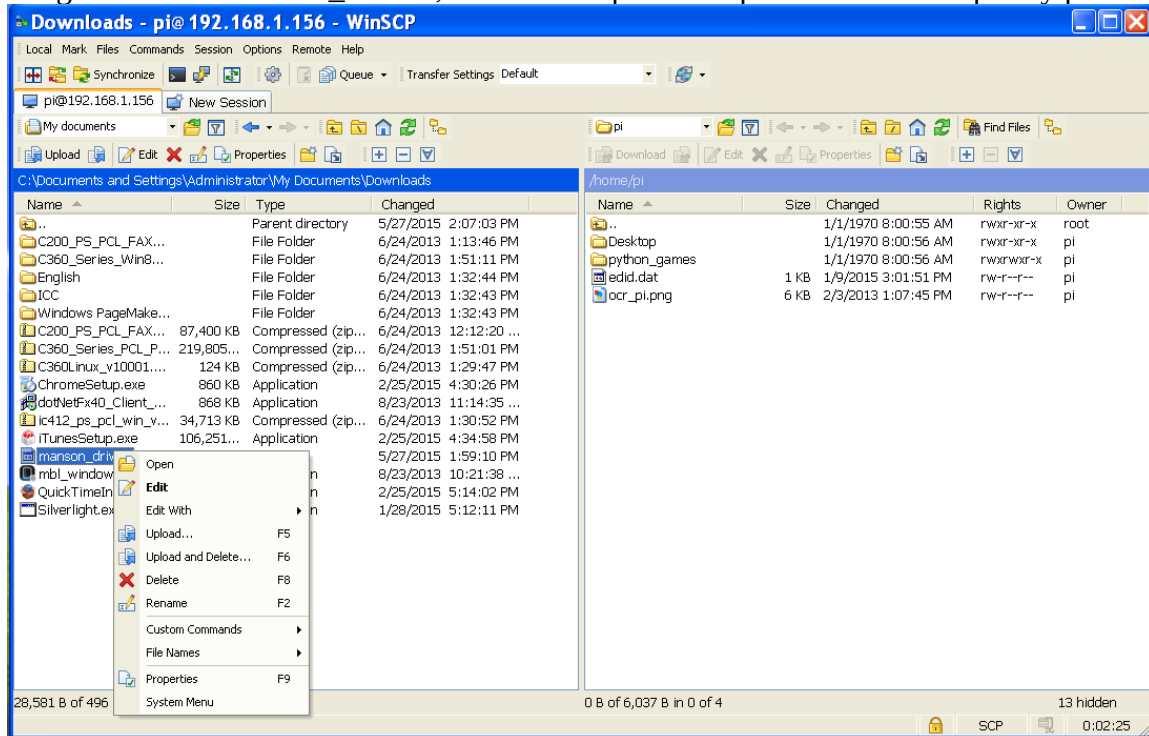


- Click “Login” to connect to raspberry pi

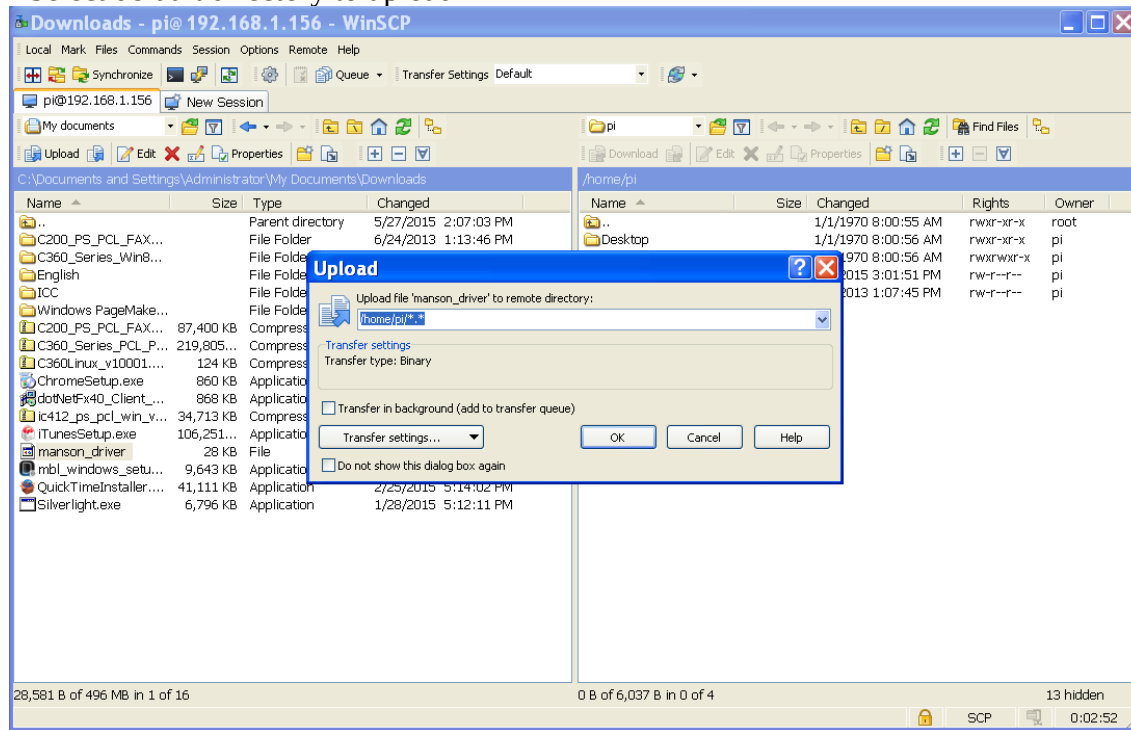
- The left hand side in following screen PM is files in your Windows PC and right hand side is file in raspberry pi



- Right click on “manson_driver”, then select upload to upload driver to raspberry pi



- Select default directory to upload



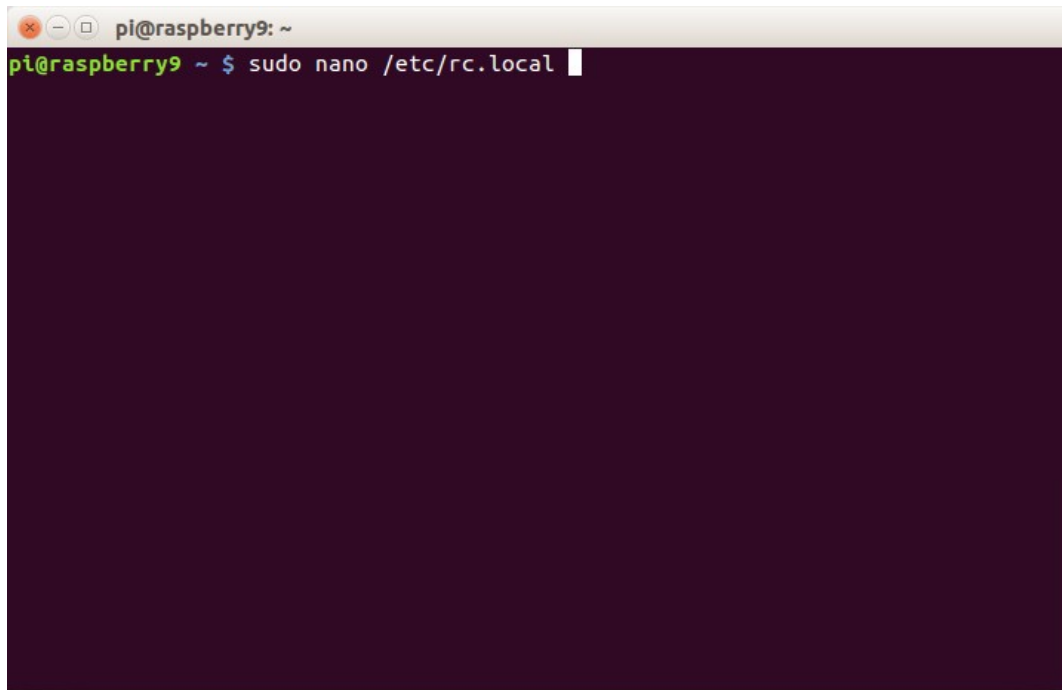
6. Change Manson driver to be executable

- The manson_driver should be changed to executable before it can be run.
- Goto directory you save manson_driver in. (/home/pi in this example)
- Run “chmod a+x manson_driver” in terminal to change manson_driver to executable”

```
pi@raspberrypi9: ~  
pi@raspberrypi9 ~ $ ls -l  
total 132  
drwxr-xr-x 2 pi pi 4096 Jan 1 1970 Desktop  
-rw-r--r-- 1 pi pi 117558 Feb 6 12:23 manson_driver  
-rw-r--r-- 1 pi pi 5781 Feb 3 2013 ocr_pi.png  
drwxrwxr-x 2 pi pi 4096 Jan 1 1970 python_games  
pi@raspberrypi9 ~ $ chmod a+x manson_driver  
pi@raspberrypi9 ~ $ ls -l  
total 132  
drwxr-xr-x 2 pi pi 4096 Jan 1 1970 Desktop  
-rwxr-xr-x 1 pi pi 117558 Feb 6 12:23 manson_driver  
-rw-r--r-- 1 pi pi 5781 Feb 3 2013 ocr_pi.png  
drwxrwxr-x 2 pi pi 4096 Jan 1 1970 python_games  
pi@raspberrypi9 ~ $
```

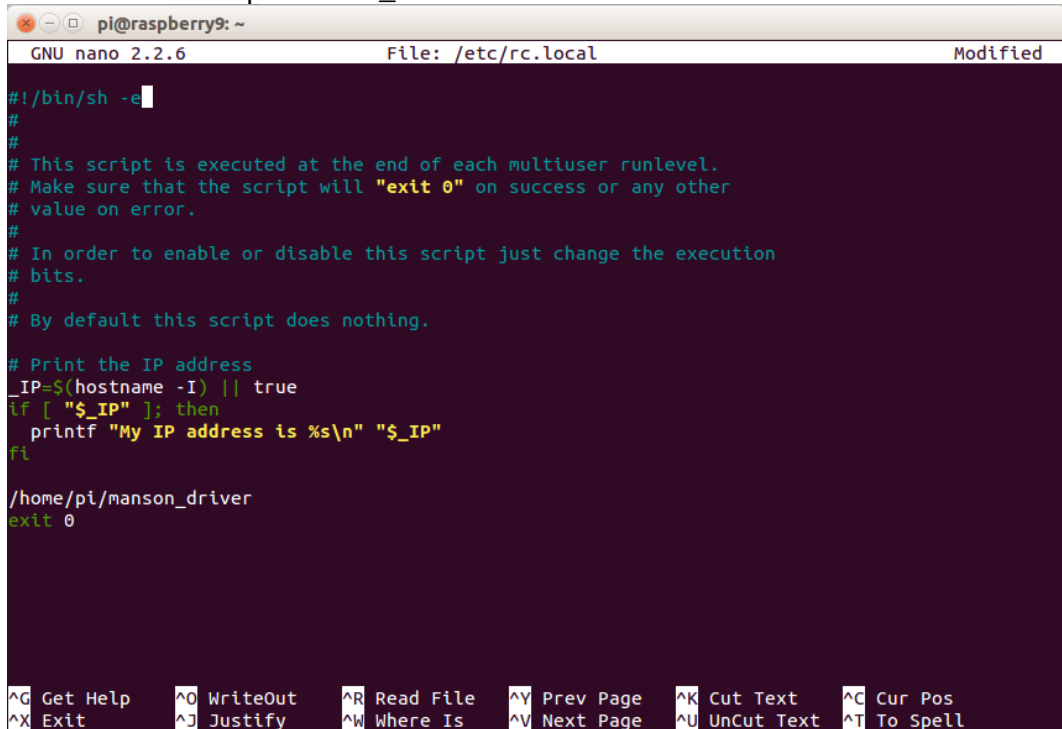
7. Run Manson driver as service in Raspberry Pi

- Add /home/pi/manson_driver into /etc/rc.local
- Run “sudo nano /etc/rc.local” in terminal.



```
pi@raspberrypi: ~  
pi@raspberrypi9 ~ $ sudo nano /etc/rc.local
```

- Add line “/home/pi/manson_driver” before exit 0



```
GNU nano 2.2.6 File: /etc/rc.local Modified  
#!/bin/sh -e  
#  
# This script is executed at the end of each multiuser runlevel.  
# Make sure that the script will "exit 0" on success or any other  
# value on error.  
#  
# In order to enable or disable this script just change the execution  
# bits.  
#  
# By default this script does nothing.  
#  
# Print the IP address  
_IP=$(hostname -I) || true  
if [ "$_IP" ]; then  
    printf "My IP address is %s\n" "$_IP"  
fi  
  
/home/pi/manson_driver  
exit 0
```

- Press “Ctrl+x” to exit editor. Press “y” to save modified file.
- Restart Raspberry Pi.