Dendro-Pi

Program to take periodic pictures and retrieve data from dendrometers at Dorval and BERMS

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Getting started

Setting up Raspberry Pi for ssh

1. Insert SD card into computer

(delete all contents of SD card)

2. Download Raspberry Pi Imager from Raspberry Pi Website

3. Open Raspberry Pi Imager

a. Select Raspberry Pi Device (Raspberry Pi Zero)

b. Select Operating System (Raspberry Pi OS (32-BIT) (Bookworm))

c. Select Storage (Mass Storage Device USB Device)

4. Edit OS Customization Settings

General Tab

a. Set hostname (Dorval#) (Name of the Pi)

b. Set Username & Password (To log into the Pi)

c. Configure Wireless LAN

SSID: Wifi network name (new_aspen_2022)

Password: Wifi Password (Aspen2022)

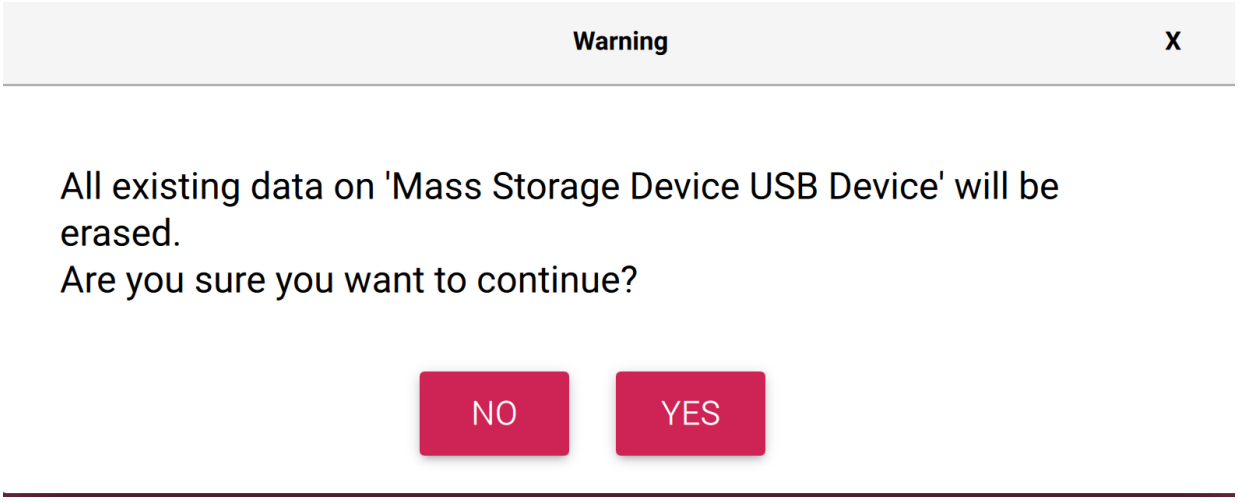
d. Set Wireless LAN Country to CA

Services Tab

e. Enable SSH: Use Password Authentication

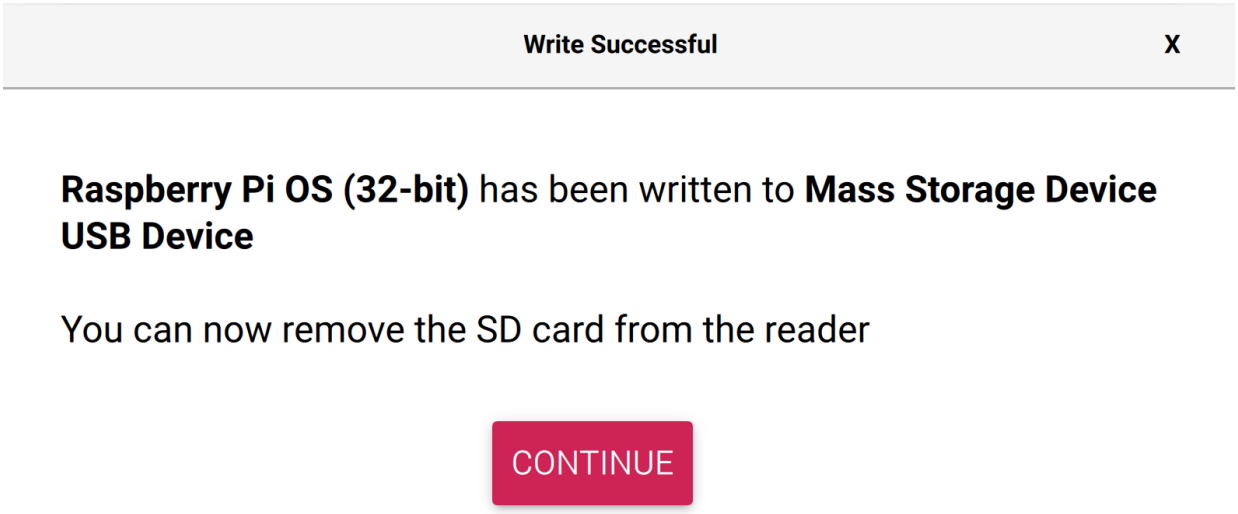
Save

Apply OS Customization Settings: Yes



This may take server minutes to Write & Verify the installation.

5. When Verification Completes:

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Remove SD from computer and insert into raspberry pi
Reboot the Raspberry Pi
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Configuring Raspberry Pi

1. Connect to same network on computer that the raspberry pi is configured to connect to

2. If on PC, open the command prompt / Windows PowerShell, SSH into raspberry pi by running the following command (without braces)

> ssh username@{hostname}.local

EXAMPLE: ssh madlab@DorvalTest.local

When prompted for password: input Password from OS Customization

3. Run the following command to configure the Raspberry Pi

> sudo raspi-config

5. Change the timezone in localization settings

6. Finish and reboot to save your changes

7. After rebooting ssh back into the Raspberry Pi.

8. Check to see if picamera2 is installed by running the following command

> rpicam-jpeg -o test.jpg

This will take a picture and saves to test.jpg

if not run the following commands to download picamera2

> sudo apt-get update

> sudo apt-get install python-picamera2 python3-picamera2

Installing

1. Download & Extract dendro-pi from Dropbox to your computer
https://www.dropbox.com/scl/fo/xuw8ubnp06l1cp1v416ws/ALyV71UHngTeN6_6W3n_WP4?rlkey=arwzjlyfpycmpph3arqi5iumh&st=8wq63p35&dl=0

2. Exit SSH, run the following command (without braces)

> scp -r {Path to File(s)} {Destination for copy}

Example:
> scp -r C:\Users\alanj\Documents\School\RaspberryPi\dendro-pi-main madlab@DorvalTest.local:~/

Recursively copies scripts from local computer to Pi.

3. With PiCamera2 installed and Dropbox files copied, ssh back in, and enter the dendro-pi-main/test/ directory, and run:

> python test_dendro.py

4. Open dendro-pi-main/main/dendro_pictures.py in a text editor

> nano dendro_pictures.py

and insert name of camera on this line:

> CAMERA_NAME = "ADD NAME HERE"

> CAMERA_NAME = "DorvalTest2_"

5. Follow this guide to install dropbox-uploader.sh

**** TODO: Rewrite this guide myself ****

https://linuxhint.com/install-use-dropbox-raspberry-pi/

Dropbox login info:
Email: Mad.lab.usask@gmail.com
Password: Madlab2019!

6. In dendro-pi-main/ Run "crontab -e" and DO NOTHING. Save and close the file without editing.

> crontab -e

7. Confirm crontab -l is empty by entering:

> crontab -l

If its not empty, enter:

> crontab -r

Run the script add_cron.sh to schedule hourly pictures and daily file uploads by running the following command:

> sh add_cron.sh

Run crontab -l again to confirm tasks were added.

**Troubleshooting:* *crontab -l (list all tasks),*
crontab -r (Deletes all tasks)
service cron status (Shows log of tasks)

8. On Dropbox, create a new folder to upload to

9. Open upload-to-dropbox.sh in a text editor

> nano upload-to-dropbox.sh

Insert the directory name in line 3 as shown below:

/dropbox_uploader.sh upload ~/dendro-pi-main/pictures/* /Directory_Name_Here/ | grep "file exists with the same hash" > already_uploaded.txt

Example:
./dropbox_uploader.sh upload ~/dendro-pi-main/pictures/ /DorvalTestDB/ | grep "file exists with the same hash" > already_uploaded.txt*

Testing

1. To test that the uploader is working run the following command in dendro-pi-main/main/

> python dendro_pictures.py

2. Run the following command in dendro-pi-main/

> sh upload-to-dropbox.sh

3. Once the previous command finishes running check to see if a picture was uploaded to Dropbox

Updating Wifi SSID and Password

> sudo raspi-config
System Options

Copying pictures from Raspberry Pi storage via ssh

1. Connect to same network on computer that the Raspberry Pi is connected to.
2. Run the following Secure Copy Protocol command (scp)

> scp username@{hostname}.local:~/path/to/folder C:\destination\

Example:
> scp -r madlab@DorvalTest:~/dendro-pi-main/pictures C:\Users\alanj\Desktop

3. Enter password for Raspberry Pi when prompted