

mini-Drops Software Manual

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Background:

The miniDrops system is powered by a Raspberry Pi 2 model B single board computer (RPI). Before proceeding with installation of the RPi into the frame of the miniDrops instrument it is strongly advised to ensure that the RPi is functioning properly and that all of the requisite software is installed. You will need the following:

- 1) `mDS_v21.py` [python GUI miniDrops control software]
- 2) `mDS_icon.png` [PNG file for image of miniDrops dektop launcher]
- 3) `mDS.desktop` [.desktop file for launching miniDrops control software]
- 4) microSD card for the Raspberry pi [>16GB and class10 reccommended]
- 5) power supply for RPi (5V, 1A or greater)
- 6) Monitor (HDMI, VGA)
- 7) RPi touchscreen
- 8) USB or wireless Keyboard
- 9) Raspbian for Raspberry Pi [<https://www.raspberrypi.org/downloads/raspbian/>]

I would have included an image of the operating system plus the miniDrops control software online however the file size is limited. I plan to provide direct images for the software through a DropBox link on request for those averse to programming/setting up the Raspberry Pi.

Procedure:

Download and install a Raspbian image to the RPi. (<https://www.raspberrypi.org/downloads/raspbian/>) An installation guide is found here: (<https://www.raspberrypi.org/documentation/installation/installing-images/README.md>)

After the image is written to the SD card insert it into the RPi and power up. (Begin by powering up the RPi in a standalone format i.e. do not attach to any portion of the miniDrops frame or hardware just yet)

Go to a terminal and update Raspbian according to the instructions found here: (<https://www.raspberrypi.org/documentation/raspbian/updating.md>)

To properly operate the miniDrops instrument needs the following packages:

Picamera
Spidev
Tkinter

Follow the instructions to install picamera:

(<https://www.raspberrypi.org/documentation/usage/camera/python/README.md>)

Follow the instructions to install spidev:

(<http://www.takaitra.com/posts/492>)

Install Tkinter from a terminal:

```
(sudo apt-get install python-tk)
```

After successfully installing the packages (You may consider a restart after all the updates, etc.), attempt to connect the RPi to the RPi-touchscreen assembly by following the directions supplied with touchscreen. Verify that the touchscreen works and is responsive.

Next, create a new folder named `code` in the `home/pi/` directory. Within the `home/pi/code/` directory, place the `mDS_v21.py` python GUI program and the `mDS_icon.png` icon file.

Finally, place the `mDS.desktop` file on the desktop of the pi. This file points to the miniDrops control program and starts the program directly from the desktop as opposed to launching from the terminal.

There are some finer points to setting up the RPi and some issues may arise if different versions or any deviations from this procedure are performed. As I stated earlier, I will provide an image of a fully functionally OS & miniDrops control software that can be directly written to the RPi for those not interested in setting up the RPi and software packages manually.