

# USING jORGAN ON THE RASPBERRY Pi

## INTRODUCTION

I have had great success in using the Raspberry Pi B3+ to run jOrgan. This tutorial has been put together to help other jOrgan users do the same. I hope that the most of what you need to know can be found here, even if you have to search a little to find it. If there are ambiguities or errors, or glaring omissions, please inform me so that the matters can be remedied.

My installation consists of two RPi's, each mounted on the back of an official 7" touchscreen which itself is enclosed in the Pimoroni LCD Stand. There is then a wooden housing for each, made and stained to suit the console. They have been placed to the left and to the right of the two manuals. Each RPi has a JustBoom audio card sitting on its GPIO pins. Initially only the left-hand RPi is being used to receive MIDI messages from the console encoder and to process and output the audio. The right-hand one is used to for control of the stops displayed on it, and can be used also for audio at a later date. The two RPi's are connected by wired LAN.

## SETTING UP

1. I bought the supplier's microSD card with NOOBS already installed. Things are easier if you are able to insert it before doing anything else. Its slot is located at the end of the board AWAY from the USB ports, and is actually UNDER the board. It needs to be inserted with the gold contacts facing UP.
2. The price of the official 7" touchscreen is attractive, but its small size will not suit everyone. Using two was an excellent fit to my requirements.

If using the Pimoroni mounting stand, partly assemble it, with due regard to the supplied assembly instructions, before inserting the ribbon cable in the touchscreen cable socket. The first step is to remove the protective film from both sides of the frames. As delivered, this adheres very effectively to the plastic frame, and requires quite some effort to remove it. Be careful to get Frame (2) oriented the correct way around. It looks symmetrical, but in fact is not. If wrongly oriented, it will project slightly beyond one end of the frame assembly, and this is not desirable. If my memory serves me correctly, it is better to delay fitting the locking stand plates (4) until the ribbon cable which connects the display driver board to the RPi board has been inserted in the driver board cable socket. Important instructions about this and other matters is found using this link: <https://learn.pimoroni.com/rpi-display> and clicking on "Getting Started etc."

Inserting the ribbon cable can be a bit tricky. Its socket has a locking bar which firstly needs to be opened by pulling it out (not up) before inserting the cable. This can perhaps best be done using finger-nails on both hands in a simultaneous action. It needs some care. Or you may have some small, sharp tool to ease the bar out. You need to pull quite hard, but if too hard, you run the risk of pulling the bar completely out, and damaging it in the process. Insert the cable with the contact surfaces UPWARDS. When fully inserted, the surfaces are still visible for a short length. Then push the locking bar back in. You can then proceed with completing the assembly of the locking stand plates (4).

Place the RPi board on its supports and insert the screws.

Insert the ribbon cable. Its socket locking bar needs first to be pulled UP. You face the same difficulties as with the previous one. After the cable is inserted, the locking bar needs to be pushed down quite hard before it clicks into place.

Two jumper leads are supplied to get power to the screen driver board. Connect them to the pins on the touchscreen driver board and to the GPIO pins. If you are uncertain about which pins, the following description may help:

Arrange the screen/RPi (RPi on top, screen downwards) so that you are looking down on it with the GPIO pins at the right. The +5V. Pin is that at the top, closest to the corner of the board. The second pin (along the line of pins) is also +5 V., but I suggest you use the top one. The third pin is used for the Ground. Now turning to the screen driver board, there are five pins (from memory) located approximately “underneath” the GPIO pins identified as above. The +5 V. one is the first one, closest to the corner. The Ground is the last pin, furthest from the corner. The printing on the board actually identifies these two pins.

The power supply came fitted with the U.K. plug, but other plugs were supplied. How to remove the U.K. plug was initially a puzzle. The answer was to push down on the plastic “tongue”, and slide the fitting in the direction away from the RPi power lead.

3. Plug in a USB mouse and USB keyboard to use in the starting up process. After turning the power on, you should immediately see the various boot-up images appearing on the screen. If you are using the Pimoroni mounting stand, you will find that the images are upside down! Turn the screen around so that you are seeing it in a way suitable for completing the setting up process. As I went through the setting-up procedure, I chose not to insert a password, and I simply pressed ENTER. However, later on, when attempting to install jOrgan, I was asked to enter a password, and the install would not proceed until I put in a simple, memorable password and started the install again. Putting in this password at this later point did not make my RPi expect it to be entered when booting up each time.

4. It is suggested that you update the NOOBS software before doing anything else. Assuming you have established an internet connection, follow the instructions in the Pimoroni link above, by clicking on the Terminal icon at the top left of the Desktop and typing and entering the following: `curl http://get.pimoroni.com/uptodate | bash`

The update process could take quite some time.

I should warn you that an update turned out to be not altogether to my liking, as the changes it made to my RPi deprived me of good audio when playing wav files, especially with those on SoundCloud, but also with Audacity, and to a less extent using the VLC Media Player. (It did not affect the sound when using jOrgan, at least when I selected “jack” as the Fluidsynth audio driver. Selecting “alsa” or “pulse audio” gave very bad distortion.) Computers and the programs to run them are a moving target, and perhaps this audio problem will be solved in some later update.

5. To get the screen images the right way up, follow the instructions in the Pimoroni link above:

In Terminal, type "`sudo nano /boot/config.txt`" (without the inverted commas)

- Add the line "`lcd_rotate=2`" to the top of the file.

(To clear a line for this, use the Enter key and the arrow keys)

- Press CTRL and X

- Then Y

- Then Enter.

- And reboot!

## INSTALLING THE jORGAN PROGRAM

On all computers, jOrgan needs Java to be installed, and on Linux computers it also needs Fluidsynth to be installed (if you plan to use Fluidsynth as your sound engine, which is what most jOrgan users do). I suspect that Raspian comes with Java already there, but you should check. The RPi version of jOrgan 3.21 needs any version of Java within the range 7 to 10.

To check whether Java is installed, and what version, go to the Terminal and enter

```
java -version (note the space after “java”)
```

Do the same for fluidsynth: `fluidsynth -version`

To download either of these, enter `sudo apt-get install java`

or `sudo apt-get install fluidsynth`

The special version of jOrgan for RPi can be downloaded [HERE](#). Two versions appear there, both compiled by Graham Goode. The preferable download is that obtained by clicking on “jorgan\_3.21\_armhf.deb”. To install using this, after downloading go to the RPi Downloads folder and double-click on this deb file. I call this the “preferable download” because it does correspond to the way that jOrgan has been designed to be used.

When I first attempted this double-click on the downloaded deb file, the install process began, but it asked for a Permissions go-ahead involving a password. I have already mentioned in 3. above that it was at this point that I went to Preferences and Raspberry Pi Configuration and created a short password. The install procedure then began a download. However, the Rasbian program for RPi is continually being updated, and this download did not succeed. The solution was to update my RPi if I was to succeed in testing the deb file download. There were no problems once I had done that.

Before giving you the details, I remind you of the warning I gave above in 4.

If you have not yet updated your RPi as in 4. above (but you need to in order to complete the jOrgan installation), you can use these Terminal command lines:

```
sudo apt update
```

```
sudo apt dist-upgrade
```

```
sudo apt clean
```

```
sudo reboot
```

I advise you that the update took a lot of time – about an hour. At one point (probably early on), I was asked to give it the go-ahead. Installing jOrgan in this fashion places the jOrgan components in two separate locations on your RPi. Here are the details, which you should record somewhere, as you may at times need to use this information:

In /usr/lib/ - the main “jorgan” folder containing the “lib” folder and the jorgan.jar file

In /home/usr/share/ - a “jorgan” folder containing a “dispositions” folder and a “skins” folder.

Less preferably, there may be a reason you feel you need to download “jorgan\_3.21-beta1.7z”. When extracted, this is a jOrgan folder. It contains all the jOrgan files needed to get it working on your RPi. However, you may need to extract it on another computer which can process “7z” files. I suggest that when extracted, it be placed within a “jorgan” folder you have created, and then placed in the “pi” folder of your RPi. The following section about launching jOrgan in various ways will not apply in your case, and you should go to A. in the APPENDIX for the relevant details.

## LAUNCHING jORGAN

(As just mentioned, this section applies only if you installed jOrgan by using the deb file download.)

Before the deb download was made available, the standard way to do this was by means of a command line, entered via the keyboard into the Terminal. This was hardly a long-term solution! That command line (altered to suit those who used the deb file download) is:

```
java -jar /usr/lib/jorgan/jorgan.jar
```

(Type in, and press ENTER)

### a. Launching jOrgan from boot-up

This is necessary for people wanting to use RPi’s headless (no screen), but it may be convenient for some other users as well. It can be implemented by adding two lines at the bottom of the “.profile” file. This file is located in the “pi” folder, but it is one of a number of files and folders which are “hidden”. These can be revealed by pressing CTRL along with the H key, and you then have the hidden contents of the “pi” folder displayed.

Open the “.profile” file with a text editor, add these two lines at the bottom, and save:

```
# launch jorgan application  
java -jar /usr/lib/jorgan/jorgan.jar
```

(Be careful with the spaces). It is probably a good idea to return the “hidden” files and folders of the “pi” folder to being hidden. Simply press CTRL along with H, once more.

In future, whenever the RPi is booted up, jOrgan will be launched. You need to be aware that using this method has the effect that the desktop will not be activated, even in the background. But this will be of no account to users who are wishing to run jOrgan on the RPi headless. In fact the desktop appears only after you exit jOrgan.

## 2. Launching particular jOrgan dispositions from the screen

This method is not needed if you made the jOrgan install by using the deb file download. You can launch any jOrgan disposition simply by double-clicking on it.

## ADJUSTING THE RPi SCREEN BRIGHTNESS

I am finding the RPi screen too bright. It is possible to reduce this by means of a Terminal command line, if you are using the latest official 7” touch screen. I have the display Version 1.1 but the earlier Version 1.0 does not allow for this adjustment of brightness. (I can’t comment on the use of other monitors.)

Here is the command line:

```
sudo sh -c 'echo "128" > /sys/class/backlight/rpi_backlight/brightness'
```

For full brightness you should use “255”. (I have seen a suggestion that “255” is actually dimmer than “200”, but I haven’t confirmed this. “128” is certainly easier on my eyes.)

Be careful when typing in the command line. There is a conflict between U.S. and U.K. keyboards. When I first typed it, it showed @128@, which of course returned an error. By using SHIFT plus the 2 key, it showed “ on the terminal, which is what I needed.

Another warning: Don’t let curiosity get the better of you, so that you try to see how small a number you can enter. It may work so well that you have extreme difficulty undoing the situation you have caused, as any further command lines you try to enter may be impossible to see! (The solution is to remove the SD card, and adjust the command line using some other computer along with a card-reader.)

## USE OF THE KEYSTROKE ELEMENT

John Kuhns has created an Element for jOrgan such that if clicked on, a keystroke message is generated which may perform some desired action.

You will need to use this element, when using the RPi with a touchscreen and without a keyboard, if you have brought up the Full Screen View. Otherwise you have no way to return to the “Desktop” View in order to exit jOrgan safely.

At the time this tutorial was written, it could be read about it here -

<http://jorgan.999862.n4.nabble.com/Keystrokes-extension-td4656444.html>

and here -

<http://jorgan.999862.n4.nabble.com/Keystroke-addon-td4657090.html#a4657091>

Here is the link to the download:

<https://www.dropbox.com/sh/9p7tduvwm5t2e0n/coptRtHMQb>.

To use this element, you need to place the keystroke.jar file into the “lib” folder within the main “jorgan” folder of your RPi (i.e. /usr/lib/jorgan/ and not /home/usr/share/jorgan/ - but if you installed jOrgan using the 7z file download, the “jorgan” folder referred to here is that which you may have created, and placed in the “pi” folder)\*. You also need to add it to any jOrgan dispositions you intend to use (it will show up as an element you can add, once you click on the ADD icon - three asterisks in a triangular arrangement - using Construct Mode and the Element View). Give it the name F11 and then reference it to the Console where you want it to appear. Still in Construct Mode, look at its Properties View and add “F11” (without the quote marks) to the cell for “Keys”, and press ENTER. You should bring up the Skin View and select a suitable image for the icon. You can use the Zoom function to re-size it if needed. Drag it to a suitable location on the Console. Save the disposition.

\*The only way I was allowed to place it into /usr/lib/jorgan/lib/ was by means of a Terminal command line, after moving it from Downloads to the Desktop. This is what I used successfully:

```
cp -r /home/pi/Desktop/keystroke.jar ~ /usr/lib/jorgan/lib/
```

(The capital “D” in Desktop was important.)

There is one further task needed for each disposition. In Construct Mode, click on View, then on Configuration, and then on Keystroke. Click on the box which allows it, if it is not already clicked. Click on Apply and OK. Save the disposition after making these changes.

## DISABLING THE BLANK SCREEN

It is a nuisance to have the screen go blank if there have been no mouse or keyboard changes after ten or twenty minutes. This can easily happen while playing the VPO. I

found one solution which worked for my older RPi (until I updated it!). It involved editing the autostart file found in the LXDE-pi folder. Open the Terminal and enter  
sudo nano /home/pi/.config/lxsession/LXDE-pi/autostart  
and then add these lines:

```
@xset s off  
@xset -dpms  
@xset s noblank
```

and then press CTRL X, then enter “Y” (without the quote marks)  
and then ENTER.

Then type  
sudo reboot

However, later versions of Raspbian have reorganised the files, and the above is not possible. Another Google search yielded the following easy result:

Make sure you have internet connection. In the Terminal, type  
sudo apt-get install xscreensaver  
and ENTER. This will take some time to download, and you will be asked to approve its completion.

When complete, type  
sudo reboot

Go to Preferences in the Desktop Menu, click on Screensaver, and adjust the blanking delay time to something more appropriate. Then close the window. (Since doing this to my updated computer, I have noticed a screensaver pattern appearing momentarily, at all sorts of odd times, and not at all related to a period of time since any mouse changes were made. It disappears the instant the mouse is moved, or even before that, and is not a particular nuisance – just rather unexpected!)

## USE OF SOUND CARDS

There has been quite some criticism of the quality of the sound from the RPi audio output socket. Whether the RPi 3B+ has improved things, I do not know, but I must say that I don't have a problem with it. There is some hum, which actually may be due to the plug-pack power supply, and could perhaps be avoided with a higher quality supply. In any event, I had the impression that it (plus any hiss) could easily be reduced to worthwhile levels by having the jOrgan sound output as high as feasible along with a high setting of the RPi audio gain, and reducing the gain later in the audio chain.

However, because I tend to be obsessive about the quality of the sound, I chose to buy high quality boards which sit on the RPi GPIO pins. My RPi supplier stocks the



JustBoom DAC HAT, so this is the one I use. Others are available. If you are using the Pimoroni stand along with the official 7" touchscreen, this particular board presents you with a couple of problems. One is that you lose the ability to plug the two power connecting leads from the screen driver board onto the relevant GPIO pins. I dealt with this by cutting off the clips used for the GPIO pins, and soldering the leads to the relevant places provided on the DAC HAT board. If your soldering skills are not up to this, I suggest you investigate buying from Pimoroni a "Y-splitter" power cable which they have had made up, to solve this problem. Note that once you have installed the DAC HAT, you need to go to the JustBoom website to discover the small software programming change you need to make to one of the RPi config files. I assume that this has to be done also for the other DAC HATs that are available. The second problem I noticed was that the mounting screws supplied with the JustBoom board are not compatible with the Pimoroni set-up. I improvised a solution using some small solder tags and some tinned copper wire, to ensure robust mounting of the board.

I should point out that even with the JustBoom DAC board, I can discern a low-level hum, due doubtless to the RPi power supply, as already mentioned. This can easily be dealt with by adjusting the relevant audio gains, as already suggested.

Before going down the DAC HAT route, I did try out a good quality USB audio card, but although the sound was good, it did seem to degrade the latency to an unacceptable degree, and I lost interest. It also required a minor configuration file change. (I find that having updated my RPi, I can no longer make that particular configuration change.....)

Note that early in my investigations, I had Jack working on my RPi, in order to look into the possibility of using reverberation software. Confining my efforts to using just the RPi audio output socket, I found that using Jack created much distortion of the sound, and I decided to investigate no further. Any other users who have success with software reverberation on the RPi should inform us of how they managed this.

## REVERBERATION

To satisfy most listeners and players, organ music requires the provision of good reverberation. In my opinion, the reverberation available from the Fluidsynth sound engine used in most jOrgan installations is of unacceptable quality unless set to a very low level. I did not explore the use of third party reverberation software for my RPi installation. Apart from what has just been mentioned above. Instead I am using a Behringer Virtualizer which I already possessed but had not used for many years. It provides excellent reverberation, along with all kinds of other effects which are not of great interest to me. A similar device, cheaper but easier to use, is the TC Electronic M100 Stereo Multi-Effects Processor, which also should give a very good sound. And there are units available from other makers.

## MISCELLANEOUS

### 1. Losing the Views by allowing them to move too low.

If you are using the official 7" touchscreen, it is fairly easy to lose access to the optional Views (Recorder, Keyboard etc., or Views when using Construct Mode), if you accidentally allow a View which is currently being displayed to get too close to the bottom of the screen. If this happens to you, you can retrieve the lost View by changing the rotate number from 2 to 1 or 3 (see earlier in this tutorial). This will rotate the screen image by 90 or 270 degrees, after a reboot, allowing you to move the View up (actually sideways). You may find that the mouse moves things in a direction you are not expecting, so some concentration is required. If you then restore the rotate number to 2, after a further reboot you should find that things are back to normal.

### 2. Use of the Configuration View.

It is outside the scope of this tutorial to discuss the actual use of jOrgan, but I shall mention the Configuration view. This allows the user to make various useful settings, such as automatically opening the disposition last used, or showing the Full Screen display when opening the disposition. You should explore other features of the View.

## SHUTTING DOWN THE RPi AFTER USE

It is usually regarded as bad practice to turn the RPi off by by a hard shut down (turning off the power), as this could sometimes lead to corruption of the data on the SD card. Users who run the RPi headless are able to use a switch wired to the appropriate GPIO pins in order to effect a soft shut down. A Google search should soon give you the details.

In similar vein, although probably not as important, before exiting jOrgan you are asked if you want to save the disposition. If you have actually made no changes to the disposition which you wish to retain, choosing each time to click on "No" may add to the longevity of the SD card, as it avoids any unnecessary writing to it.

## ACKNOWLEDGEMENTS

I wish to record my gratitude to Sven Meier, the creator of this marvellous jOrgan program, and also to those who helped me have success with the RPi: Marc-Paul

Allen, Eric Apperley, Graham Goode, John Kuhns, Aaron Laws, Eric De Schrijver and Brian Sweetnam.

John Reimer July 2019

## APPENDIX

A. This portion of the Appendix applies only to those users who made the 7z file download when installing jOrgan. When I began to use jOrgan on the RPi, this was the only method available. My console RPi's have given excellent service, and I have not updated them or used what is the preferable installation. In each of those RPi's, I placed the "jorgan" folder within the "pi" folder. The "jorgan" folder contains the jorgan.jar file along with the other standard jorgan installation components. I then placed any jOrgan disposition folders I wished to use, within the "jorgan" folder.

### LAUNCHING jORGAN

One way to do this is by means of a command line, which is entered via the keyboard into the Terminal. This is hardly a long-term solution! That command line is:

```
java -jar /home/pi/jorgan/jorgan.jar
```

(Type in, and press ENTER)

#### a. Launching jOrgan from boot-up

This is necessary for people wanting to use RPi's headless (no screen), but it may be convenient for some other users as well. It can be implemented by adding two lines at the bottom of the ".profile" file. This file is located in the "pi" folder, but it is one of a number of files and folders which are "hidden". These can be revealed by pressing CTRL along with the H key, after you have the hidden contents of the "pi" folder displayed.

Open the ".profile" file with a text editor, add these two lines at the bottom, and save:

```
# launch jorgan application
java -jar /home/pi/jorgan/jorgan.jar
```

(Be careful with the spaces). It is probably a good idea to return the "hidden" files and folders of the "pi" folder to being hidden. Simply press CTRL along with H, once more.

In future, whenever the RPi is booted up, jOrgan will be launched. You need to be aware that using this method has the effect that the desktop will not be activated, even in the background. But this will be of no account to users who are wishing to

run jOrgan on the RPi headless. In fact the desktop appears only after you exit jOrgan.

## 2. Launching particular jOrgan dispositions from the screen

I am assuming the use of RPi along with a touchscreen, or a mouse and non-touchscreen. You may want a convenient way to choose which disposition you are about to use. In Windows it is possible to click on the disposition file icon, and this launches jOrgan along with the disposition. Something like this can be done with the RPi.

It is necessary to create a special execute file for each disposition for which you need to have convenient access, and to place that file on the desktop. A file for the “NAME1“ disposition execute file would be “NAME1.sh”. You will need to impose the “sh” extension in place of whatever file extension has been created by means of a rename after the initial save. The NAME1.sh file should be given the following contents (be careful with the spaces):

```
#!/bin/bash
# Launch jOrgan with NAME1

java -jar /home/pi/jorgan/jorgan.jar /home/pi/jorgan/NAME1/NAME1.disposition

exit 0
```

(Note that the main command line is all one line.)

After saving this file to the Desktop, do a right-click on its Desktop icon, click on Properties, click on Permissions, and then allow “Anyone” to execute it.

Double-tapping or double-clicking on the NAME1.sh icon on the RPi desktop brings up a window where you still have to tap/click on “EXECUTE”. On a touchscreen, double-tapping the NAME1.sh icon works, but sometimes needs a bit of coaxing. Sometimes it will work first go, and sometimes it needs double-tapping a few times.

## B. FURTHER MISCELLANEOUS DETAILS

### i) Use of LAN.

My successful use of RPi for jOrgan depends on implementing the jOrgan LAN function. It needs to be explained in a separate tutorial.

### ii) Moving files or folders to other locations.

This can usually be done by a normal click-and-drag method. It is also possible to do a right-click , then copy, go to the new location, do a right-click on it, and then paste.

You may wish to delete it from the original location. In some situations RPi will allow a file or folder to be moved only by means of the appropriate Terminal command line. (See USE OF THE KEYSTROKE ELEMENT above.)