

RPI High Speed Camera micro-SD Images

Source Media

Sandisk microSDHC UHS-I 32 GB

Maximum speed: 100 MB/s, 667X

App performance: A1

Video speed class: V30

inxi

ID-1: /dev/mmcblk0 model: SM32G size: 29.72 GiB

fdisk -l

Disk /dev/mmcblk0: 29.7 GiB, 31914983424 bytes, 62333952 sectors

Units: sectors of 1 * 512 = 512 bytes

Sector size (logical/physical): 512 bytes / 512 bytes

I/O size (minimum/optimal): 512 bytes / 512 bytes

Disklabel type: dos

Disk identifier: 0x4b16a8ce

Device	Boot	Start	End	Sectors	Size	Id	Type
/dev/mmcblk0p1		8192	532479	524288	256M	c	W95 FAT32 (LBA)
/dev/mmcblk0p2		532480	62333951	61801472	29.5G	83	Linux

Gparted

The screenshot shows the GParted application window for /dev/mmcblk0 (29.72 GiB). The main view displays a yellow bar representing the partition /dev/mmcblk0p2, which is 29.47 GiB in size. Below this, a table lists the partitions:

Partition	File System	Mount Point	Label	Size	Used	Unused	Flags
unallocated	unallocated			4.00 MiB	---	---	
/dev/mmcblk0p1	fat32	/boot	boot	256.00 MiB	57.28 MiB	198.72 MiB	lba
/dev/mmcblk0p2	ext4	/	rootfs	29.47 GiB	8.10 GiB	21.37 GiB	

0 operations pending

Hardware

The RPI high camera system was installed on a Raspberry Pi 4 computer with 4 GB memory. The system will probably work on a Raspberry Pi 3 with 4 GB memory. 512 MB memory for GPU must be available if using a RPI with small amount (<4 GB) of memory.

Operating System

OS: Raspberry Pi OS

Linux raspberrypi 5.4.51-v7l+ #1333 SMP Mon Aug 10 16:51:40 BST 2020 armv7l GNU/Linux

cat /etc/os-release

```
PRETTY_NAME="Raspbian GNU/Linux 10 (buster)"
NAME="Raspbian GNU/Linux"
VERSION_ID="10"
VERSION="10 (buster)"
VERSION_CODENAME=buster
ID=raspbian
ID_LIKE=debian
HOME_URL="http://www.raspbian.org/"
SUPPORT_URL="http://www.raspbian.org/RaspbianForums"
BUG_REPORT_URL="http://www.raspbian.org/RaspbianBugs"
```

Software Versions

Python:	3.7.3
OpenCV:	4.4.0
rpi-camera suite:	20.8.2020

Memory Card Images

Clonezilla

Clonezilla version used to create this image: clonezilla-live-20180712-cosmic-amd64

URL: <https://clonezilla.org>

Image name: **rpi4-opencv4.4-2020-08-21-img**

Tar image name: **4-opencv4.4-2020-08-21-img.tar**

Clonezilla - Release 2020.08.26

Clonezilla version used to create this image: clonezilla-live-20180712-cosmic-amd64

URL: <https://clonezilla.org>

Image name: **rpi4-opencv4.4.0-scipy1.5.2-2020-08-26-img**

Tar image name: **rpi4-opencv4.4.0-scipy1.5.2-2020-08-26-img.tar**

Clonezilla - Release 2020.09.16 (current version)

Clonezilla version used to create this image: clonezilla-live-2.6.7-28-amd64

URL: <https://clonezilla.org>

Image name: **rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img**

Tar image name: **rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar**

dd and RaspberryPi Image Shrinkwrap

Version: 8.30

Image name: **rpi4-opencv4.4-2020-08-24.img**

Image was shrunk with shrinkwrap.sh (URL: <https://github.com/mtyka/shrinkwrap>). New size of partitions:

Device	Boot	Start	End	Sectors	Size	Id	Type
/dev/loop1000p1		8192	532479	524288	256M	c	W95 FAT32 (LBA)
/dev/loop1000p2		532480	17920160	17387681	8.3G	83	Linux

Gzip image name: **rpi4-opencv4.4-2020-08-24.img.gz**

dd and RaspberryPi Image Shrinkwrap – Release 30.08.2020

Version: 8.30

Image name: **rpi4-opencv4.4.0-scipy1.5.2-2020-08-30.img**

Image was shrunk with shrinkwrap.sh. New size of partitions:

Device	Boot	Start	End	Sectors	Size	Id	Type
/dev/loop1000p1		8192	532479	524288	256M	c	W95 FAT32 (LBA)
/dev/loop1000p2		532480	18154832	17622353	8,4G	83	Linux

Gzip image name: **rpi4-opencv4.4.0-scipy1.5.2-2020-08-30.img.gz**

Deploying a Clonezilla image to a micro-SD card

Download the Clonezilla archive and SHA256SUMS file from [rpi-camera/images](https://github.com/rpi-camera/images). Verify the SHA-256 hash:

Release 2020.08.21

```
sha256sum -c SHA256SUMS 2>&1 | grep OK  
rpi4-opencv4.4-2020-08-21-img.tar: OK
```

Extract the directory and files using the following command:

```
tar -xvf rpi4-opencv4.4-2020-08-21-img.tar
```

Release 2020.08.26

```
sha256sum -c SHA256SUMS 2>&1 | grep OK  
rpi4-opencv4.4.0-scipy1.5.2-2020-08-26-img.tar: OK
```

Extract the directory and files using the following command:

```
tar -xvf rpi4-opencv4.4.0-scipy1.5.2-2020-08-26-img.tar
```

Deploy the extracted image to a new ≥ 32 GB micro-SD card using Clonezilla.

Release 2020.09.16

```
$ sha256sum -c SHA256SUMS 2>&1 | grep OK  
rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar-aa: OK  
rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar-ab: OK  
rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar-ac: OK
```

Recreate the image

```
$ cat rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar-* >  
rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar  
$ rm rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar-*
```

Download SHA256SUMS from <https://github.com/kmiikki/rpi-camera/tree/master/images> to image directory. Verify the SHA256 hash:

```
$ sha256sum -c SHA256SUMS 2>&1 | grep OK  
rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img.tar: OK
```

Extract the directory and files using the following command:

```
$ tar -xvf rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-  
img.tar
```

=>

```
rpi4__opencv4.4-scipy1.5.2-roi-suite__2020-09-16-img/
```

Deploy the extracted image to a new ≥ 32 GB micro-SD card using Clonezilla.

Deploying a dd image to a micro-SD card

Download the compressed dd archive and SHA256SUMS file from `rpi-camera/images`. Verify the SHA-256 hash:

Release 2020.08.24

```
sha256sum -c SHA256SUMS 2>&1 | grep OK  
rpi4-opencv4.4-2020-08-24.img.gz: OK
```

Extract the image file (size ~32 GB) from the compressed file:

```
gunzip -k rpi4-opencv4.4-2020-08-24.img.gz
```

NB The -k option keeps the input file.

Release 2020.08.30

```
sha256sum -c SHA256SUMS 2>&1 | grep OK  
rpi4-opencv4.4.0-scipy1.5.2-2020-08-30.img.gz: OK
```

Extract the image file (size ~32 GB) from the compressed file:

```
gunzip -k rpi4-opencv4.4.0-scipy1.5.2-2020-08-30.img.gz
```

Get the micro-SD device name from `lsblk` output, i.e.:

```
lsblk  
NAME          MAJ:MIN RM  SIZE RO TYPE MOUNTPOINT  
sde           8:64   1 14.8G  0 disk  
└─sde1         8:65   1  256M  0 part  
└─sde2         8:66   1 14.5G  0 part
```

Clone the image to a new ≥ 32 micro-SD card using following command:

```
sudo dd bs=4M if=rpi4-opencv4.4.0-scipy1.5.2-2020-08-30.img  
of=/dev/sde conv=fsync status=progress
```

Clone the extracted image

NB It is possible to clone the shrunk dd image to a 16 GB micro-SD card. An error will be thrown (dd: error writing 'dev/...': No space left on device) which can be ignored.

Post Imaging Tasks

Insert the cloned micro-SD card into a Raspberry Pi. Start the computer and expand the root partition to fill SD card (if a shrunk dd image was used):

```
sudo raspi-config  
7 Advanced Options <Enter>  
A1 Expand Filesystem Ensures that all of the SD card storage is  
available <Enter>  
<Ok>  
<Finish>  
Reboot now? <Yes>
```

Cloning with dd and shrinkwrap image

This task is mandatory before anything else can be done! Doing something else (like installing programs) will probably make the system unusable.

Finnish keyboard layout can be changed following way:

Preferences > Raspberry Pi Configuration

Select Localisation tab, press <Set Keyboard...> and select form the Layout drop down list the desired keyboard layout.

Change the default password

Default user: pi
Default password: raspberry

Preferences > Raspberry Pi Configuration

Press <Change Password...>

Update the system and software

```
sudo apt update && sudo apt dist-upgrade
```

Install SciPy (< Release 2020.08.26)

```
$ sudo apt install python3-scipy
```

Update numpy, matplotlib, opencv-python and install spyder (Release ≤ 2020.08.30)

```
$ sudo apt install libatlas3-base libgfortran5
```

```
$ sudo apt install libgtk2.0-dev pkg-config
```

```
$ sudo pip3 install dlib face_recognition imutils
```

```
$ sudo pip3 install pysimplegui
```

```
$ sudo pip3 install Cython
```

```
$ sudo pip3 install scikit-build
```

```
$ sudo pip3 install numpy==1.19.1 --extra-index-url https://www.piwheels.org/simple
```

```
$ sudo pip3 install matplotlib==3.3.1 --extra-index-url https://www.piwheels.org/simple
```

Uninstall and build opencv-python

```
$ sudo pip3 uninstall opencv-python
```

```
$ sudo pip3 install --no-binary :all: opencv-python
```

Build time: ~2 h

```
$ sudo apt install spyder3
```

Copy ROI applications (roi*.py) to /opt/tools directory

```
$ sudo chmod ugo+rx /opt/tools/*.py
```