Rover Cam KI Manual

Rover Cam KI is a network independent security, and pest control software, to be used on Raspberry Pi.

On motion detection it can:

- record clips, or images
- play one or more audio files, or run python files
- control up to 8 GPIO pins by turning them on and off, called “Actions”

With extra electronics and hardware, Rover Cam can be used for pest control, by making sounds that frighten, or irritate animals, by moving an object to scare the animal, or initiating a spray of water, as motion sensing sprinklers do. As a security camera it can sound an alarm, or any custom audio recording, and/or move objects.

System Requirements (version tested on):

Raspberry Pi OS (32 bit)

- Python (3.7.3)
- opencv-contrib-python (4.5.3)
- numpy (1.21.2)
- Pillow (5.4.1)
- RPi.GPIO
- gpiozero
- picamera 1.13

Recommended Hardware:

- Raspberry Pi 4
- A keypad or keyboard
- At least 2 5mm LEDs with 1k ohm resistor to serve as indicator light
- A USB storage device

Installation

Rover Cam may edit your crontab, to check or change your crontab in terminal enter `crontab -e`.

1. Put the Rover Cam KI folder on a USB storage device (it may also run on the pi’s boot storage, but not tested).

2. In “/boot/config.txt”, uncomment the “`#hdmi_force_hotplug=1`” by removing the #. This allows the pi to run properly without a monitor connected.

GPIO Set-Up

Using the GPIO BCM numbering:

LED Hook-Up

Green LED	Pin 27
Red LED	Pin 22

Action Hook-Up

Action 1	Pin 12
Action 2	Pin 16
Action 3	Pin 20
Action 4	Pin 21
Action 5	Pin 23
Action 6	Pin 24
Action 7	Pin 13
Action 8	Pin 19

Operation

The Settings Interface interacts with RC_config.txt, and aoi_pts.txt. These files can be edited on any type of operating system.

To Initiate Settings Interface:

In terminal:
python3 /path to/Rover_Cam.py
Or launch it with an IDE

To Initiate Normal Operation:

In Settings turn on “Run At System Boot”
Restart the pi
Or run start-up.py from terminal, or an IDE

Setting Date Time

Rover Cam operates independently of any networks, so if accurate date time stamps are desired on video clips, date time will have to be set for each boot up, in the settings interface, or config.txt. Set the date time to about 1 minute after the pi will be turned on with “Run At System Boot” on. This will give the pi time to boot up, and the software to initiate a timer.

States

When power is supplied to the pi and “Run At System Boot” is on, after about a minute plus any user set “Activation Delay” time, the camera will be active and any Actions, audio, and clip recording will be initiated on motion detection. From here on there are 2 possible states that Rover Cam can be in:

Operational State – one of 3 modes are running as chosen in settings, or key input menu. Recording, actions and audio will activated on motion if set.

Disabled State – All is disabled except for key input.

Keyboard/Numpad Menu

NumLock must be off on numpad.

Numbers on keyboard or numpad may be used enter PIN. If PIN is correct the menu options are as follows:

“backspace” on keyboard or numpad	Exits any level of menu, PIN will need to be re-entered to go back into menu. Cancels PIN entry if incomplete.
“tab” on keyboard or “tab” or “.” on numpad	Change mode: enter 1, 2, or 3 to switch to that mode.
“space” on keyboard or “*” on numpad	Check mode: if in enabled state red LED with flash slowly to indicated the mode number, then quickly for number of clips or images in the current clips date folder. If in disabled state green LED will flash instead of red.
“/” on keyboard or numpad	Toggles disabled/enabled mode. LEDs will flash, if green LED is on last it just entered disabled mode, if red LED on last it entered enabled mode. If “Activation Delay” is more then 0, Rover Cam will be in enabled mode after red LED is done flashing.
“enter” on keyboard or numpad	Enter a new date time: enter a date time in order yyyy-mo-da-hr-mi-se. A new folder will be created in /Clips with that date in the name, and any new recording will be saved there.
“+” on keyboard or numpad	Reboots the pi
“-” on keyboard or numpad	Shuts down the pi

After a menu task is completed, the menu exits and the PIN will have to be re-enter to access it again.

Modes

There are 3 possible modes to choose from:

Mode1 – only records clips, or images on motion
Mode2 – records clip or images, and performs Actions, and plays audio or python files on motion
Mode 3 – only perform Actions/audio or python files on motion

Audio / Python Files

If “Play Audio” is set to “on” and there are audio/python files in “audio” folder then each file in that directory will run one after the other, in alphabetical order. They will not start again until they are finished running, even if “Clip Time” is shorter. If motion is detected another clip or image will be record even if the audio/python files are still running.

Actions

Actions should always start in “off” even if for 0 seconds, and not have 2 consecutive “ons” or “offs”. They can end in either “on” or “off”. All Action will begin as the same time, and will not start again until they are all finished. If “Clip Time” is shorter than the longest Action run time, and motion is detected again before all the Actions are finished, Actions will not start on this motion instance. Setting one Action to end in “off” for an extended period of time is a good way to restrict Actions from starting again while recording images or short clip times.

See the user interface or /support/config.txt for more details.