LightPi stations

AT_Duerrenstein
AT_Wildalm

Identifying Package Contents

HDMI-to-USB Video Capture Dongle

HDMI cabel

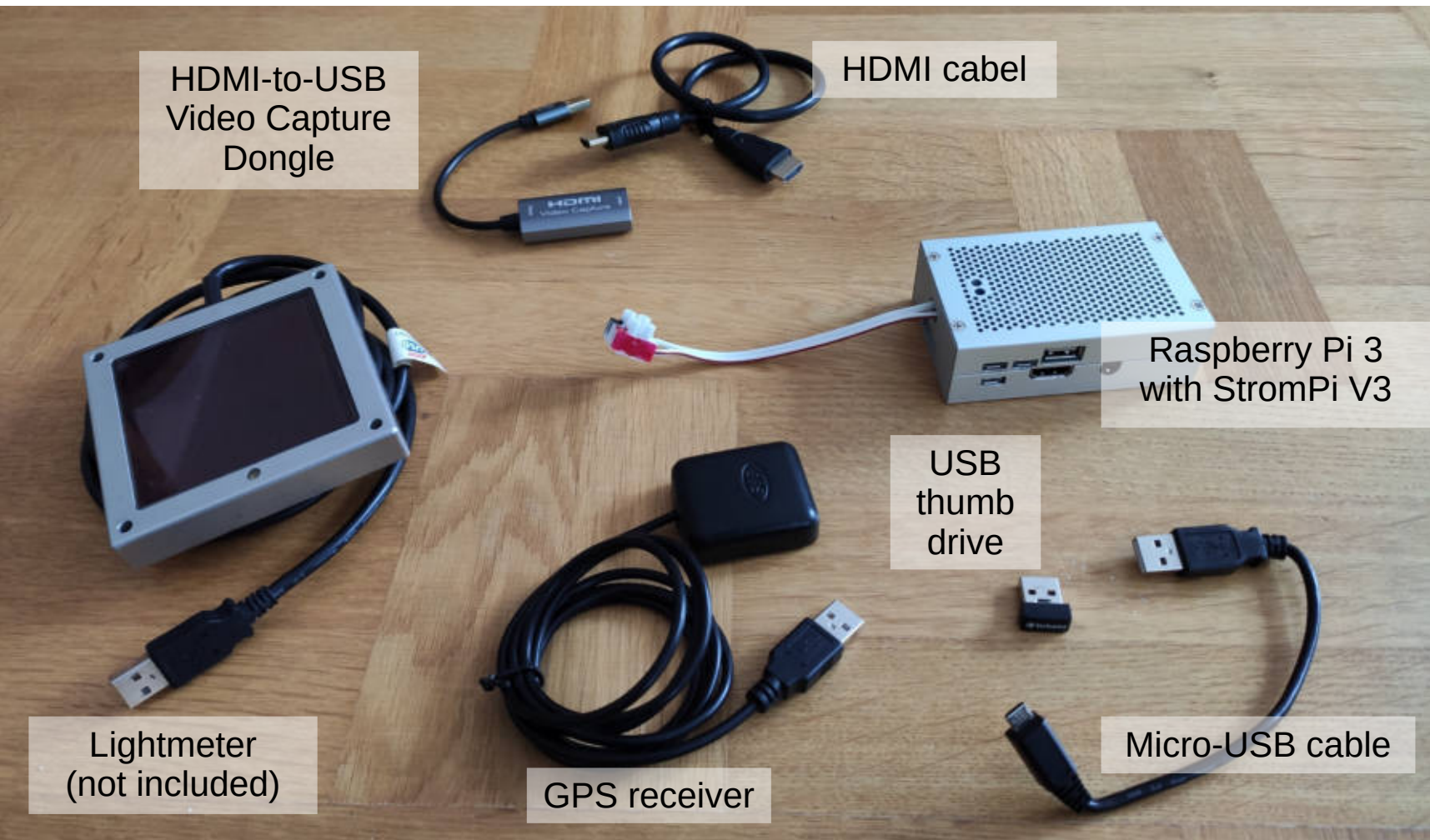not depicted: wireless USB keyboard and microSD-to-SD adapter card
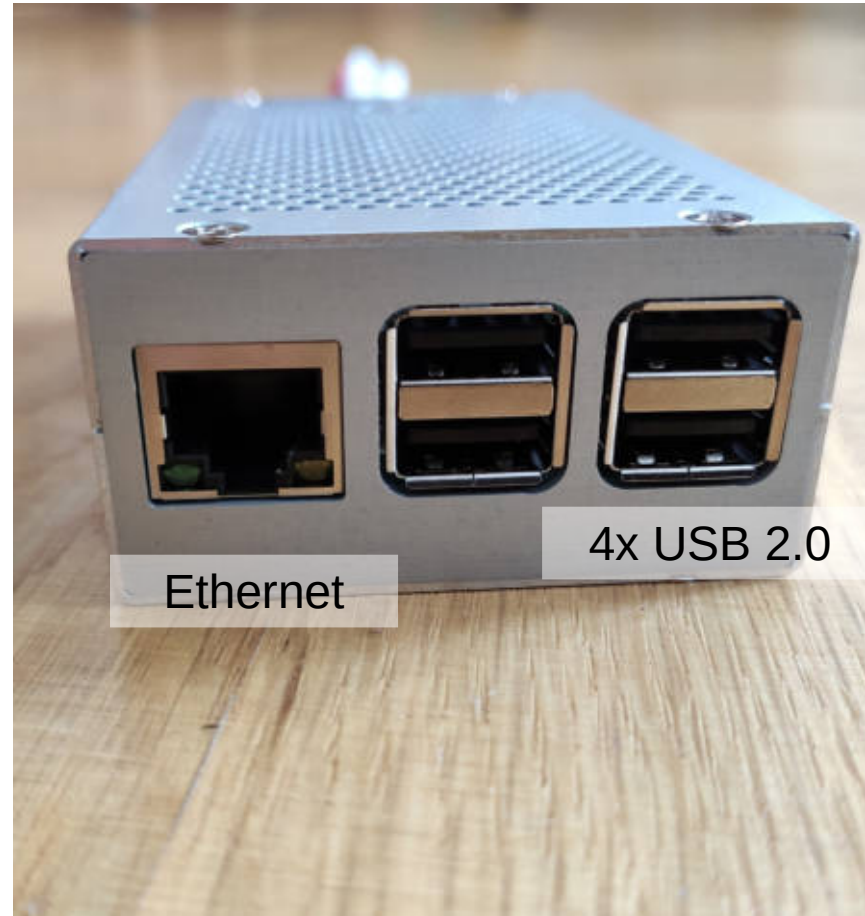
Raspberry Pi 3 with StromPi V3

USB thumb drive

Lightmeter (not included)

GPS receiver

Micro-USB cable

Micro SD card
(already installed)
contains system

6-60V wide range DC power input
RED IS **POSITIVE**!

Ethernet

4x USB 2.0

Interfaces 2

Data port
for voltage
stabilized USB

5V power input

Voltage stabilized
USB 2.0
(read instructions!)

3.5mm Audio

HDMI

old power input
DO NOT USE

Cabling Overview

Power coming from 12V solar battery

USB stick and GPS receiver connected via USB

see →

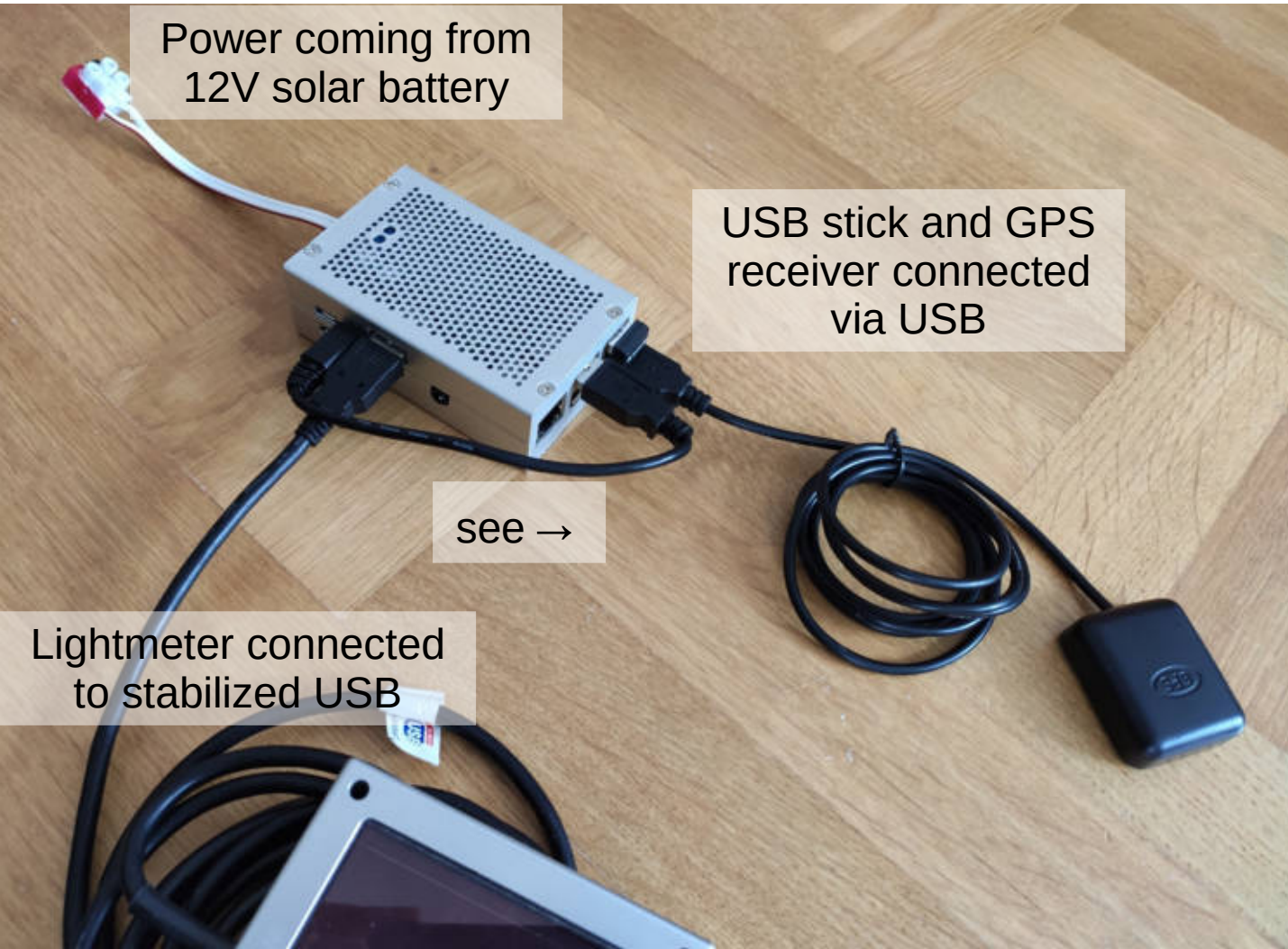Lightmeter connected to stabilized USB
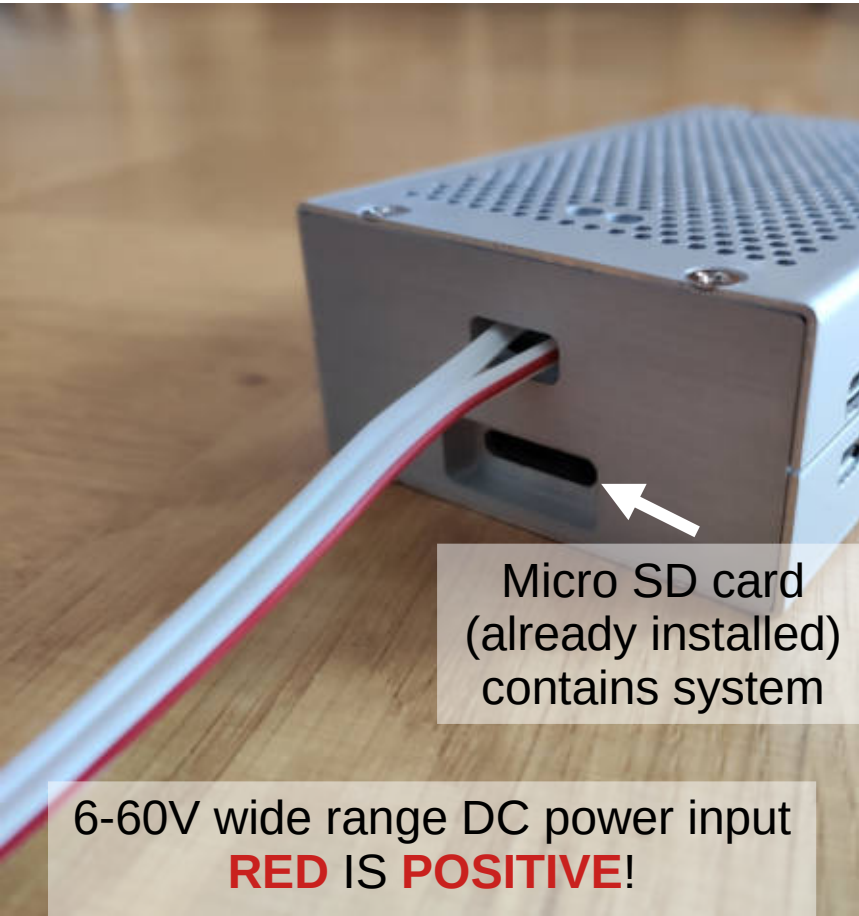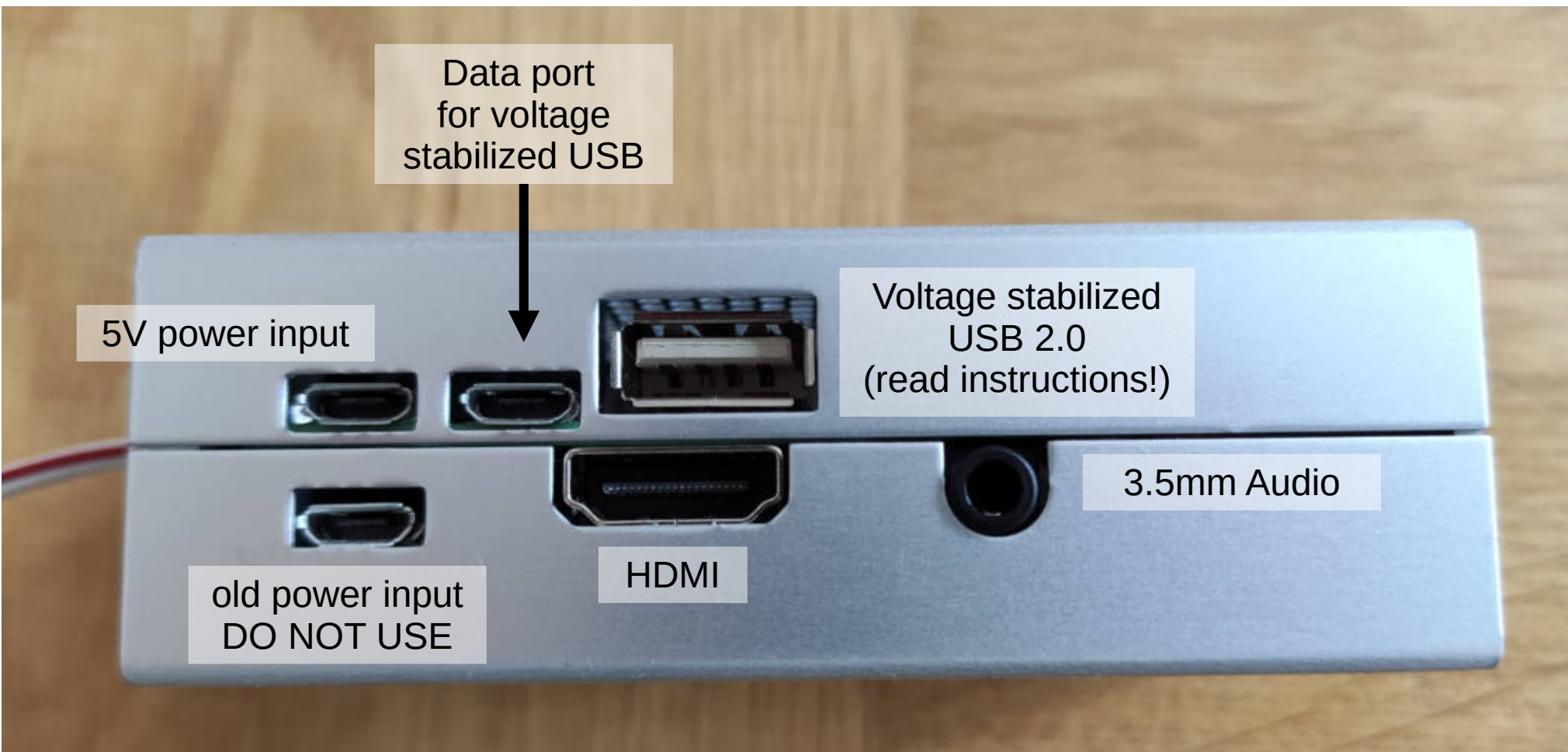
Note the short USB cable, connecting the micro-USB data port (next to the Lightmeter) to one of the main USB ports on the front side.

When installing this cable, pay attention not to apply too much force to the micro USB port.

Cabling front side


One unused USB port under here

The front USBs need to connect to the USB stick, the GPS receiver and (via the short cable) to the Data Port on the LightPi's side surface.

The USB drive can be any FAT32 formatted stick. It is used to save data and logfiles and thereby minimize write-cycles on the SD card.

If no USB drive is present, data will still be recorded and then saved to the SD card.

The unused USB port can be used for the wireless keyboard for direct access.

Cabling side view

short USB cable from
data port to front USB

optional
5V power

do not
use

HDMI
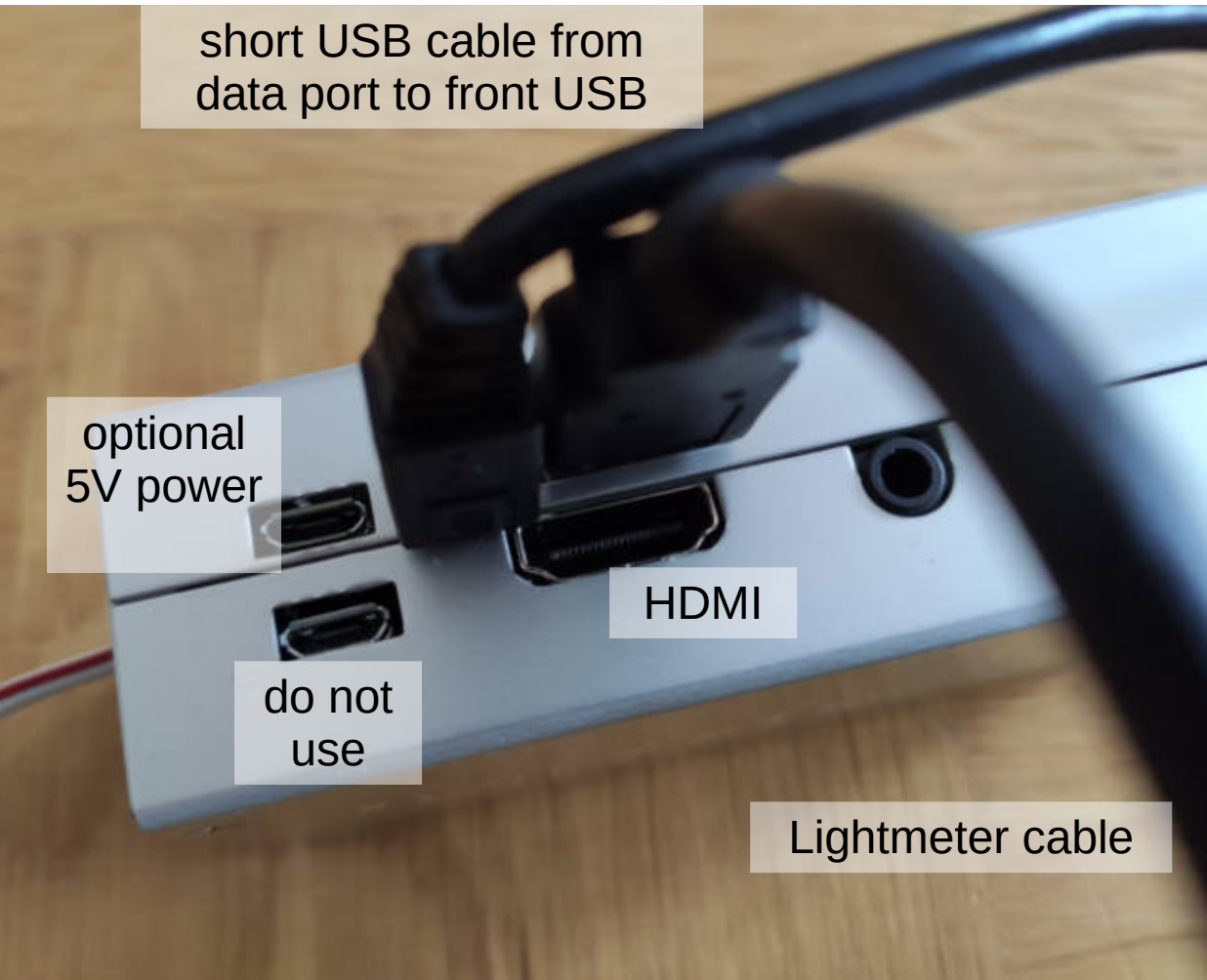
Lightmeter cable

As seen in this picture, in the
normal operating configuration, the
HDMI-Port is slightly obstructed. If
you need to access the HDMI port,
it is recommended to completely
remove the short USB cable and
plug the Lightmeter into one of the
frontal USBs.
When you are done with your
HDMI access, remove the HDMI
cable, re-install the short USB
cable and plug the Lightmeter back
into the stabilized USB port.

To stress the obvious: Plug/unplug
the Lightmeter only in powered
down state, never on a running
system!

Accessing the Pi - WiFi

Each LightPi emitts a WiFi with its station name, the WPA2 passphrase is "**lightmeter**" (without quotation marks).

(The range of this WiFi is rather limited.)

As soon as you are connected to the WiFi, you can access the Pi by the IP **192.168.7.1**

SSH, **rsync** and **VNC** are available. For the latter you need a VNC viewer installed on your machine. This is the easiest way to access the Pi, since it gives you full access to its graphical user interface.

Credentials for these services are:
User: **pi**   Password: **kuffner85612**

If you arrive at the station and the Wifi is not available, or the Pi does not answer, the first step of troubleshooting is to un-power the Pi for at least 30sec, and then to plug power back in.

After max. 3-4min the WiFi should be available. Make sure your machine re-scans the available networks.

Accessing the LightPi via WiFi and extracting the data via rsync is the easiest and preferred method to retrieve data. It has the additional benefit of not needing any reboots and not interrupting the Pi's data collection.

Accessing the Pi – keyboard, video, mouse

If the connection over WiFi is not successful, you can access the Pi directly. Use the hints in chapter *Cabling side view* to connect your HDMI cable to the Pi.
The wireless keyboard has a small receiver-dongle stored on its back – insert it into the Pi's unoccupied frontal USB port. Also, move the keyboard's power switch to "on".

The HDMI-to-USB Video-Capture dongle should be connected to the other end of the HDMI cable as well as to your Laptop. It registers on your machine as a webcam. Just use your camera application to access the video feed.

Pay attention: The video dongle's USB connector is slightly finicky.

Accessing the data directly

Power down the LightPi and remove the USB thumb drive.

You can access the drive with any machine – it is formatted as FAT32, compatible with Windows and Linux.

Copy all the data to your machine, preferably simultaneously also make a second backup onto an external storage device.

The USB drive has a capacity of 32GB. Should capacity become an issue, remove old data and log files from the drive.

Re-insert the drive to the Pi's frontal USB and power on the Pi.

Should you suspect that maybe some data was written to the sytem micro-SD card (e.g. you find the USB drive to be empty), remove the micro-SD card from the Pi, put it into the micro-SD-to-fullsize-SD adapter card and use a card reader to access it. You will need a Linux machine for this, as the file format is ext4 and therefore not Windows compatible.

The card has a partition called "root". In there is a folder "LIGHT" which contains data and logs (if any) in separate folders.

You may want to have tweezers with you. These make removing the SD card way easier.

Checking the system

Assuming you have the system up and running again, here are a few checks to do, before you leave:

Connect via WiFi and SSH or VNC and use
```
df -h
```
This will show you all mounts on the system. If you see device */dev/sda1* mounted to */LIGHT*, then you know that the USB drive has been found an mounted correctly.

Look into the folder */LIGHT/logs/* and display the newest gpslog file. On the last lines you should see how the clock was corrected by the GPS information.

Use the **date** command and check the system time (attention: UTC!).

Issue the command
```
ls -lahrt /LIGHT/light
```
the last line should be the current lightmeter data file. Right after startup its size will be zero, but after a few minutes, the size should have increased.

Last hardware checks before you leave:

- Is the Lightmeter plugged into the voltage stabilized USB port?

- Is the USB drive plugged back in?

- Has the GPS receiver sufficient sky view?

- Did you take the wireless keyboard's receiver dongle with you?