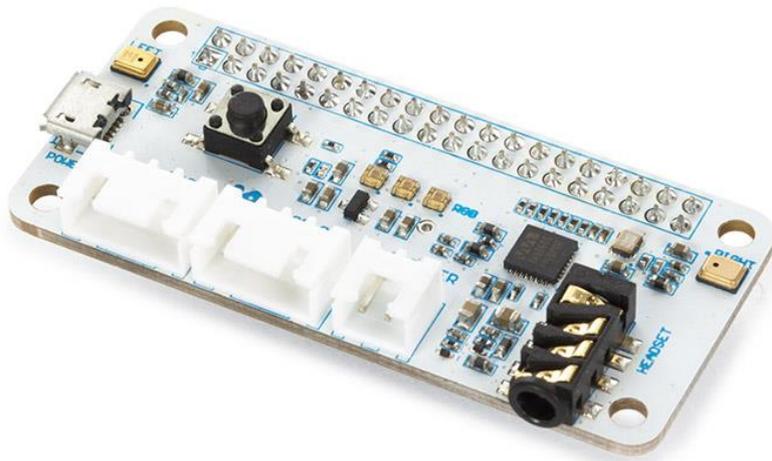


VMP403



USER MANUAL

1. Introduction



To all residents of the European Union

Important environmental information about this product

This symbol on the device or the package indicates that disposal of the device after its lifecycle could harm the environment. Do not dispose of the unit (or batteries) as unsorted municipal waste; it should be taken to a specialized company for recycling. This device should be returned to your distributor or to a local recycling service. Respect the local environmental rules.

If in doubt, contact your local waste disposal authorities.

Thank you for choosing Velleman! Please read the manual thoroughly before bringing this device into service. If the device was damaged in transit, do not install or use it and contact your dealer.

2. Safety Instructions



Read and understand this manual and all safety signs before using this appliance.



Indoor use only.

- This device can be used by children aged from 8 years and above, and persons with reduced physical, sensory or mental capabilities or lack of experience and knowledge if they have been given supervision or instruction concerning the use of the device in a safe way and understand the hazards involved. Children shall not play with the device. Cleaning and user maintenance shall not be made by children without supervision.

3. General Guidelines

- Refer to the Velleman® Service and Quality Warranty on the last pages of this manual.
- All modifications of the device are forbidden for safety reasons. Damage caused by user modifications to the device is not covered by the warranty.
- Only use the device for its intended purpose. Using the device in an unauthorised way will void the warranty.
- Damage caused by disregard of certain guidelines in this manual is not covered by the warranty and the dealer will not accept responsibility for any ensuing defects or problems.
- Nor Velleman nv nor its dealers can be held responsible for any damage (extraordinary, incidental or indirect) – of any nature (financial, physical...) arising from the possession, use or failure of this product.
- Keep this manual for future reference.

4. Overview

General

ReSpeaker 2-mics Pi HAT is a dual-microphone expansion board for Raspberry Pi designed for AI and voice applications. It allows you to build a powerful and flexible voice product that integrates services like Amazon Alexa Voice Service, Google Assistant, etc.

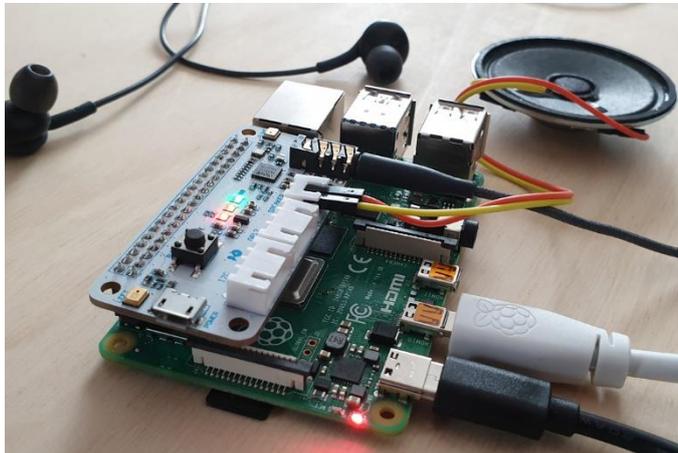
The board is developed based on WM8960, a low power stereo codec. There are 2 microphones on both sides of the board for collecting sounds and it also provides 3 APA102 RGB LEDs, 1 User Button and 2 on-board interfaces for expanding your applications. There is also a 3.5mm Audio Jack and JST 2.0 Speaker pins for audio output.

Technical Specifications

dimensions 65 x 30 x 15 mm (2.6 x 1.18 x 0.6")

5. Operation

Overview



Follow this manual to connect the Raspberry Pi 4 2 GB RAM to Google Assistant. This service allows you to voice-control the appliance after saying 'Ok Google' or 'hey Google'.

Requirements:

- Raspberry Pi 4 with Raspbian
- monitor
- keyboard and mouse
- mini HDMI® to monitor
- ReSpeaker 2-mics Pi HAT
- headphones or speakers

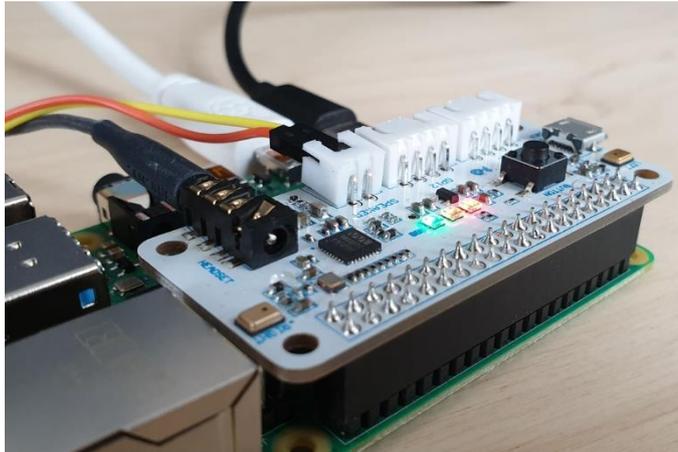
Raspberry Pi Configuration

If you are new to Raspberry Pi, just follow this tutorial to download and install the latest version of Raspbian:

<https://projects.raspberrypi.org/en/projects/raspberry-pi-setting-up>

Programming

1. Connect the ReSpeaker to your Raspberry Pi 4.



2. Download and install the drivers for the ReSpeaker by entering following commands into the Command Prompt:
 - o `sudo apt-get update`
 - o `sudo apt-get upgrade`

```

pi@raspberrypi: ~
File Edit Tabs Help
pi@raspberrypi:~ $ sudo apt-get update
Hit:1 http://raspbian.raspberrypi.org/raspbian buster InRelease
Hit:2 http://archive.raspberrypi.org/debian buster InRelease
Reading package lists... Done
pi@raspberrypi:~ $ sudo apt-get upgrade
Reading package lists... Done
Building dependency tree
Reading state information... Done
Calculating upgrade... Done
The following packages will be upgraded:
  libgnutls30
1 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Need to get 1,047 kB of archives.
After this operation, 0 B of additional disk space will be used.
Do you want to continue? [Y/n] y
Get:1 http://ftp.fi.muni.cz/pub/linux/raspbian/raspbian buster/main armhf libgnu
tls30 armhf 3.6.7-4+deb10u3 [1,047 kB]
Fetched 1,047 kB in 1s (1,561 kB/s)
Reading changelogs... Done
(Reading database ... 93527 files and directories currently installed.)
Preparing to unpack ../libgnutls30_3.6.7-4+deb10u3_armhf.deb ...
Unpacking libgnutls30:armhf (3.6.7-4+deb10u3) over (3.6.7-4+deb10u2) ...
Setting up libgnutls30:armhf (3.6.7-4+deb10u3) ...
Processing triggers for libc-bin (2.28-10+rpi1) ...

```

- o `git clone`
- o `cd seed-voicecard`
- o `sudo .*install.sh`

This may take a couple of minutes. When ready, reboot the Raspberry Pi.

```

File Edit Tabs Help
pi@raspberrypi:~$ git clone https://github.com/respeaker/seeed-voicecard.git
Cloning into 'seeed-voicecard'...
remote: Enumerating objects: 16, done.
remote: Counting objects: 100% (16/16), done.
remote: Compressing objects: 100% (10/10), done.
remote: Total 710 (delta 8), reused 10 (delta 6), pack-reused 694
Receiving objects: 100% (710/710), 1.31 MiB | 2.89 MiB/s, done.
Resolving deltas: 100% (442/442), done.
pi@raspberrypi:~$ cd seeed-voicecard
pi@raspberrypi:~/seeed-voicecard$ sudo ./install.sh
Hit:1 http://raspbian.raspberrypi.org/raspbian buster InRelease
Hit:2 http://archive.raspberrypi.org/debian buster InRelease
Reading package lists... Done
Building dependency tree
Reading state information... Done
All packages are up to date.
Reading package lists... Done
Building dependency tree
Reading state information... Done
git is already the newest version (1:2.20.1-2+deb10u1).
i2c-tools is already the newest version (4.1-1).
i2c-tools set to manually installed.
The following additional packages will be installed:
  raspberrypi-kernel-headers
Suggested packages:
  python3-apport menu
The following NEW packages will be installed:
  dkms libasound2-plugins raspberrypi-kernel-headers
0 upgraded, 3 newly installed, 0 to remove and 0 not upgraded.
Need to get 25.1 MB of archives.
After this operation, 164 MB of additional disk space will be used.
Get:1 http://archive.raspberrypi.org/debian buster/main armhf raspberrypi-kernel-headers armhf 1.20200212-1 [24.9 MB]
Get:2 http://raspbian.mirror.garr.it/mirrors/raspbian/raspbian buster/main armhf dkms all 2.6.1-4 [74.4 kB]
Get:3 http://ftp.fi.muni.cz/pub/linux/raspbian/raspbian buster/main armhf libasound2-plugins armhf 1.1.8-1 [64.2 kB]
Fetched 25.1 MB in 3s (7,920 kB/s)
Selecting previously unselected package dkms.
(Reading database ... 93527 files and directories currently installed.)
Preparing to unpack .../archives/dkms_2.6.1-4_all.deb ...
Unpacking dkms (2.6.1-4) ...
Selecting previously unselected package libasound2-plugins:armhf.
Preparing to unpack .../libasound2-plugins_1.1.8-1_armhf.deb ...
Unpacking libasound2-plugins:armhf (1.1.8-1) ...
Selecting previously unselected package raspberrypi-kernel-headers.

```

- o sudo reboot

3. Now, let's check if the name of the ReSpeaker matches with the name of the source. Open the Command Prompt and enter following commands:

- o cd speed-voicecard
- o aplay
- o arecord

```

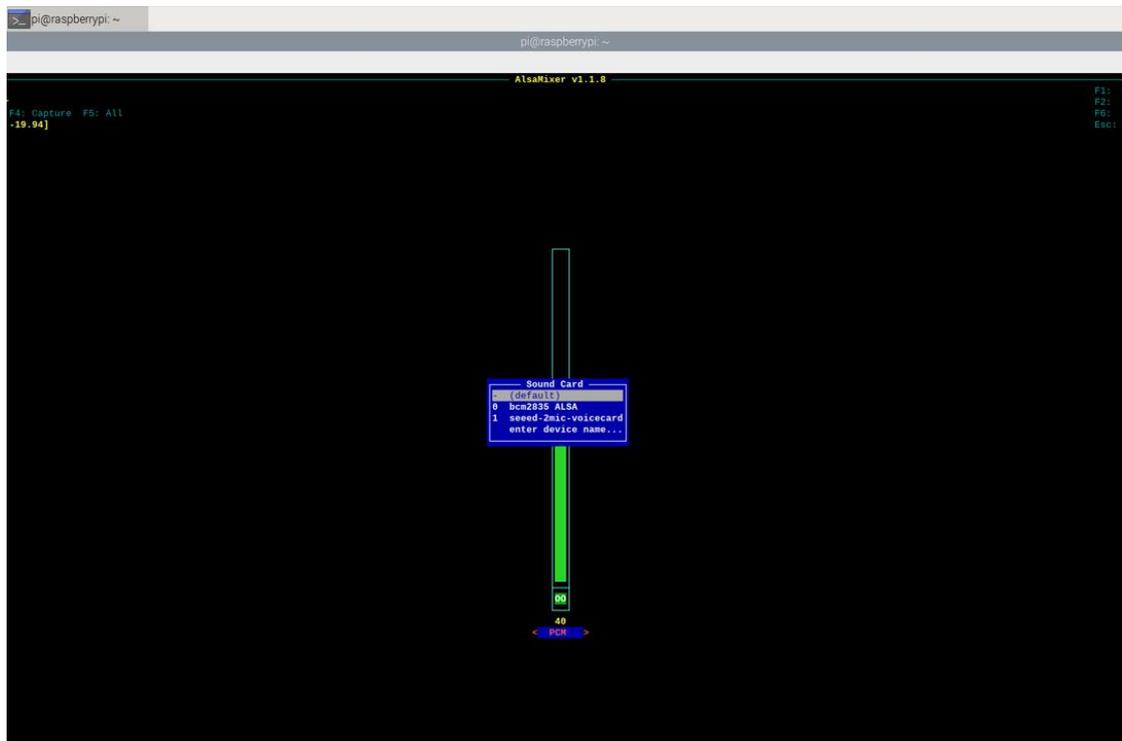
File Edit Tabs Help
pi@raspberrypi:~$ cd seeed-voicecard
pi@raspberrypi:~/seeed-voicecard$ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 7/7
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 IEC958/HDMI [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 0: ALSA [bcm2835 ALSA], device 2: bcm2835 IEC958/HDMI1 [bcm2835 IEC958/HDMI1]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 1: seeed2micvoicec [seeed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hifi wm8960-hifi-0 []
  Subdevices: 1/1
    Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard$ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 7/7
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 IEC958/HDMI [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 0: ALSA [bcm2835 ALSA], device 2: bcm2835 IEC958/HDMI1 [bcm2835 IEC958/HDMI1]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 1: seeed2micvoicec [seeed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hifi wm8960-hifi-0 []
  Subdevices: 1/1
    Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard$

```

4. Now, it's time to set the sound. Enter following command:

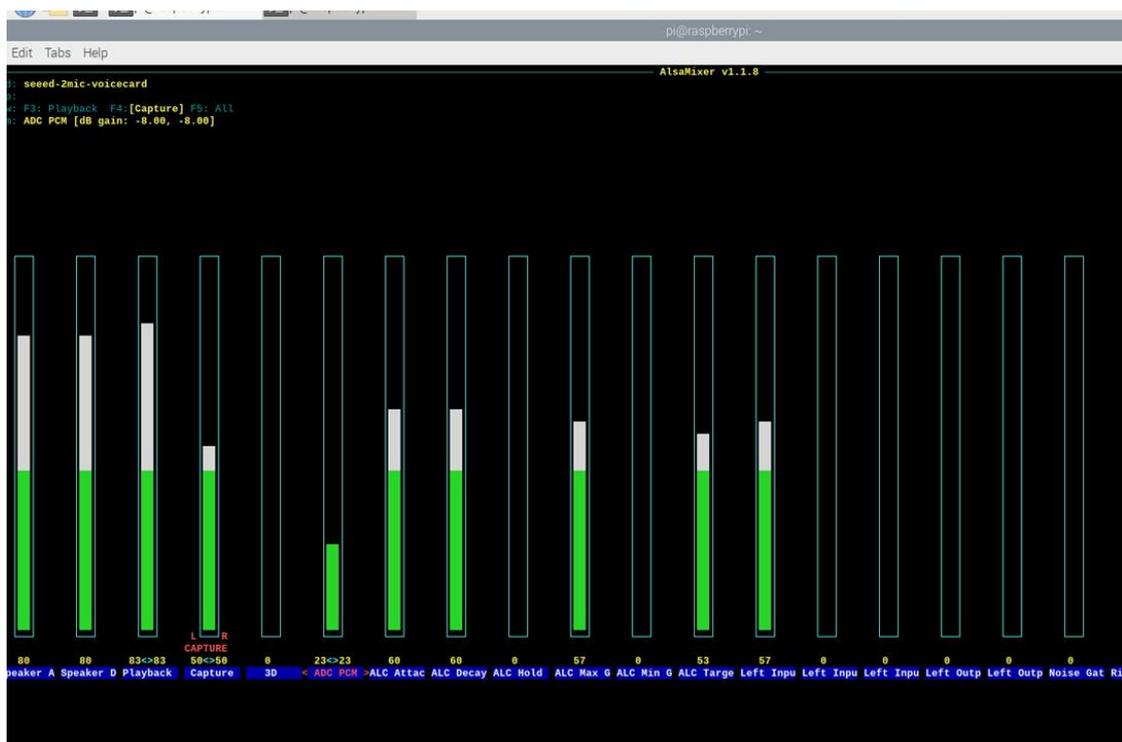
- o alsamixer

Press F6 and select the correct board (option 1).



Set following values:

- o Lower 'ADC PCM' to ± 25 or you will hear a loud beep.
- o Set the recording's volume with 'Capture'.



5. Time to test. Connect a speaker or headphones, open a new Command Prompt and enter following command:

- `arecord -f cd -Dhw:1 | aplay -Dhw:1`

Now, you should hear your own voice through the speaker/headphones.

Activating the On-Board RGB LEDs

Open the Command Prompt and enter following commands:

- `sudo pip install spidey`
- `cd ~/`
- `git clone https://github.com/respeaker/mic_hat.git`
- `cd mic_hat`
- `python pixels.py`

You can change the colour of the LEDs through the Command Prompt.

Using the On-Board User Button

1. The press button on the ReSpeaker 2-mics is connected to the GPIO17. Enter following commands:

- `sudo pip install rpi.gpio`
- `nano userbutton.py`

2. Copy the code below into the Command Prompt:

```
import RPi.GPIO as GPIO
import time
GPIO.setmode(GPIO.BCM)
GPIO.setup(17, GPIO.IN, pull_up_down=GPIO.PUD_UP)
while True:
    input_state = GPIO.input(17)
    if input_state == False:
        print("Button Pressed")
        time.sleep(1)
    else:
        print("Button Released")
        time.sleep(1)
```

```

File Edit Tabs Help
pi@raspberrypi:~ $ cd seeed-voicecard
pi@raspberrypi:~/seeed-voicecard $ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 7/7
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 IEC958/HDMI [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 0: ALSA [bcm2835 ALSA], device 2: bcm2835 IEC958/HDMI1 [bcm2835 IEC958/HDMI1]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 1: seeed2micvoicec [seeed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hifi wm8960-hifi-0 []
  Subdevices: 1/1
    Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard $ aplay -l
**** List of PLAYBACK Hardware Devices ****
card 0: ALSA [bcm2835 ALSA], device 0: bcm2835 ALSA [bcm2835 ALSA]
  Subdevices: 7/7
    Subdevice #0: subdevice #0
    Subdevice #1: subdevice #1
    Subdevice #2: subdevice #2
    Subdevice #3: subdevice #3
    Subdevice #4: subdevice #4
    Subdevice #5: subdevice #5
    Subdevice #6: subdevice #6
card 0: ALSA [bcm2835 ALSA], device 1: bcm2835 IEC958/HDMI [bcm2835 IEC958/HDMI]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 0: ALSA [bcm2835 ALSA], device 2: bcm2835 IEC958/HDMI1 [bcm2835 IEC958/HDMI1]
  Subdevices: 1/1
    Subdevice #0: subdevice #0
card 1: seeed2micvoicec [seeed-2mic-voicecard], device 0: bcm2835-i2s-wm8960-hifi wm8960-hifi-0 []
  Subdevices: 1/1
    Subdevice #0: subdevice #0
pi@raspberrypi:~/seeed-voicecard $

```

3. Save the code with CTRL+S.
4. Execute with python userbutton.py. Check the terminal to see if the button is pressed.

```

pi@raspberrypi:~
pi@raspberrypi:~
AlsaMixer v1.1.8
F4: Capture F5: All F11: Esc
-19.94]
Sound Card
[ (default)
0 bcm2835 ALSA
1 seeed-2mic-voicecard
enter device name...
00
40
PCN

```

Google Assistant

Follow [this](#) manual to configure the Google Assistant on your Raspberry Pi (from **Configure a Developer Project and Account Settings** up to **Run the Sample Code**).

Once this works, you can go on with controlling LEDs, sensors, a speaker, etc., which you can connect to the ReSpeaker 2-mics Pi HAT.

Use this device with original accessories only. Velleman nv cannot be held responsible in the event of damage or injury resulting from (incorrect) use of this device. For more info concerning this product and the latest version of this manual, please visit our website www.velleman.eu. The information in this manual is subject to change without prior notice.

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Velleman® Service and Quality Warranty

Since its foundation in 1972, Velleman® acquired extensive experience in the electronics world and currently distributes its products in over 85 countries.

All our products fulfil strict quality requirements and legal stipulations in the EU. In order to ensure the quality, our products regularly go through an extra quality check, both by an internal quality department and by specialized external organisations. If, all precautionary measures notwithstanding, problems should occur, please make appeal to our warranty (see guarantee conditions).

General Warranty Conditions Concerning Consumer Products (for EU):

- All consumer products are subject to a 24-month warranty on production flaws and defective material as from the original date of purchase.
- Velleman® can decide to replace an article with an equivalent article, or to refund the retail value totally or partially when the complaint is valid and a free repair or replacement of the article is impossible, or if the expenses are out of proportion.

You will be delivered a replacing article or a refund at the value of 100% of the purchase price in case of a flaw occurred in the first year after the date of purchase and delivery, or a replacing article at 50% of the purchase price or a refund at the value of 50% of the retail value in case of a flaw occurred in the second year after the date of purchase and delivery.

• Not covered by warranty:

- all direct or indirect damage caused after delivery to the article (e.g. by oxidation, shocks, falls, dust, dirt, humidity...), and by the article, as well as its contents (e.g. data loss), compensation for loss of profits;
- consumable goods, parts or accessories that are subject to an aging process during normal use, such as batteries (rechargeable, non-rechargeable, built-in or replaceable), lamps, rubber parts, drive belts... (unlimited list);
- flaws resulting from fire, water damage, lightning, accident, natural disaster, etc....;
- flaws caused deliberately, negligently or resulting from improper handling, negligent maintenance, abusive use or use contrary to the manufacturer's instructions;
- damage caused by a commercial, professional or collective use of the article (the warranty validity will be reduced to six (6) months when the article is used professionally);
- damage resulting from an inappropriate packing and shipping of the article;
- all damage caused by modification, repair or alteration performed by a third party without written permission by Velleman®.
- Articles to be repaired must be delivered to your Velleman® dealer, solidly packed (preferably in the original packaging), and be completed with the original receipt of purchase and a clear flaw description.
- Hint: In order to save on cost and time, please reread the manual and check if the flaw is caused by obvious causes prior to presenting the article for repair. Note that returning a non-defective article can also involve handling costs.
- Repairs occurring after warranty expiration are subject to shipping costs.
- The above conditions are without prejudice to all commercial warranties.

The above enumeration is subject to modification according to the article (see article's manual).