RepPanel HWv2 Documentation

Revision v1.3
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Content

Assembly Instructions

Your purchase includes 3D files for a case for the RepPanel Hardware Module. The design is very compact, slim and does not require any screws. The files are optimized for the FFF and mSLA print process.
Besides the ready-to-print 3MF, the files also include the source CAD file. The CAD file can be used to adjust the case to your needs and your printers' tolerances. You can open and edit the files using FreeCAD.

Position the display module in an angle and insert the lower part with the ESP32-antenna within the case. Now slightly pull on the other side of the case to allow the snap fit to move over the PCB and then the display.

Flashing, Install & Update Instructions

Windows: Use ESP32 Download Tool

The espressif flash download tool offers a convenient way to flash RepPanel firmware on the hardware board.

Install Serial Driver

First you will need to install the *"Silicon Labs CP210x USB to UART Bridge"* driver to be able to talk to the device. The driver is already bundled with the firmware files you downloaded. You can also download the latest version here. Extract the downloaded package and navigate to the folder "*CP210x_Windows_Drivers*".
Launch and follow the steps of the installer.

- Launch "CP210xVCPInstaller_x64" on 64bit Windows systems (if you don't know this should be the correct driver). Otherwise choose "CP210xVCPInstaller_x86" for 32bit systems.
- After the successful installation make sure your HWv2 module is connected to your PC via USB. Launch the Device-Manager to identify the COM port of the device.

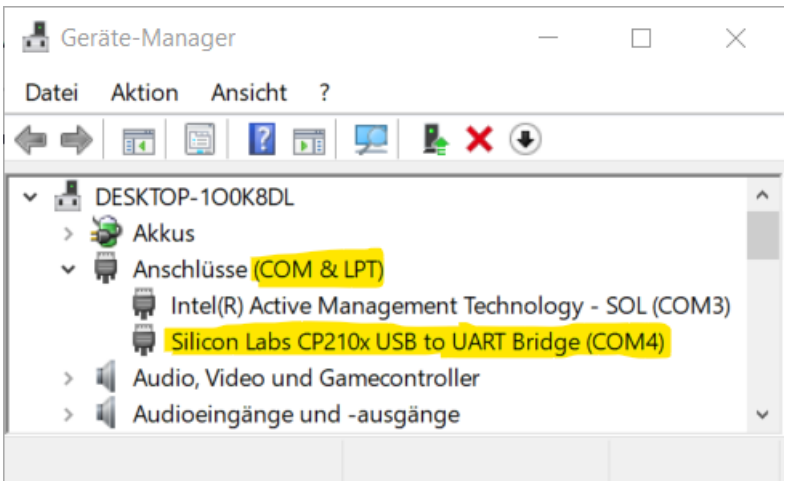


Figure 1: Open the Device Manager in Windows, navigate to the serial ports and find the COM port of the connected hardware board. The board will appear as Silicon Labs CP210x USB to UART Bridge. The COM-Port in this example would be COM4

Flashing Steps

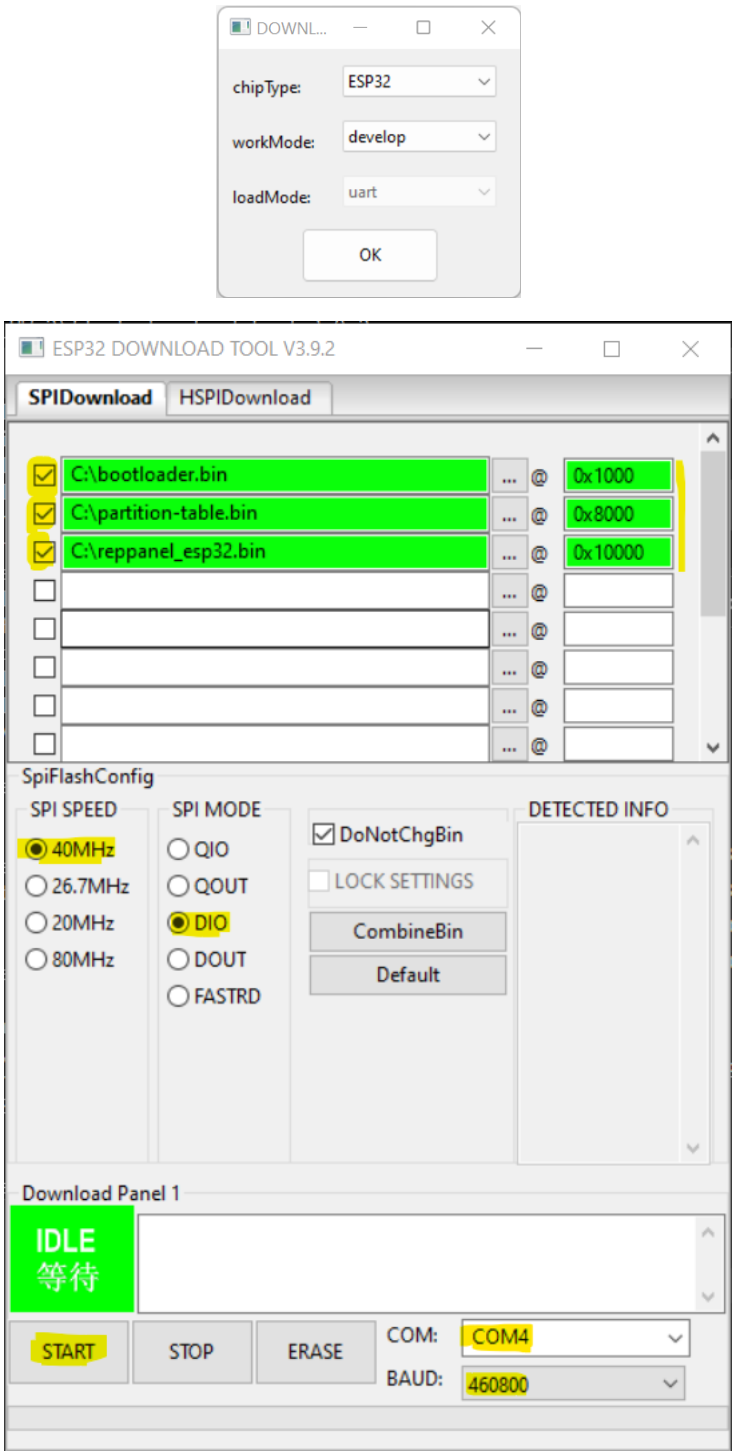


Figure 2: Set the bootloader, partition-table and reppanel_esp32 binary files according to the picture and select the checkbox in the left of each entry. Check the flashing instructions of the release to get the correct address (0xXXXX). Enter the addresses in the fields on the right as shown above. Select the COM-Port from the previous step and click START to flash the firmware. You might need to ERASE the flash first. This will delete any existing configuration of a previous RepPanel installation.

1. Connect the hardware module to your PC via USB. Make sure you have the VCP drivers installed (see also steps above).
2. In Windows navigate to the “Device Manager” (via Windows search)
3. Determine the COM-Port of the connected hardware module. It should be listed as “*Silicon Labs CP210x USB to UART Bridge (COMX)*”.

4. Execute “flash_download_tool_3.9.2.exe” as part of your download package or get the latest version here. Windows might warn you when running the application. You will have to trust the application and select “run anyway”. Select “ESP32” and “develop” and click OK.
5. Select the COM-Port from step 3. within the application.
6. If this is your first flash of RepPanel, it is necessary to erase the on-board flash first. Click “ERASE” to do that.
7. Now select the firmware files from the download package and set the *partitions.bin*, *bootloader.bin* and *reppanel.bin* within the tool as shown. The addresses “0xXXXX” may change from release to release. Check the *flashing_instructions.txt* to get the right values for your release.
8. Set *SPI SPEED*, *SPI MODE*, *FLASH SIZE* and *BAUD* as shown above.
9. Click *START* to flash the RepPanel firmware.
10. After flashing go and power cycle the module. You can do that by disconnecting and re-connect the hardware from your PC.
    Congratulations! You did it!

macOS

1. Install the driver in order to communicate with the board. Your RepPanel firmware download also includes a copy of the macOS driver in the folder *“Mac_OSX_VCP_Driver”*.
2. Go to Preferences/Security & Privacy and allow the driver to run, and restart the Mac.
3. Since macOS High Sierra you have to load and enable the drivers after the installation. Load the driver via the Terminal:
   `sudo kextload /Library/Extensions/SiLabsUSBDriver.kext`
4. Install esptool via brew to be able to flash the firmware
   `brew install esptool`
5. Connect the hardware module to your MAC via USB.
6. Check if everything is set up properly by running:
   `esptool.py flash_id`
7. The output will display the serial port: *Serial port /dev/<some_cyptic_name>*
   Copy that port.
8. If this is your first flash of RepPanel, it is necessary to erase the on-board flash first. Run:
   `esptool.py --port /dev/<port> erase_flash`
9. Export the downloaded package from this website and navigate to the folder within the terminal by running:
   `cd <path to extracted files>`
10. Run the following command to flash the firmware. Insert your port and check the flashing instructions file for detailed information on the binary addresses (0x…):
    ```
    esptool.py --chip esp32 --port /dev/<YOUR_PORT> -b 460800 --before default_reset --after hard_reset --chip esp32  write_flash --flash_mode dio --flash_size detect --flash_freq 40m 0x1000 bootloader.bin 0x8000 partition-table.bin 0x10000 reppanel_esp32.bin
    ```
11. After flashing go and power cycle the module. You can do that by disconnecting and re-connect the hardware from your MAC. If you encounter problems, consider erasing the flash, and reflashing or pressing the reset-button on the back of your module.
    Congratulations! You did it!

All Platforms

1. Download the esp-idf for windows or Linux or install via
   `pip install esptool`
2. Connect via USB/Serial. Find out the serial port via `dmesg` on linux or using the device manager on windows. In this example the serial connection to the ESP32 is on `COM4` (in Linux e.g. /dev/ttyUSB0).
3. `esptool.py -p COM4 erase_flash`

4. esptool.py -p COM4 -b 460800 --before default_reset --after hard_reset --chip esp32 write_flash --flash_mode dio --flash_size detect --flash_freq 40m 0x1000 bootloader.bin 0x8000 partition-table.bin 0x10000 reppanel_esp32.bin

   You might need to press the boot button on your ESP to start the upload/flash process.

Look here for more detailed information

Connecting to your 3D Printer

Not all Duet3D board configurations are supported by RepPanel. Please check the compatibility table before your purchase!

You do have multiple options for powering your module. Same goes for the connection to your printer. You can connect via WiFi or UART (wired, PanelDue port).

You may only connect power cables to your RepPanel and use WiFi for a minimum wiring effort.

Power Options

The HWv2 module supports multiple power options.

1. You can connect a power bar via USB-C to the hardware. This is the most convenient way of powering and works great with WiFi connections
2. You can power the module via 5 V power input using the connector on the backside of the module (pitch 2mm)
3. You can power the module via the PanelDue port by connecting GND and 5V directly to the connector on the backside, or the breakout board for wired connections **available here**.
4. You can power the module with a stable 5 V to 9 V DC power source via the solder pads on the back of the module.

For more detailed information about the hardware module and its powering options please check out the **wireless-tag documentation**.

WiFi Connection

To connect to your Duet3D printer via WiFi please follow the steps below:

1. Power your module (see power options)
2. Enter the “Info” screen
3. Click the “Scan” button to scan for available WiFi networks
4. Select your WiFi from the list and click “OK”
5. Click inside the WiFi password text field and scroll down to see the keyboard. Now enter your WiFi password and click the “check” key. Save your WiFi settings by clicking “Save”. RepPanel should now connect to your WiFi. You may need to power cycle the device.
6. Within the “Info” screen click on the “Scan” button to scan for your Duet3D printer. Select the printer from the list and click “OK”. You can also manually enter the printers address using the format **http://<printername>.local** or **192.168.1.1**
7. Enter your printers DuetWebControl password and click save. RepPanel should now connect to your printer and start displaying information.

Wired Connection

To connect to your Duet3D printer via UART/PanelDue port please follow the steps below. The PanelDue port is also able to supply the module with power.

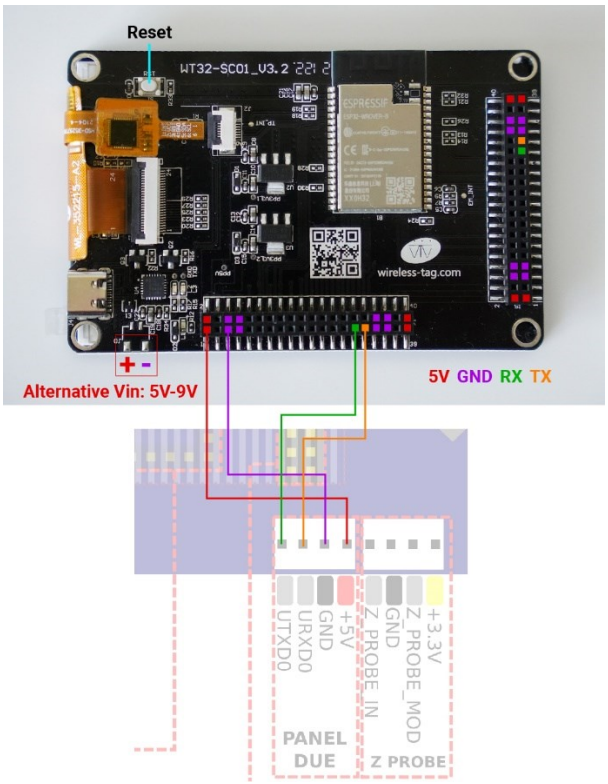
RRF3 requires you to have
M575 P1 S0 B57600
present in your config.g file of the printer.

Using the custom RepPanel breakout board

A custom RepPanel breakout board is in development. It will be open source and can also be ordered from www.reppanel.com.

Use the PanelDue port on your Duet3D board and connect, GND to GND, 5V to 5V and TX to RX and vice versa.
Check the instructions available here.

Manually wiring



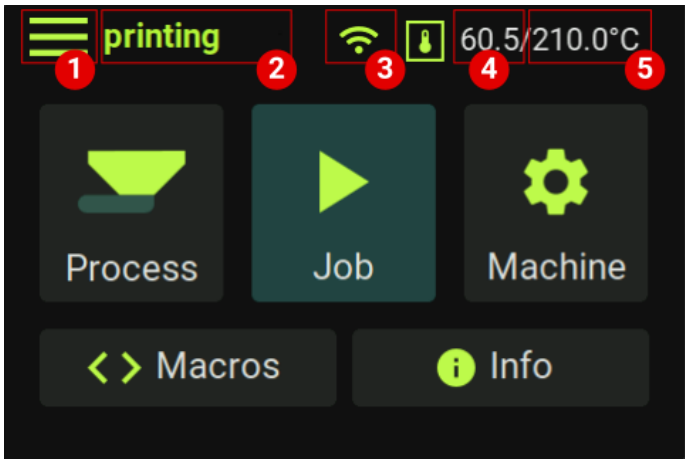
RepPanel as the following pinout configured (see pinout):

- **5V**: See pinout
- **GND**: See pinout
- **TX**: (GP)IO 33
- **RX**: (GP)IO 32

Connect these pins to your PanelDue connector. You need to connect TX to RX and RX to TX.
Check the instructions available here.

RepPanel User Manual

This section explains the main screens of RepPanel.



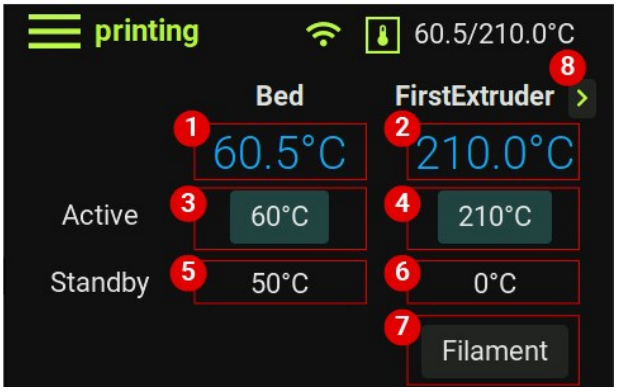
1 [Button] Enter Main Menu

2 [Info] Duet3D Board Status

3 [Button] Show connection and API info

4 [Info] Print bed temperature (sensor 0)

5 [Info] Temperature of tool 0



1 [Info] Current bed temperature

2 [Info] Current tool 0 temperature

3 [Info] [Button]
Set active bed temperature.
Long-Press to set temperature active.
Short-Press to change temperature.

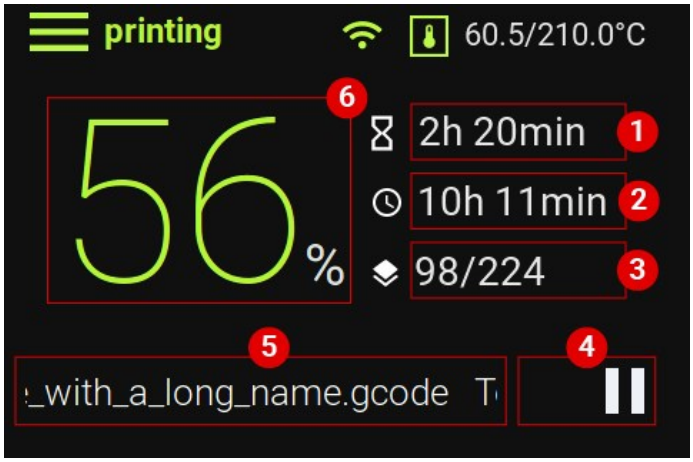
4 [Info] [Button]
Set active tool temperature.
Long-Press to set temperature active.
Short-Press to change temperature.

5 [Info] [Button]
Set standby bed temperature.
Long-Press to set temperature active.
Short-Press to change temperature.

6 [Info] [Button]
Set standby tool temperature.
Long-Press to set temperature active.
Short-Press to change temperature.

7 [Button] Change filament of tool 0

6 [Info] [Button]
Show next tool temperatures



1 [Info] Elapsed print time

2 [Info] Remaining print time.
Simulated time > Slicer time

3 [Info] Current layer and total layer count of print job

4 [Button] Pause, resume or stop print job

5 [Info] Print job file name

6 [Info] Print job progress in percent based on used filament/required filament

1 [Info] [Buttons]
Click to home axis. Green button indicates axis is homed.

2 [Button] Run G32

3 [Button] Run G29

4 [Info] [Button] Adjust babystep amount

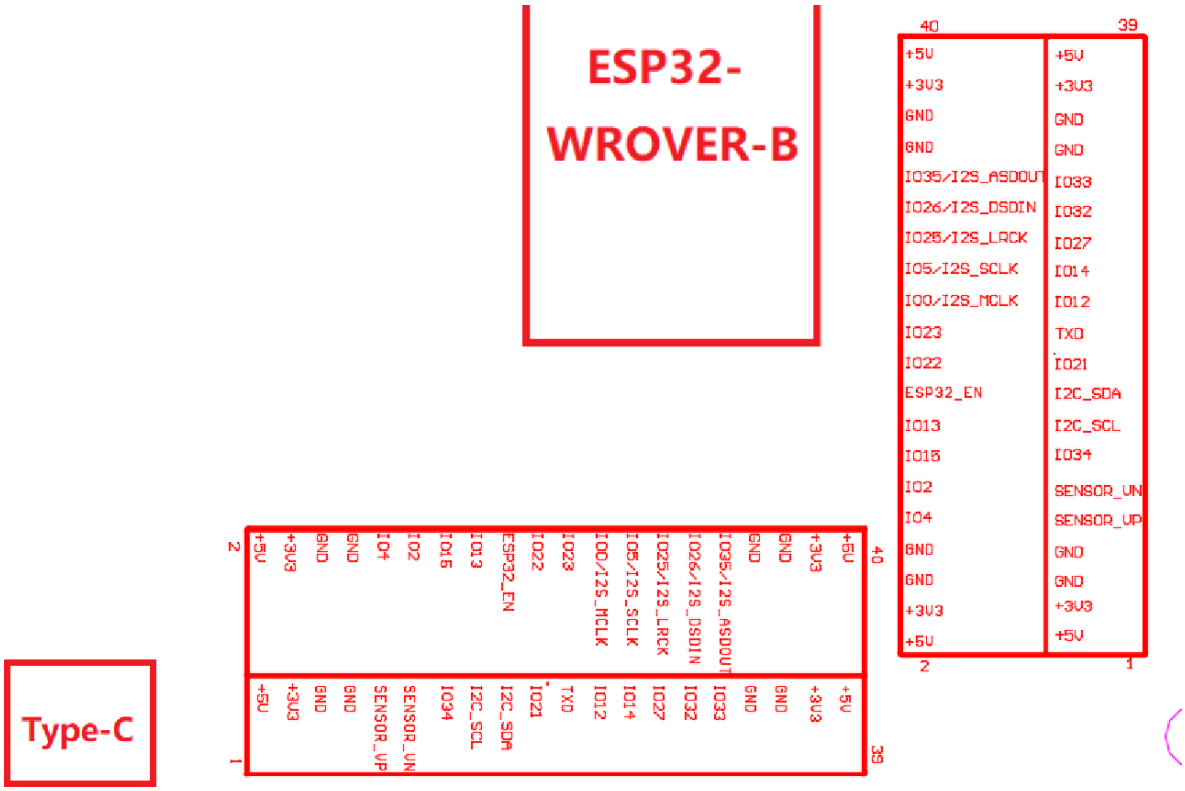
5 [Info] [Button] Adjust part cooling fan 0

Setup a WiFi connection to your Duet board. Scan for available WiFi networks, select a network and enter the WiFi password. To enter the password, click inside the text field first, a new window will open that allows you to enter the text. Click the check button on the keyboard to return to the settings page.

Click the save button to save the settings. Leave RepRap password empty if no password is set.

Set the screensaver timeout to zero in order to deactivate the screensaver.

Hardware Pinout



The hardware module has to identical 2x20 pin female headers with a pitch of 2,00 mm. Both connectors output the same IOs and are electrically coupled. This means you could connect the PanelDue port TX pin to the RX pin of the horizontal connector while connecting the PanelDue RX pin to the TX pin of the hardware module vertical connector.

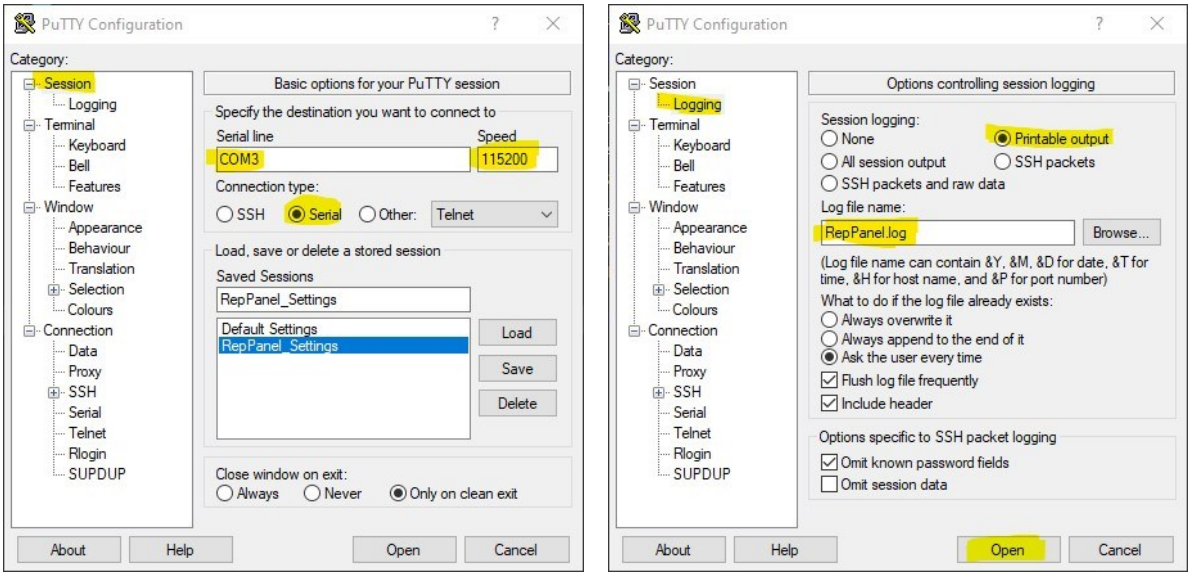
For more details, please refer to the wireless-tag documentation.

Debugging & Logging

Windows & Linux

Use putty to collect logs. It's free and you can get it here. Or anywhere else really.

Set the configuration as depicted below (entering your COM-port) and hit "*Open*" to open the terminal. Close the window to stop logging.



Once you closed the window a new file called e.g., ***RepPanel.log*** is created containing the entire serial output.

macOS

On macOS you can use the built-in tools to read the serial output.
Just run

```
screen <port_name> 115200
```

in the terminal and copy the output to a file.

Alternatively, you can use the following tool:
https://apps.apple.com/de/app/serialtools/id611021963?mt=12
Set Baud Rate to 115200, Bits to 8, Parity None, Stop Bits 1

Report a Bug

Please use the contact form on the RepPanel website for now to report bugs. A forum like website is under construction.

Imprint

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