DC Motor Control HAT with TLE94112ES

Quick Start Guide
V1.0.0

Introduction

The TLE94112ES HAT is a DC Motor Control board that is capable to drive up to six independent or eleven cascaded bidirectional DC motors.

The HAT can be controlled by a Raspberry Pi board via an SPI interface and features an Infineon TLE94112ES, a twelve-fold half-bridge driver with integrated MOSFETs.
The HAT has an active reverse polarity protection with the p-channel MOSFET IPD50P04P4L-11 and is able to power a Raspberry Pi via the DC/DC-converter TLS4125D0EP 50V. To ensure the use of multiple HATs on one Raspberry Pi the CS pin can be changed via jumpers.

All software is released into the public domain and available as open source libraries on GitHub.

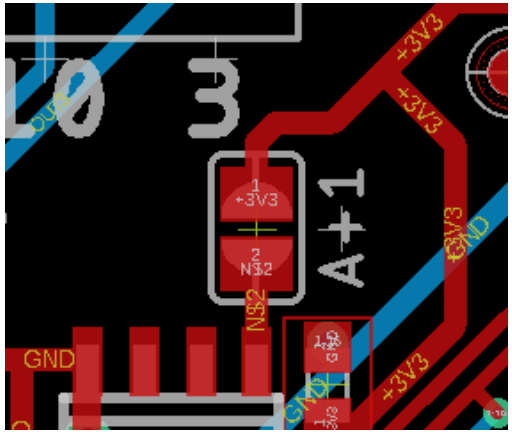
HAT Notes

- Supply voltage is typ. **12V** (max. 20V)
- All **outputs** can drive up to **0.9A**
- Outputs can be used stand-alone or **combined** to increase driving capability up to **3.6A**
- The **default CS-pin** is **CS0**, but it can be changed via jumpers to CS1, CS2 or CS3
- Via pin header 8 the input voltage can **be bridged to another HAT**

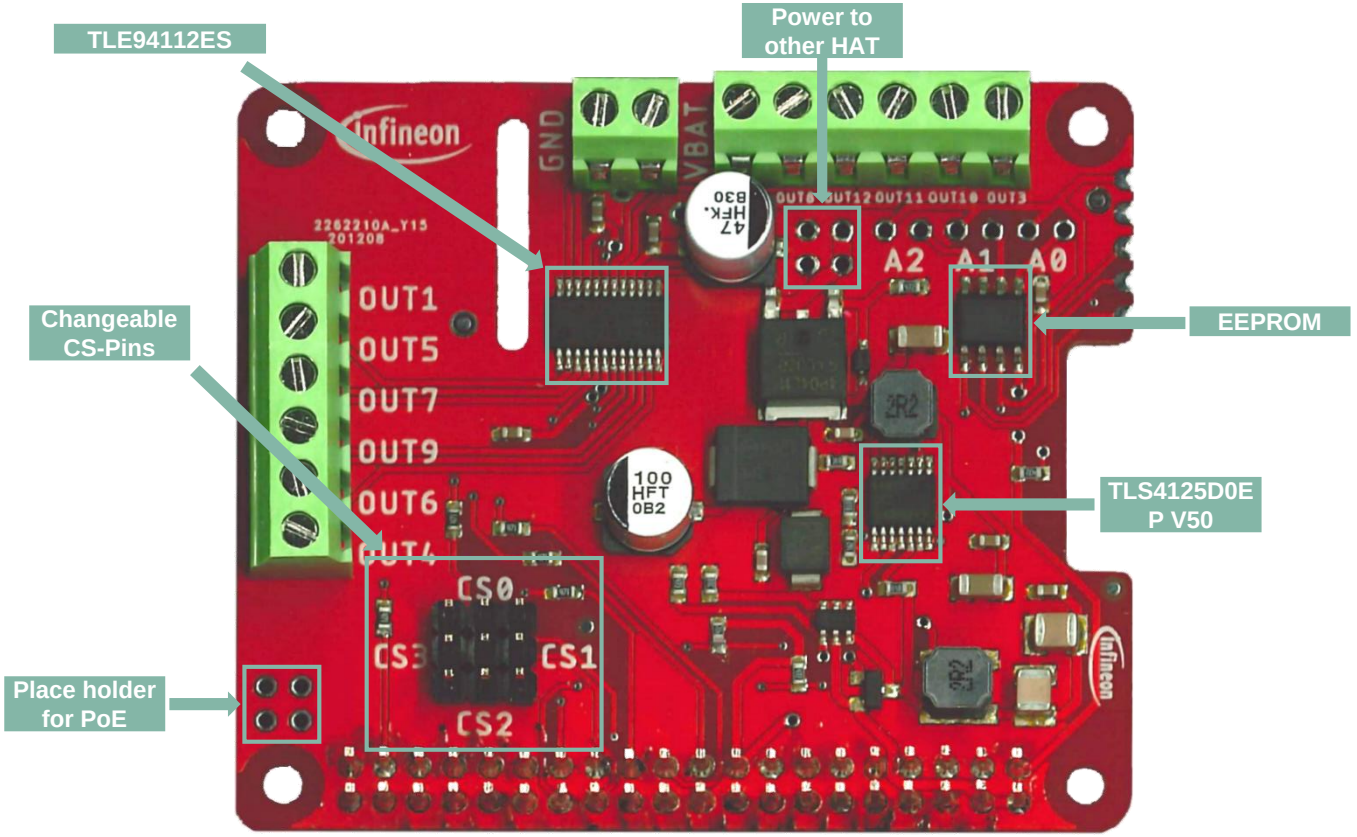
EEPROM

- The HAT includes an EEPROM which stores vendor, product and interface information and can **automatically enable the SPI interface** of the Raspberry Pi.

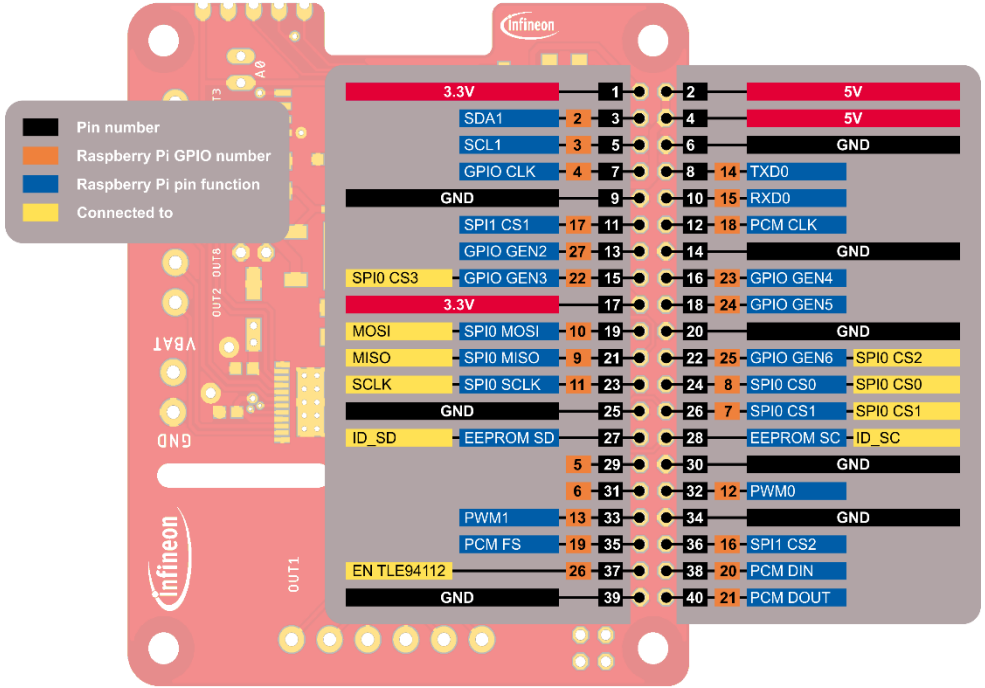
- In case multiple HATs are stacked, the EEPROM on **all but one** HAT need to be disabled. This can be done by closing the solder bridge marked with **A+1**



HAT Overview



Pinout Diagram



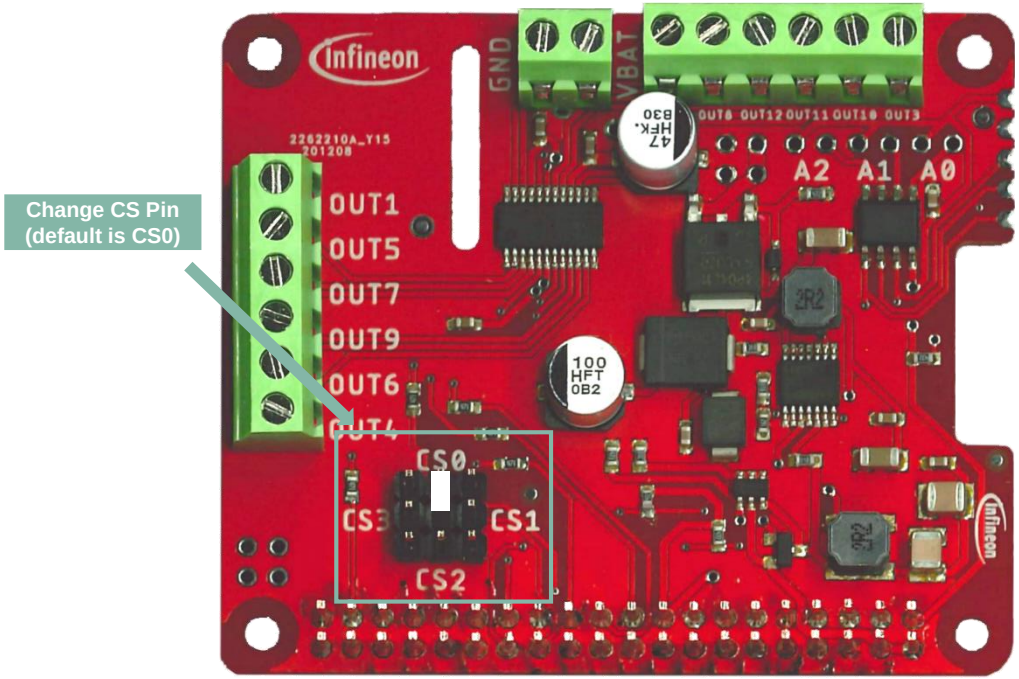
Getting Started

› Check if your Raspberry Pi is compatible with the HAT

Raspberry Pi Model	Compatibility
1 Model A	No
1 Model A+	**Yes**
1 Model B	No
1 Model B+	**Yes**
2 Model B	**Yes**
2 Model B v1.2	**Yes**
3 Model A+	**Yes**
3 Model B	**Yes**
3 Model B+	**Yes**
4 Model B	**Yes**
Zero	**Yes**
Zero W	**Yes**

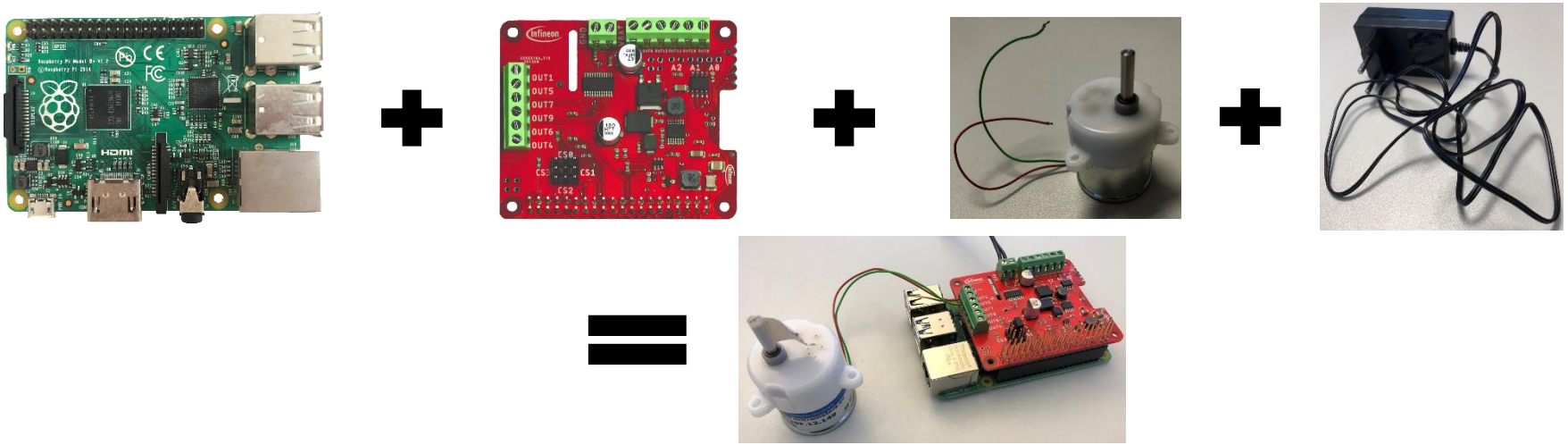
Getting Started

- Check if ...
  - ... the correct CS pin is selected



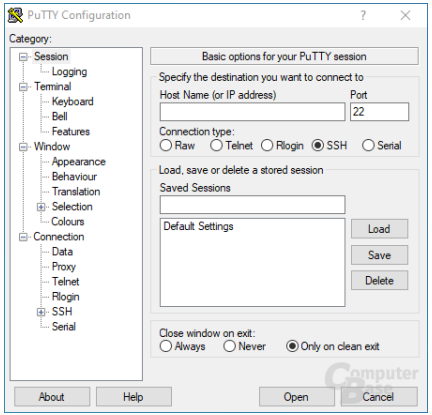
Getting Started

- Connect
  - the **HAT to the Raspberry Pi** via the 40 pin pinheader,
  - a **12V power supply unit to VBAT and GND** (The Pi is also powered now) and
  - a **DC motor** to **outputs 1 and 5**



Getting Started (Software)

- As soon as the Pi is powered, make sure it is **connected to the internet**
  - Either via **Wi-Fi** or via an **ethernet** cable
- There are two options to access the Raspberry Pi
  - Connect the Pi via a HDMI cable to a monitor
  - or download Putty and access the Pi via its IP address



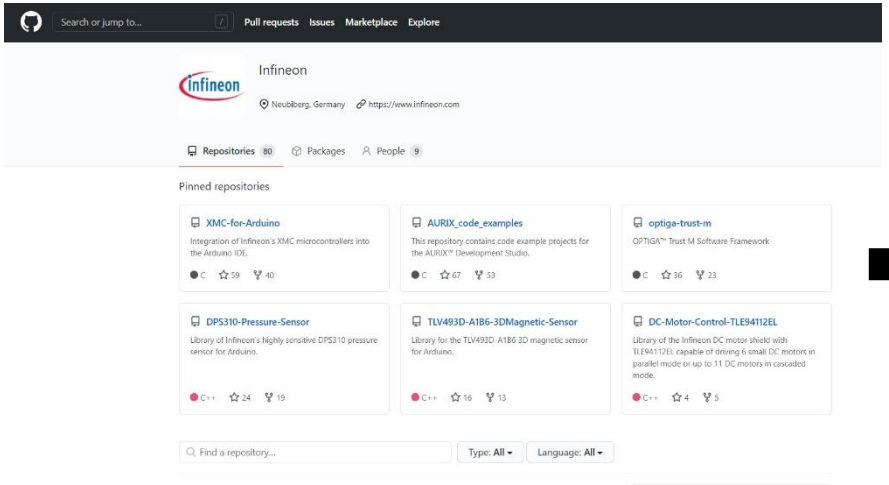
For further information please refer to
the official Rasberry Pi documentation

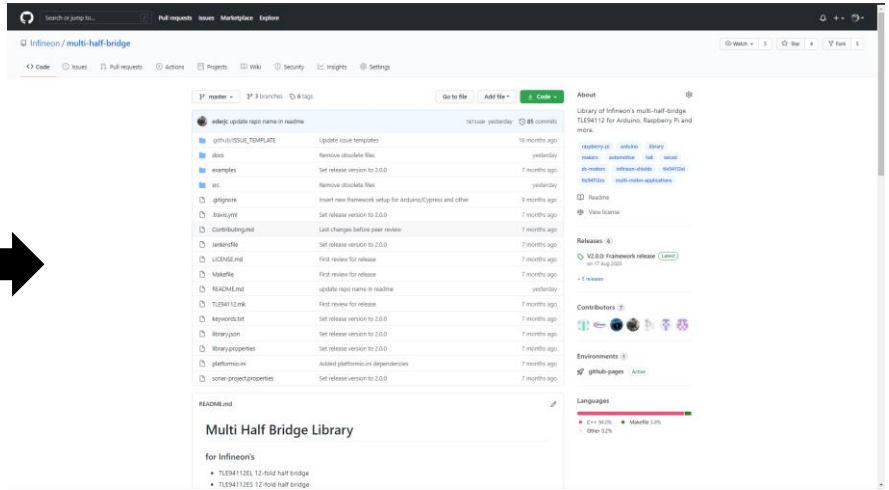
Getting Started (Software)

- When the Pi is all set up, go to Infineon GitHub
- Look for multi-half-bridge, you can find all information there
- Clone the git repository with

```
git clone https://github.com/Infineon/multi-half-bridge.git
```

  - This repository includes the TLE94112ES library and usage examples





Getting Started (Software)

- The **bcm2835 library** provided by airspayce is required by the library and can be installed automatically, using the script **install_requirements.sh** in **src/framework/raspberrypi**

- **For this, execute**
  - `cd multi-half-bridge/src/framework/raspberrypi`
  - `sudo chmod +x ./install_requirements.sh`
  - `./install_requirements.sh`

  - More information about this library can be found **here**

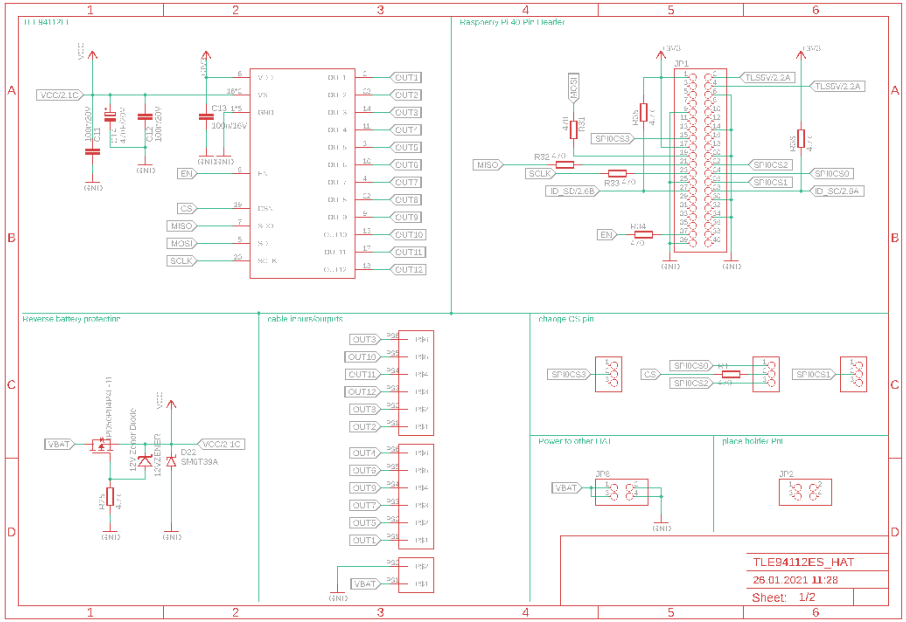
Getting Started (Software)

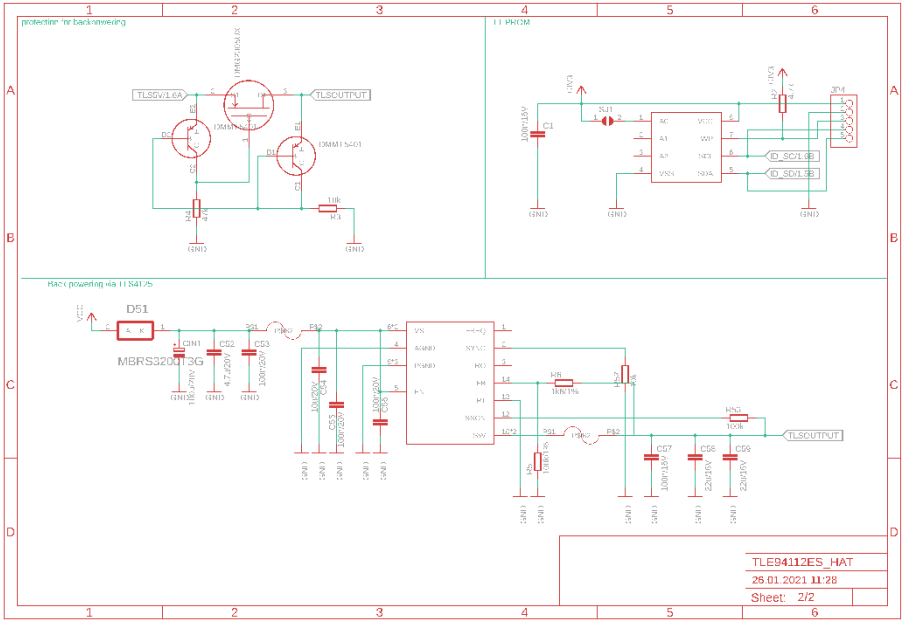
- For a quick first test, **example code** can be found here:

  /src/framework/raspberrypi/examples

- To **compile** the basicTest example
  - execute „`cd /src/framework/raspberrypi/`“
  - and then compile the code with „`make examples/basicTest`“.
    - if you compiled another example before execute „`make clean`“ before compiling
- To **run the code** on the Raspberry Pi
  - change to **folder „build“** and **execute** the code
    - `../../../build/basicTest`

Schematics





Revision History

- Version 1.0.0: Initial Release

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