STEVAL-3DP001V1

Reference design for FDM 3D printing

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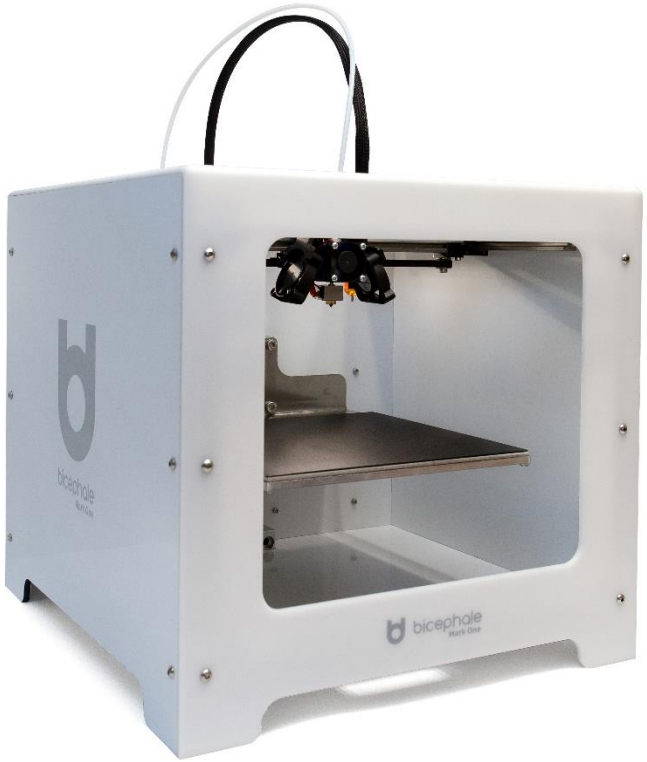
STEVAL-3DP001V1

Ready for the next generation of 3D printers

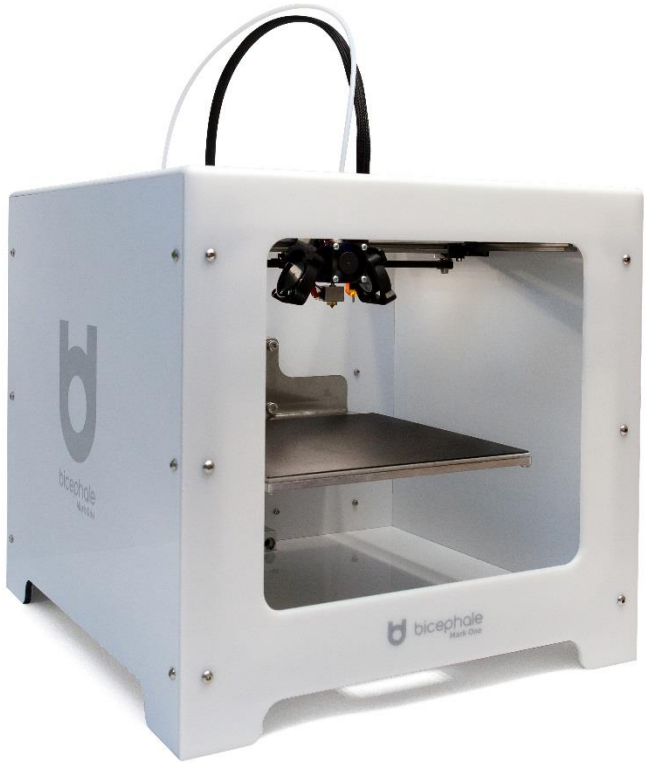
- A complete and integrated solution for driving all 3D printers on the market
- It is designed to drive 3D printers providing several axes (6 motors), several extruders (1 to 3), and multi-zone heating bed (1 to 3).
- It can be used with a software interface or with custom firmware thanks to the embedded STM32 microcontroller based on the 32-bit ARM® Cortex®-M4 core



Features and benefits

STEVAL-3DP001V

State-of-the-art ST technologies for fused deposition modeling (FDM) 3D printing with 100% STMicroelectronics on the PCB



STSPIN
motor driving

Multiple extruders
and
heated beds

Open-source
firmware

Full set
of
interfacing options

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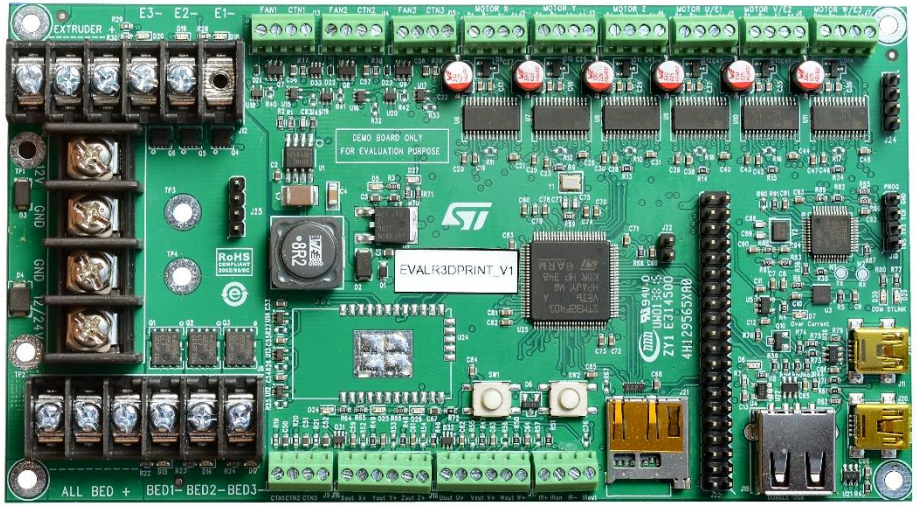
3D printer demo mechanics courtesy of bicephale

STEVAL-3DP001V1 in a nutshell



3 x Hot ends (+ fans)

Head positioning (XYZ axis)

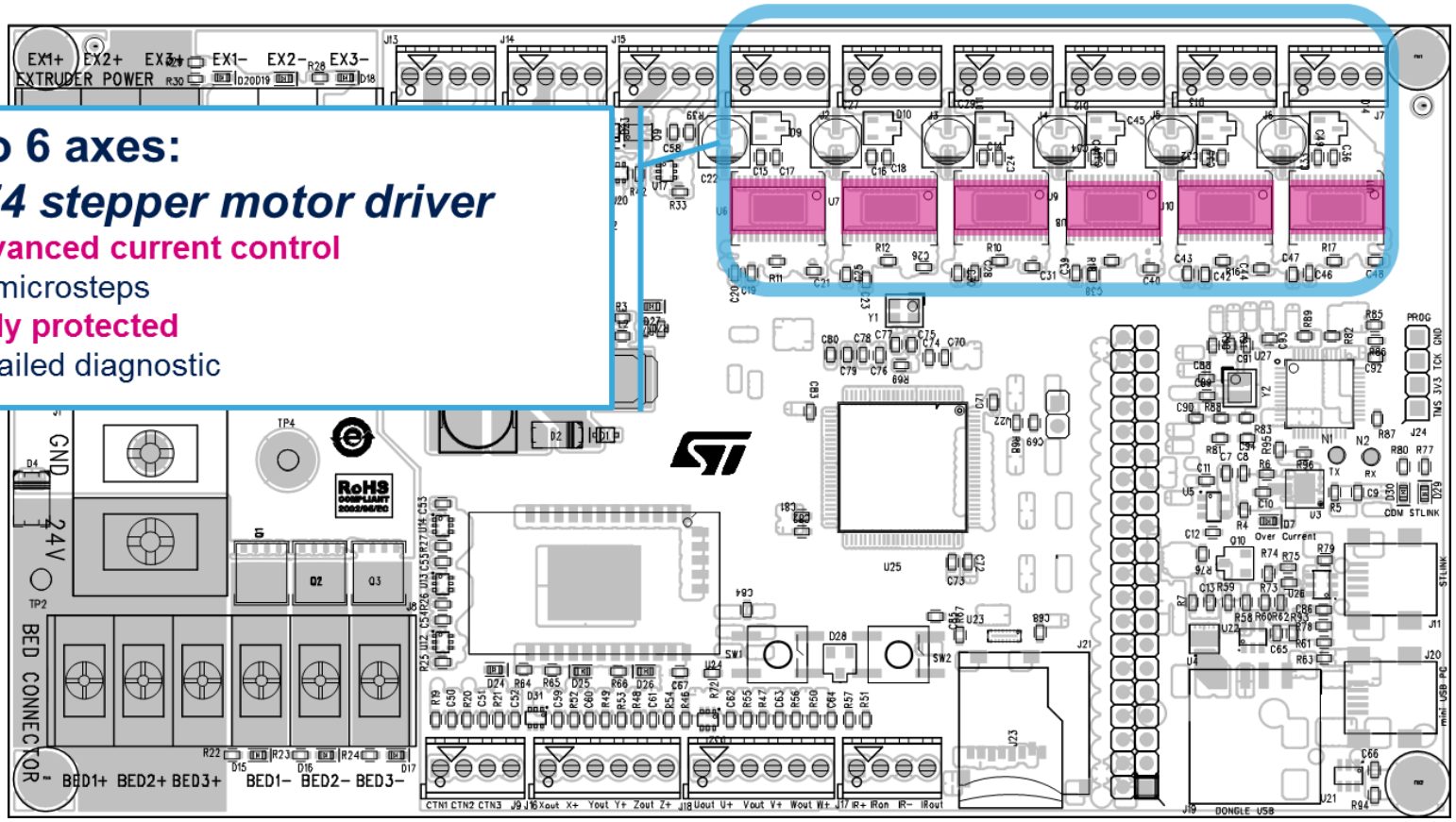
3 x Heated beds or hot chambers

Web server

USB connection

3 x Extruders (UVW axis)

STEVAL-3DP001V1: Motor driving



Up to 6 axes:

L6474 stepper motor driver

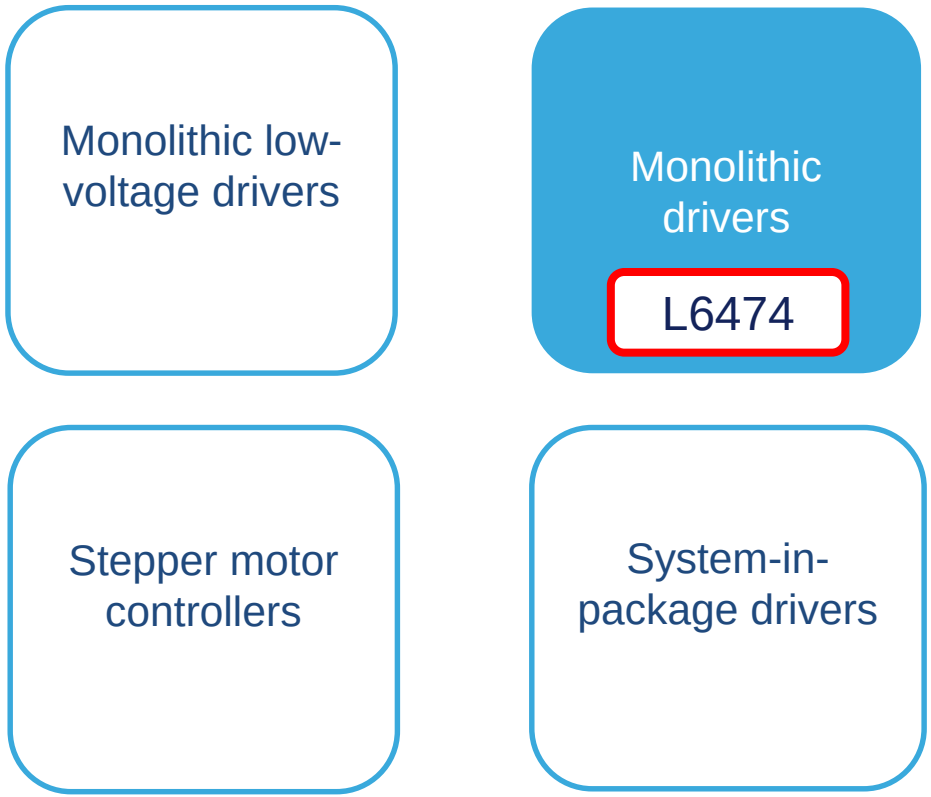
- **Advanced current control**
- 16 microsteps
- **Fully protected**
- Detailed diagnostic

PCB footprint: 85 x 155 mm

STSPIN product portfolio

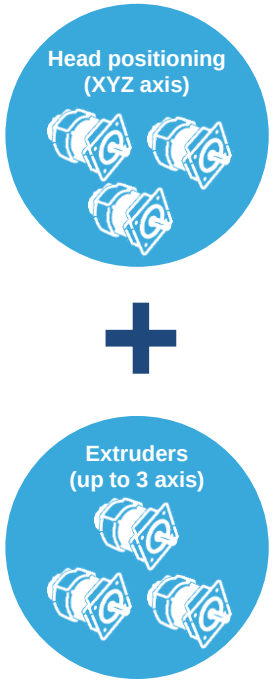
The state-of-the-art in stepper motor driving at your disposal to boost your creativity

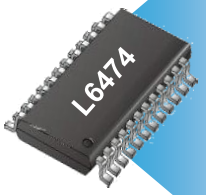
STEVAL-3DP001V1 is based on the STSPIN L6474 stepper motor driver with unique features in terms of current control and protection



STSPIN motor driving

The state-of-the-art in stepper motor driving at your disposal to boost your creativity





Advanced current control
allowing low noise and high precision

Integrated current sensing
avoids the need for a shunt resistor

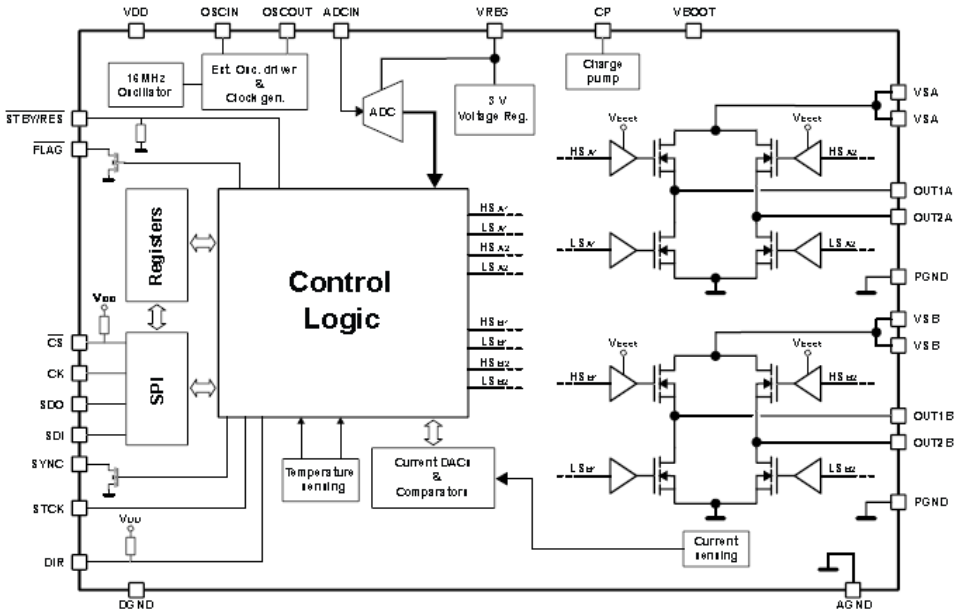
Full set of protection functions and **advanced diagnostics**
for improved reliability

L6474

Fully integrated stepper motor driver

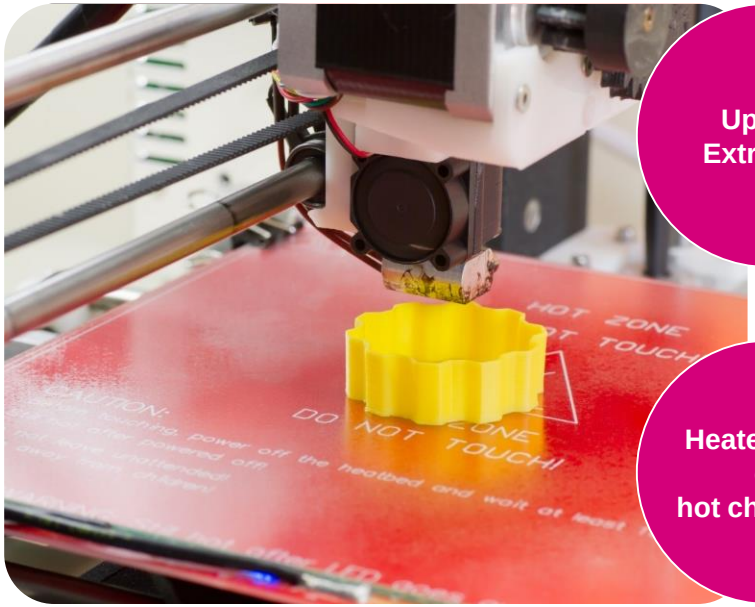
The state-of-the-art in stepper motor driving at your disposal to boost your creativity

- Supply up to 45 V
- Power stage
  - 3 A_{RMS} (7 A peak) , $R_{DS(ON)}$ = 0.28 Ω
- **Easy driving:**
  - SPI or step-clock & direction
- **Advanced current control:**
  - Automatic decay mode selection
  - Fast/slow decay balancing
- **Integrated current sensing**
- **Detailed digital diagnostics**
- **Fully protected**
  - Overcurrent, overtemperature and UVLO
- **SPI interface with MCU**



Multiple extruders and heated beds

Keep your hot ends cold thanks to ST's power MOSFETs



STL8N10F7

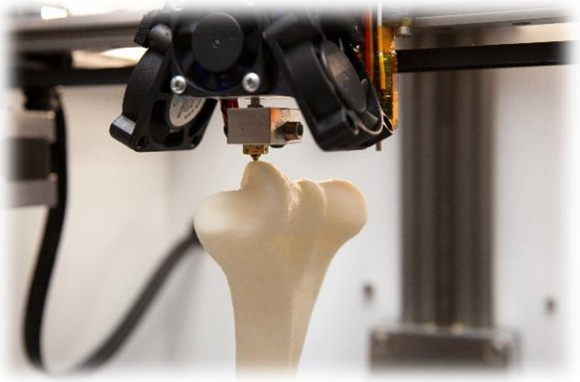
- STripFET™ VII MOSFET with 17 mΩ $R_{ds(ON)}$
- Miniaturized **3 x 3 mm PowerFLAT™** package
- **P_d = 1 W at 8 A of load!**

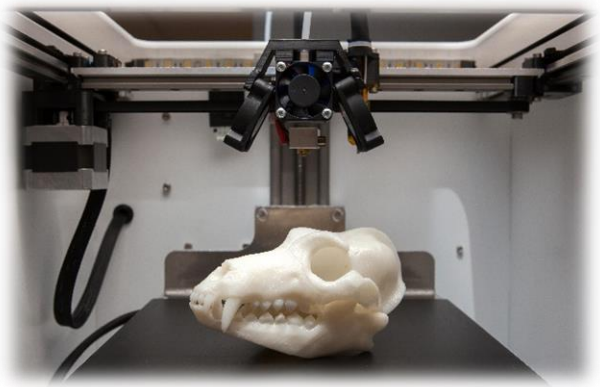
STL220N3LLH7

- STripFET™ VII MOSFET with **<1 mΩ $R_{ds(ON)}$**
- 5 x 6 mm **PowerFLAT™** package
- **P_d = 0.4 W at 20 A of load!**

Open-source firmware

Easy to use and plug-n-play thanks to “ST Marlin” firmware





Adapts the code to different mechanics
All the features can be easily configured through definitions in .h files

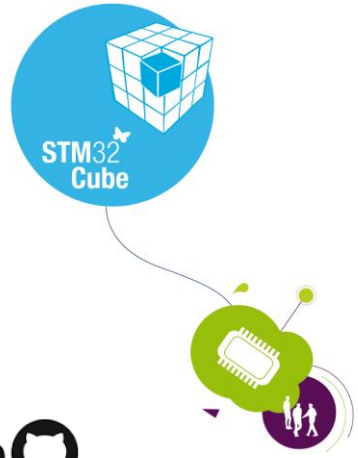
STM32Cube software libraries
Enabling portability between different STM32 devices and including a collection of middleware components

Based on the most famous open-source firmware
The **Marlin** firmware is supported by a diverse and active makers community

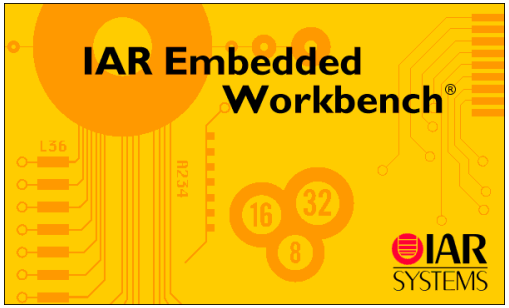
3D printer demo mechanics courtesy of bicephale

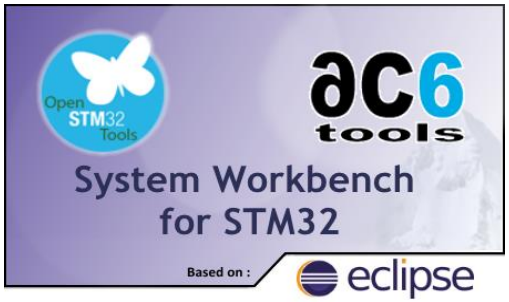
ST Marlin firmware environment

- The firmware of the 3D printer board is based on:
  - STM32Cube environment for drivers peripherals and FatFS
  - Marlin FW for the 3D printer algorithms
- Binary and source code is provided via GitHub as a Marlin fork
- Two different supported IDEs:
  - IAR embedded workbench
  - OpenStm32 (free license)
- Easy upgrade via drag'n'drop thanks to the board's embedded ST-LINK/V2.1



GitHub

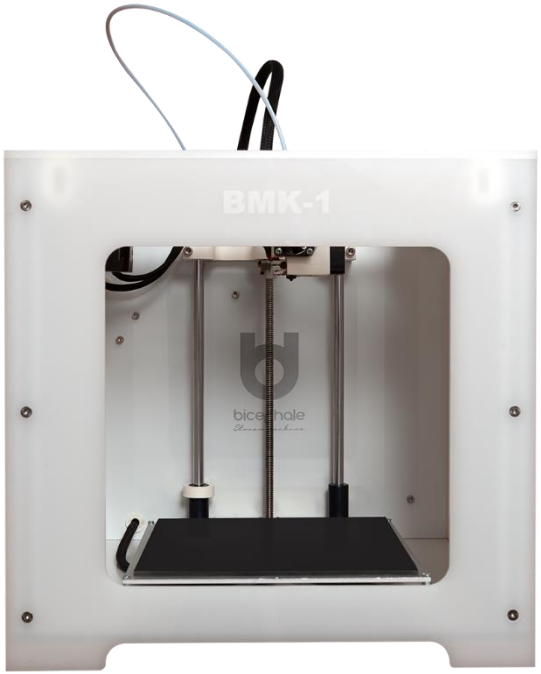




Full set of interfacing options

Connect your 3D printer to the world through Wi-Fi or USB

The STEVAL-3DP001V1 features integrated WiFi connectivity, enabling the user to drive a 3D printer using a smartphone or tablet.



SPWF01SA Wi-Fi module

- Integrated TCP/IP protocol stack
- Small form factor
- Embedded antenna

USB connection supporting different modes

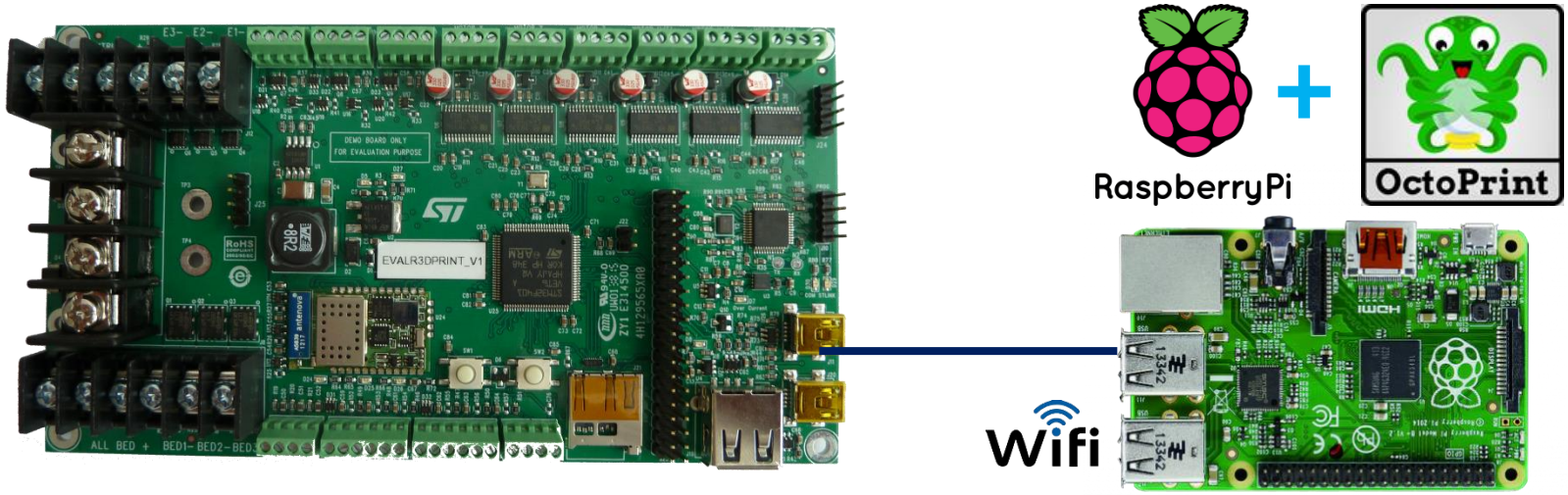
- Dongle
- Virtual COM
- Mass-storage

3D printer demo mechanics courtesy of bicephale

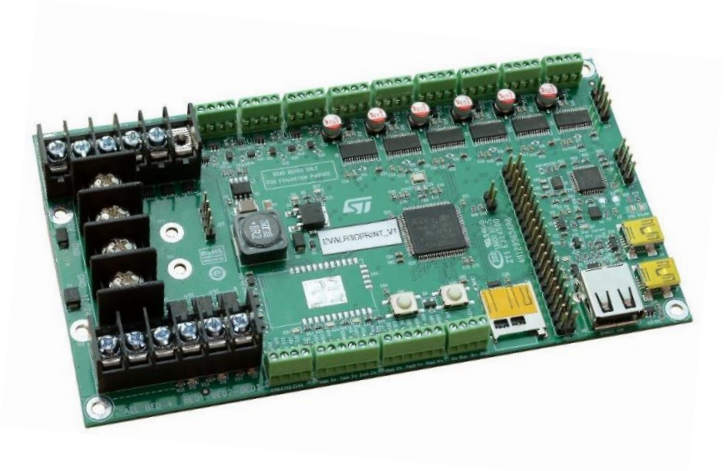
Raspberry Pi & Octoprint interface

New 3D Printing experience thanks to Raspberry Pi & Octoprint tool connection

You can connect the STEVAL-3DP001V1 to other boards (e.g. Raspberry board or user board) using a connector that provides drive power (5 V - 3.3 V) and a digital interface (SPI-I^{2}C-ADC-GPIOS-SD-USB).



STEVAL-3DP001V1 ecosystem



Part number

Order code	Description	Core products
STEVAL-3DP001V1	Evaluation board for 3D printer	STM32 microcontroller; L6474 STSPIN monolithic motor driver; STL8N10F7 STL220N3LLH7 STripFETTM VII MOSFETs SPWF01SA Serial-to-Wi-Fi module

Software

Order code	Description
STSW-3DP001	STEVAL-3DP001V1 setup

Further information and full design support at: www.st.com/3dprint