STEVAL-3DP001V1

Reference design for FDM 3D printing
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

3D printer demo mechanics courtesy of bicephale
STEVAL-3DP001V1 in a nutshell

- **3 x Extruders** (UVW axis)
- **USB connection**
- **Web server**
- **Head positioning** (XYZ axis)
- **3 x Heated beds or hot chambers**
- **3 x Hot ends (+ fans)**
- **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

- Monolithic low-voltage drivers
- Monolithic drivers
- L6474
- Stepper motor controllers
- System-in-package drivers
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

- Head positioning (XYZ axis)
- Extruders (up to 3 axis)
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
  - $3 \text{ A}_{\text{RMS}}$ (7 A peak), $R_{\text{DS(ON)}} = 0.28 \ \Omega$
- 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
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
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-I²C-ADC-GPIO-SD-USB).
## STEVAL-3DP001V1 ecosystem

![Evaluation board for 3D printer](image)

### Part number

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
<th>Core products</th>
</tr>
</thead>
<tbody>
<tr>
<td>STEVAL-3DP001V1</td>
<td>Evaluation board for 3D printer</td>
<td>STM32 microcontroller; L6474 STSPIN monolithic motor driver; STL8N10F7 STL220N3LLH7 STripFETTM VII MOSFETs SPWF01SA Serial-to-Wi-Fi module</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STSW-3DP001</td>
<td>STEVAL-3DP001V1 setup</td>
</tr>
</tbody>
</table>

Further information and full design support at: [www.st.com/3dprint](http://www.st.com/3dprint)