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# STM32 hardware debugging & programming tools

## Discover the STLINK portfolio





# User-friendly hardware and software tools to simplify application development

## STLINK portfolio

Debugging & programming

STLINK-V3MINIE



STLINK-V3PWR



ST-LINK/V2



STLINK-V3SET



STLINK-V3MODS

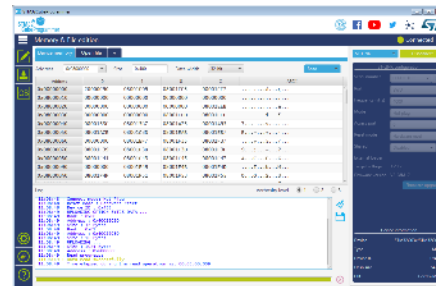


..and expansion boards!

## STM32CubeProgrammer SW tool

Code & hardware  
programming

STM32CubeProg



## STM32HSM HW security module

Authentication &  
license generation

STM32HSM-V2



## Third-party programming systems

From prototyping to  
mass production



# STLINK portfolio



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# STLINK-V3 tools for more efficient debugging



STLINK-V3SET



STLINK-V3PWR

**Easier**

**Faster**

**More flexible**

- Standalone probe or on-board module
- Direct support of power-constrained IoT products (1.65 - 3.3 V)
- Virtual COM port and multi-path bridge
- Secure programming with STM32HSM, Trusted package creator and STM32CubeProgrammer software tools
- Large choice of STM32 software tools among partner offering

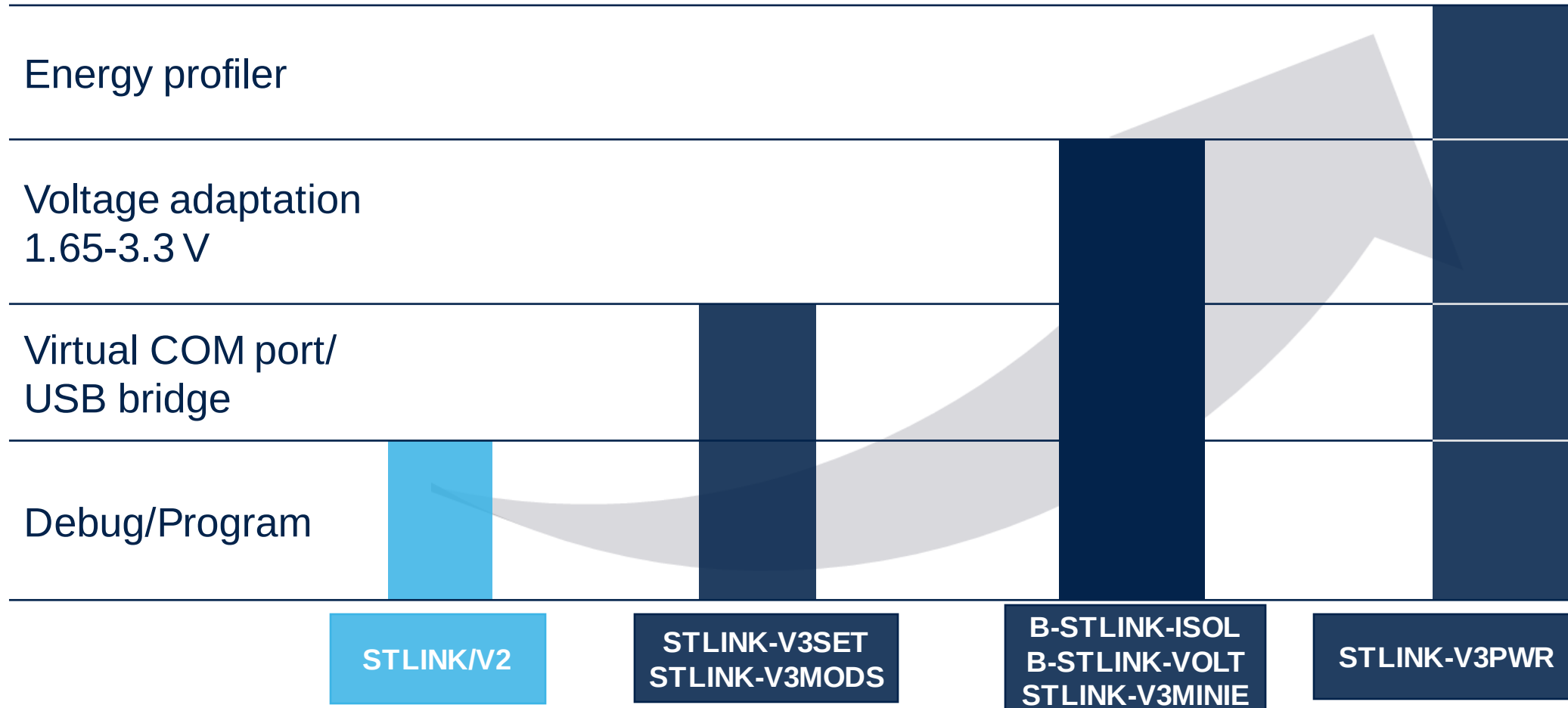


STLINK-V3MODS



STLINK-V3MINIE

# STLINK evolution



# STLINK-V3SET a scalable debugger/programmer



**Easier**

- JTAG / SWD / SWV (STM32 debug)
- SWIM (STM8 debug)
- Drag and drop flash programming
- Virtual COM port

**Faster**

- Performance boost (vs STLINK/V2)
- Optimized algorithms
- USB 2.0 High Speed interface



**More flexible**

- Extension boards
- Multi-path bridge (through adapter board)

**STLINK-V3SET**

**\$35**

# STLINK-V3SET addresses multiple needs



Adapter board

Connector formats:

STDC-14

JTAG-20

Easy addition of  
multi-path bridge  
and debug connector  
formats

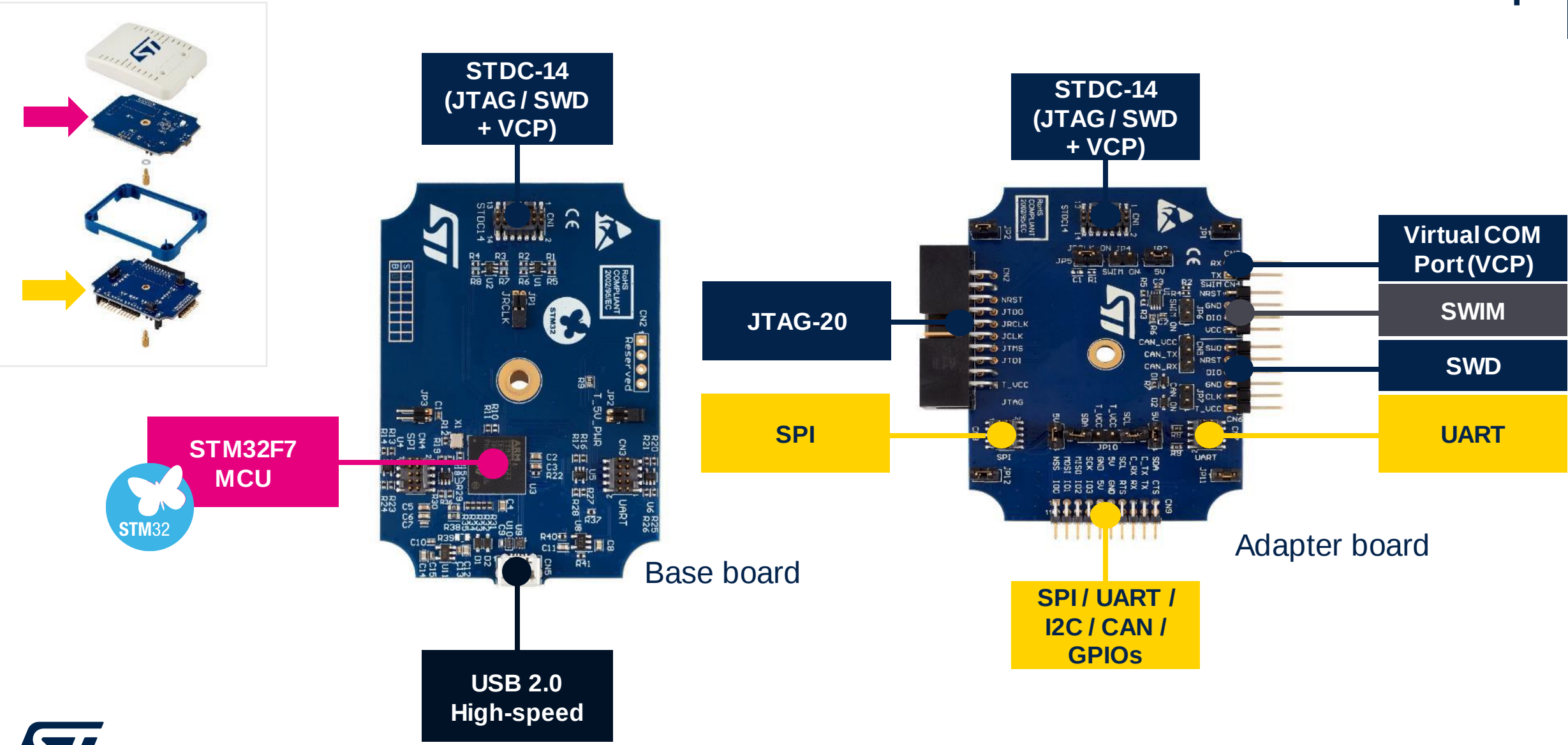
USB to:

- UART
- SPI
- CAN
- I2C
- :
- GPIOs



STLINK-V3SET

# STLINK-V3SET close-up



# A ready-to-use module for your custom boards

## STLINK-V3MODS



**STLINK-V3SET**



**STLINK-V3MODS**

**\$8.25**

**Performance boost  
(vs STLINK/V2)**

- JTAG / SWD /SWV debug interfaces
- USB 2.0 High Speed interface

**Small size,  
small price**

- Footprint 15 x 30 mm
- Price below \$9

**Multi-path bridge**

- Virtual COM port
- Drag and drop programming
- USB to UART / SPI / I2C / CAN / GPIOs

# STLINK extension boards



**B-STLINK-VOLT**

**\$20**



**B-STLINK-ISOL**

**\$40**

## Voltage adaptation

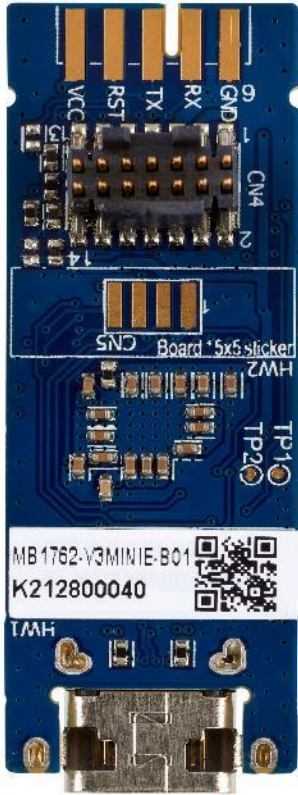
- 1.65 – 3.3 V voltage adaptation for debug / virtual COM port / bridge signals
- Compatible with STLINK-V3SET casing

## Galvanic isolation & voltage adaptation

- 1.65 – 3.3 V galvanic isolation and voltage adaptation for debug / virtual COM port / bridge signals
- Compatible with STLINK-V3SET casing

# The small probe that makes a big difference

## STLINK-V3MINIE



**STLINK-V3MINIE**

**\$11**

**More performance  
at a lower price  
(vs STLINK/V2)**

- JTAG / SWD / SWV debug interfaces
- USB Type-C High Speed interface

**Easier in-the-field  
firmware update**

- Virtual COM port
- Tiny size: 15 x 42 mm
- 3D printer files for custom casing

**Direct support of  
power-constrained  
IoT products**

Voltage adaptation 1.65-3.3V

# STLINK overview

|                        | STLINK/V2                 | STLINK-V3MODS              | STLink-V3MINIE             | STLINK-V3SET               | B-STLINK-VOLT<br>B-SLINK-ISOL | STLINK-V3PWR               |
|------------------------|---------------------------|----------------------------|----------------------------|----------------------------|-------------------------------|----------------------------|
| MCUs supported         | STM32<br>STM8             | STM32                      | STM32                      | STM32<br>STM8              | STM32                         | STM32                      |
| Casing                 | Yes                       | (on-board module)          | STL file                   | Yes                        | V3SET extension               | Yes                        |
| USB                    | Full Speed<br>(12 Mbit/s) | High Speed<br>(480 Mbit/s) | High Speed<br>(480 Mbit/s) | High Speed<br>(480 Mbit/s) | V3SET extension               | High Speed<br>(480 Mbit/s) |
| SWD max read data rate | 150 Kbytes/s              | 800 Kbytes/s               | 800 Kbytes/s               | 800 Kbytes/s               |                               | 475 Kbytes/s               |
| Virtual COM port       | No                        | 16 MHz                     | 16 MHz                     | 16 MHz                     | 10 MHz                        | 12 MHz                     |
| Multi-path bridge      | No                        | Yes                        | No                         | Yes                        | Yes                           | Yes                        |
| Target voltage         | 3.3 V                     | 3.3 V                      | 1.65-3.3 V                 | 3.3 V                      | 1.65-3.3 V                    | 1.6-3.6 V                  |
| Energy profiler        | No                        | No                         | No                         | No                         | No                            | Yes                        |
| Price                  | \$21                      | \$8.25                     | \$11                       | \$35                       | \$20 / \$40                   | \$95                       |

# Software support and product references



**STLINK-V3MINIE / V3MODS**  
**STLINK-V3SET / V3PWR**

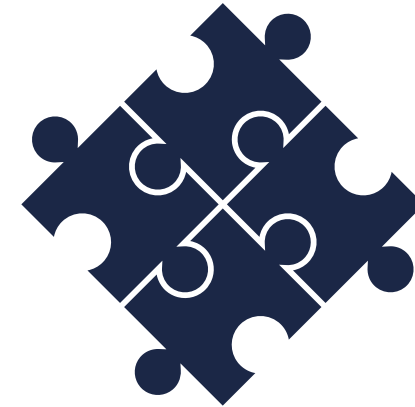
STM32CubeMonitor  
STM32CUBEMON

STM32CubeProgrammer  
STM32CUBEPROG

STM32CubeIDE

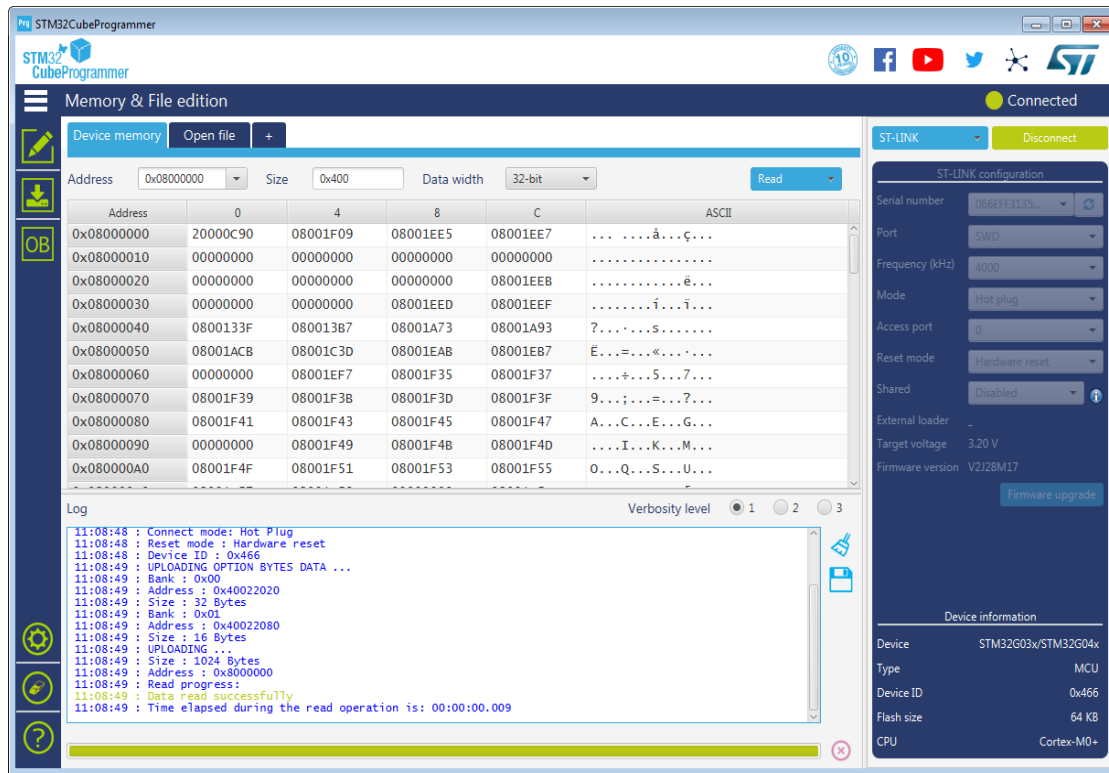
IDE toolset  
MDK-ARM

IDE toolset  
EWARM



# STM32CubeProgrammer software tool

User-friendly tool compatible with multiple platforms (Windows, Linux, macOS)



STLINK direct support  
(JTAG, SWD)

Automatic mode

Option bytes  
program & upload

Command line interface  
for scripting

Internal / external flash  
services

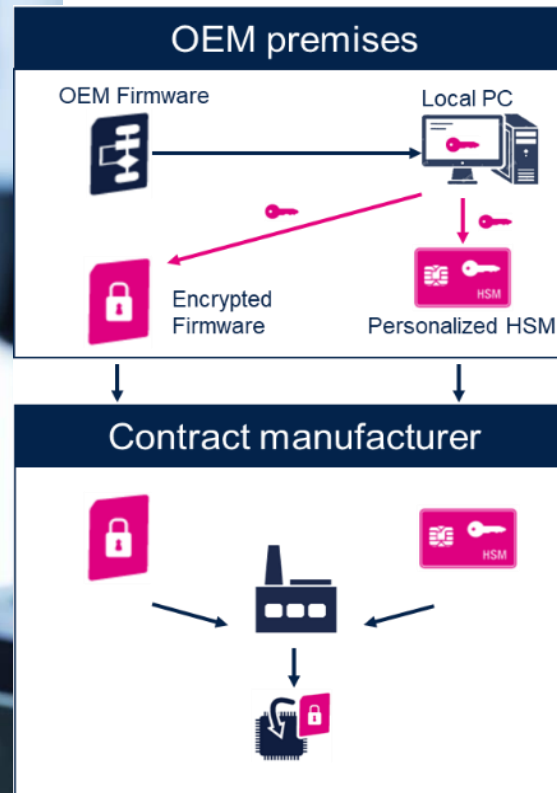
API DLL  
for custom integration

Bootloader interface support  
(USB, UART, SPI, I2C, CAN)

Trusted package creator  
(secure programming)

# Secure your production flow with secure firmware install (SFI)

## Protect application firmware at the contract manufacturer



Complete toolset to encrypt OEM binaries with the [STM32 Trusted Package Creator](#) software

Securely flash the STM32 with licenses from a [STM32HSM](#) at the programming partner location

Control the [number of devices](#) programmed with the firmware

End-to-end security programming

# Secure the STM32 programming flow in untrusted areas

**STM32HSM, a hardware secure module for secure firmware installation (SFI)**



**STM32HSM-V2xx**

(license number from 25 units to 1Mu)

Secure storage of OEM firmware encryption key  
and license counter (SFI operations)

License generation engine  
with smartcard format

Identification of genuine firmware  
and STM32 products

Direct support from STM32CubeProgrammer  
and Trusted Package Creator software tools

# STLINK-V3PWR for energy profiling



# Optimize energy efficiency in STM32 applications

## STLINK-V3 Power, a debugger to measure power consumption

**Measure the dynamic current consumption of any STM32 device with high accuracy**

**Visualize and analyze the evolution of power consumption during an unlimited time window**

**Debug STM32 code and measure current consumption at the same time**

# STLINK-V3PWR powerful, user-friendly energy profiler

**Debug code and measure energy consumption at the same time**



STM32  
CubeMonitor-Power



Visualize energy consumption with  
STM32CubeMonPwr software tool

Current measurement with wide dynamic range  
(nA-500mA)

High accuracy (up to +/-0.5%)  
Resolution up to 2nA

Programmable output voltage source  
1.6 - 3.6V (under up to 2A)

Direct support of Keil and IAR IDEs  
for power profiling

Programmer with multi-path bridge

# Energy profiling using any STM32 MCU



X-NUCLEO-LPM01A



STM32L562E-DK



STLINK-V3PWR

|                        | Power shield           | Energy metering                             | STLINK-V3 Power |
|------------------------|------------------------|---------------------------------------------|-----------------|
| Dynamic current ranges | 100nA / 50mA           | 300nA / 150mA                               | nA up to 500mA  |
| Target MCUs            | STM32L0, L4<br>STM32WB | STM32L0, L4,<br>STM32L5, U5,<br>STM32WB, WL | All STM32 MCUs  |

# Visualize power data with STM32CubeMonPwr tool



**Display**

Graphical rendering in real-time (up to 100 kSPS)  
Acquisition log over large period of time

**Analyze**

Intuitive zoom and navigation into energy consumption data

**Benchmark**

Fast computation of EEMBC ULPMark-CP scores

# STLINK-V3PWR overview

## USB Type-C high-speed interface

- Simultaneous debug and monitoring with STM32CubeMonPwr and IDEs
- Fast programming with STM32CubeProg

## Multi-path bridge USB to UART / SPI / I2C / CAN / GPIOs

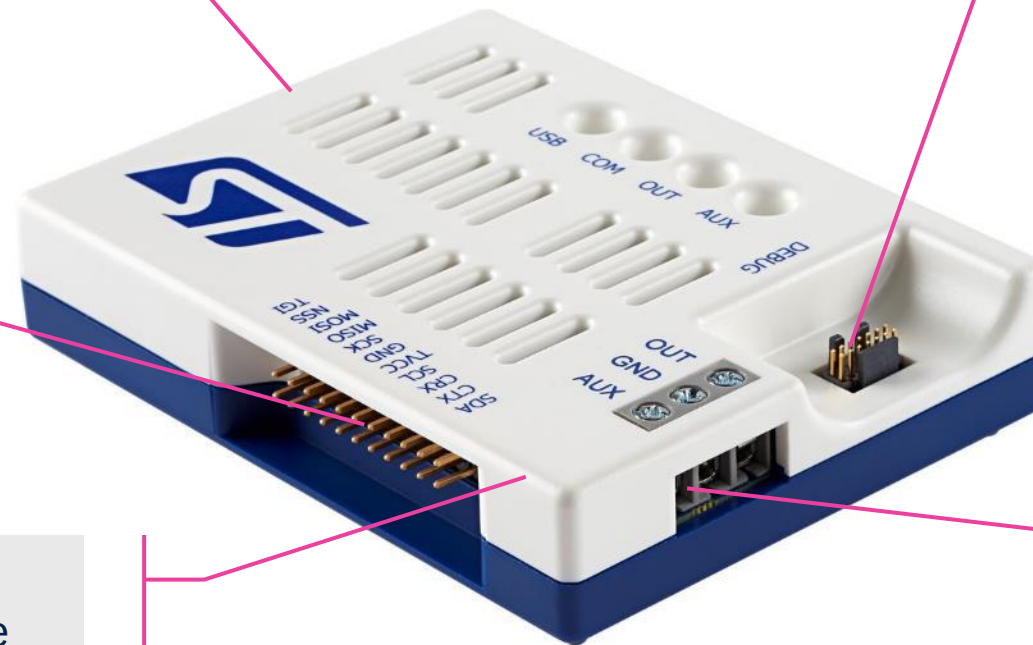
**Current measurement** with wide dynamic range and high accuracy

## Debugger / Programmer

- SWD / JTAG
- Drag and drop programming
- Virtual COM port

## Debug code in sync with power consumption measurements

Programmable voltage  
supply for target



## STLINK-V3PWR

**\$95**

# Software support and product references



STM32CubeMonitor-Power  
**STM32CubeMonPwr**

From release v1.2



STM32CubeProgrammer  
**STM32CubeProg**

From release v2.13



STM32CubeIDE

From release v1.12



IDE toolset  
MDK-ARM

From release v5.38a



IDE toolset  
EWARM

From release v9.32.2

# Releasing your creativity



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[@ST\\_World](#)



[community.st.com](#)



[www.st.com/stlink](#)  
[www.st.com/stm32cubeprog](#)  
[www.st.com/stm32cubemonpwr](#)



[wiki.st.com/stm32mcu](#)



[github.com/stm32-hotspot](#)



[STM32 MCU Developer Zone](#)

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