Programmer/Debugger Tool

- Untuk membuat **prototype embedded system** menggunakan **chip mikrokontroler**, salah satu alat penting yang harus kita miliki adalah **programmer/debugger chip mikrokontroler**.

- Programmer/debugger **berfungsi** untuk mengunduh program ke dalam chip mikrokontroler.

- **Tanpa** programmer/debugger, maka kita **tidak dapat mengunduh program** ke dalam **chip mikrokontroler**.

Interface Komputer - ST-Link/V2 - Aplikasi uC STM

ST-LINK/V2
Programmer/Debuger

Komputer

Aplikasi Mikrokontroler
STM8 & STM32

Programmer/Debugger ST-LINK/V2

- ST-LINK/V2 adalah *programmer* dan sekaligus *debugger* untuk mikrokontroler produk dari ST microelectronics (STM) keluarga STM8 dan STM32.

- ST-LINK/V2 dapat menjadi jembatan komunikasi antara komputer/PC dengan:

1. Aplikasi **STM8** menggunakan antarmuka USB melalui pin data **SWIM** (*Single wire interface module*) dengan bantuan software **ST Visual Develop** (STVD) atau **ST Visual Program** (STVP).

2. Aplikasi **STM32** menggunakan antarmuka USB melalui pin data **SWD** (*Single wire debugging*) atau **JTAG** (*Joint Test Action Group* - pin TDI, TMS, TCK, TDO) dengan bantuan software *Integrated Development Environments* (IDE) **berlisensi** seperti Atollic, IAR, dan ARM Keil atau dengan software IDE **gratis** seperti CooCox CoIDE, System Workbench for STM32 (SW4STM32), Eclipse, dan **STM32CubeIDE**.

Fitur ST-LINK/V2

- 5 V power supplied by a USB connector, USB 2.0 full-speed-compatible interface, USB standard A to Mini- B cable

- **SWIM (Serial Wire Interface Module) specific features**:

  STM8

  1. 1.65 V to 5.5 V application voltage supported on SWIM interface

  2. SWIM low-speed and high-speed modes supported

  3. SWIM programming speed rate: 9.7 Kbytes/s in low speed and 12.8 Kbytes/s in high speed

  4. SWIM cable for connection to the application via an ERNI standard vertical connector (ref: 284697 or 214017) or horizontal connector (ref: 214012)

  5. SWIM cable for connection to the application via a pin header or a 2.54 mm pitch connector

- **JTAG*/SWD (serial wire debugging) specific features**:
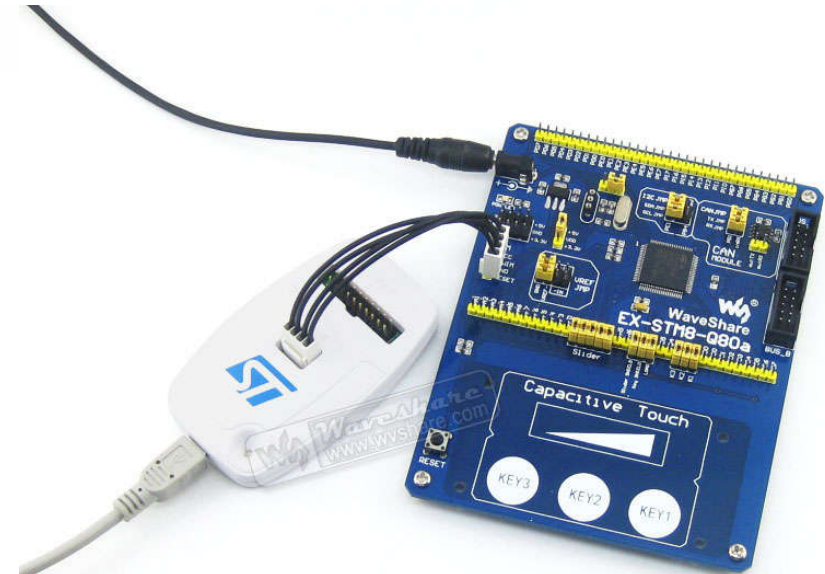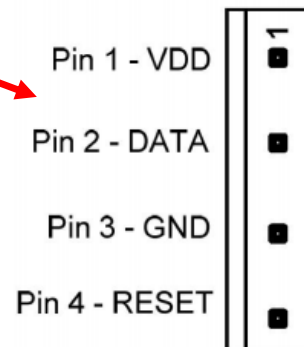
  STM32

  1. 1.65 V to 3.6 V application voltage supported on the JTAG/SWD interface and 5 V tolerant inputs

  2. JTAG supported. JTAG cable for connection to a standard JTAG 20-pin pitch 2.54 mm connector

  3. SWD and serial wire viewer (SWV) communication supported

- Direct firmware update (DFU) feature supported

- Status LED which blinks during communication with the PC
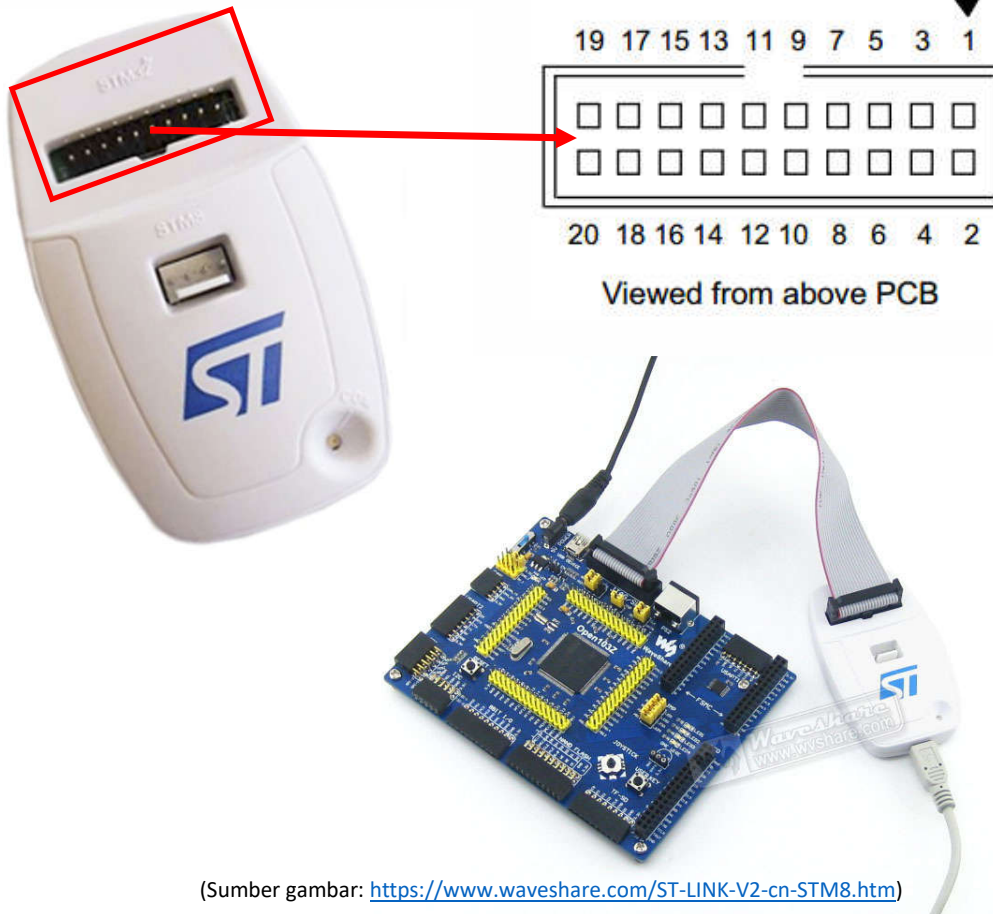
- Operating temperature 0 to 50 °C

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* JTAG = *Joint Test Action Group* (pin: TDI, TMS, TCK, TDO)

Koneksi ST-LINK/V2 & Aplikasi STM8

Pin no.	Name	Function	Target connection
1	VDD	Target VCC[1]	MCU VCC
2	DATA	SWIM	MCU SWIM pin
3	GND	GROUND	GND
4	RESET	RESET	MCU RESET pin

1. The power supply from the application board is connected to the ST-LINK/V2 debugging and programming board to ensure signal compatibility between both boards.

Pin 1 - VDD

Pin 2 - DATA

Pin 3 - GND

Pin 4 - RESET

(Sumber gambar: https://www.waveshare.com/ST-LINK-V2-cn-STM8.htm)

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Koneksi ST-LINK/V2 & Aplikasi STM32

19 17 15 13 11 9 7 5 3 1

20 18 16 14 12 10 8 6 4 2

Viewed from above PCB

(Sumber gambar: https://www.waveshare.com/ST-LINK-V2-cn-STM8.htm)

Pin no.	ST-LINK/V2 connector (CN3)	ST-LINK/V2 function	Target connection (JTAG)	Target connection (SWD)
1	VAPP	Target VCC	MCU VDD[1]	MCU VDD[1]
2				
3	TRST	JTAG TRST	JNTRST	GND[2]
4	GND	GND	GND[3]	GND[3]
5	TDI	JTAG TDO	JTDI	GND[2]
6	GND	GND	GND[3]	GND[3]
7	TMS_SWDIO	JTAG TMS, SW IO	JTMS	SWDIO
8	GND	GND	GND[3]	GND[3]
9	TCK_SWCLK	JTAG TCK, SW CLK	JTCK	SWCLK
10	GND	GND	GND[3]	GND[3]
11	NC	Not connected	Not connected	Not connected
12	GND	GND	GND[3]	GND[3]
13	TDO_SWO	JTAG TDI, SWO	JTDO	TRACESWO[4]
14	GND	GND	GND[3]	GND[3]
15	NRST	NRST	NRST	NRST
16	GND	GND	GND[3]	GND[3]
17	NC	Not connected	Not connected	Not connected
18	GND	GND	GND[3]	GND[3]
19	VDD	VDD (3.3V)[5]	Not connected	Not connected
20	GND	GND	GND[3]	GND[3]

Mikrokontroler STM yang disupport ST-LINK/V2

Product Line	Microcontroller Series
STM32	STM32F100xx, STM32F101xx, STM32F102xx, STM32F103xx, STM32F105xx, STM32F107xx, STM32F2xxx, STM32F4xxx
	STM32L15xx6, STM32L15xx8,STM32L15xxB, STM32L151xC, STM32L151xD, STM32L152xC, STM32L152xD, STM32L162xD
	STM32TS60
	STM32W108C8, STM32W108xB, STM32W108xC, STM32W108xZ
STM8	STM8AF51x, STM8AF52x, STM8AF61x, STM8AF62x,STM8AH51x, STM8AH61x
	STM8S003K3, STM8S003F3, STM8S005C6, STM8S005K6, STM8S007C8, STM8S103xx, STM8S105xx, STM8S207xx, STM8S208xx, STM8S903F3, STM8S903K3
	STM8L101xx, STM8L15x, STM8L16x
	STM8TL52x4,STM8TL53x4

ST-LINK/V2 Software Support

1. STM32 ST-LINK utility/**STM32CubeProgrammer** (GUI for download program process)

https://www.st.com/content/st_com/en/products/development-tools/software-development-tools/stm32-software-development-tools/stm32-programmers/stsw-link004.html

2. ST-Link/V2 Firmware

https://www.st.com/content/st_com/en/products/development-tools/software-development-tools/stm32-software-development-tools/stm32-programmers/stsw-link007.html

3. ST-LINK/V2 USB driver (for Windows7/8/10)

https://www.st.com/content/st_com/en/products/development-tools/software-development-tools/stm32-software-development-tools/stm32-utilities/stsw-link009.html

Terima kasih