life.augmented

STM 8

× Products | Tools & software | Applications | Solutions | ST Developer Zone

- Automotive logic ICs
- Automotive microcontrollers
- Clocks and timers
- Data converters
- Digital set-top box ICs
- Diodes and rectifiers
- Imaging and photonics solutions
- Interfaces and transceivers
- Memories
- MEMS and sensors
- Microcontrollers & microprocessors
- Motor drivers
- NFC

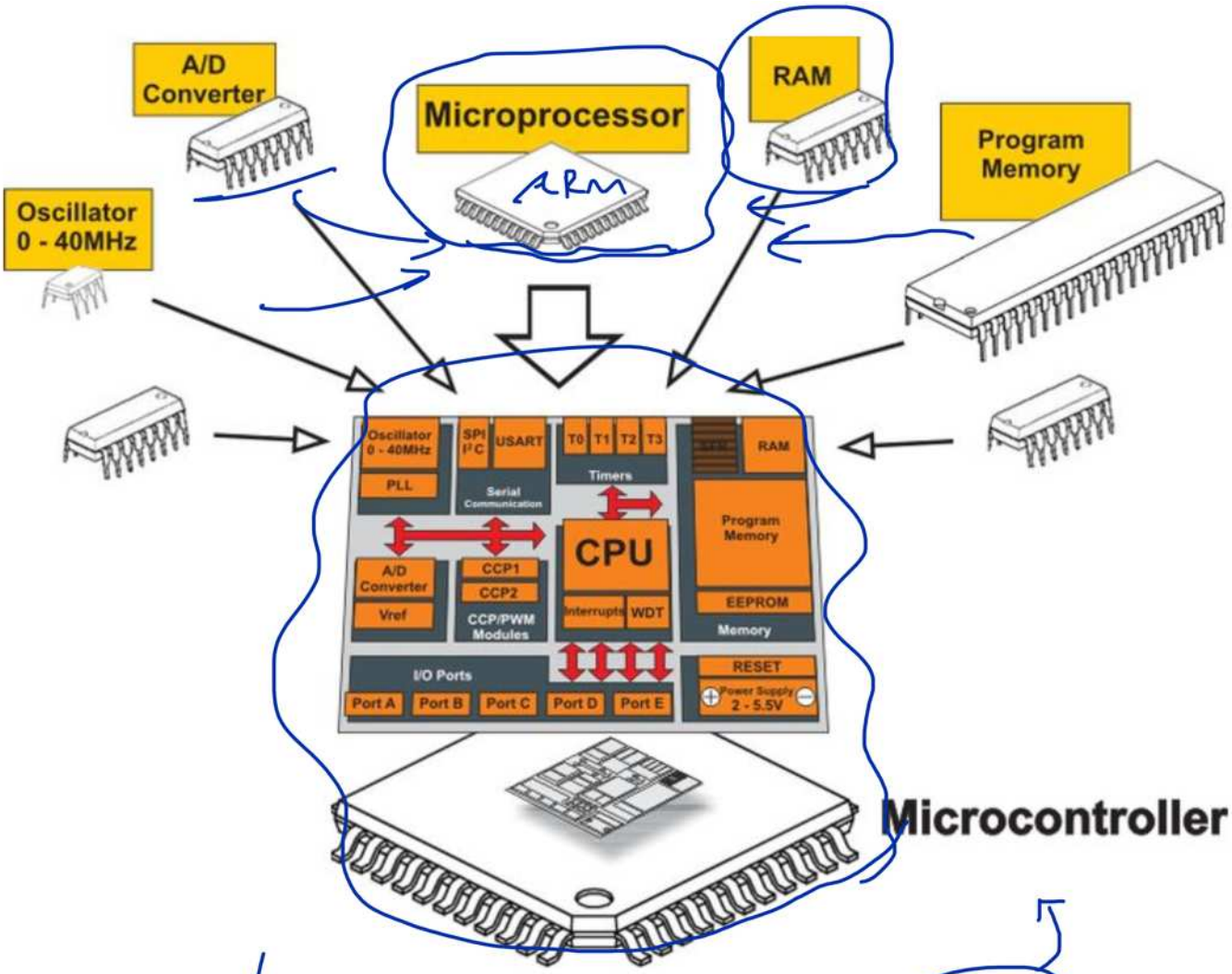
Microcontrollers & microprocessors — Browse Microcontrollers & microprocessors

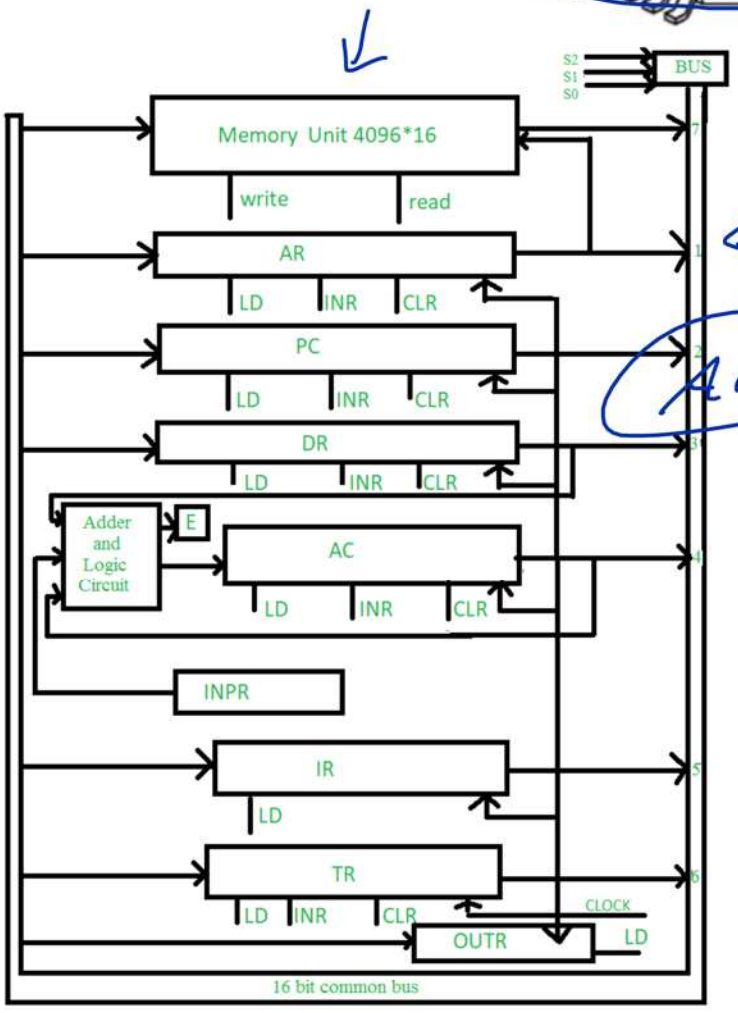
STM32 32-bit Arm Cortex MCUs ✓	STM32 high performance MCUs	STM32 mainstream MCUs
	STM32 ultra low power MCUs	STM32 wireless MCUs
STM32 Arm Cortex MPUs	STM32MP1 series	STM32MP2 series
STM8 8-bit MCUs	STM8AF series	STM8AL series
	STM8L series	STM8S series
	STM8T series	

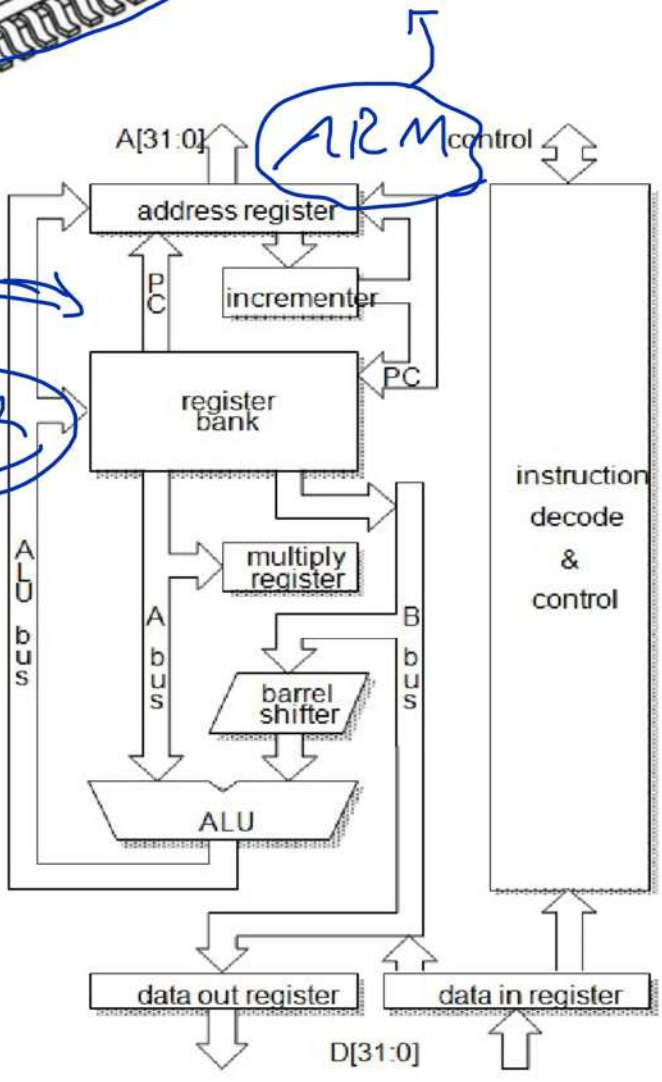
arm

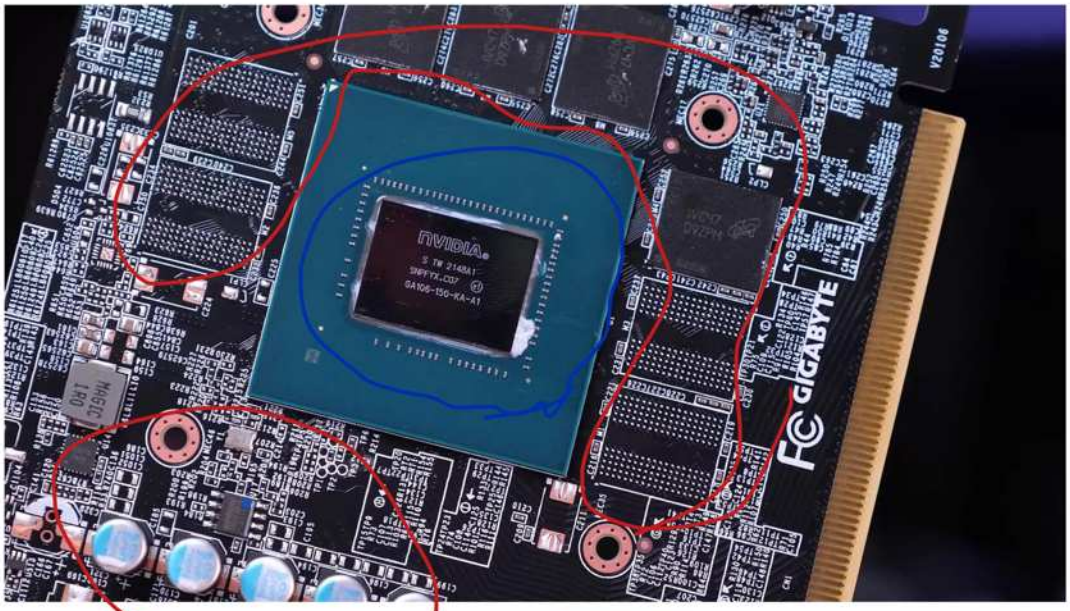
formerly an acronym for **Advanced RISC Machines**

and originally **Acorn RISC Machine** ✓


A/D Converter
Microprocessor
RAM
Program Memory
Oscillator 0 - 40MHz
Oscillator 0 - 40MHz
PLL
SPI I²C
USART
Serial Communication
T0 T1 T2 T3
Timers
RAM
CPU
Program Memory
A/D Converter
Vref
CCP1
CCP2
CCP/PWM Modules
Interrupts
WDT
EEPROM Memory
I/O Ports
Port A
Port B
Port C
Port D
Port E
RESET
Power Supply 2 - 5.5V
Microcontroller


BUS
S2
S1
S0
Memory Unit 4096*16
write
read
AR
LD
INR
CLR
PC
DR
Adder and Logic Circuit
E
AC
INPR
IR
TR
OUTR
CLOCK
16 bit common bus


A[31:0]
control
address register
incrementer
PC
register bank
multiply register
barrel shifter
ALU
ALU bus
A bus
B bus
instruction decode & control
data out register
data in register
D[31:0]


NVIDIA
GIGABYTE

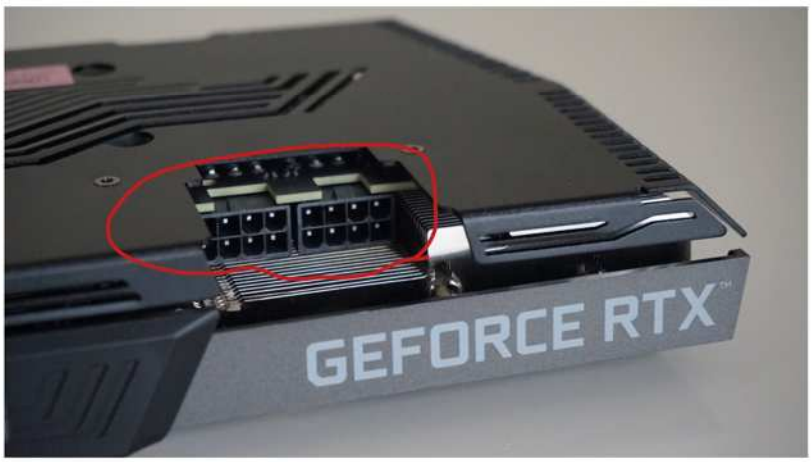

HDMI
HDMI

3070

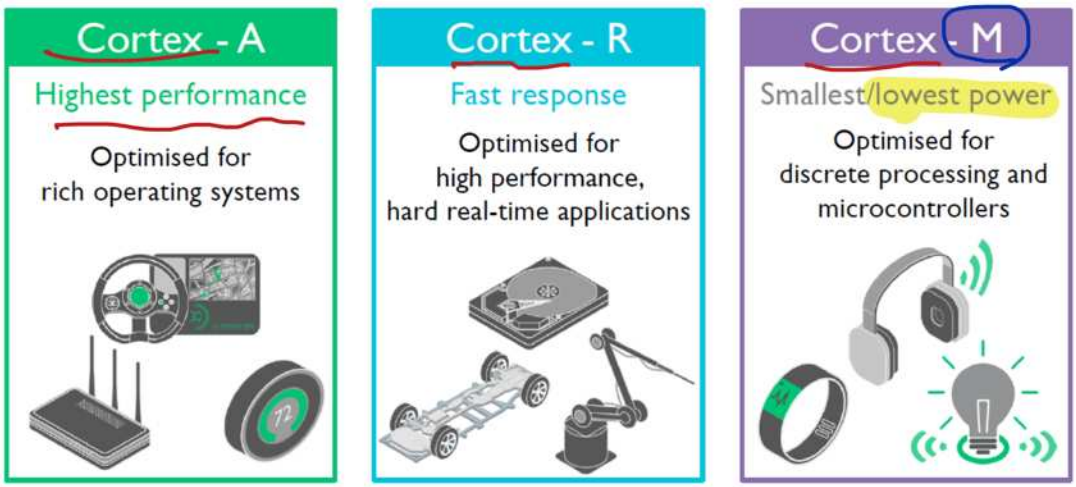

TUF GAMING
ASUS


msi
msi


LEADTEK
GEFORCE RTX
3070
GEFORCE RTX 3070


GEFORCE RTX

ARM Architecture: For Diverse Embedded Processing Needs



Samsung Galaxy S20 SD865 - CPU

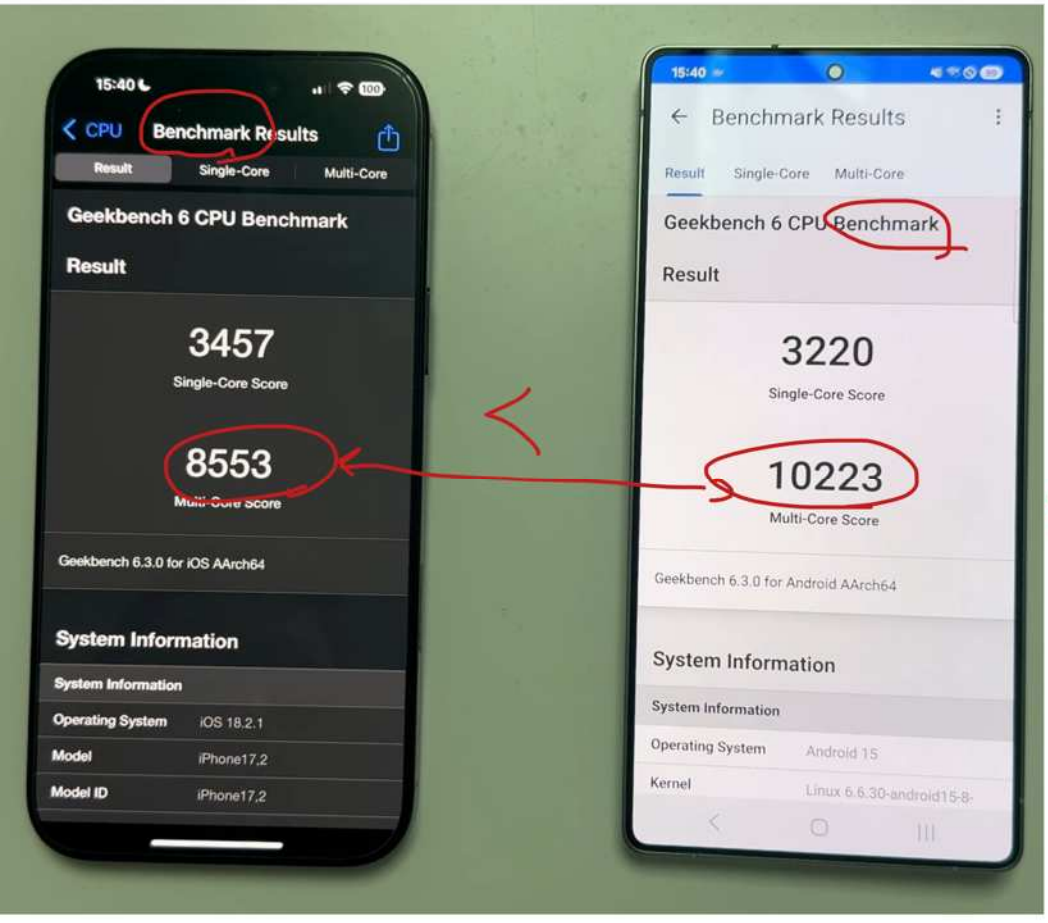
Width | Height | Thickness | Weight | Write a review

Specifications | Display | Camera | CPU | Battery | SAR

Dimensions: 69.1 x 151.7 x 7.9 mm
Weight: 163 g
SoC: Qualcomm Snapdragon 865 (SM8250)
CPU: 1x 2.84 GHz Cortex-A77, 3x 2.42 GHz Cortex-A77, 4x 1.8 GHz Cortex-A55 (Kryo 585)
GPU: Qualcomm Adreno 650, 587 MHz
RAM: 8 GB, 2750 MHz
Storage: 128 GB
Memory cards: microSD, microSDHC, microSDXC
Display: 6.2 in, Dynamic AMOLED 2X, 1440 x 3200 pixels, 24 bit
Battery: 4000 mAh, Li-Polymer
OS: Android 10
Camera: 4032 x 3024 pixels, 7680 x 4320 pixels, 24 fps
SIM card: Nano-SIM, eSIM
Wi-Fi: a, b, g, n, n 5GHz, ac, Wi-Fi 6 (ax), Dual band, Wi-Fi Hotspot, Wi-Fi Direct, Wi-Fi Display
USB: 3.2, USB Type-C
Bluetooth: 5.0
Positioning: GPS, A-GPS, GLONASS, BeiDou, Galileo

Add for comparison


STM32 MCUs
32-bit Arm® Cortex®-M
20 YEARS LONGEVITY COMMITMENT
High Performance
STM32F2
398 CoreMark
120 MHz Cortex-M3
STM32F4
608 CoreMark
180 MHz Cortex-M4
STM32F7
1082 CoreMark
216 MHz Cortex-M7
STM32H5
Up to 1023 CoreMark
250 MHz Cortex-M33
STM32H7
Up to 3224 CoreMark
Up to 600 MHz Cortex-M7
240 MHz Cortex-M4
STM32N6
3360 CoreMark
800 MHz Cortex-M55
Mainstream
STM32C0
114 CoreMark
48 MHz Cortex-M0+
STM32G0
142 CoreMark
64 MHz Cortex-M0+
STM32F0
106 CoreMark
48 MHz Cortex-M0
STM32F1
177 CoreMark
72 MHz Cortex-M3
STM32G4
569 CoreMark
170 MHz Cortex-M4
STM32F3
245 CoreMark
72 MHz Cortex-M4
Optimized for mixed-signal applications
Ultra-low-power
STM32L0
75 CoreMark
32 MHz Cortex-M0+
STM32U0
140 CoreMark
56 MHz Cortex-M0+
STM32L4
273 CoreMark
80 MHz Cortex-M4
STM32L4+
409 CoreMark
120 MHz Cortex-M4
STM32L5
443 CoreMark
110 MHz Cortex-M33
STM32U5
651 CoreMark
160 MHz Cortex-M33
STM32U3
393 CoreMark
96 MHz Cortex-M33
Wireless
STM32WL
162 CoreMark
48 MHz Cortex-M4
48 MHz Cortex-M0+
STM32WB0
156 CoreMark
64 MHz Cortex-M0+
STM32WB
219 CoreMark
64 MHz Cortex-M4
32 MHz Cortex-M0+
STM32WBA
407 CoreMark
100 MHz Cortex-M33
Cortex-M0+ Radio co-processor


15:40
CPU
Benchmark Results
Result
Single-Core
Multi-Core
Geekbench 6 CPU Benchmark
Result
3457
Single-Core Score
8553
Multi-Core Score
Geekbench 6.3.0 for iOS AArch64
System Information
System Information
Operating System iOS 18.2.1
Model iPhone17,2
Model ID iPhone17,2
15:40
Benchmark Results
Result
Single-Core
Multi-Core
Geekbench 6 CPU Benchmark
Result
3220
Single-Core Score
10223
Multi-Core Score
Geekbench 6.3.0 for Android AArch64
System Information
System Information
Operating System Android 15
Kernel Linux 6.6.30-android15-8-

STM32 High performance MCUs
32-bit Arm® Cortex®-M

STM32N6
- Arm® Cortex®-M55 at 800 MHz – 1280 DMPIS
- 4.2 MB embedded RAM
- First MCU with NPU: ST Neural-ART @ 600Gops

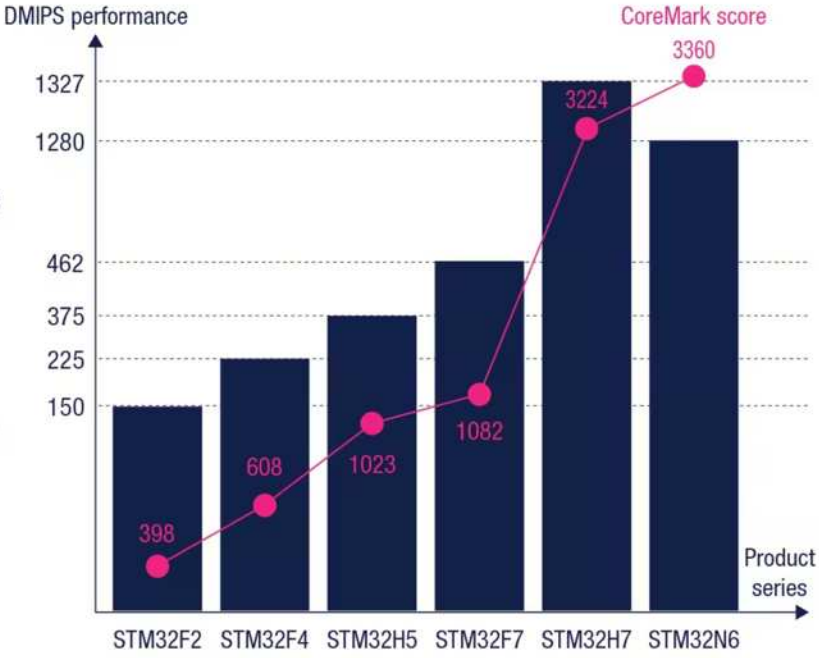
STM32H5
- Arm® Cortex®-M33 at 250 MHz – 375 DMPIS
- From 128 Kbytes to 2 Mbytes of Flash memory
- High performance, scalable security, affordable

STM32H7
- Arm® Cortex®-M7 + Arm® Cortex®-M4 FPU at 480 MHz – 1327 DMIPS and up to 600 MHZ - 1284 DMIPS on single core Arm® Cortex®-M7
- From 64 Kbytes to 2 Mbytes of Flash memory
- High Performance, scalable memory and security

STM32F7
- Arm® Cortex®-M7 + FPU at 216 MHz – 462 DMPIS
- From 256 Kbytes to 2 Mbytes of Flash memory
- Embedded flash & external memories

STM32F4
- Arm® Cortex®-M4 + FPU up to 180 MHz – 225 DMIPS
- From 64 Kbytes to 2 Mbytes of Flash memory
- Cost-effective and power efficiency

STM32F2
- Arm® Cortex®-M3 at 120 MHz – 150 DMIPS
- From 128 Kbytes to 1 Mbyte of Flash memory
- Foundation lines for performance and connectivity



Legend: Latest product series/lines generation

STM32 Ultra-low power MCUs
32-bit Arm® Cortex®-M

STM32U5
- 32-bit Arm® Cortex®-M33 + FPU at 160 MHz
- From 128 to 4 Mbytes of Flash memory
- Lowest power mode with RAM + RTC: 0.35 µA

STM32L5
- 32-bit Arm® Cortex®-M33 + FPU at 110 MHz
- From 256 to 512 Kbytes of Flash memory
- Lowest power mode with RAM + RTC: 0.35 µA

STM32L4+
- 32-bit Arm® Cortex®-M4 + FPU at 120 MHz
- From 512 Kbytes up to 2 Mbytes of Flash memory
- Lowest power mode with RAM + RTC: 0.39 µA

STM32L4
- 32-bit Arm® Cortex®-M4 + FPU at 80 MHz
- From 64 Kbytes to 1 Mbyte of Flash memory
- Lowest power mode with RAM + RTC: 0.34 µA

STM32U3
- 32-bit Arm® Cortex®-M33 + FPU at 96 MHz
- From 512 Kbytes to 1 Mbytes of Flash memory
- Lowest power mode with RAM + RTC: 0.95 µA

STM32U0
- 32-bit Arm® Cortex®-M0+ at 56 MHz
- From 16 to 256 Kbytes of Flash memory
- Lowest power mode with RAM + RTC: 0.25 µA

STM32L0
- 32-bit Arm® Cortex®-M0+ at 32 MHz
- From 8 to 192 Kbytes of Flash memory
- Lowest power mode with RAM + RTC: 0.67 µA

Legend: Latest product series/lines generation

STM32 Wireless MCUs
32-bit Arm® Cortex®-M

STM32WB0

- Arm® Cortex®-M0+ at 64 MHz
- From 192 Kbytes to 512 Kbytes of Flash memory
- Output power: +8 dBm
- Sensitivity: -97 dBm (1Mbps) / -104 dBm (125Kbps)

STM32WL

LoRaWAN sigfox M-Bus mioty amazon sidewalk

- Arm® Cortex®-M4 and -M0+ at 48 MHz supporting RF
- From 64 Kbytes to 256 Kbytes of Flash memory
- Dual output power: Up to 15 dBm / Up to 22 dBm
- Sensitivity LoRa®: -148 dBm

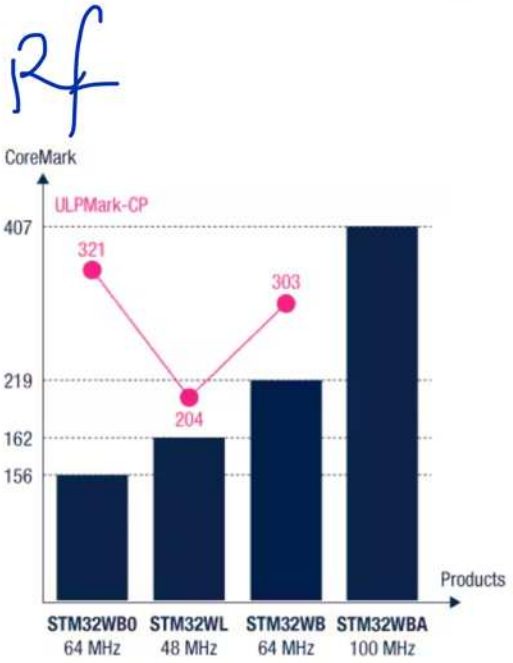
STM32WB

- Arm® Cortex®-M4 at 64 MHz and dedicated M0+ at 32 MHz supporting RF
- From 256 Kbytes to 1 Mbyte of Flash memory
- Output power: +6 dBm
- Sensitivity BLE: -96 dBm, 802.15.4: -100dBm

STM32WBA

amazon sidewalk

- Arm® Cortex®-M33 + FPU at 100 MHz
- From 512 Kbytes to 1 Mbyte of Flash memory
- Output power: +10 dBm
- Sensitivity BLE: -96 dBm, 802.15.4: -97.5 dBm



Legend: Latest product series/lines generation

STM32 Mainstream MCUs
32-bit Arm® Cortex®-M

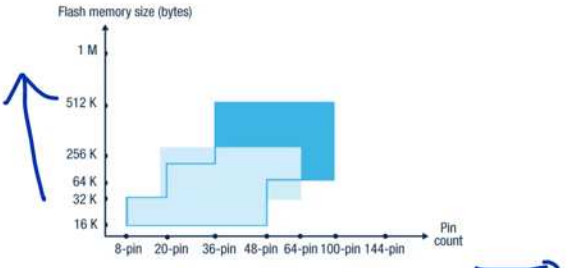
Latest product generation

STM32C0

- Arm Cortex-M0+ at 48 MHz – 44 DMIPS
- Most affordable entry-cost STM32 32-bit MCU
- Affordable, reliable, continuum with STM32G0

STM32G0

- Arm Cortex-M0+ at 64 MHz – 59 DMIPS
- Maximum IO count per package
- Advanced function is analog, low-power, control



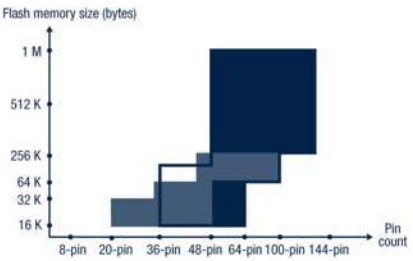
Legacy product

STM32F1

- Arm Cortex-M3 at 72 MHz – 61 DMIPS
- STM32 Foundation line
- Wide range of performance and peripherals, easy-to-tuse tools

STM32F0

- Entry-level MCU for cost-sensitive operations
- Arm Cortex-M0 at 48 MHz – 38 DMIPS



Mixed-signal MCUs

STM32G4

- Arm Cortex-M4 + FPU at 170 MHz – 213 DMIPS
- Rich analog peripheral set
- High-resolution timer
- Mathematical accelerators

STM32F3

- Arm Cortex-M4 + FPU at 72 MHz – 90 DMIPS
- Rich analog peripheral set
- High-resolution timer

STM32f103C8T6

STM | 32	F	4	29	Z	I	T	6

STM | BITS	
STM	32

TYPE	
F	MAINSTREAM
L	LOW POWER
H	HIGH PERFORMANCE
W	WIRELESS

CORE	
0	MO
1	M3
2	M3
3	M4
4	M4
7	M7

LINE
SPEED (Mhz), RAM, INPUT / OUTPUT

NUMBER OF PINS	
F	20
G	28
K	32
T	36
S	44
C	48
R	64-66
V	100
Z	144
I	176

FLASH SIZE kB	
4	16
6	32
8	64
B	128
C	256
D	384
E	512
F	768
G	1024
H	1536
I	2048

PACKAGE	
P	TSOOP
H	BGA
U	VFQFPN
T	LQFP
Y	WLCSP

TEMP RANGE	
6	-40 to 85°c
7	-40 to 105°c

Specific features (3 digits)

(Depends of product series
None exhaustive list)

STM32x …

051	Entry-level
103	STM32 foundation
303	103 upgraded with DSP and Analog
407	High-performance and DSP with FPU
152	Ultra-low-power

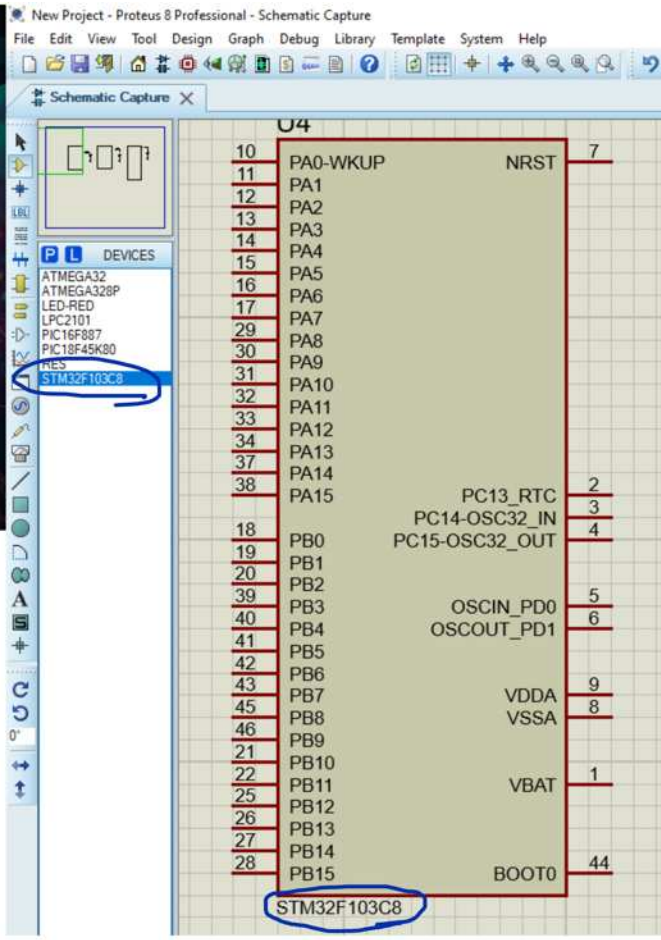
328

32 2k

Flash memory size / RAM size (bytes)

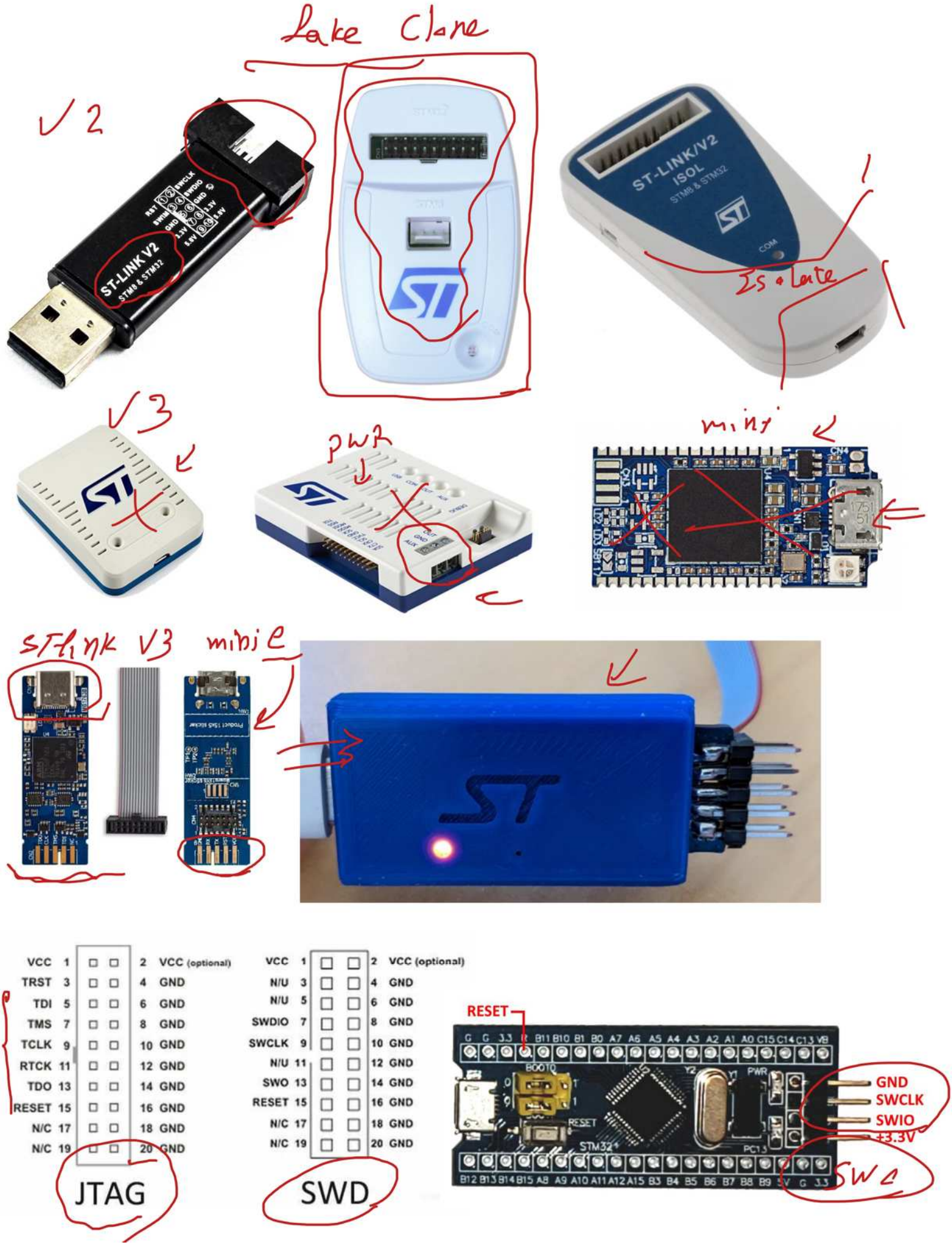
	36-pin QFN	48-pin LQFP/QFN	64-pin BGA/CSP/LQFP	100-pin LQFP	144-pin BGA/LQFP
1 M / 96 K			STM32F103RG	STM32F103VG	STM32F103ZG
768 K / 96 K			STM32F103RF	STM32F103VF	STM32F103ZF
512 K / 64 K			STM32F103RE	STM32F103VE	STM32F103ZE
384 K / 64 K			STM32F103RD	STM32F103VD	STM32F103ZD
256 K / 48 K			STM32F103RC	STM32F103VC	STM32F103ZC
128 K / 20 K	STM32F103TB	STM32F103CB	STM32F103RB	STM32F103VB	
64 K / 20 K	STM32F103T8	STM32F103C8	STM32F103R8	STM32F103V8	
32 K / 10 K	STM32F103T6	STM32F103C6	STM32F103R6		
16 K / 6 K	STM32F103T4	STM32F103C4	STM32F103R4		

Pin count



Blue Pill
uno

- Arm® 32-bit Cortex®-M3 CPU core
  - 72 MHz maximum frequency, 1.25 DMIPS/MHz (Dhrystone 2.1) performance at 0 wait state memory access
  - Single-cycle multiplication and hardware division
- Memories
  - 64 or 128 Kbytes of Flash memory
  - 20 Kbytes of SRAM
- Clock, reset and supply management
  - 2.0 to 3.6 V application supply and I/Os
  - POR, PDR, and programmable voltage detector (PVD)
  - 4 to 16 MHz crystal oscillator 8 MHz
  - Internal 8 MHz factory-trimmed RC
  - Internal 40 kHz RC
  - PLL for CPU clock
  - 32 kHz oscillator for RTC with calibration
- Low-power
  - Sleep, Stop and Standby modes
  - V_{BAT} supply for RTC and backup registers
- 2x 12-bit, 1 µs A/D converters (up to 16 channels)
  - Conversion range: 0 to 3.6 V
  - Dual-sample and hold capability
  - Temperature sensor
- DMA
  - 7-channel DMA controller
  - Peripherals supported: timers, ADC, SPIs, I^2Cs and USARTs
- Up to 80 fast I/O ports
  - 26/37/51/80 I/Os, all mappable on 16 external interrupt vectors and almost all 5 V-tolerant
- Debug mode:
  - Serial wire debug (SWD) and JTAG interfaces
- Seven timers
  - Three 16-bit timers, each with up to 4 IC/OC/PWM or pulse counter and quadrature (incremental) encoder input
  - 16-bit, motor control PWM timer with dead-time generation and emergency stop
  - Two watchdog timers (independent and window)
  - SysTick timer 24-bit downcounter
- Up to nine communication interfaces
  - Up to two I^2C interfaces (SMBus/PMBus®)
  - Up to three USARTs (ISO 7816 interface, LIN, IrDA capability, modem control)
  - Up to two SPIs (18 Mbit/s)
  - CAN interface (2.0B Active)
  - USB 2.0 full-speed interface
- CRC calculation unit, 96-bit unique ID
- Packages are ECOPACK®


fake Clone
V2
ST-LINK V2
STM8 & STM32
ST-LINK/V2
ISOL
STM8 & STM32
COM
Is a fake
V3
PWR
mini
STlink V3 mini
SWCLK
SWDIO
GND
3.3V
5.0V
VCC 1
2 VCC (optional)
TRST 3
4 GND
TDI 5
6 GND
TMS 7
8 GND
TCLK 9
10 GND
RTCK 11
12 GND
TDO 13
14 GND
RESET 15
16 GND
N/C 17
18 GND
N/C 19
20 GND
JTAG
N/U 3
N/U 5
SWDIO 7
SWCLK 9
N/U 11
SWO 13
SWD
RESET
BOOT0
STM32
PWR
PC13
GND
SWCLK
SWIO
+3.3V
SWD

printf(ول

Debug (printf) Viewer

```
AD value = 0x039
AD value = 0x03a
AD value = 0x03f
AD value = 0x040
AD value = 0x041
AD value = 0x042
AD value = 0x043
AD value = 0x044
AD value = 0x045
```

COM3 (9600 bps)

Connected to COM3 (9600 bps) Send values:

```
55    U
5a    Z
```