

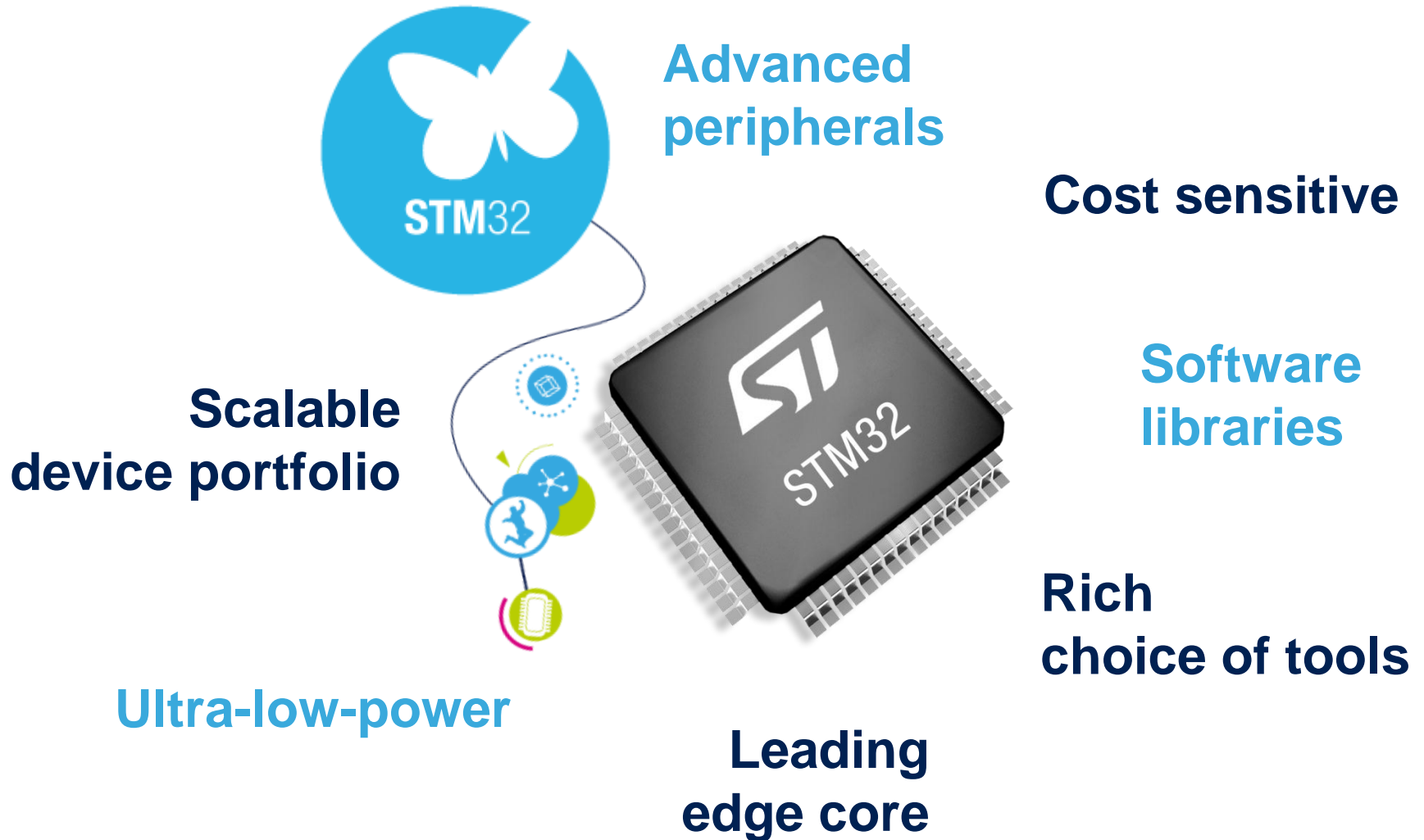


STM32 32-bit Cortex™-M MCUs






Releasing your creativity

What does a developer want in an MCU?

2



STM32 platform key benefits

Real-time performance Cortex Intelligent Processors by ARM*	Outstanding power efficiency	Superior and innovative peripherals	Maximum integration	Extensive ecosystem
 <p>ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash</p>	 <p>< 1 μA RTC in V_{BAT} mode, ultra-low dynamic power consumption 140 μA/MHz 1.65 to 3.6 V V_{DD}, 0.45 μA Stop mode and 0.3 μA Standby mode</p>	 <p>USB-OTG High Speed, camera interface, Ethernet, CAN, TFT controller, crypto/hash processor, PGA, sigma-delta 16-bit ADC and 12-bit ADC (up to 5 MSPS), external memory interface, CEC</p>	 <p>Reset circuitry, voltage regulator, internal RC oscillator, PLL</p>	 <p>ARM + ST ecosystem (eval boards, discovery kits, software libraries, RTOS)</p>

More than **450 compatible devices**
Releasing your creativity




STM32 a comprehensive platform

Flash size (bytes)

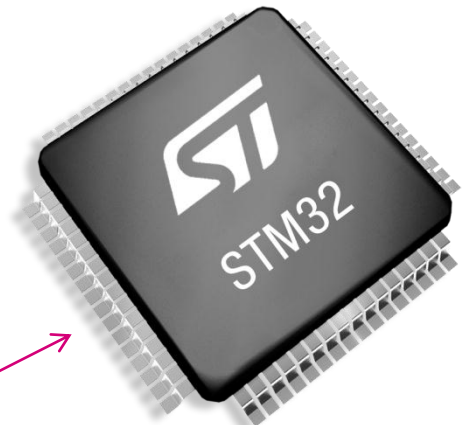
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Select your fit product inside a wide, compatible portfolio

Cortex™-M3/M4/M0
Flash – High performance



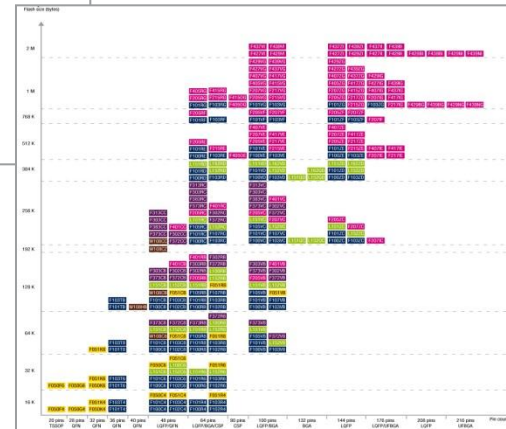
STM32 F0 STM32 F1 STM32 F2 STM32 F3 STM32 F4
STM32 L1 STM32 W



16 K



20 pins



216 pins

STM32 – 7 product series

Common core peripherals and architecture:

Communication peripherals: USART, SPI, I ² C
Multiple general-purpose timers
Integrated reset and brown-out warning
Multiple DMA
2x watchdogs Real-time clock
Integrated regulator PLL and clock circuit
External memory interface (FSMC)
Up to 3x 12-bit DAC
Up to 4x 12-bit ADC (Up to 5 MSPS)
Main oscillator and 32 kHz oscillator
Low-speed and high-speed internal RC oscillators
-40 to +85 °C and up to 105 °C operating temperature range
Low voltage 2.0 to 3.6 V or 1.65/1.7 to 3.6 V (depending on series)
Temperature sensor

STM32 F4 series - High performance with DSP (STM32F401/405/415/407/417/427/437/429/439)

180 MHz Cortex-M4 with DSP and FPU	Up to 256-Kbyte SRAM	Up to 2-Mbyte Flash	2x USB 2.0 OTG FS/HS	3-phase MC timer	2x CAN 2.0B	SDIO 2x I ² S audio Camera IF	Ethernet IEEE 1588	Crypto TFT LCD + SDRAM
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STM32 F3 series - Mixed-signal with DSP (STM32F302/303/313/372/373/383)

72 MHz Cortex-M4 with DSP and FPU	Up to 48-Kbyte SRAM & CCM-SRAM	Up to 256-Kbyte Flash	USB 2.0 FS	2x 3-phase MC timer (144 MHz)	CAN 2.0B	Up to 7x comparator	3x 16-bit ΣΔ ADC	4x PGA
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STM32 F2 series - High performance (STM32F205/215/207/217)

120 MHz Cortex-M3 CPU	Up to 128-Kbyte SRAM	Up to 1-Mbyte Flash	2x USB 2.0 OTG FS/HS	3-phase MC timer	2x CAN 2.0B	SDIO 2x I ² S audio Camera IF	Ethernet IEEE 1588	Crypto
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STM32 F1 series - Mainstream - 5 product lines (STM32F100/101/102/103 and 105/107)

Up to 72 MHz Cortex-M3 CPU	Up to 96-Kbyte SRAM	Up to 1-Mbyte Flash	USB 2.0 OTG FS	3-phase MC timer	Up to 2x CAN 2.0B	SDIO 2x I ² S audio	Ethernet IEEE 1588
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STM32 F0 series – Entry level (STM32F030/50/051)

48 MHz Cortex-M0 CPU	Up to 8-Kbyte SRAM	Up to 64-Kbyte Flash	3-phase MC timer	Comparator	CEC
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STM32 L1 series - Ultra-low-power (STM32L100/151/152/162)

32 MHz Cortex-M3 CPU	Up to 48-Kbyte SRAM	Up to 384-Kbyte Flash	USB FS device	Up to 12-Kbyte EEPROM	LCD 8x40 4x44	Comparator	BOR MSI VScal	AES 128-bit
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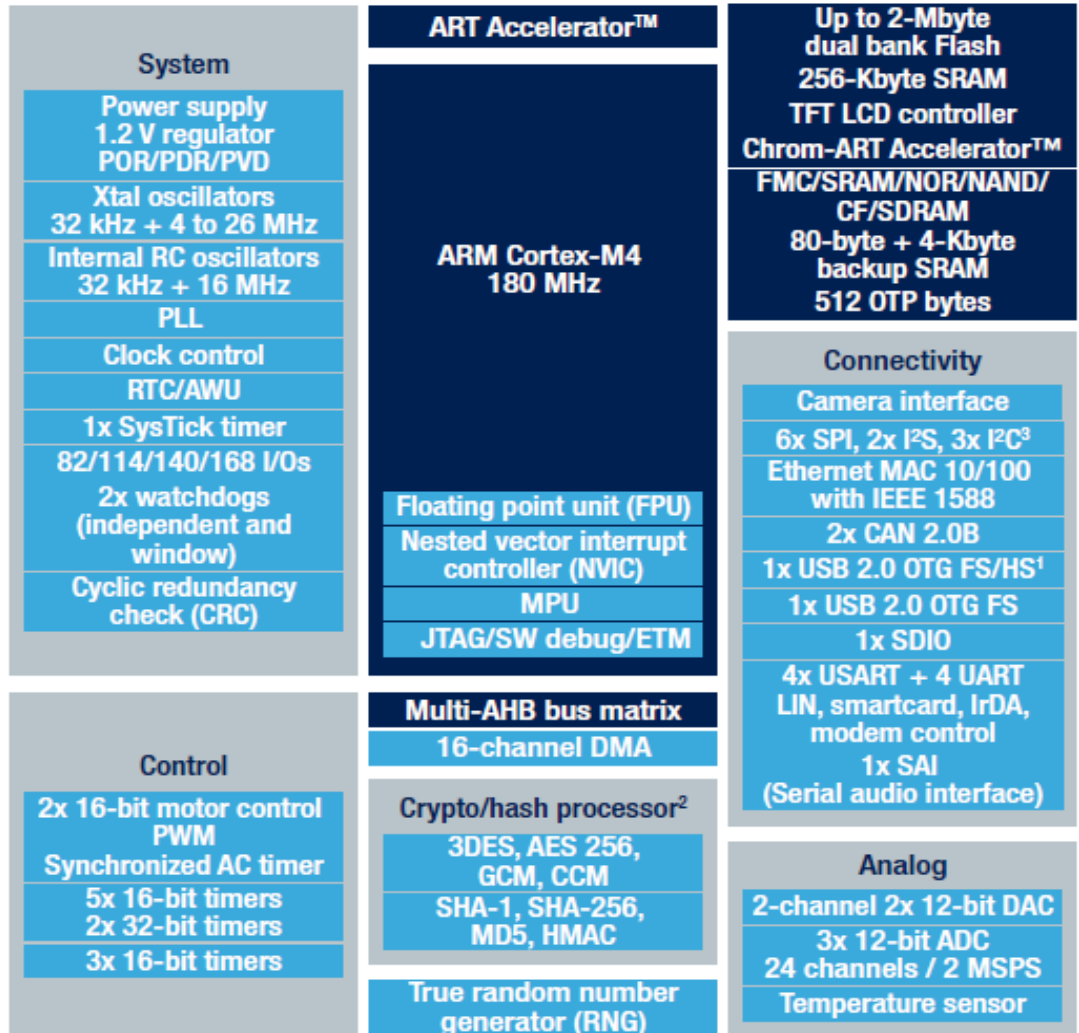


STM32 W series - Wireless (STM32W108)

24 MHz Cortex-M3 CPU	Up to 16-Kbyte SRAM	Up to 256-Kbyte Flash	2.4 GHz IEEE 802.15.4 Transceiver	Lower MAC Digital baseband	AES 128-bit
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STM32 F4 2MB block diagram



Notes:

1. HS requires an external PHY connected to the ULPI interface
2. Crypto/hash processor on STM32F415, STM32F417, STM32F437 and STM32F439
3. With digital filter feature

ST has licensed Cortex-M processors

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- **Forget traditional 8/16/32-bit classifications and get**
 - Seamless architecture across all applications
 - Every product optimized for ultra-low power and ease of use

Cortex-M0

8/16-bit applications

Cortex-M3

16/32-bit applications

Cortex-M4

32-bit/DSC applications

Binary and tool compatible



Cortex-M processors binary compatible

Floating Point Unit (FPU)

VABS	VADD	VCMP	VCMPE	VCVT	VCVTR	VDIV	VLDH
VLDR	VMLA	VMLS	VMOV	VMRS	VMSR	VMUL	VNEG
VNHLA	VHMLS	VNMUL	VPOP	VPUSH	VSQRT	VSTH	VSTR
VSUB	VFMA	VFMS	VFNMA	VFNHS			

Cortex-M4 FPU

DSP (SIMD, fast MAC)

PKH	QADD	QADD16	QADD8	QASX	QDADD	QDSUB	QSAX
QSUB	QSUB16	QSUB8	SADD16	SADD8	SASX	SEL	SHADD16
SHADD8	SHASX	SHSAX	SHSUB16	SHSUB8	SMLABB	SMLABT	SMLATB
SMLATT	SMLAD	SMLALBB	SMLALBT	SMLALTB	SMLALTT	SMLALD	SMLAWB
SMLAWT	SMLSD	SMLSDB	SMMLA	SMMLS	SMMUL	SMUAD	SMULBB

Advanced data processing
Bit field manipulations

ADC	ADD	ADR	AND	ASR	B	SHULT	SMULTT
CLZ	BFC	BFI	BIC	CDP	CLREX	SHULTB	SMULWT
CBNZ	CBZ	CMN	CMP	DRG	EOR	LDC	SMULWB
LDHIA	LDHOB	LDR	LDRB	LDRBT	LDRD	SSAT16	SSAX
LDREX	LDREXB	LDREXH	LDRH	LDRHT	LDRSB	SSUB16	SSUB8
LDRSBT	LDRSHT	LDRSH	LDRT	MCR	LSL	SXTAB	SXTAB16
LSR	MCRB	MLS	MLA	MOV	MOVT	SXTAH	SXTB16
MRC	MRCB	MUL	MVN	NOP	ORN	UADD16	UADD8
ORR	PLD	PLDW	PLI	POP	PUSH	UASX	UHADD16
RBIT	REV	REV16	REVSH	ROR	RORX	UHADD8	UHASX

BKPT	BLX	ADC	ADD	ADR
BX	CPS	AND	ASR	B
DHR		BL	BIC	
DSB	CMN	CMP	EOR	
ISB	LDR	LDRB	LDM	
MRS	LDRH	LDRSB	LDRSH	
MSR	LSL	LSR	MOV	
NOP	REV	MUL	MVN	ORR
REV16	REVSH	POP	PUSH	ROR
SEV	SXTB	RSB	SBC	STM
SXTH	UXTB	STR	STRB	STRH
UXTH	WFE	SUB	SVC	TST
WFI	YIELD			

Cortex-M0/M0+/M1

RSB	SBC	SBFX	SDIV	SEV	SMLAL
SMULL	SSAT	STC	STMIA	STMDB	STR
STRB	STRBT	STRD	STREX	STREXB	STREXH
STRH	STRHT	STRT	STRH	STRHT	STRT
SUB	SXTB	SXTH	TBB	TBH	TEQ
TST	UBFX	UDIV	UHLAL	UHLL	USAT
UXTB	UXTH	WFE	WFI	YIELD	IT

Cortex-M3

SHULB	SMULTT	SHULTB	SMULWT	SMULWB	SMUSD	SSAT16	SSAX
SSUB16	SSUB8	SXTAB	SXTAB16	SXTAH	SXTB16	UADD16	UADD8
UASX	UHADD16	UHADD8	UHASX	UHSAX	UHSUB16	UHSUB8	UMAAL
UQADD16	UQADD8	UQASX	UQSAX	UQSUB16	UQSUB8	USAD8	USADA8
USAT16	USAX	USUB16	USUB8	UXTAB	UXTAB16	UXTAH	UXTB16

Cortex-M4

General data processing
I/O control tasks

• Industrial

- PLC
- Inverters
- Printers, scanners
- Industrial networking
- Solar inverters



• Medical

- Glucose meters
- Portable medical care
- VPAP, CPAP
- Patient monitoring



• Buildings and security

- Alarm systems
- Access control
- HVAC
- Power meters



• Appliances

- 3-phase motor drives
- Application control
- User interfaces
- Induction cooking



• Consumer

- Home audio
- Gaming
- PC peripherals
- Digital cameras, GPS



A large community of partners



Hardware Development Tools

- Discovery Kits



- Evaluation Boards



- Open Hardware Boards

- Arduino-based

- Leaf labs Maple, Olimexino-STM32, Netduino,...

- Microsoft Gadgeteer-based

- Netduino Go, Mountaineer, GHI...



- Debug Probes and Programming Tools

- ST-Link

- J-Link

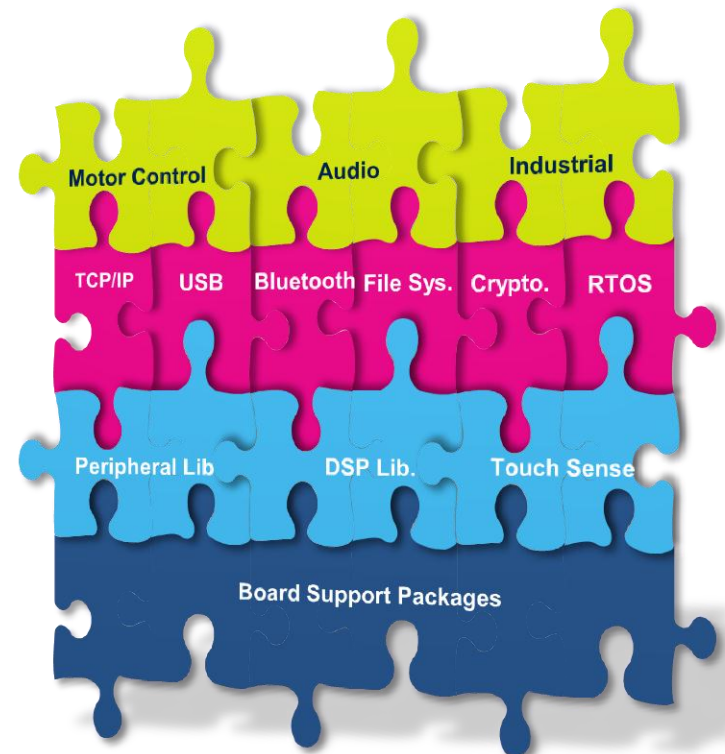
- Ulink



Embedded Software (Firmware)

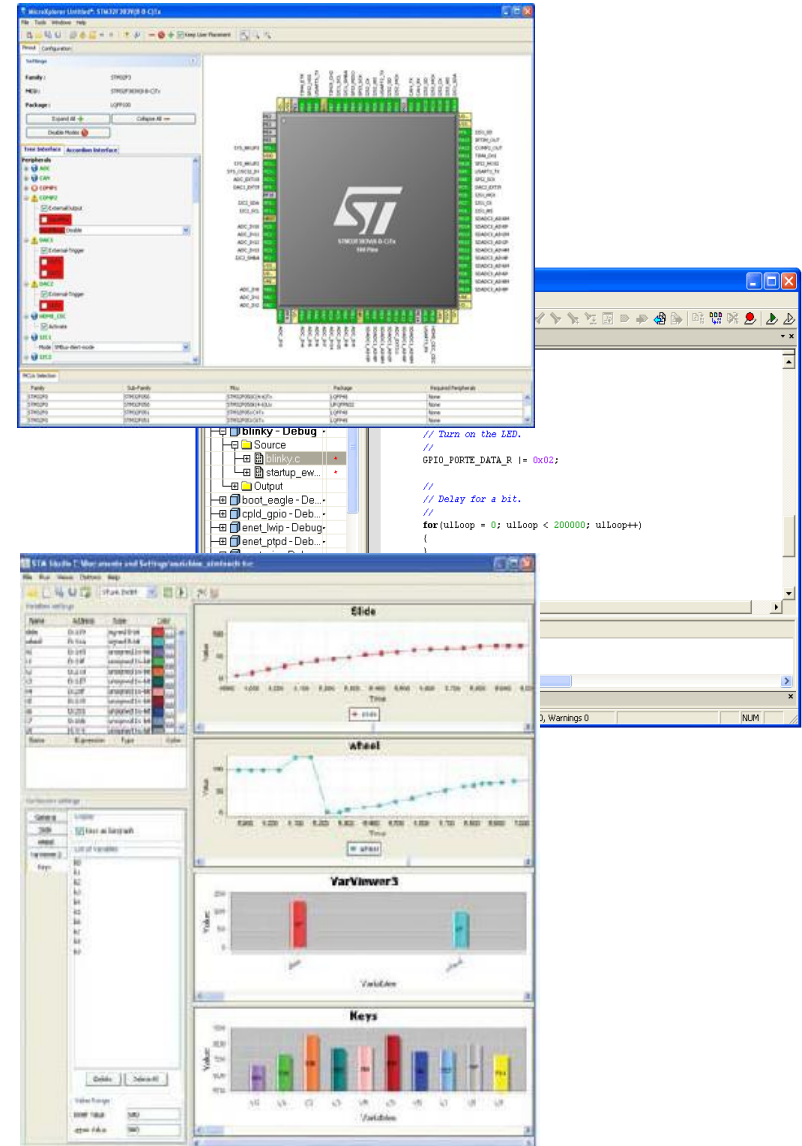
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- HAL / Drivers
 - ST Boards Support Packages (BSP)
 - Peripheral Libraries (Drivers)
 - DSP Library
- RTOS / Firmware Stacks
 - RTOS
 - Cryptographic
 - USB
 - TCP/IP
 - File Systems
 - BlueTooth
 - Zigbee
 - Graphism
 - Touch sensing
- Application Bricks
 - Audio
 - Industrial
 - Motor Control
- High Level Frameworks (STM32 only)
 - Java
 - Microsoft .Net Micro Framework
 - Matlab/Simulink



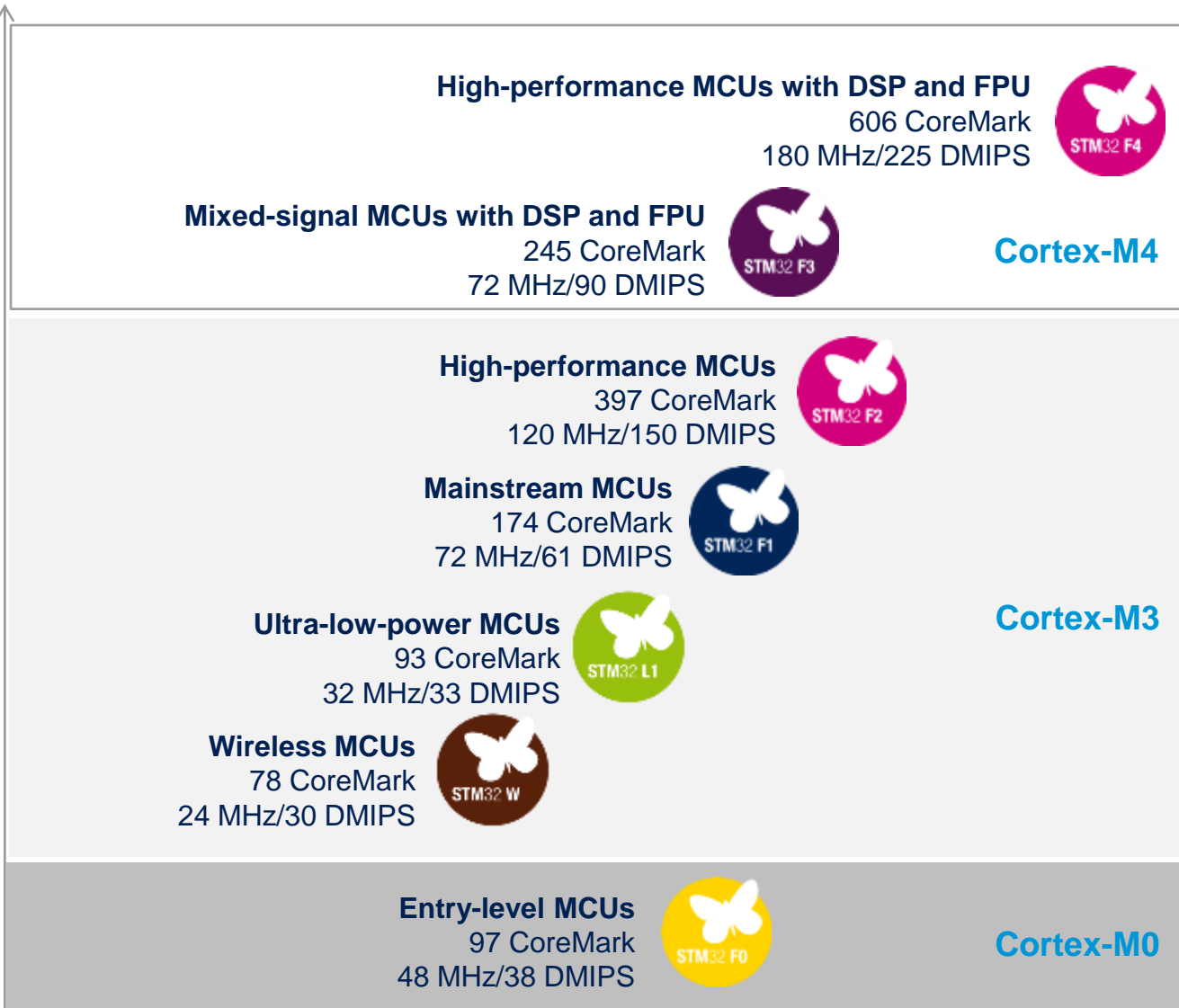
Software Development Tools

- Configuration Tools
 - μ Xplorer
- Development and Debugging Tools
 - IAR EWARM
 - Keil MDK
 - Atollic TrueStudio
 - Rowley CrossWorks
 - Embest CooCox
 - Segger emIDE
 - Code Red RedSuite
 - Raisonance Ride
 - Altium Tasking
 - Cosmic Idea
 - Yagarto...
- Monitoring Tools
 - STMStudio



STM32 offer by performance core

Core/features



Frequency/performance

Thank you 15



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www.st.com/stm32