STM8

July 2015

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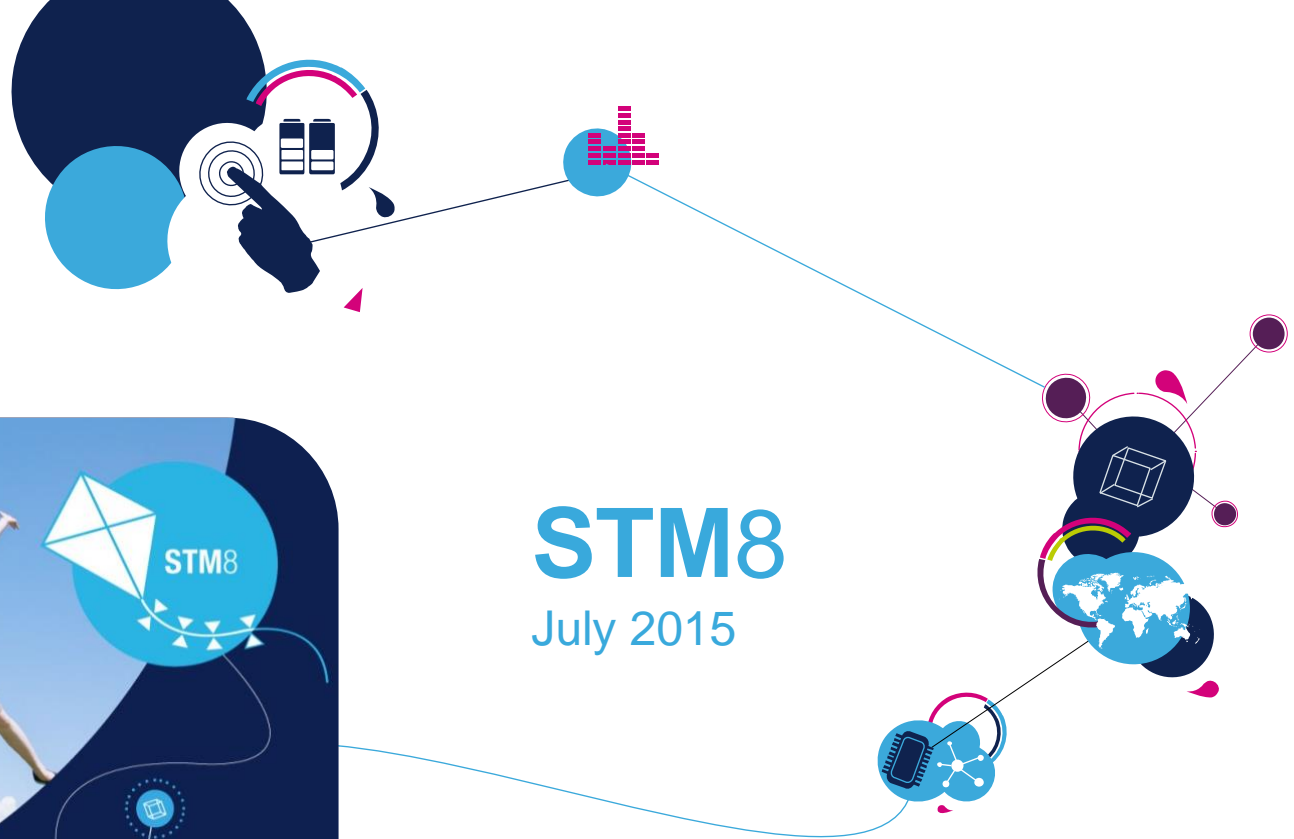
Press release

STMicroelectronics Ships Milestone STM8 Microcontroller

*Fast ramp to one billionth device, demonstrates market
focus and continuing commitment to 8-bit market*

Geneva, May 21, 2014 – STMicroelectronics (NYSE: STM), a global
semiconductor leader serving customers across the spectrum of electronics
applications, and a leading supplier of embedded microcontrollers, has announced
the shipment of its one billionth STM8 8-bit microcontroller. The one billionth device
was shipped to lighting-control manufacturer Lutron Electronics.

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STM8 growth (2008 – 2015)

Second BILLION units shipment forecast in Q4 2015 !

200% CAGR

First BILLION units shiment line crossed in May 2014

LONGEVITY **10** YEARS COMMITMENT
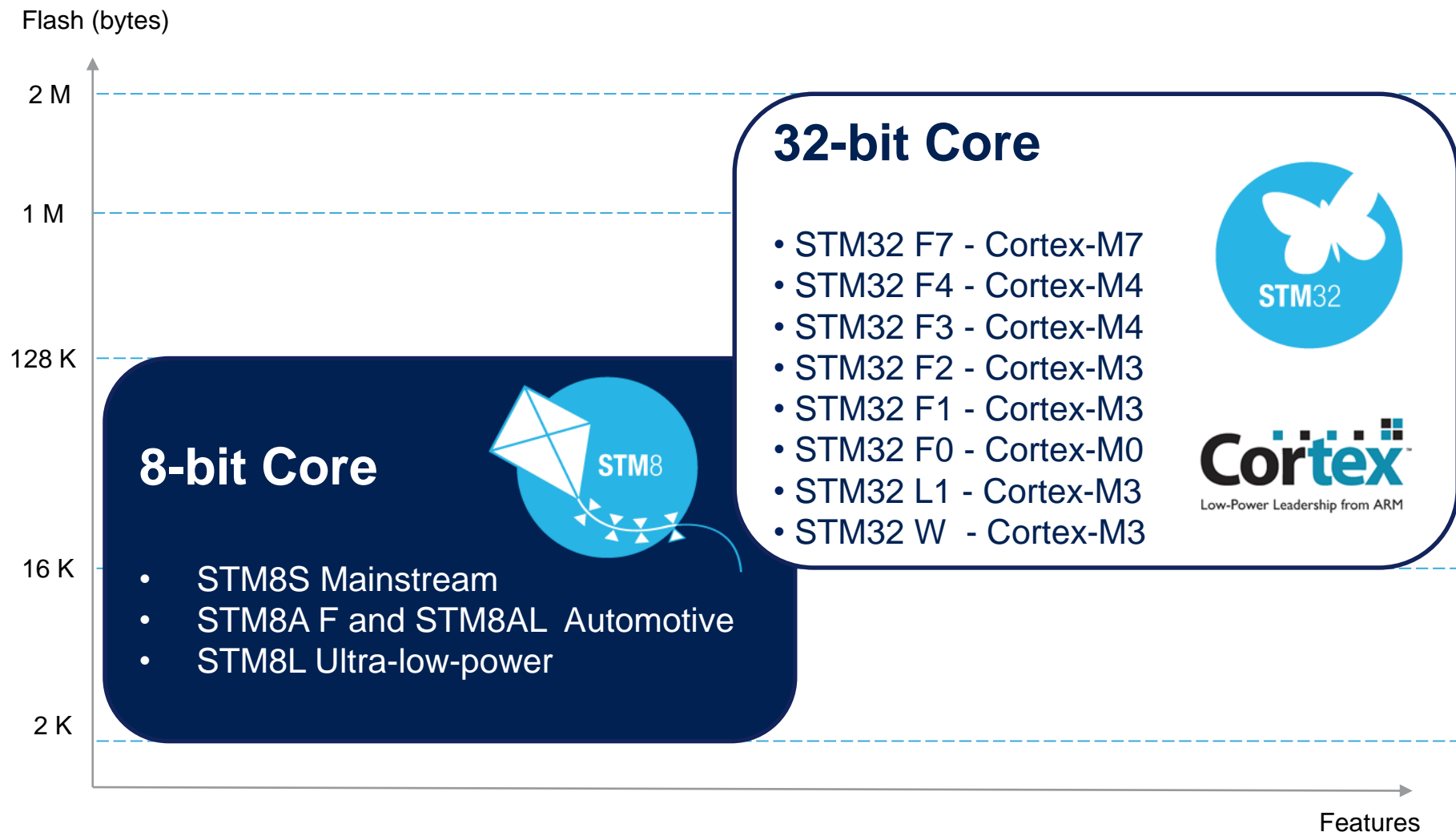
Cumulated STM8 shipments in MuPcs

■ 2008 ■ 2009 ■ 2010 ■ 2011 ■ 2012 ■ 2013 ■ 2014 ■ 2015 forecast

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Flash (bytes)

2 M

1 M

128 K

16 K

2 K

32-bit Core

- STM32 F7 - Cortex-M7
- STM32 F4 - Cortex-M4
- STM32 F3 - Cortex-M4
- STM32 F2 - Cortex-M3
- STM32 F1 - Cortex-M3
- STM32 F0 - Cortex-M0
- STM32 L1 - Cortex-M3
- STM32 W - Cortex-M3

STM32

Cortex
Low-Power Leadership from ARM

8-bit Core

STM8

- STM8S Mainstream
- STM8A F and STM8AL Automotive
- STM8L Ultra-low-power

Features

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STM8 introduction & key benefits

- STM8 is our new 8-bit family, a new generation after legacy ST6/7/9 offering 10x more performance and 30% code size reduction.

- The STM8S is a combination of Process improvement (130nm) and new design architecture (Harvard architecture, 16bit registers).

- Designed for General purpose and Industrial, Appliance, consumer markets.

  - Robustness & Reliability for Industrial and automotive

  - 1.65 to 5.5V operating voltage range covered

  - Cost reduction based on 130nm technology to address many consumer applications

- The STM8S has a strong synergy with STM32 with the same peripheral base and tools compatibility

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STM8S Mainstream

Data EEPROM, 3 and 5 V family, precise RC

Best market value

**Robust and reliable
Up to 125 ° C
www.st.com/stm8s**

STM8A Automotive

Data EEPROM, 3 and 5 V family, precise RC, LIN, CAN, grade 0

Long term guarantee

**AEC-Q100
Up to 150 °C
www.st.com/stm8a**

STM8L Ultra-low-power

Data EEPROM, 1.65 and 3 V family, strong analog, LCD drivers, low-leakage technology

Ideal combination of low-power performance and features

**High en analog IPs
Active halt <1µA
www.st.com/stm8l**

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STM8 Synergy

Economy of scale & volume

STM8A
Automotive

Innovation & volume

STM8S
Mainstream

STM8 S

STM8L
Ultra-low-power

STM8 A

STM8 L

Data EEPROM, 3 and 5 V family, precise RC

Data EEPROM, 3 and 5 V family, precise RC, LIN, CAN, grade 0 AEC-Q100

Data EEPROM, 1.65 and 3 V family, strong analog, LCD drivers, low-leakage technology

Platform designed and engineered for cost effectiveness

Robust and reliable www.st.com/stm8s

Conceived to meet high quality and reliabilty standards

Simply smarter www.st.com/stm8a

Architecture and technology focused on power savings

Ultra-low-power www.st.com/stm8l

Reliability & Quality

Reliability & Quality

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STM8 – 4 product series

Common core peripherals and architecture:

- Multiple communication peripherals USART, SPI, I²C
- Multiple 16-timers
- Internal 16 MHz and Low speed RC oscillators
- 2x watchdogs
- Reset circuitry POR/PDR

STM8AF Series – 3.0 to 5.5V (-40dgC to 150dgC) AEC-Q100 grade 1 and grade 0

| STM8 core @ 16/24 MHz | 8KB to 128 KB Flash | Up to 6 KB SRAM | 20 to 80 pins | BOR | Main osc. input 1-16 MHz | Up to 2 KB data EEPROM | CAN / LIN | 16ch. 12-bit ADC (5 µs) |

STM8AL Series – 1.8 to 3.6V (-40dgC to 125dgC) AEC-Q100 grade 1

| STM8 core @ 16 MHz | 4KB to 32 KB Flash | Up to 1 KB SRAM | 32 to 48 pins | BOR PVD | Main osc. input 1-16 MHz | Up to 2 KB data EEPROM | RTC | Up to 4 ch DMA | 25ch. 12-bit ADC (1 µs) | 12-bit DAC | LCD 4x28 |

Automotive

STM8 A

STM8S Series – 2.95 to 5.5V (-40dgC to 125dgC)

| STM8 core @ 16/24 MHz | 8KB to 128 KB Flash | Up to 6 KB SRAM | 20 to 80 pins | BOR | Main osc. input 1-16 MHz | Up to 2 KB data EEPROM | CAN | 16ch. 12-bit ADC (2.3 µs) |

Mainstream

STM8 S

STM8L Series – 1.8 to 3.6V(-40dgC to 125dgC)

| STM8 core @ 16 MHz | 2KB to 64 KB Flash | Up to 4 KB SRAM | BOR PVD | Main osc. input 1-16 MHz | Up to 2 KB data EEPROM | RTC with 32 kHz osc. | Up to 4 ch DMA | 12-bit ADC (1 µs) 12-bit DAC | LCD 8x40 4x44 | AES 128-bit |

Ultra-low power

STM8 L

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STM8 – 8-bit microcontroller platform

STM8 µC platform

STM8 core	130nm EEPROM Technology
Debug module	Tools
Peripherals	Robustness
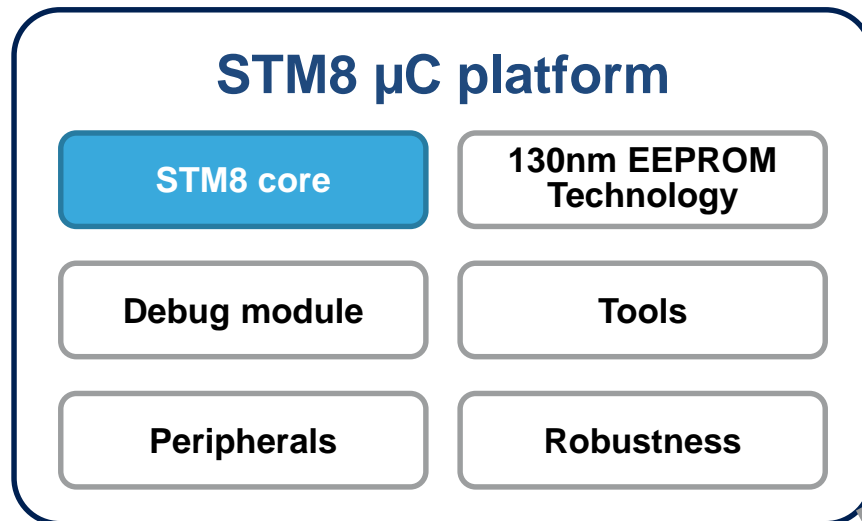
STM8 S — Mainstream

**Industrial and Consumer
Robust & reliable
Up to 125 °C**

STM8 A — Automotive

**AEC-Q100
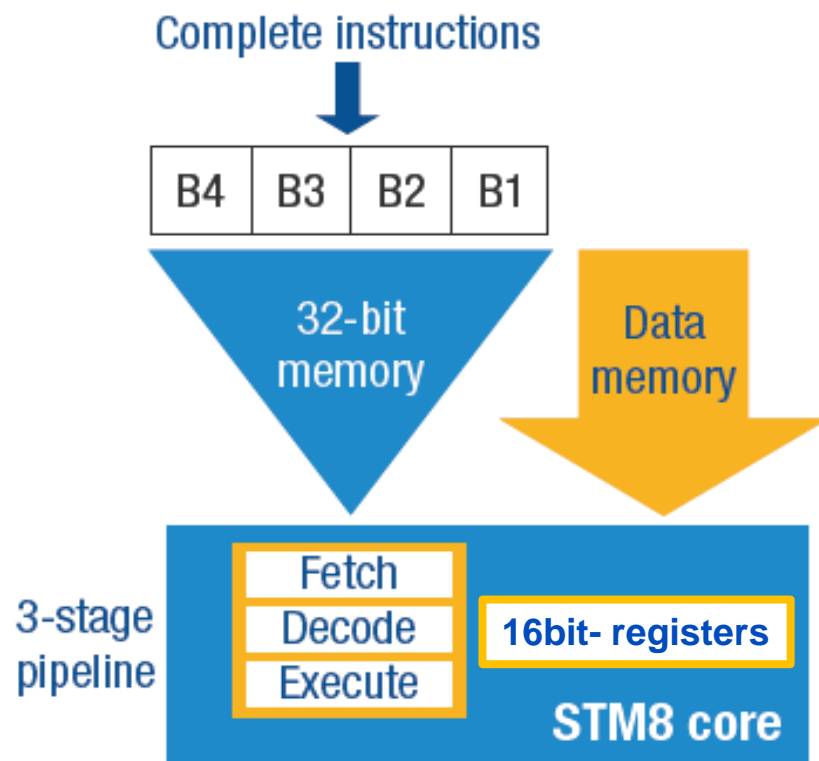Up to 150 °C**

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STM8 L — Ultra-low-power

**High en analog IPs
Active halt <1µA**

STM8 – advanced architecture

- **High-performance core**
  - Advanced Harvard and CISC architecture
  - New arithmetic instructions (**hardware multiply** and **divide**)
  - 16 CISC MIPs peak @ 16 MHz CPU

- **Innovative architecture**
  - Up to 128 Kbytes of linear address space, no paging
  - 16-bit index registers
  - Internal 32-bit memory interface and 3-stage pipeline
  - Advanced clock controller for improved power consumption and noise control
  - Interrupt management to reduce latency

Complete instructions

| B4 | B3 | B2 | B1 |

32-bit memory

Data memory

3-stage pipeline

Fetch
Decode
Execute

16bit- registers

STM8 core

Performance and code compactness

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High performance and high integration level
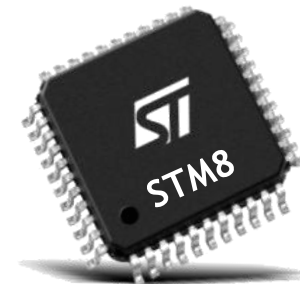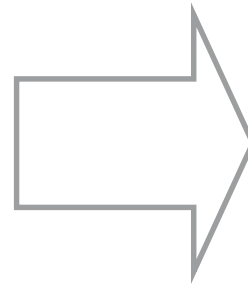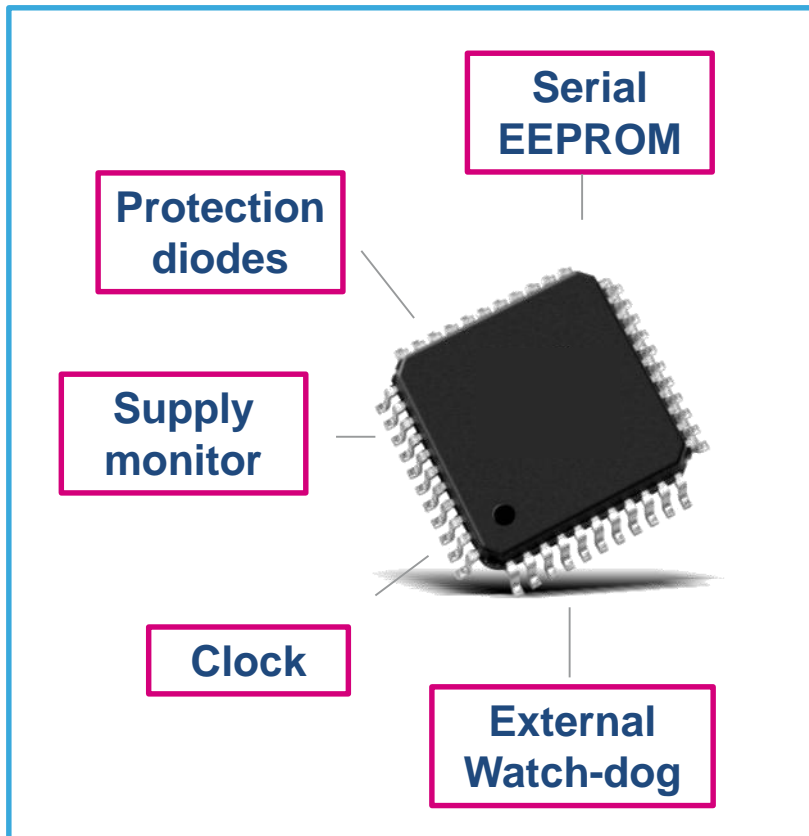
- **Lower system cost**

- **Increased reliability**

- **Smaller module size**

STM8 - Key Features summary

- **Robustness, reliability, cost effectiveness and simplicity**

1% Trim

| Int. RC 16 MHz |
| Xtal 1-24 MHz |
| Int. RC 128 KHz |

2µS Switch

Clock Controller

Clock Detector

2x Watchdogs
Clock Security

Peripherals clock gated

Reset Block

POR   **BOR**

V_{BOR+}
V_{BOR-}

NRST

Safe Reset
Susceptibility Reset

Performance 3-stage Pipe-line.

STM8 Core @ 24 MHz

Address & Data Bus

4kB-128kB Flash Memory

Single Byte Programming

Up to 2KB EEPROM

True independent EEPROM
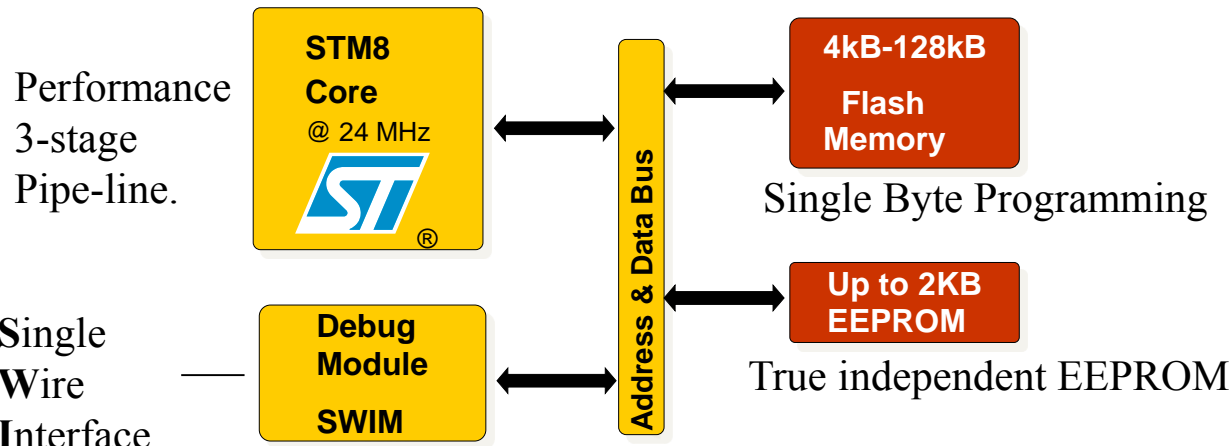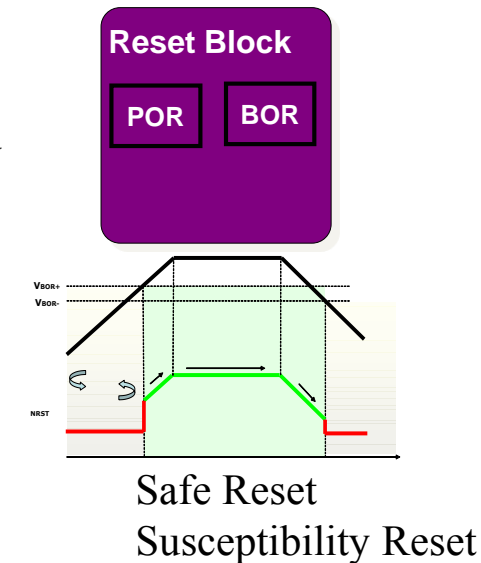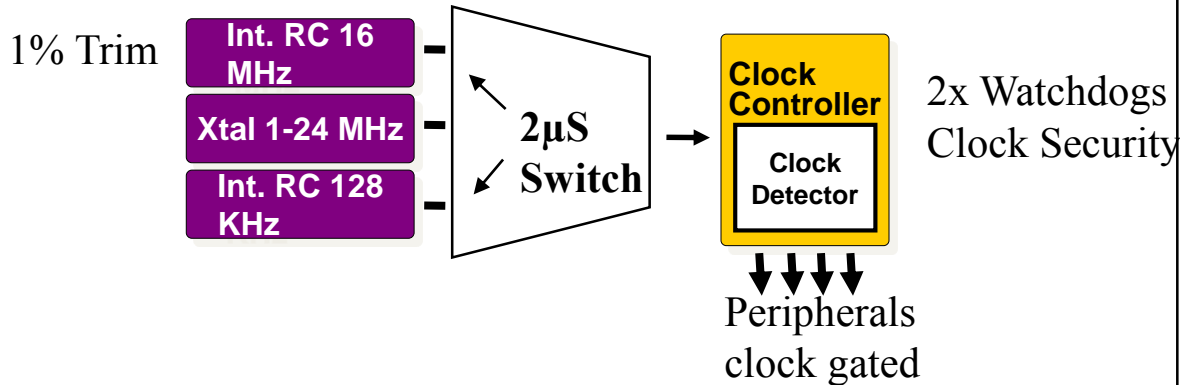
Single **W**ire **I**nterface **M**odule & Debug Module

Debug Module SWIM

I/O 4mA

I/O

High injection immunity

1µA

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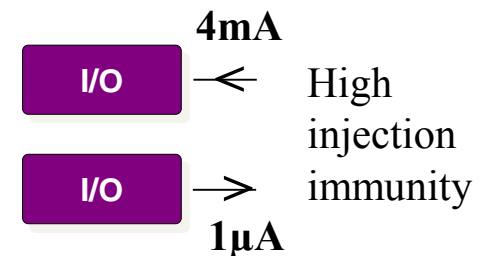
STM8 - Pinout compatibility & scalability

- Easy hardware implementation

- Smooth migration across the package family

- SPI, I²C, UART always available

- Analog on the same side

Timers (yellow)	Communications (blue)
Analog Inputs (green)	System (red)

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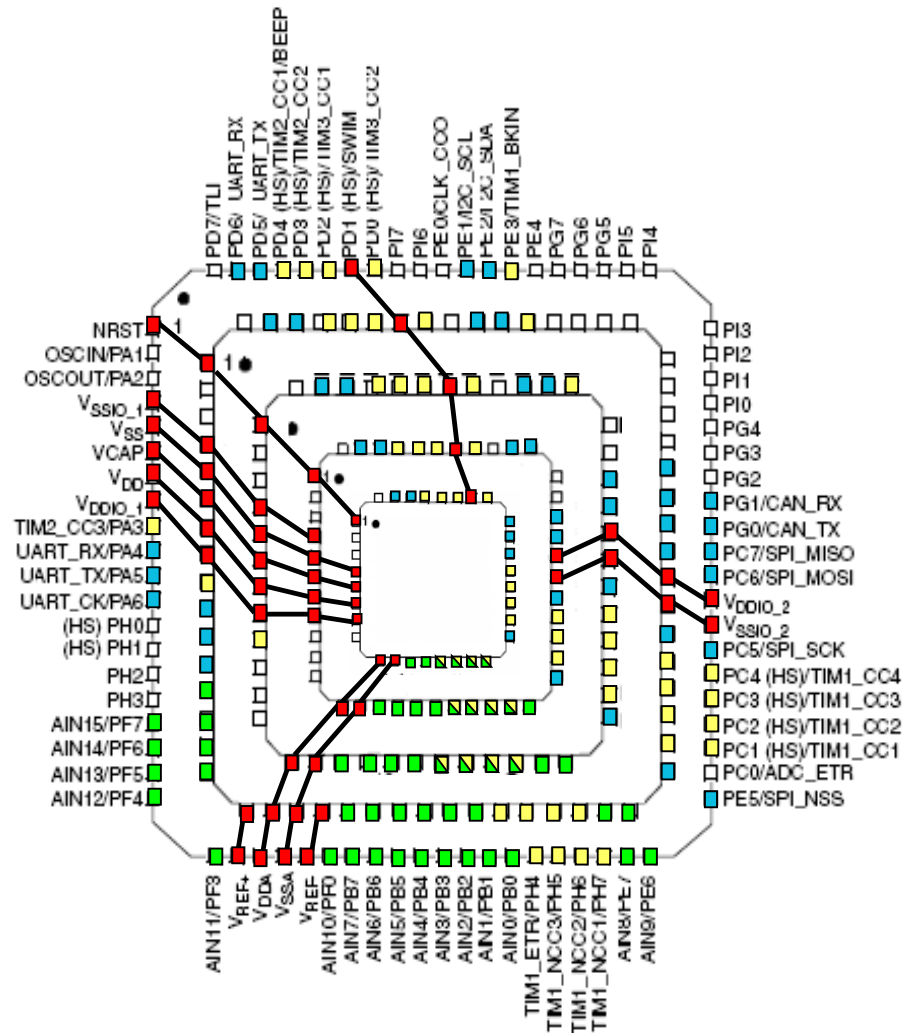
STM8 **S**

Discover more: st.com/stm8s

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STM8S mainstream family

Main common features

STM8 core @ 16 or 24 MHz

- 10-bit ADC
- UART,SPI,I²C
- Up to 3x 16-bit timers 8-bit timer
- Xtal 16 MHz and 128 KHz internal RC oscillators
- SWIM debug module

STM8S Application specific line

8-KB Flash 1-KB SRAM 640-byte EEPROM	7 analog channels	Voltage reference and timer sync	LNB firmware

STM8S207/208 Performance line

Up to 128-KB Flash Up to 6-KB SRAM Up to 2-KB EEPROM	CAN 2.0B	+ 1UART

STM8S103/105 Access line

Up to 32-KB Flash
Up to 2-KB SRAM
Up to 1-KB EEPROM

STM8S003/005/007 Value line

Up to 64-KB Flash
Up to 6-KB SRAM
128-byte EEPROM

STM8 S

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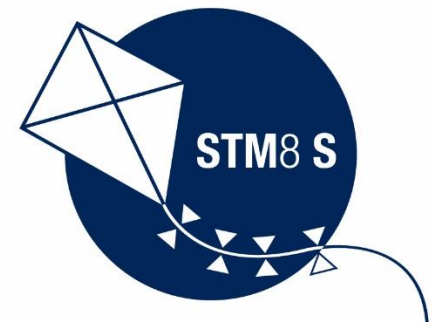
STM8 S

STM8 core – Up to 24 MHz

- **10-bit ADC**
- **USART, SPI, I²C**
- **8 and 16-bit timers**
- **Xtal 16 MHz and 128 KHz internal RC oscillators**
- **SWIM debug module**

Product line	FCPU (MHz)	FLASH (KB)	RAM (KB)	Data EEPROM (bytes)	CAN 2.0B	2nd UART	Additional analog channels	LNB firmware
STM8S003/005/007 Value line	16	8 to 64	1 to 6	128				
STM8S103/105	16	4 to 32	1 to 2	640 to 1024				
STM8S207/208	24	32 to 128	6	1024 to 2048	●	●	●	
STM8S Application Specific Line	16	8	1	640			●	●

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STM8S generic block diagram

- **Core**
  - STM8 core @ 24 MHz
  - -40 to +85 °C, or up to 125 °C temperature range

- **Memory**
  - 4- to 128-Kbyte Flash
  - Up to 6-Kbyte SRAM
  - Up to 2-Kbyte data EEPROM

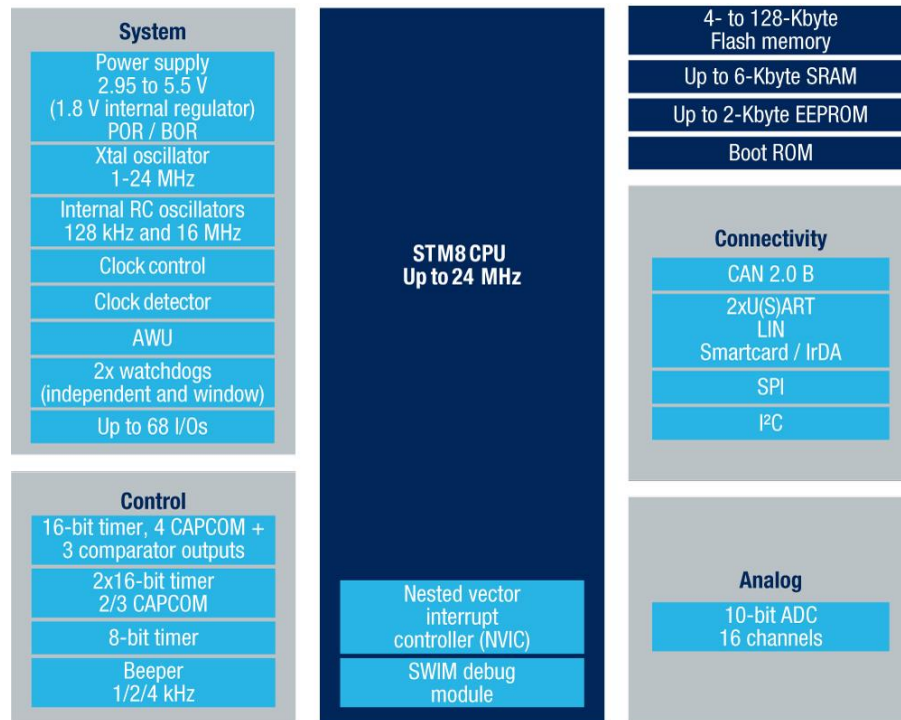- **Features/Performances**
  - Robust and reliable
  - Price competitive with system cost integration
  - Performance up to 20 MIPs at 24 MHz
  - Excellent code density
  - Leading edge embedded Flash technology with true embedded E² data
  - Embedded debug function with low cost development tools
  - Automotive STM8A family up to 150 °C

System
Power supply 2.95 to 5.5 V (1.8 V internal regulator) POR / BOR
Xtal oscillator 1-24 MHz
Internal RC oscillators 128 kHz and 16 MHz
Clock control
Clock detector
AWU
2x watchdogs (independent and window)
Up to 68 I/Os

Control
16-bit timer, 4 CAPCOM + 3 comparator outputs
2x16-bit timer 2/3 CAPCOM
8-bit timer
Beeper 1/2/4 kHz

STM8 CPU Up to 24 MHz

Nested vector interrupt controller (NVIC)

SWIM debug module

4- to 128-Kbyte Flash memory
Up to 6-Kbyte SRAM
Up to 2-Kbyte EEPROM
Boot ROM

Connectivity
CAN 2.0 B
2xU(S)ART LIN Smartcard / IrDA
SPI
I²C

Analog
10-bit ADC 16 channels

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Computer and peripherals
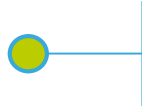
Consumer

Home appliances

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Flash size (bytes)

	20 pins TSSOP/ QFN/SO	32 pins LQFP/ QFN/SDIP	44 pins LQFP	48 pins LQFP	64 pins LQFP	80 pins LQFP
128 K			STM8S208SB	STM8S208CB	STM8S208RB	STM8S208MB
			STM8S207SB	STM8S207CB	STM8S207RB	STM8S207MB
			STM8S208S8	STM8S208C8	STM8S208R8	STM8S208M8
64 K		STM8S207K8	STM8S207S8	STM8S207C8	STM8S207R8	STM8S207M8
				STM8S007C8		
			STM8S208S6	STM8S208C6	STM8S208R6	
32 K		STM8S207K6	STM8S207S6	STM8S207C6	STM8S207R6	
		STM8S105K6	STM8S105S6	STM8S105C6		
		STM8S005K6		STM8S005C6		
16 K		STM8S105K4	STM8S105S4	STM8S105C4		
	STM8S903F3	STM8S903K3				
8 K	STM8S103F3	STM8S103K3				
	STM8S003F3	STM8S003K3				
4 K	STM8S103F2					

Pin count

Legend:

■ Performance line   ■ Access line   ■ Application specific line   ■ Value line

STM8S Value line: simple and smart

- High-performance STM8 core up to **20 MIPS** at **24 MHz**

- Reduced system cost and safe design:

  - internal supervisor circuits
  - power-on reset
  - dual watchdog
  - brown-out reset
  - clock security system

- Wide range of communication peripherals:

  - up to 2 UARTs
  - SPI
  - I²C interfaces

- Complete set of development tools from low-cost debuggers
  to high-end emulators

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STM8S Value line key benefits

Features	Benefits
High-performance STM8 core, up to 16MIPS at 16MHz architecture for code efficiency	Room for more complex applications and higher performance
Internal supervisor circuits, power-on reset, dual watchdog, brown-out reset, clock security system	Reduced system cost, robustness, safe designs
Up to 2 UART, SPI, I²C interfaces	All essential communication peripherals always included
Product platform with layout compatibility	Time-to-market, re-use of software libraries. Easy upgradability with existing access and performance lines
Advanced development tools from low-cost debuggers to high-end emulators	Fast and low-cost development

- Target markets **consumer, industrial, and mass market** applications requiring more basic specifications with best price/performance ratio.

- STM8S00x are direct alternatives for existing low-cost MCU from. At **similar price levels, our value line brings more performances and features**.

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Features comparison between STM8S003, STM8S103, and STM8S903

Features	STM8S003	STM8S103	STM8S903
Program memory size	8K	4K and 8K	4K and 8K
Data EEPROM size	128 bytes	640 bytes	640 bytes
Factory programing service	No	Yes	Yes
Cycling for program memory	100 cycles	10K cycles	10K cycles
Cycling for EEPROM	100K cycles	300K cycles	300K cycles
Internal voltage reference	No	No	Yes
ADC channels on 32pins	4	4	7
Synchronization on second 16-bit timer	No	No	Yes
Unique ID	No	Yes	Yes
Packages	LQFP32, TSSOP20, UQFN20	LQFP32, UQFN32, SO20, TSSOP20, UQFN20	LQFP32, UQFN32, SDIP32, SO20, TSSOP20, UQFN20

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STM8S Value line advantages vs. competition

- First basic low pin-count MCU based on 130nm embedded non-volatile memory technology adressing cost-sensitive applications.

- Outstanding set of features and performances vs. Competition at similar price levels:
    - Core performance and code compactness
    - Memory size
    - Eeprom
    - Connectivity

- Compatibilty & upgradability to existing large and succesful STM8S access and performance portfolio.

- Sourcing simplification, for example single STM8S003 codification to cover all your needs from 1K to 8K memory, from 8pins to 20pins and 32pins needs.

- ST supply chain and company sustainability in semiconductor market

LONGEVITY 10 YEARS COMMITMENT

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Conclusion: select the right STM8S line !

- STM8S Value line, when:
  - the very last cents count
  - more basic set of features/performances are required
  - Customer wish to rationalize all its micro needs with few codifications

- STM8S Access line / Performance line, when:
  - other various type of packages are needed
  - other memory configuration needed
  - unique ID feature needed
  - higher endurance on the Flash/EEPROM is needed
  - factory programming service is required

- STM8S Application specific line, when:
  - More ADC/Timers channels needed
  - Internal Vref needed

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STM8S Value line Discovery kit

Sale price = $7

Pre-programmed with a set of application code examples taken from the STM8S library (code size <8K)

Free compiler up to 32K code size

st.com/stm8svldiscovery

STM8 – Key messages summary

- **Robust** and **Reliable** products

- **Complete platform from** 2 kB to 128 kB, from 20 pins to 80 pins

- **True EEPROM,** 130nm technology, **ECC**

- Lower system cost with **embedded features**

- Friendly IDE with free software suite

- 3 families dedicated for **Automotive, Industrial , and low voltage/power applications.**

STM8 8-bit MCU family
Come grow with us!
Simply Smarter

STM8 Simply **smarter**

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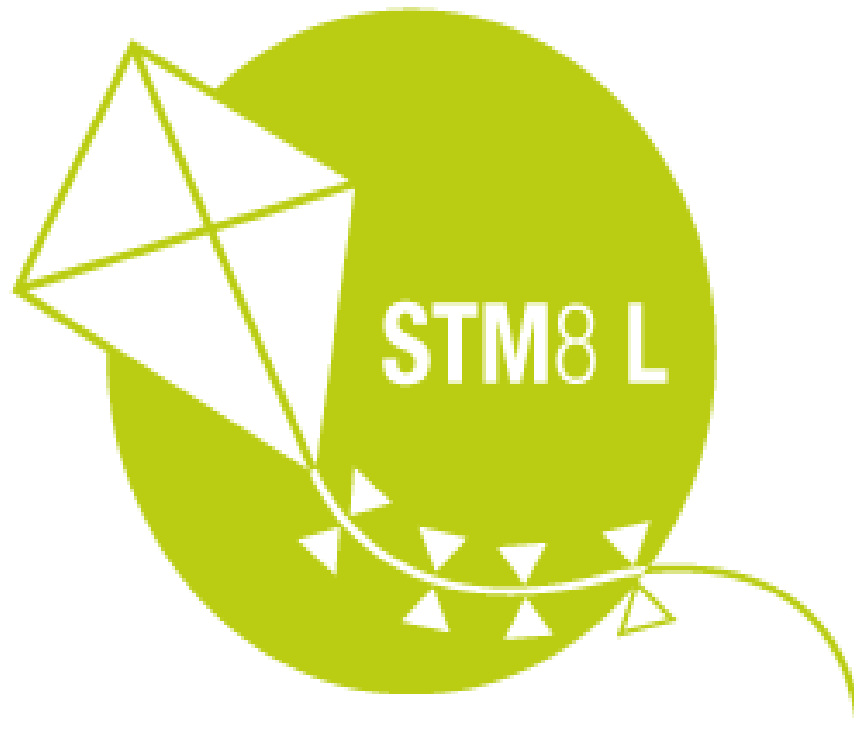
Discover more: st.com/stm8l

STM8L low power family

Main common features

**STM8 core
@ 16 MHz**

- 12-bit ADC
- 12-bit DAC
- RTC with 32 kHz osc.
- USART, SPI, I²C
- Multiple 16-bit timers, comparators, temperature sensors

Note: *Only for STM8L052

STM8L162

| Up to 64-KB Flash Up to 4-KB SRAM Up to 2-KB EEPROM | Up to 4 channels DMA | LCD 8x40 | AES 128-bit |

STM8L151/152

| Up to 64-KB Flash Up to 4-KB SRAM Up to 2-KB EEPROM | Up to 4 channels DMA | LCD 8x40 |

STM8L101

| Up to 8-KB Flash Up to 1.5-KB SRAM Up to 2-KB data EEPROM |

STM8L051/052 Value line

| Up to 64-KB Flash Up to 4-KB SRAM 256-byte data EEPROM | Up to 4 channels DMA | LCD 8x24* |

STM8 L

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STM8 L

STM8 core – Up to 16 MHz

- 12-bit ADC
- 12-bit DAC
- USART, SPI, I²C
- RTC with 32 kHz oscillator
- 8-bit and 16-bit timers
- Temperature sensor
- Comparators
- SWIM debug module

Product line	FLASH (KB)	RAM (KB)	Data EEPROM (bytes)	Four DMA channels	LCD interface	AES 128-bit crypto
STM8L051/052 Value line	8 to 64	1 to 4	256	●	●	
STM8L101	2 to 8	1.5				
STM8L151/152	4 to 64	1 to 4	256 to 2048	●	●	
STM8L162	64	2	2048	●	●	●

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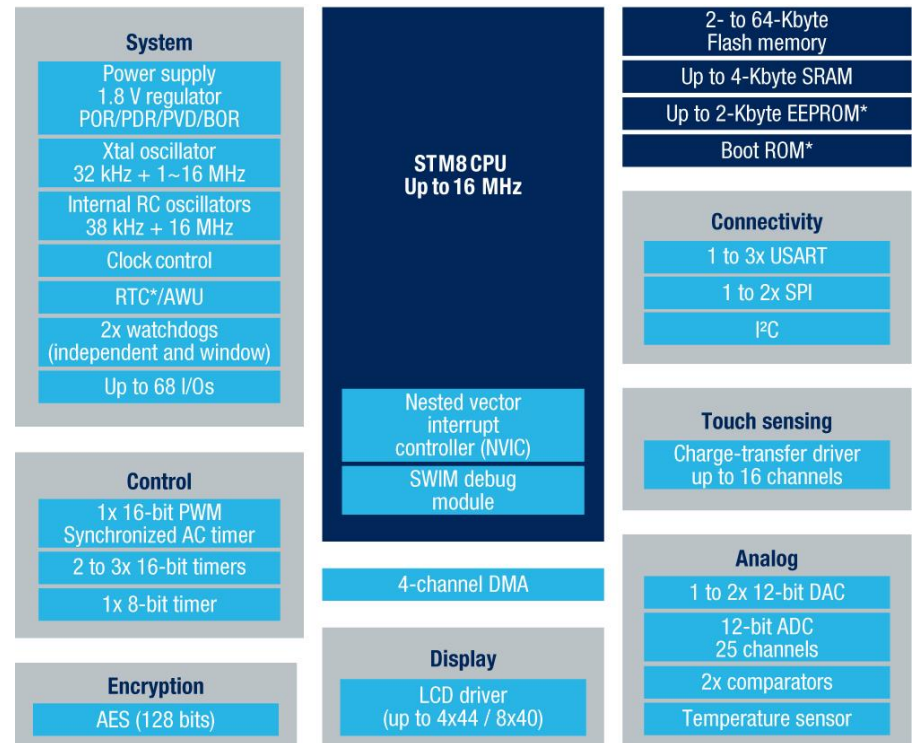
STM8L generic block diagram

- **Core**
  - STM8 core @ 16 MHz
  - -40 to +85 °C, or
    up to 125 °C temperature range
- **Memory**
  - From 2 to 64-Kbyte Flash
  - 1.5 to 4-Kbyte SRAM
  - 1 to 2-Kbyte data EEPROM

System
- Power supply
  1.8 V regulator
  POR/PDR/PVD/BOR
- Xtal oscillator
  32 kHz + 1~16 MHz
- Internal RC oscillators
  38 kHz + 16 MHz
- Clock control
- RTC*/AWU
- 2x watchdogs
  (independent and window)
- Up to 68 I/Os

**STM8 CPU
Up to 16 MHz**
- Nested vector
  interrupt
  controller (NVIC)
- SWIM debug
  module

- 2- to 64-Kbyte
  Flash memory
- Up to 4-Kbyte SRAM
- Up to 2-Kbyte EEPROM*
- Boot ROM*

Connectivity
- 1 to 3x USART
- 1 to 2x SPI
- I²C

Touch sensing
- Charge-transfer driver
  up to 16 channels

Control
- 1x 16-bit PWM
  Synchronized AC timer
- 2 to 3x 16-bit timers
- 1x 8-bit timer

- 4-channel DMA

Analog
- 1 to 2x 12-bit DAC
- 12-bit ADC
  25 channels
- 2x comparators
- Temperature sensor

Display
- LCD driver
  (up to 4x44 / 8x40)

Encryption
- AES (128 bits)

Typical @ 25 °C

192 µA/MHz

Dynamic Run

From Flash

90 µA/MHz

Dynamic Run

From RAM

5.1 µA

Low-power Run @ 32 kHz

3.0 µA

Low-power Wait @ 32 kHz

1.2 µA

Active Halt with RTC

0.4 µA

Halt

Notes:
- POR/PDR on
- RAM content preserved
- BOR option at 2.4 µA
- Startup time from active Halt 5 µs
- Run and Wait consumption values are independent of V_{DD}
- Active Halt and Halt values measured at V_{DD} = 1.8 V

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STM8L targeted applications

- Portable medical devices

- Alarm systems

- Factory automation

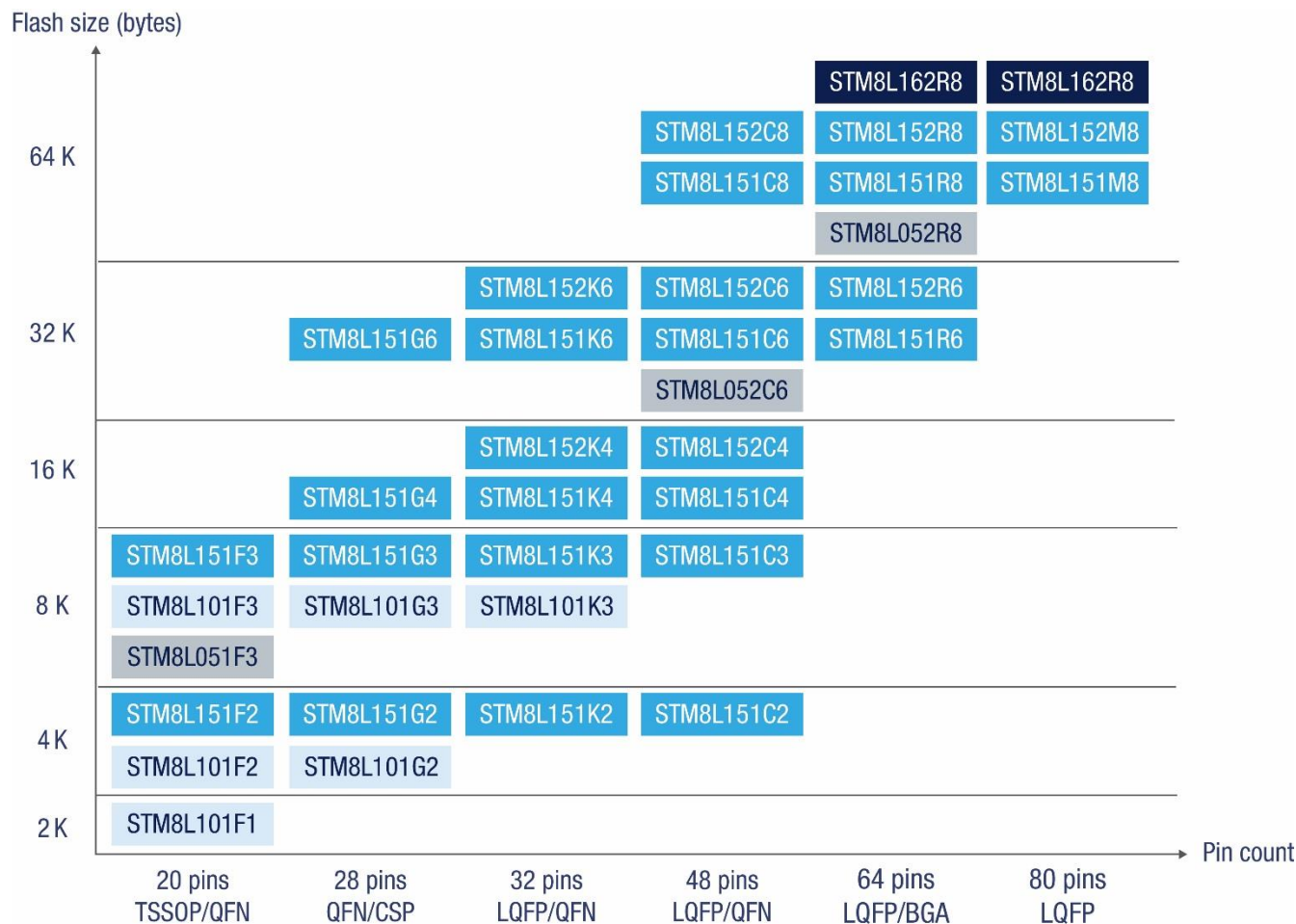- Mobile applications

- Metering

- General portable devices

- Sensors

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STM8L product portfolio

Flash size (bytes)

	20 pins TSSOP/QFN	28 pins QFN/CSP	32 pins LQFP/QFN	48 pins LQFP/QFN	64 pins LQFP/BGA	80 pins LQFP
64 K				STM8L152C8	STM8L152R8	STM8L152M8
				STM8L151C8	STM8L151R8	STM8L151M8
					STM8L052R8	
					STM8L162R8	STM8L162R8
32 K		STM8L151G6	STM8L152K6 STM8L151K6	STM8L152C6 STM8L151C6	STM8L152R6 STM8L151R6	
				STM8L052C6		
16 K		STM8L151G4	STM8L152K4 STM8L151K4	STM8L152C4 STM8L151C4		
8 K	STM8L151F3 STM8L101F3 STM8L051F3	STM8L151G3 STM8L101G3	STM8L151K3 STM8L101K3	STM8L151C3		
4 K	STM8L151F2 STM8L101F2	STM8L151G2 STM8L101G2	STM8L151K2	STM8L151C2		
2 K	STM8L101F1					

Pin count

STM8L Value line key benefits

Features	Benefits
High-performance STM8 core, up to 16MIPS at 16MHz architecture for code efficiency	Room for more complex applications and higher performance
Internal supervisor circuits, power-on reset, dual watchdog, brown-out reset, clock security system	Reduced system cost, robustness, safe designs
Up to 3 USART, 2 SPI, I²C interfaces	All essential communication peripherals always included
Product platform with layout compatibility	Time-to-market, re-use of software libraries. Easy upgradability with existing access and performance lines
Advanced development tools from low-cost debuggers to high-end emulators	Fast and low-cost development
Ultra low power performances	4 Low power modes, Halt mode : 0.35uA

- Target markets **consumer, industrial, and mass market** applications requiring more basic specifications with best price/performance ratio.

- STM8L05x **value line brings more performances and features vs. Competition at similar or reduced budget price.**

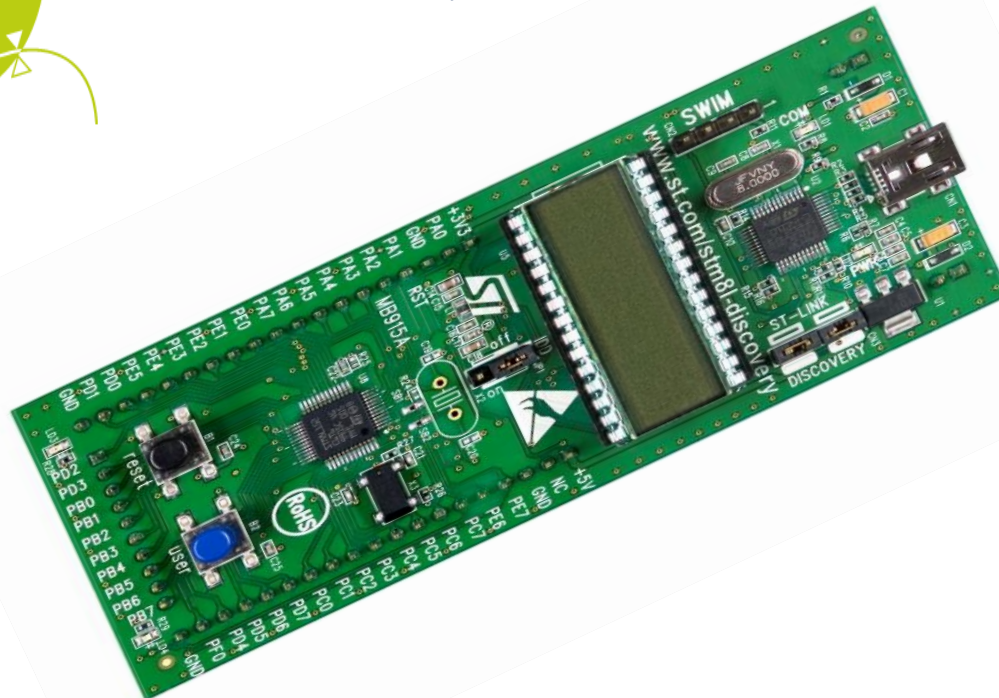WWW.EMCU.IT

Features Comparison for VALUE line

Features	STM8L05X	STM8L15X
Program memory size	8 KB - 64 KB	4 KB - 64KB
Data EEPROM size	256 Bytes	2 KB
Factory programing service	No	Yes
Operating Voltage range	1.8V to 3.6V	1.65V to 3.6V
Cycling for program memory	100 cycles	10K cycles
Cycling for EEPROM	100K cycles	300K cycles
Temperature range	– 40 to 85 ° C	– 40 to 125 ° C
RC (HSI) accuracy	+/-5% (-40 to 85 ° C - Vdd 1.8 to 3.6 V)	+3% and -4% (-40 to 125 ° C - Vdd 1.65 to 3.6 V)
Analog features,	No comparator, no DAC, no temp sensor. No touch sensing	ALL available
LCD	up to 8x24 or 4x28 segments	Up to 8x40 or 4x44 segment
Unique ID	No	Yes
Packages	TSSOP20, LQFP48, LQFP64	TSSOP20/28, UQFN20/28, LQFP32, LQFP48, LQFP64, LQFP80

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STM8L-DISCOVERY
9.9$
www.st.com/stm8l-discovery

STM8 development tools

Quick start evaluation boards

STM8S-DISCOVERY
STM8SVLDISCOVERY
STM8L-DISCOVERY

STM8L-PRIMER

Debugging tools

ST-LINK/V2

STICE

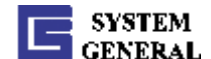## Development platforms

STM8/128-EVAL

STM8-SK/RAIS

STM8/128_MCKIT

IDE solutions

STVD

EWSTM8

RIDE

IDEA

SW/HW providers

CMX SYSTEMS

Propox — Many ideas one solution

HI-LO SYSTEMS 河洛半導體股份有限公司

Vector

KAMAMI

SMH Technologies

Data I/O

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BP MICROSYSTEMS

FALCON

i SYSTEM

SYSTEM GENERAL

AVNET Memec

SILICA An Avnet Company

life.augmented

www.st.com/stm32

www.st.com/stm8

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