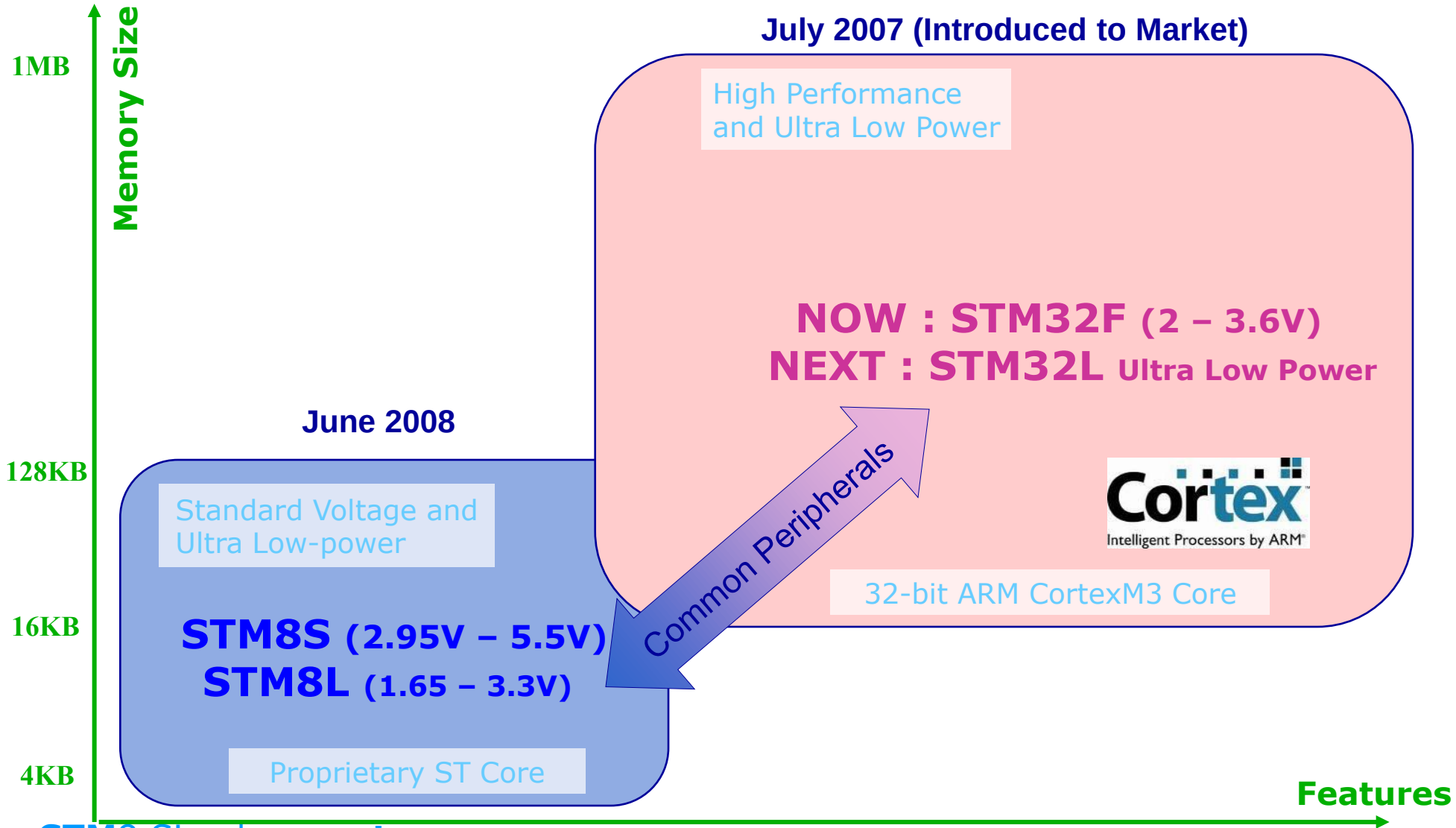
STM8S Microcontroller Family

8-bit STM8 based Flash microcontroller

January 2009

ST Microcontroller Families focus



Introduction STM8S

- New 8-bit general purpose microcontroller from STMicroelectronics
  - STM8S combines the innovations and experiences built-up over many years
  - STM8S is going to be our 8-bit offering covering ST6, ST7, ST5 and ST9 portfolio.
  - Process breakthrough, 0.13µm non-volatile memory technology

- Bringing advanced 8-bit core and platform scalability to industrial applications
  - Improved robustness and reliability
  - Lower cost system
  - Simplicity in 8-bit

Applications for STM8S; Can't list all

- Home Appliances

- HVAC

- User interfaces

- Factory automation

- Motor control

- Sensors

- Lighting

- E-bikes

- Circuit breakers

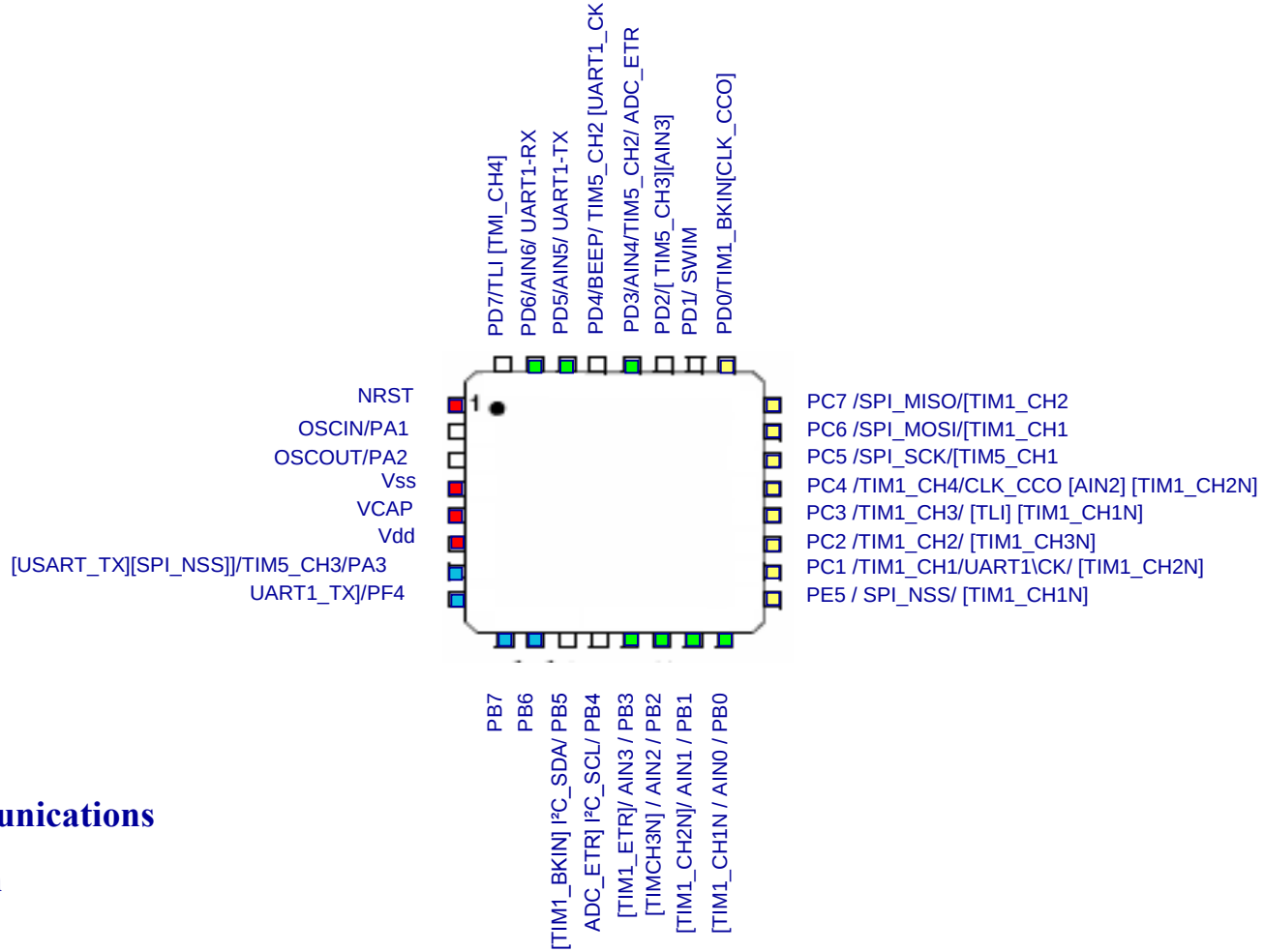
- Personal Care

- Rechargeable battery operated devices

- Toys and game accessories
- Power supplies and power management
- Power tools

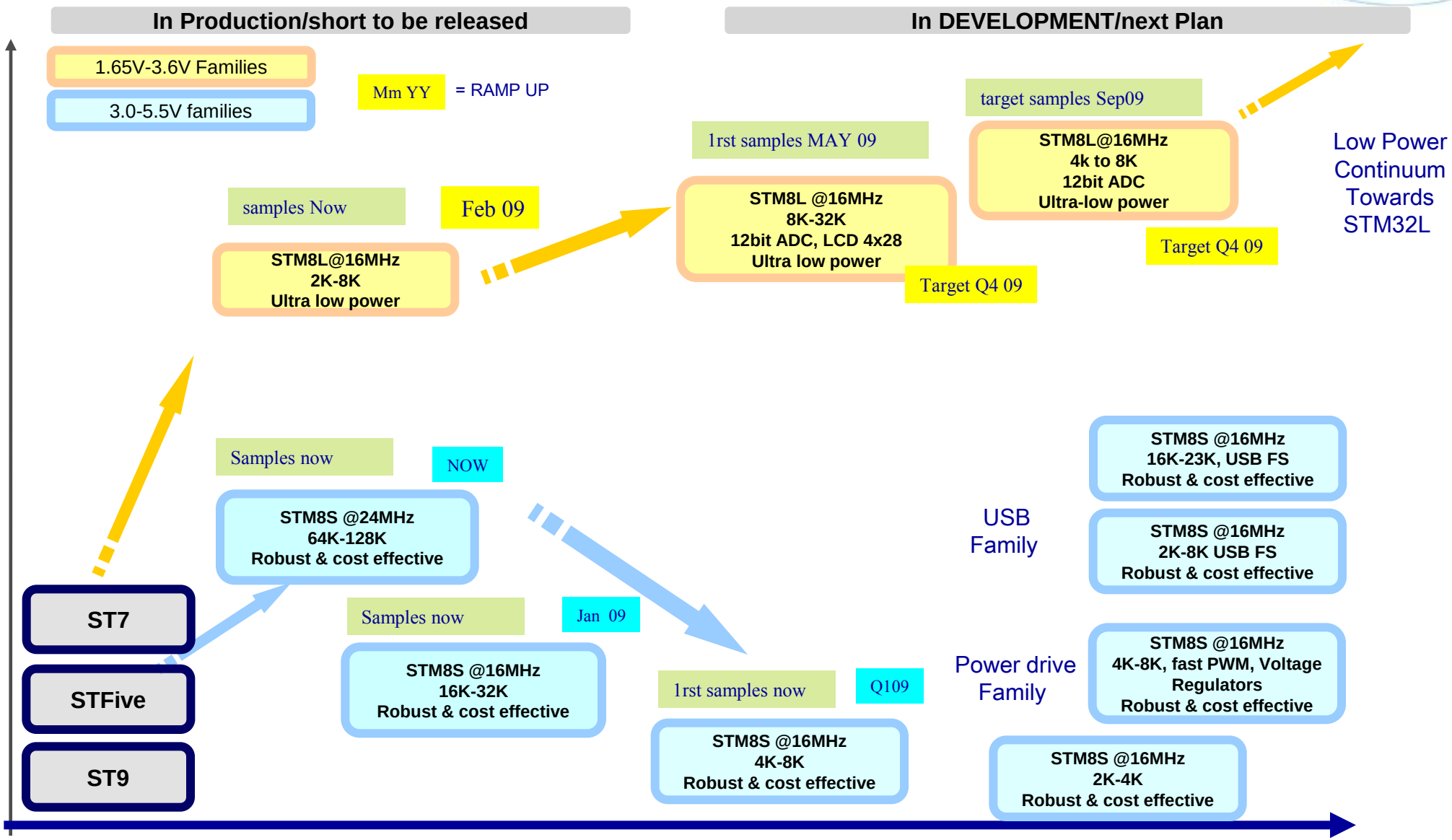
New Reference for More. ADC + TIM1 +UART +I²C

STM8S903K3T6



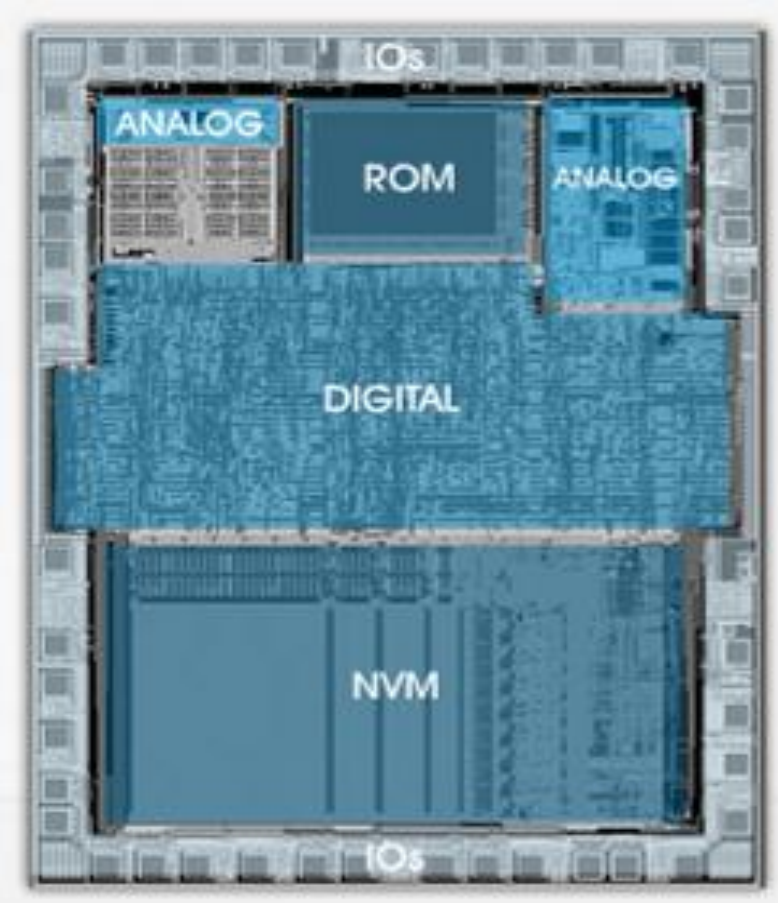
- Timers
- Communications
- Analog Inputs
- System

8bit roadmap – Advanced information

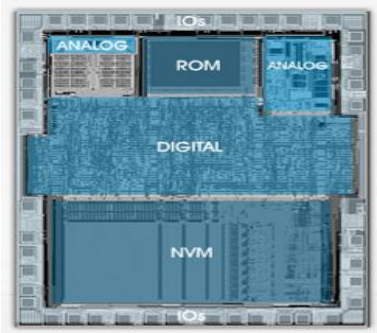


Example for 8K / 32pin technology effect

0.45µm

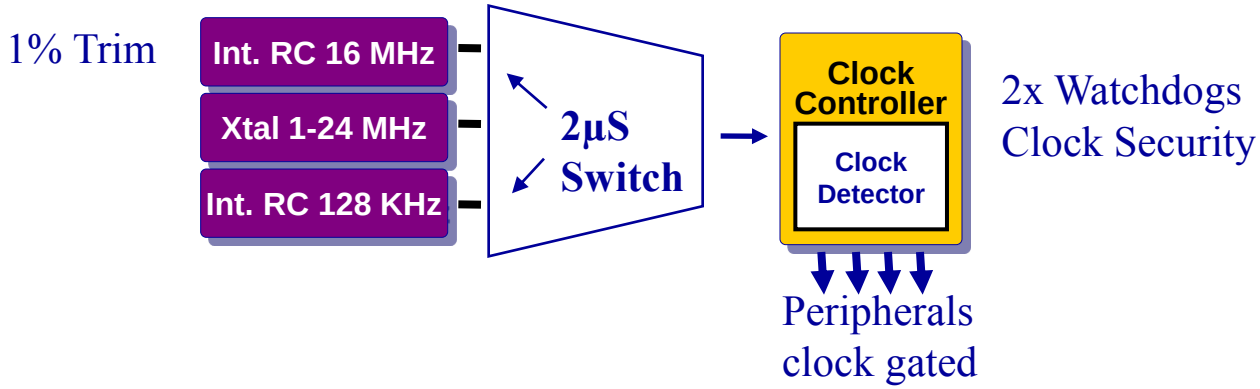


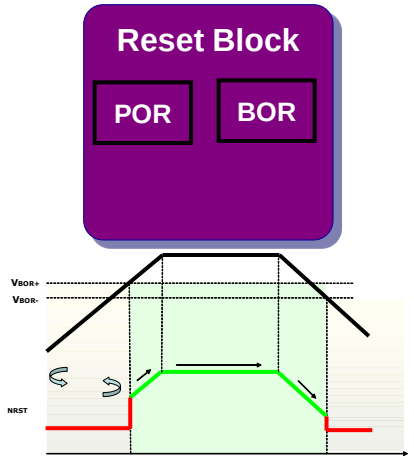
0.13µm

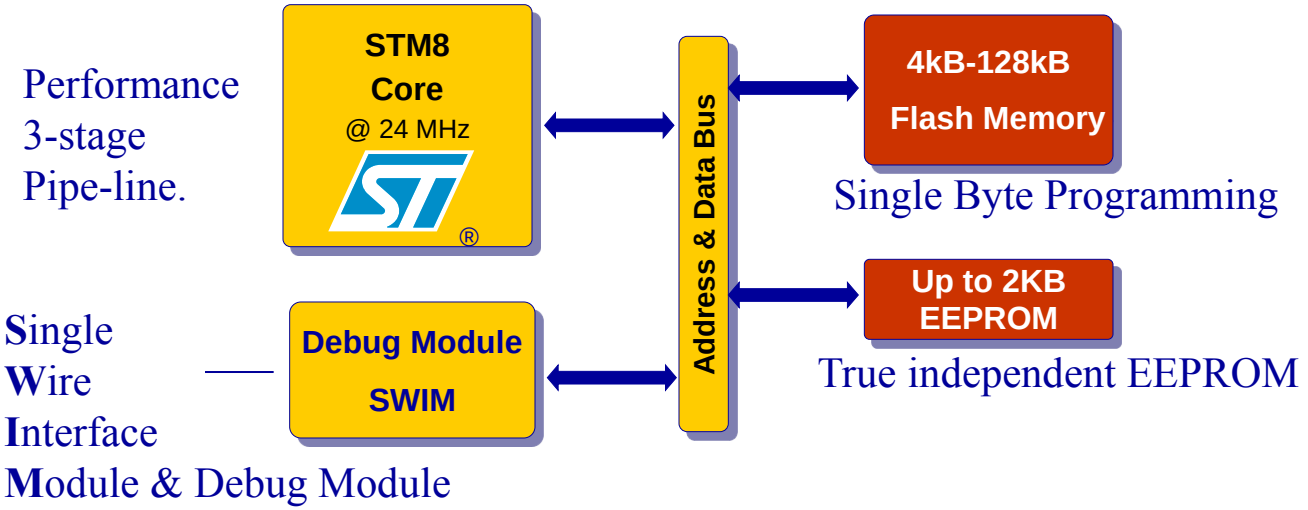


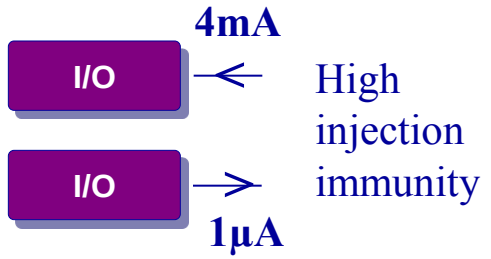
STM8S Key Features

- **Mission: Robust, reliable, cost effective and simple**





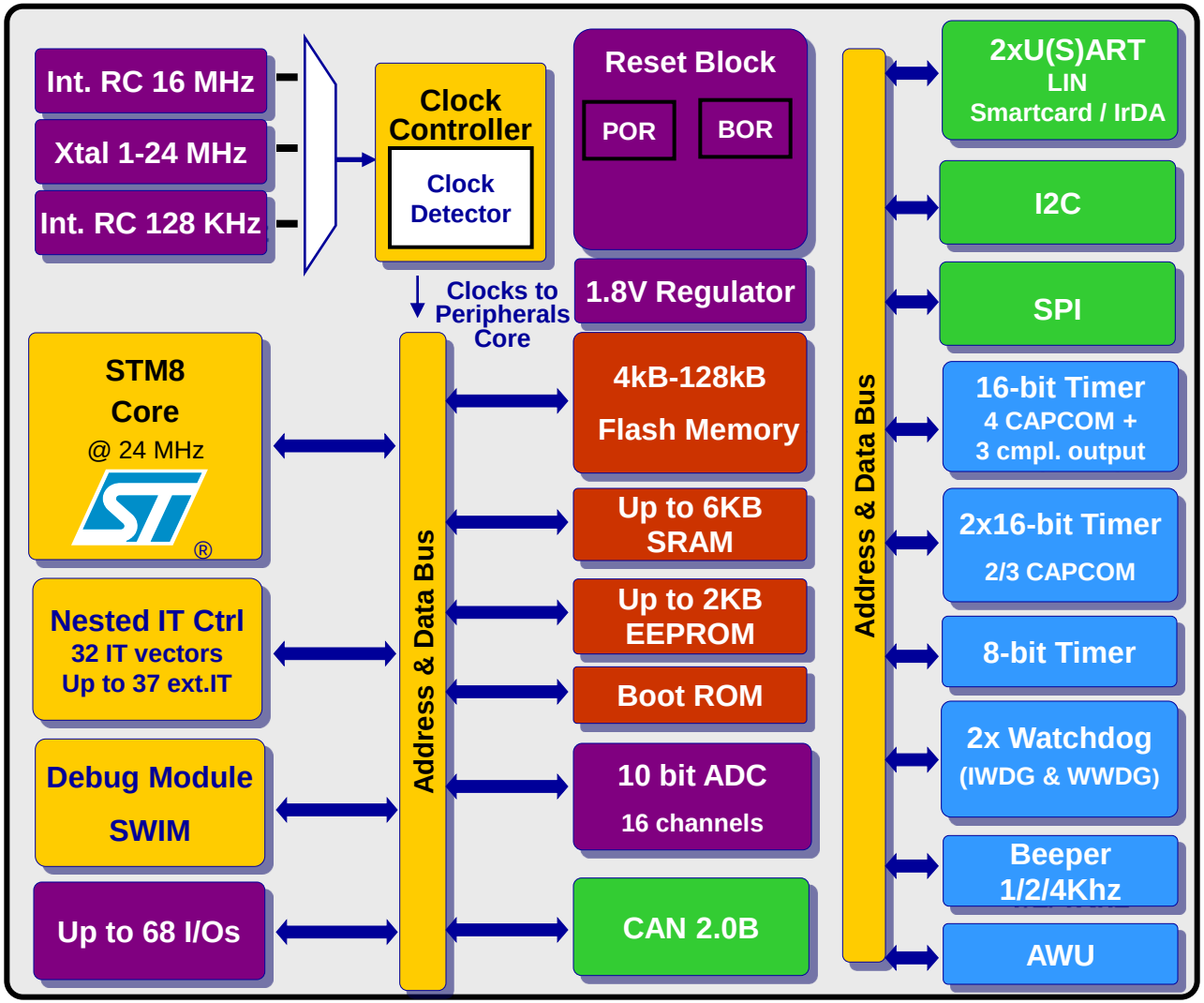




STM8S Block Diagram

Key features

- 2.95 to 5.5V
- -40 to +125 °C
- 24MHz core frequency
- 10K cycles for Flash
- 300K cycles for EEPROM
- 4 Low power modes (~5µA in Halt mode)
- Trim-able HSI RC 16MHz, +/-1% typ.
- IrDA and Smartcard I/F
- SWIM for fast programming (<6s for 128KB)
- LQFP 80, 64, 48, 44, 32 VQFN 20, 32, TSSOP 20 DIP packages



Building STM8S families

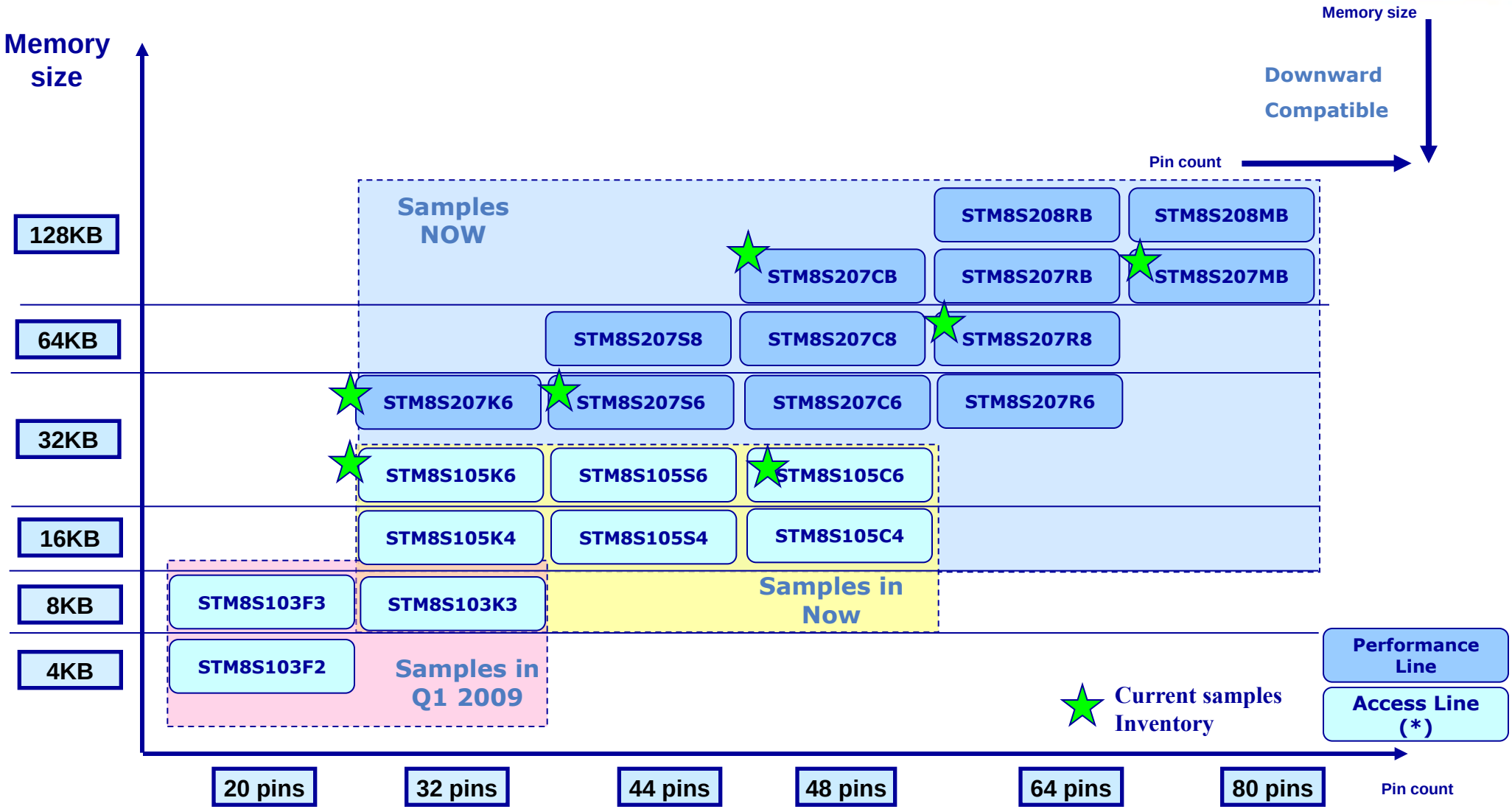
- UART
  LIN /Smartcard / IrDA
- I2C
  400 KHz multi-master
- SPI
  10MHz
- Up to 3x16-bit Timer
  8-bit Timer
- 2x Watchdog
  (IWDG & WWDG)
- AWU
  Beeper 1/2/4Khz
- 10-bit ADC
  Up to 16 channel
- XTAL
  16MHz int.RC osc.
  128KHz int.RC osc.
- SWIM
  Debug Module

Performance Line STM8S20x

+

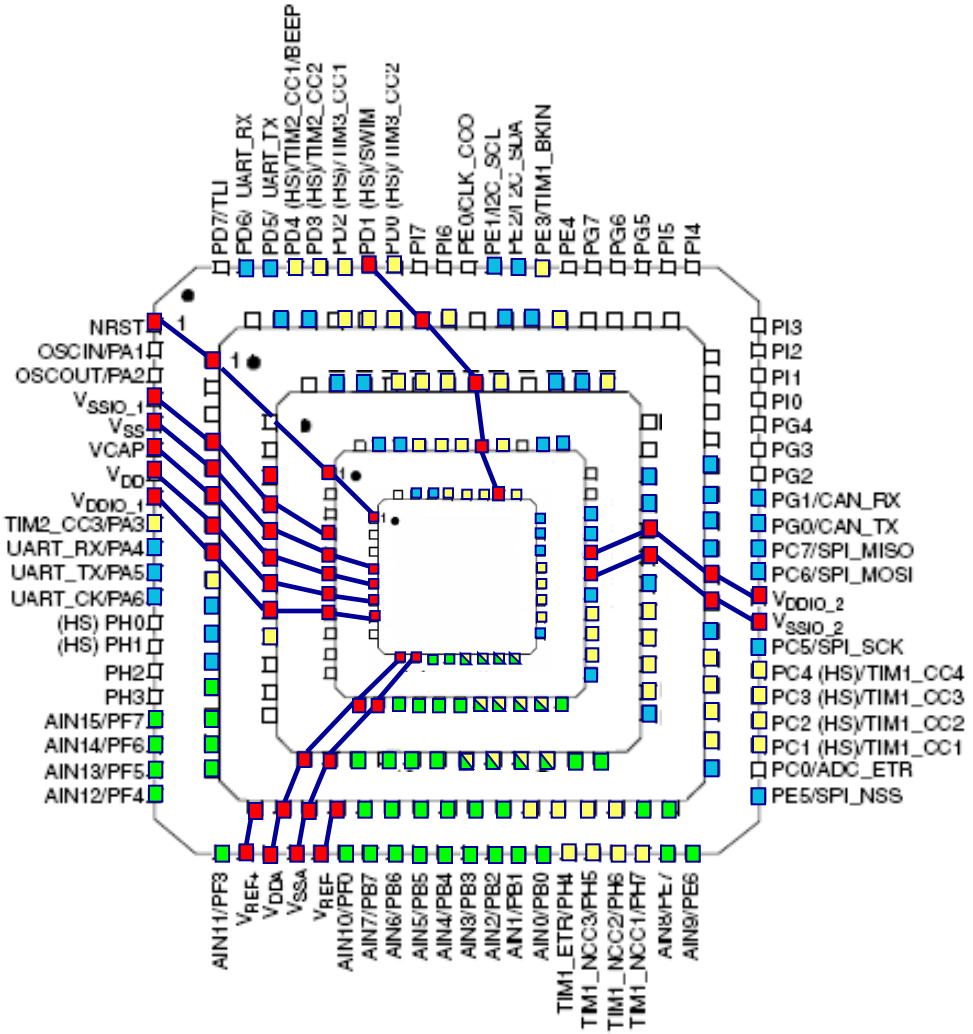
Access Line STM8S10x

STM8S - Portfolio, for a full platform



Pinout compatibility & scalability

- Easy hardware implementation
- Smooth migration across the package family
- SPI, I²C, UART always available
- Analog on the same side



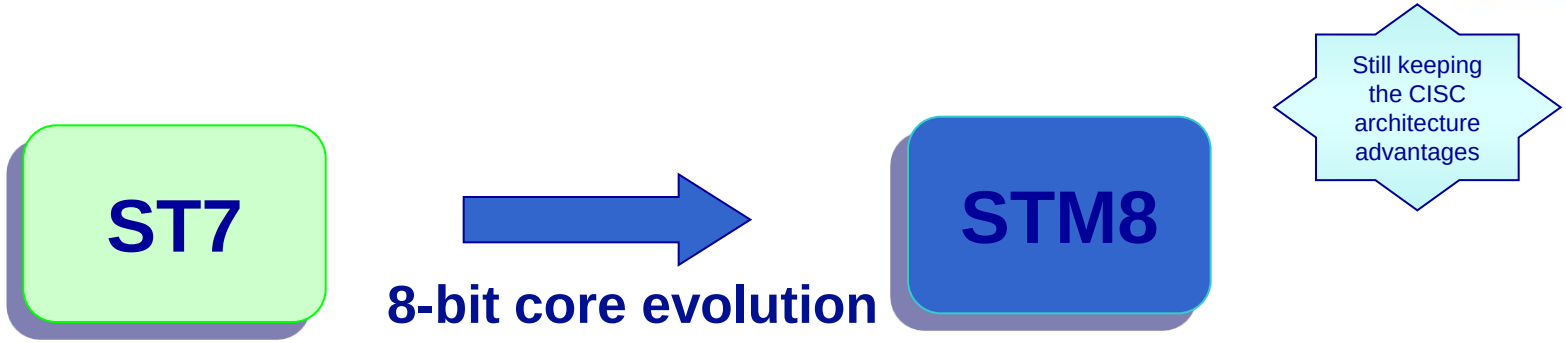
Timers

Communications

Analog Inputs

System

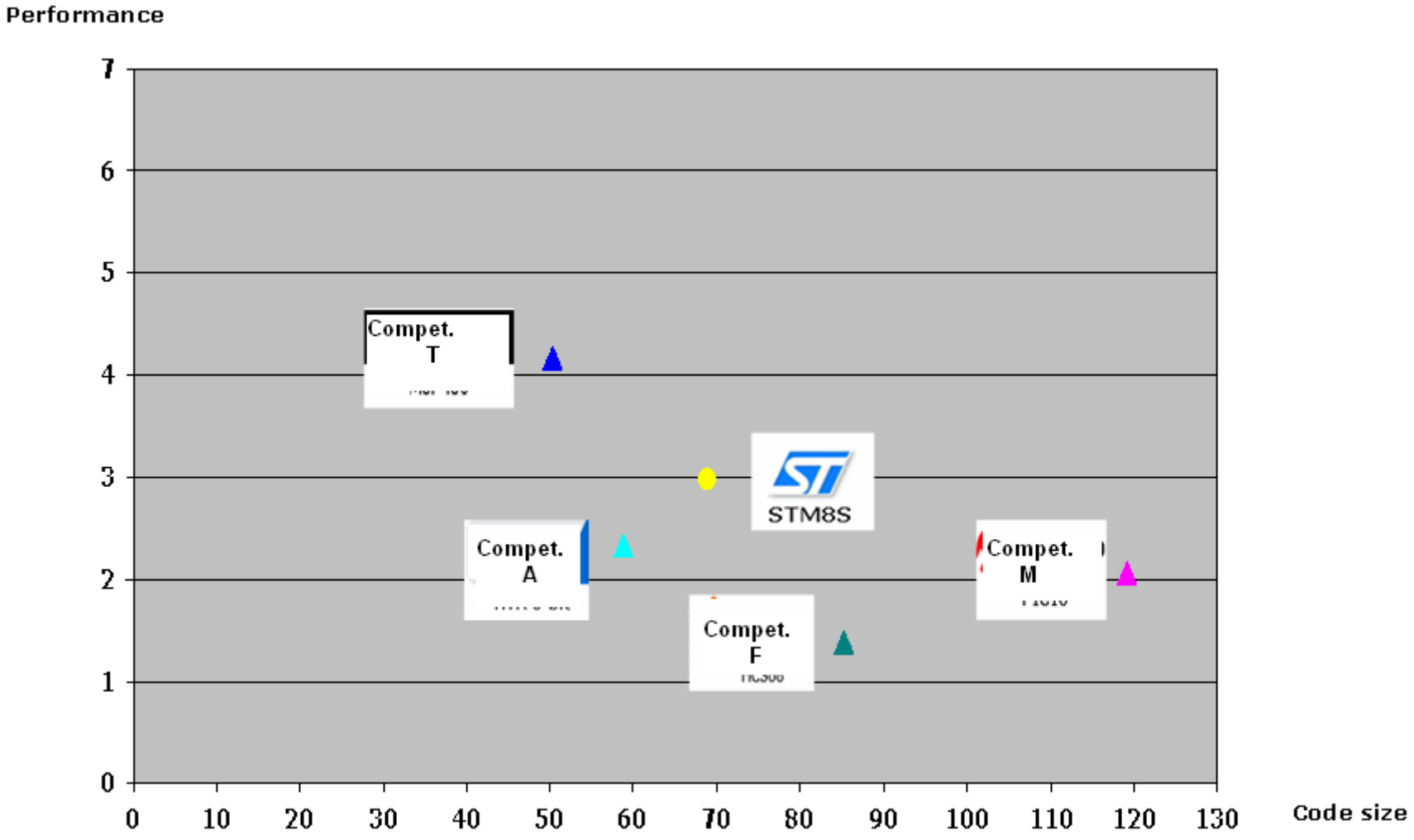
What's new in STM8 core? A "boosted" architecture



10x performance vs. ST7 & 30% code size reduction vs. ST7

- Harvard Architecture with **3 stage pipeline**
- **Linear** memory space up to 16MB with new FAR instructions
- **20 MIPS peak** performance @Fcpu=24MHz
- **32-bit wide** program memory bus
- **2x16-bit** index registers
- 16-bit/8-bit and 16-bit/16-bit div.
- Faster 8-bit*8-bit multiplication, signed arithmetic operation
- 32 interrupt vectors
- RAM execution
- 96 instructions

STM8: High end performance core.



* STM8S overall benchmark results are based on standard 8/16-bit MCU benches. (Mips/MHz)

Smart power management

- Advanced Clock Control Architecture allows the device to switch from low speed clock to high speed clock in 2usec

Mode for STM8S208MB	Oscillator	CPU	Peripherals	Wake-up trigger event	Consumption (Typical)
RUN*	ON	ON	OFF		8mA from Flash 2.5mA from RAM
RUN**	ON	ON	ON		10mA from Flash 4.5mA from RAM
Peripheral Clock Gating	ON	ON	ON		Depends on Peripheral selection
Wait @ RC 16Mhz 5V	ON	OFF	ON	Internal or external IT	1.2mA 0.5mA@128KHz
Active Halt Fast Wake-up @ RC 128Khz	128Khz	OFF	OFF	External IT or AWU (2µS)	200µA
Active Halt Slow Wake-up @ RC 128Khz	128Khz	OFF	OFF	External IT or AWU (100µs)	11µA
HALT @5V	OFF	OFF	OFF	External IT (100µS)	4.5µA

* All peripherals OFF, 16MHz RC at 5V, 25 °C

**All peripherals ON, all i/o ports toggling in infinite loop with 16MHz RC at 5V, 25 °C

Compliance to Class B of IEC60335

- ST is committed to support customers to have IEC 60335 / IEC 60730 compliant end-products

- Specific hardware features of STM8S to help in conformance to safety regulations
  - Dual watchdog architecture, IWDG+WWDG
  - Internal clock sources, HSI and LSI RC
  - Clock security system, CSS, to monitor external clock source
  - Error correction code on memory, ECC
  - High impedance state for I/Os under RESET

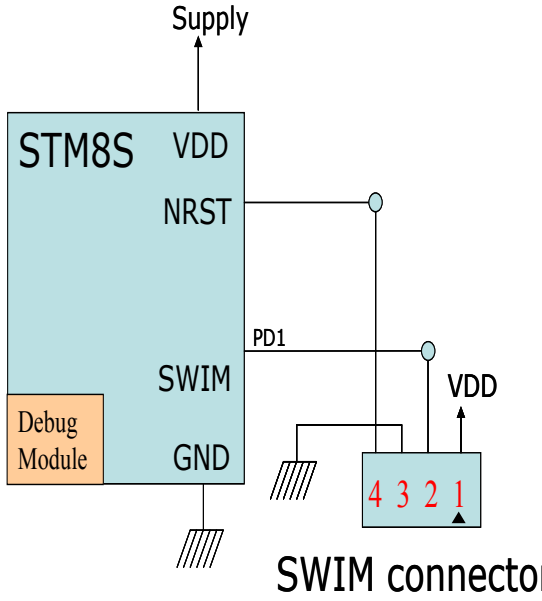
- Class B self-diagnostic library for STM8
- STL, self-test library for CPU, RAM, flash, WDG and clock source check at start-up
- Run-time test routines for CPU, RAM, flash, WDG, clock source and stack overflow check
- Application note and user manual for the library
- Self-test library f/w modules approved by the VDE
- All f/w libraries are MISRA C compliant

SWIM and Debug module

- Non-intrusive, SWIM doesn't use any CPU resource.
- No restrictions for addresses and memory space.
- No monitor code
- No interrupt remapping
- Use only single pin

- Real-time code execution, SWIM steals dead cycles to read RAM and registers
- Single wire interface module for non-intrusive in-circuit debugging and fast programming
- Unlimited instruction breakpoints
- 2 configurable advance breakpoints up to 23 conditions and data breakpoints
- Read/write RAM and peripheral registers during application execution

Read Flash during application execution.



Development kits; More to come!

- STICE-SYS001- High-end full featured emulator
- STM8/128-EVAL- Evaluation board with full range of peripheral features
- STM8/128-EV/TS – Evaluation board, including support for Touch sensing.
- STM8/128-SK/RAIS- Starter kit including everything needed to begin a design
- STX-RLINK- Programming and debugging dongle

STM8/128-EVAL

$150

STICE-SYS001

$1990

STM8/128-SK/RAIS

$219

STX-RLINK

$59

All recommended resale prices

Software and firmware library and support

- ST Visual Develop (STVD), free IDE
- ST Visual Programmer (STVP), free MCU programming software
- STM8S peripheral firmware library and examples
- STM8S IEC 60335 ClassB compliant firmware library, VDE approved

www.st.com/stm8

- Raisonance RIDE, free IDE with RBuilder and RFlasher
- Raisonance C Compiler, 16KB free

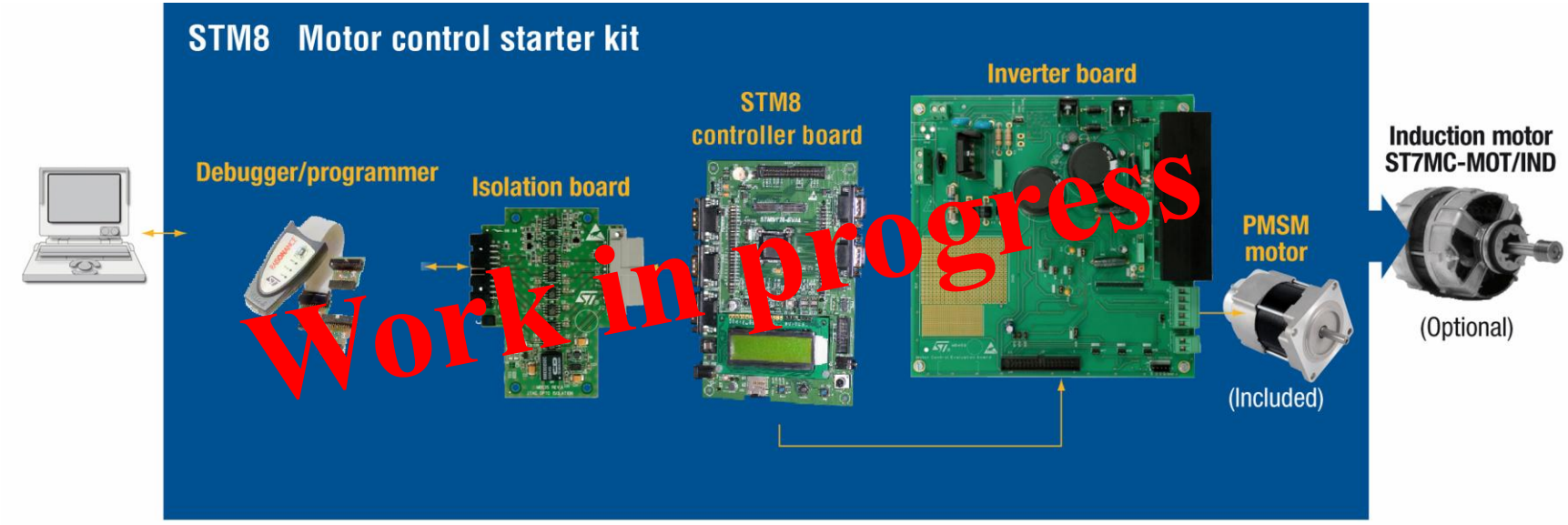
www.raisonance.com

- Cosmic C Complier, 16KB free

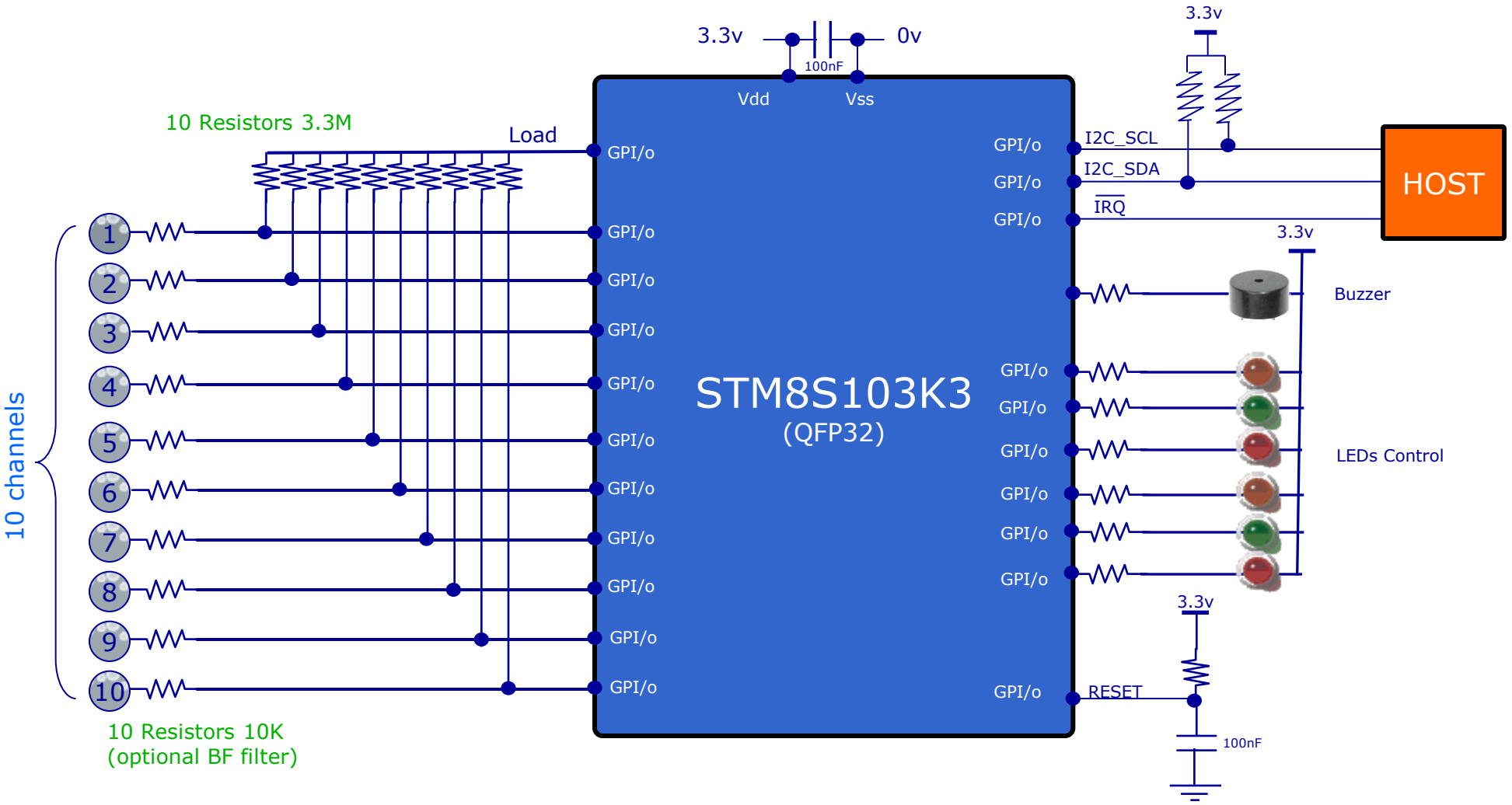
www.cosmic-software.com

STM8/MCKIT-Demonstration Kit

- Hardware reference design for power stage
- Complete source files software libraries for 3-PH Induction and BLDC/PMSM motors
- PMSM motor included
- Stand alone or user interface driven libraries
- Run your motor in just a few minutes!!

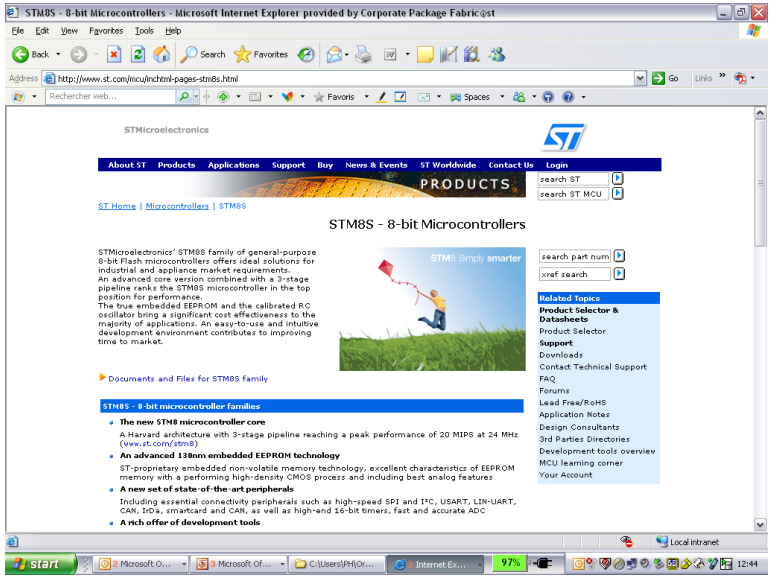


Project example with STM8S103K3 in LQFP32 (10 keys – I2C – LEDs - Buzzer)



More resources

- For more information on STM8S MCUs, please visit www.st.com/stm8s
- Selection guide, datasheets, reference manual, application notes
- Standard peripheral and IEC 60335 Class B compliant firmware libraries
- STVD & STVP PC software tools
- Complete list of 3rd party tools and software support
- Technical user forum
- Training material
- Technical support contact information



Conclusion : Be ready for the launch Q109

- High performance core, advanced technology and improved code density are ideal combinations for price sensitive 8-bit microcontroller applications
- Robustness and reliability are the key differentiation parameters.
- Maximum integration reduces the need for external components keeping system cost low.
- Common peripheral definition for STM8 and STM32 families.
- A combination of easy-to-use and accessible development tools shorten the design cycles.

Order code: BRSTM8S0908

Thank you

Back-up slides for information

STM8 Part Numbers