ST10 family

16-bit microcontrollers for automotive applications

June 2006

16-bit microcontroller for automotive applications

The ST10 family, **STMicroelectronics'** industry-standard 16-bit microcontrollers, provide pin-compatible alternatives with enhanced scalable Flash memory. Since its introduction, ST has sold more than 100 million devices.

With the DSP-MAC, STMicroelectronics leverages this success, adding cutting-edge DSP potential to its ST10 advanced 16-bit MCU.
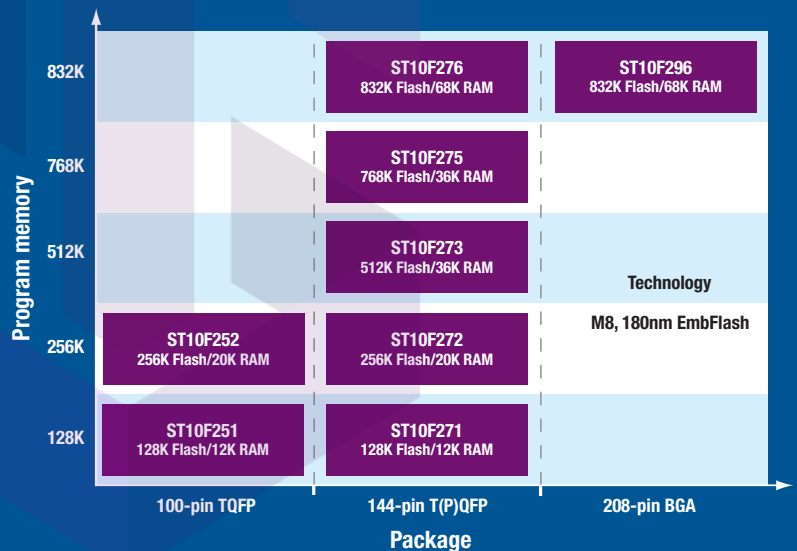
Building on ST's experience in embedded cores, the ST10 architecture is based on an analysis of the true requirements of system designers and software engineers in some of the fastest-moving segments of the industry, where high-performance, real-time capabilities and low-power consumption are essential to enable innovative and competitive solutions.

ST10 0.18μm family features

- ST10 with DSP unit
- 5th generation embedded Flash
- Uniform peripheral set
- CAN module compliant to OEMs
- Variety of packages
- Broad frequency range

ST10F2xx family characteristics

- 64MHz ST10 CPU with DSP functions
- 5V single supply, on-chip regulator
- Up to 832KB Flash
- QFP100, 144/BGA208
- -40 to 125°C temperature range

Program memory (vertical axis)

Program memory	100-pin TQFP	144-pin T(P)QFP	208-pin BGA
832K		ST10F276 832K Flash/68K RAM	ST10F296 832K Flash/68K RAM
768K		ST10F275 768K Flash/36K RAM	
512K		ST10F273 512K Flash/36K RAM	Technology
256K	ST10F252 256K Flash/20K RAM	ST10F272 256K Flash/20K RAM	M8, 180nm EmbFlash
128K	ST10F251 128K Flash/12K RAM	ST10F271 128K Flash/12K RAM	

Package

Key features

- High-performance industry standard ST10 core with DSP unit
- Extensive software and tools
- Large choice of peripherals and interfaces, same peripheral set across the ST10F27x family
- Single 5V power supply
- High-quality embedded Flash (data retention 20 years at 55°C)
- Tightly coupled DMA: real-time CPU core
- Rich package options
- Operating temperature range: -40 to 125°C
- Fully automotive qualified

Key benefits

- Future-proof microcontrollers that easily adapt to customer requirements
- Dramatically reduces development time and increases ease-of-use
- Reduces system cost with all peripherals in a single chip
- Native supply of automotive applications. No 3.3V conversion needed
- Suitable for long-life equipment
- Optimizes your developments: the same device with different options will fit your entire product range
- Increases validity for high temperature applications

ST10 family

Applications

Powertrain

- ST10F2xx products controlling motion in engine control units: Gasoline, diesel, direct and indirect injection and hybrid vehicles

- ST10F2xx controlling clutch and gear ratio in automatic gear boxes: Electro-hydraulic robotized and electric-motor based gear boxes

- ST10F2xx improving engine performance: e-Turbo and e-Boost

Chassis

- ST10F2xx improving passenger comfort with controlled suspension: Air-suspension, wheel-suspension hub

- ST10F2xx assisting steering: Electric power steering, electro-hydraulic power steering

- ST10F2xx controlling torque distribution: Torque case transfer

- ST10F2xx managing 3ph motors in HEV (hybrid electrical vehicles): Starter-alternators, e-Pumps and e-Brakes

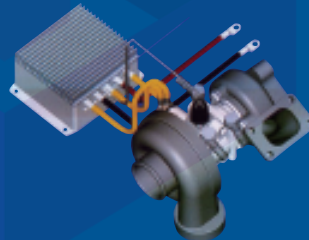*Torque case transfer*

Starter alternator

Electric power steering

Robotized gear boxes

Combustion engines

E-turbo

Suspension

Tools and third party support

The ST10 range is supported by state-of-the-art tools from a number of third parties:

- Misra C compatible tool chains
- Real-time emulators
- In-line Flash programming tools
- OSEK operating systems and CAN drivers
- Code generators
- Calibration tools

Tools are permanently updated and/or improved by ST10 third parties to support new ST10 variants and to bring the latest technology to the ST10 range, including:

- Code coverage analysis tools
- Productivity tools such as emulators with backward simulation from a recorded trace
- Efficient tool chains with improved code size and performance

For information on the latest developments, please contact your chosen ST10 third party.

ST10 family product table

Part number	Program memory Flash	Program memory ROM	Prog. (bytes)	RAM (bytes)	CPU freq. (max)	A/D inputs	Timer functions 16-bit (IC/OC/PWM)	Timer functions 16-bit GPT	Timer functions Others	Standard serial interface ASC/LIN	Standard serial interface SSC	Standard serial interface I²C	Standard serial interface CAN	I/Os	Package	Suppy voltage	Special features
ST10 16-bit high-performance real-time applications (up to 16MByte address space)																	
ST10F251	●		128K	12K	48MHz	10x10-bit	18Ch/8PWM	5	RTC/WDT	2	2	1	2	76	TQFP100	5V	MAC
ST10R251		●	128K	12K	48MHz	10x10-bit	18Ch/8PWM	5	RTC/WDT	2	2	1	2	76	TQFP100	5V	MAC
ST10F252	●		256K	20K	48MHz	10x10-bit	18Ch/8PWM	5	RTC/WDT	2	2	1	2	76	TQFP100	5V	MAC
ST10F252M	●		256K	16K	40MHz	16x10-bit	18Ch/8PWM	5	WDT	2	2	1	2	76	TQFP100	5V	MAC
ST10R252		●	256K	12K	48MHz	10x10-bit	18Ch/8PWM	5	RTC/WDT	2	2	1	2	76	TQFP100	5V	MAC
ST10F269D	●		256K	12K	40MHz	16x10-bit	2x16Ch/4PWM	5	RTC/WDT	1	1	-	2	111	P(T)QFP	5V	MAC
ST10F271	●		128K	12K	64MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F271M	●		128K	12K	40MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10R271		●	128K	12K	64MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F272	●		256K	20K	64MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F272M	●		256K	20K	40MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10R272		●	256K	20K	64MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F273	●		512K	36K	64MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F273M	●		512K	36K	40MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F275	●		768K	36K	64MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F276	●		832K	68K	64MHz	24x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	111	P(T)QFP	5V	MAC/32KHz osc
ST10F280	●		512K	18K	40MHz	32x10-bit	2x16Ch/8PWM	5	RTC/WDT	1	1	-	2	143	BGA	5V	MAC
ST10F296	●		832K	68K	64MHz	32x10-bit	2x16Ch/8PWM	5	RTC/WDT	2	2	1	2	143	BGA	5V	MAC/32KHz osc

(Row groups: 100 pins, 144 pins, 208 pins)

ST in the automotive industry

From engine and transmission, control to safety and onboard entertainment, electronics and microelectronics are increasingly prevalent in all sectors of the automotive industry.

ST's family of automotive products provide a broad range of features that enhance performance, safety and comfort while reducing the environmental impact of the vehicle.

These stringent requirements are sustained through ST's commitment to constant improvement and the development of robust, automotive grade quality electronics.

Over recent years, ST has provided automotive solutions for most of the world's leading automobile manufacturers, forging strong partnerships by delivering products and services that meet or exceed customer expectations.

For selected STMicroelectronics sales offices fax:

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Full product information at www.st.com

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