ST7FLxx: automotive MCU family

Optimized to reduce overall application cost without compromising reliability

January 2006

STMicroelectronics' ST7FLxx automotive series of 8-bit Flash microcontrollers provides both flexibility and reliability for a wide variety of cost-sensitive automotive applications. Users can rely on an embedded 'true' EEPROM memory bank for parameter storage, eliminating the cost of an external EEPROM device, wiring and PCB area. Some devices within the family also allow for a standard network interface through a LIN protocol, for easy implementation of small and cost-effective LIN solutions, reducing the need for external components.

With an extensive range of development utilities, the family enables a very short time to market and, thanks to the in-circuit programming capability of single-voltage Flash technology, devices can be programmed at the end of the assembly line, ensuring flexible stock management for end users.
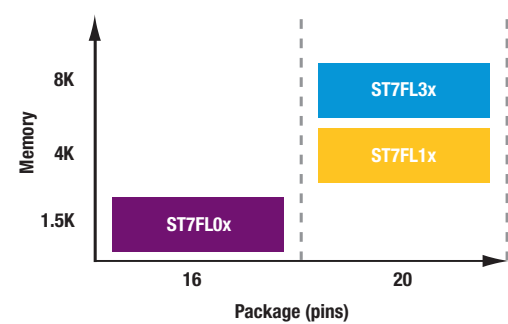
Key benefits

- Low-cost 8-bit microcontroller with more on-chip functions, making applications smaller and easier to design
- Data EEPROM
- Accurate internal RC oscillator (1% or 5%)
- Single voltage Flash memory technology for fast programming
- LINSCI interface able to work without external clock source

Automotive applications

- Wipers
- Door locking
- Mirror adjust
- Sensors
- HVAC
- Blowers
- LIN slaves

- Keyless entry
- Relays
- Failsafe MCU
- Sunroof
- Window lift
- And many more

ST7FLxx family overview

	Part number	Program memory type			Prog. (bytes)	RAM (bytes)
		Flash	Fast ROM[1]	ROM		
16 pins	ST7FL05	●	●		1.5K	128
	ST7FL09	●	●		1.5K	128
	ST7FL15	●	●	●	4K	256
	ST7FL19	●	●	●	4K	256
20 pins	ST7FL34	●	●	●	8K	384
	ST7FL35	●	●	●	8K	384
	ST7FL38	●	●	●	8K	384
	ST7FL39	●	●	●	8K	384

Notes:
● Under development
1 Factory advanced service technique ROM
2 Number of high current pins included in the number of I/O pins

ST7FLxx family product guide

Memory axis: 8K, 4K, 1.5K
ST7FL3x (8K), ST7FL1x (4K), ST7FL0x (1.5K)
Package (pins) axis: 16, 20

ST7FLxx family

- Read-out protection against software piracy
- Fast A/D converter (3.5µs conversion time @ 8MHz f_{CPU})
- Fast and flexible timers for PWM generation, output compare and input capture
- Full set of development tools including free ANSI C compilers
- Low-cost debugging thanks to on-chip debug module
- Automotive development tool for LIN implementation
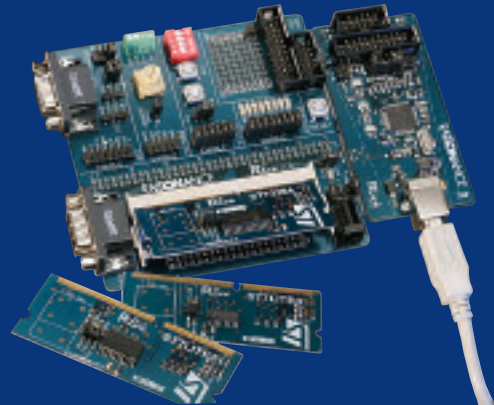
Complete solution including evaluation, development and debugging tool for the whole ST7FLxx family

Data EEPROM (bytes)	A/D inputs	Timer functions			Serial interface	LVD levels	I/Os (high current[2])	Package	Supply voltage	Temperature range °C	Special features
		12-bit (IC/OC/PWM)	8-bit (IC/OC/PWM)	Others							
	5x8-bit	1(0/1/1)	1(1/0/0)	WDG, RTC	SPI		13 (6)	SO16	3.0 to 5.5V	-40 to 85	Internal RC oscillator, PLL, ROP, ICP, IAP
128	5x8-bit	1(0/1/1)	1(1/0/0)	WDG, RTC	SPI		13 (6)	SO16	3.0 to 5.5V	-40 to 105	
	7x10-bit	2(1/4/4)	2(1/0/0)	WDG, RTC	SPI	1	17 (7)	SO20	3.0 to 5.5V	-40 to 85	Internal RC oscillator, PLL, auto wake-up from HALT, ROP, ICP, IAP, debug module
128	7x10-bit	2(1/4/4)	2(1/0/0)	WDG, RTC	SPI	1	17 (7)	SO20	3.0 to 5.5V	-40 to 125	
	7x10-bit	2(1/4/4)	2(1/0/0)	WDG, RTC	SPI	1	15 (7)	SO20	3.0 to 5.5V	-40 to 85	Internal RC oscillator, PLL, auto wake-p from HALT, ROP, ICP, IAP
	7x10-bit	2(1/4/4)	2(1/0/0)	WDG, RTC	SPI, LINSCI	1	15 (7)	SO20	3.0 to 5.5V	-40 to 125	
256	7x10-bit	2(1/4/4)	2(1/0/0)	WDG, RTC	SPI	1	15 (7)	SO20	3.0 to 5.5V		
256	7x10-bit	2(1/4/4)	2(1/0/0)	WDG, RTC	SPI, LINSCI	1	15 (7)	SO20	3.0 to 5.5V		

Abbreviations:

ADC: Analog to digital converter
IAP: In-application programming
I²C: Inter integrated circuit

ICP: In-circuit programming
LVD: Low-voltage detection
PLL: Phase locked loop

PWM: Pulse width modulation
ROP: Readout protection
RTC: Real-time clock timer

SCI: Serial communication interface (UART)
LIN: Local interconnect network

SPI: Serial peripheral interface
WDG: Watchdog timer

Hardware and software development tools

For fast and easy development, ST offers a wide range of state-of-the-art development tools including:

- Automotive evaluation kit for networking
- Mid-range to high-end emulators (DVP and EMU series)
- Starter kits
- Real-time, in-circuit debugging kits
- Programmers
- IDEs, C compilers (including free versions)
- SW drivers for easy LIN implementation
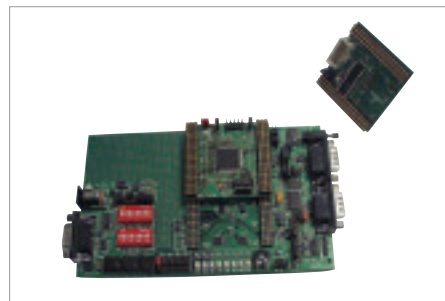
Automotive evaluation kit for networking

Part number	Automotive evaluation kit	In-circuit debugger			Emulation		Programming tool		
		inDart series		RLINK series (with demo board)	DVP series	EMU series	ST in-circuit communication kit (STICK)	Socket boards[1]	3rd party programmer
		Without demo board	With demo board						
ST7FLOx		STXF-INDART/USB[2]	ST7FLITE0-INDART[3] ST7FLIT0-IND/USB[2]	ST7FLITE-SK/RAIS[4]	ST7MDT10-DVP3[5]	ST7MDT10-EMU3	ST7-STICK[6]	ST7SB10-SU0[6]	BP Microsystems www.bpmicro.com Data I/O www.data-io.com Dataman www.dataman.com Elnec www.elnec.com
ST7FL1x		STXF-INDART/USB[2]		ST7FLITE-SK/RAIS[4]	ST7MDT10-DVP3[5]	ST7MDT10-EMU3	ST7-STICK[6]	ST7SB10-123[6]	HI-LO www.hilosystem.com.tw Leap www.leap.com.tw RK-System www.rk-system.com.pl Segger www.segger.com Softec Microsystems www.softecmicro.com System General www.sg.com Xeltek www.xeltek.com
ST7FL3x	Phytec[7]	STXF-INDART/USB[2]		ST7FLITE-SK/RAIS[4]	ST7MDT10-DVP3[5]	ST7MDT10-EMU3	ST7-STICK[6]	ST7SB10-123[6]	

Notes:
1 Socket boards complement any tool that has ICC programming capabilities (like ST7-STICK, InDART, RLINK, DVP3, EMU3...)
2 USB connection to PC
3 Parallel port connection to PC
4 USB connection to PC. Complete kit containing one REva motherboard, daughter boards and Rlink (In-circuit debugging and programming tool). The ST7FL3 daughter board should be used to debug ST7FL1 devices.

5 Includes only connection kit for SO16. Refer to www.st.com/mcu for connection kit ordering information
6 Add Suffix /EU, /US or /UK for the power supply for your region.
7 More information is available at www.phytec.com

For further information www.st.com/mcu

For selected STMicroelectronics sales offices fax:
France +33 1 55489569; Germany +49 89 4605454; Italy +39 02 8250449; Japan +81 3 57838216; Singapore +65 6481 5124; Sweden +46 8 58774411; Switzerland +41 22 9292900; United Kingdom and Eire +44 1628 890391; USA +1 781 861 2678
Full product information at www.st.com

Order code: BRST7FLAUTO0106

www.BDTIC.com/ST

Recycled and chlorine free paper