

# P89LPC93x family

The P89LPC93x family is designed for highly integrated, low cost applications requiring advanced peripherals in 28-pin packages.



## Key features

- Two independent 4-channel 8-bit ADCs/DACs (LPC935/936). Both ADCs can be converted in parallel with same-time sampling
- One 4-channel 8-bit ADC and two 1-channel 8-bit DACs (LPC933/934) or one 8-channel 10-bit ADC (LPC938)
- 4/8/16 KB byte-erasable Flash code memory with 1 KB /2 KB sectors and 64-byte pages. Sectors or pages can be erased in 2 ms
- 256/768-byte RAM data memory
- Two 16-bit timers. Each timer pin may be configured to become a PWM output or a counter input
- Real-time clock that can also be used as a system timer
- Two analog comparators with selectable inputs and reference source
- 2.4V to 3.6V<sub>DD</sub> operating range. I/O pins are 5V tolerant (may be pulled up or driven to 5.5V)
- SPI communication port
- 400 kHz byte-wide I<sup>2</sup>C communication port plus enhanced UART
- 16-bit capture/compare unit (CCU) (LPC935 / 936 / 938)

Flexible performance. Low Power.  
Advanced peripherals...8-bit ADC/DAC.  
Byte erasable Flash, ICP, ISP and IAP



## Description

The P89LPC930/931/932A1/933/934/935/936/938 devices have byte-erasable Flash memory, ADC and DAC (933/934/935/936 only), enhanced timing functions and on-chip serial communications. Designers can benefit from lower total system cost and miniature footprint while enjoying additional functionality. These devices are being used for consumer, automotive, and industrial products, ranging from battery powered devices to white goods.

The LPC900 family is a high performance 80C51 that executes instructions in two to four clocks, 6 times the rate of standard 80C51 devices. A wide variety of communication ports and system supervisory functions have been incorporated into many various package ranging from low profile 8-,14- and 16-pin TSSOP up to 28-pin HVQFN packages in order to reduce component count, board space and system cost. The LPC900 family is designed for applications that demand low voltage, high integration, high performance, and low cost.

The LPC900 family is supported by a comprehensive set of low cost development tools, designed by Philips and third parties, to improve time-to-market, reduce design cycles and lower development costs. Visit [www.philips.semiconductors.com/microcontrollers](http://www.philips.semiconductors.com/microcontrollers) for more information.

## LPC900 family overview

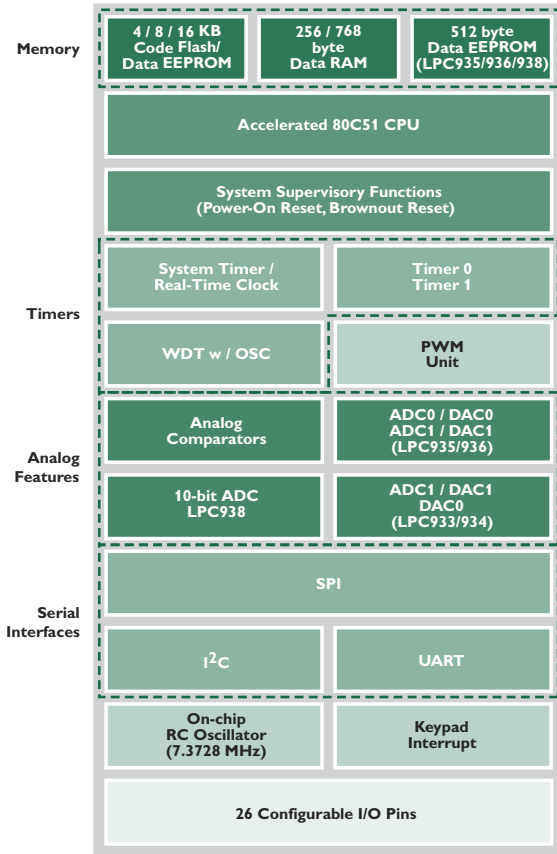
Part Number	On-chip Memory		Timers/Counters*		I/O Pins	Serial Interfaces			A/D b/ch	F. max (MHz)	Package
	Flash	RAM	PWM	CCU		UART	I <sup>2</sup> C	SPI			
P89LPC938	8K	768B	Y	Y	26	Y	Y	Y	8/4x2	18	TSSOP28, HVQFN28
P89LPC936	16K	768B	Y	Y	26	Y	Y	Y	8/4x2	18	TSSOP28, HVQFN28
P89LPC935	8K	768B	Y	Y	26	Y	Y	Y	8/4x2	18	TSSOP28, HVQFN28
P89LPC934	8K	256B	Y	N	26	Y	Y	Y	8/4	18	TSSOP28
P89LPC933	4K	256B	Y	N	26	Y	Y	Y	8/4	18	TSSOP28
P89LPC932A1	8K	768B	Y	Y	26	Y	Y	Y	—	12	TSSOP28, HVQFN28
P89LPC931	8K	256B	Y	N	26	Y	Y	Y	—	12	TSSOP28
P89LPC930	4K	256B	Y	N	26	Y	Y	Y	—	12	TSSOP28
P89LPC925	8K	256B	Y	N	18	Y	Y	N	8/4	18	TSSOP20, DIP20
P89LPC924	4K	256B	Y	N	18	Y	Y	N	8/4	18	TSSOP20, DIP20
P89LPC922	8K	256B	Y	N	18	Y	Y	N	—	12	TSSOP20, DIP20
P89LPC921	4K	256B	Y	N	18	Y	Y	N	—	12	TSSOP20, DIP20
P89LPC920	2K	256B	Y	N	18	Y	Y	N	—	12	TSSOP20, DIP20
P89LPC917	2K	256B	Y	N	14	Y	Y	N	8/4	18	TSSOP16
P89LPC916	2K	256B	Y	N	14	Y	Y	Y	8/4	18	TSSOP16
P89LPC915	2K	256B	Y	N	12	Y	Y	N	8/4	18	TSSOP14
P89LPC914	1K	128B	Y	N	12	Y	N	Y	—	12	TSSOP14
P89LPC913	1K	128B	N	N	12	Y	N	Y	—	12	TSSOP14
P89LPC912	1K	128B	Y	N	12	N	N	Y	—	12	TSSOP14
P89LPC9107	1K	128B	Y	Y	10	Y	N	N	8/4	18	TSSOP14
P89LPC9103	1K	128B	Y	Y	10	N	N	N	8/4	18	HVSON10
P89LPC9102	1K	128B	Y	Y	10	N	N	N	8/4	18	HVSON10
P89LPC908	1K	128B	N	N	6	Y	N	N	—	IRC	SO8
P89LPC907	1K	128B	N	N	6	Y	N	N	—	IRC	SO8
P89LPC906	1K	128B	Y	N	6	N	N	N	—	12	SO8
P89LPC904	1K	128B	N	N	6	Y	N	N	8/2	12	SO8, DIP8
P89LPC903	1K	128B	N	N	6	Y	N	N	—	IRC	SO8
P89LPC902	1K	128B	N	N	6	N	N	N	—	IRC	SO8, DIP8
P89LPC901	1K	128B	Y	N	6	N	N	N	—	12	SO8, DIP8

\* includes 4 timers and a WatchDog

# PHILIPS

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Flexible performance. Low Power. Advanced peripherals...8-bit ADC/DAC.



P89LPC93x block diagram

[www.semiconductors.philips.com/microcontrollers](http://www.semiconductors.philips.com/microcontrollers)



Purchase of Philips I<sup>2</sup>C components conveys a license under the Philips' patent to use the components in the I<sup>2</sup>C system provided the system conforms to the I<sup>2</sup>C specification defined by Philips.



## Development tool support selection

Tool Name	Description	Vendor	Price
EPM900	Emulator/Programmer with emulation & parallel programming functionality	Keil Software	\$199.00
MCB900	Development Board	Keil Software	\$59.00
FE-900	Emulator/Programmer	Ceibo	\$399.00
PAB900	Programming adapter board to MCB900/EPM900	LPC Tools	\$49.00
PDS900	Emulator/Programmer	Philips	\$499.00

## Ordering information

Part Number	Memory		Temperature Range	Package
	Flash	RAM		
P89LPC930	4 K	256 B	-40° to +85° C	TSSOP28
P89LPC931	8 K	256 B	-40° to +85° C	TSSOP28
P89LPC932A1	8 K	768 B	-40° to +85° C	TSSOP28, HVQFN28
P89LPC933	4 K	256 B	-40° to +85° C	TSSOP28
P89LPC934	8 K	256 B	-40° to +85° C	TSSOP28
P89LPC935	8 K	768 B	-40° to +85° C	TSSOP28, HVQFN28
P89LPC936	16 K	768 B	-40° to +85° C	TSSOP28, HVQFN28
P89LPC938	8 K	768 B	-40° to +85° C	TSSOP28, HVQFN28

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