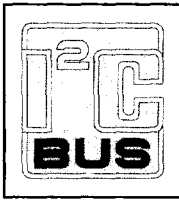


## Single-chip 8-bit microcontroller

## 80C552/83C552

Single-chip 8-bit microcontroller with 10-bit A/D, capture/compare timer, high-speed outputs, PWM



## DESCRIPTION

The 80C552/83C552 (hereafter generically referred to as 8XC552) Single-Chip 8-Bit Microcontroller is manufactured in an advanced CMOS process and is a derivative of the 80C51 microcontroller family. The 8XC552 has the same instruction set as the 80C51. Three versions of the derivative exist:

- 83C552—8k bytes mask programmable ROM
- 80C552—ROMless version of the 83C552
- 87C552—8k bytes EPROM (described in a separate chapter)

The 8XC552 contains a non-volatile 8k × 8 read-only program memory (83C552), a volatile 256 × 8 read/write data memory, five 8-bit I/O ports, one 8-bit input port, two 16-bit timer/event counters (identical to the timers of the 80C51), an additional 16-bit timer coupled to capture and compare latches, a 15-source, two-priority-level, nested interrupt structure, an 8-input ADC, a dual DAC pulse width modulated interface, two serial interfaces (UART and I<sup>2</sup>C-bus), a "watchdog" timer and on-chip oscillator and timing circuits. For systems that require extra capability, the 8XC552 can be expanded using standard TTL compatible memories and logic.

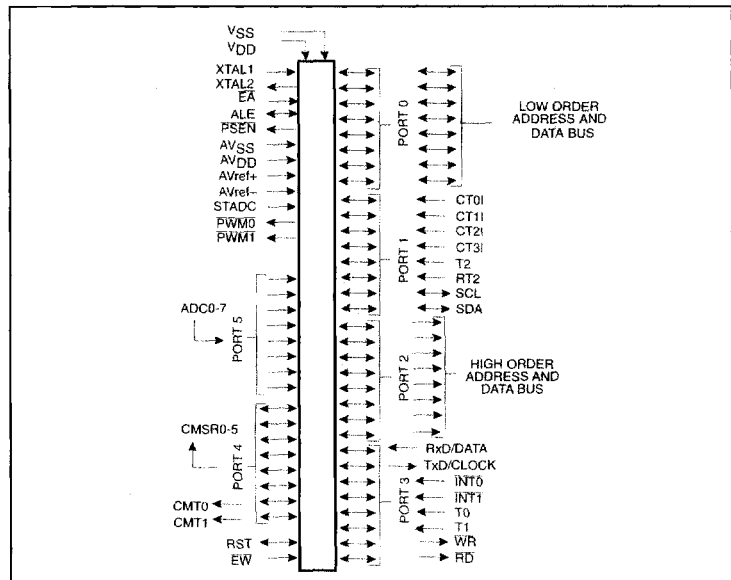
In addition, the 8XC552 has two software selectable modes of power reduction—idle mode and power-down mode. The idle mode freezes the CPU while allowing the RAM, timers, serial ports, and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator, causing all other chip functions to be inoperative.

The device also functions as an arithmetic processor having facilities for both binary and BCD arithmetic plus bit-handling capabilities. The instruction set consists of over 100 instructions: 49 one-byte, 45 two-byte, and 17 three-byte. With a 16MHz (24MHz) crystal, 58% of the instructions are executed in 0.75µs (0.5µs) and 40% in 1.5µs (1µs). Multiply and divide instructions require 3µs (2µs).

## FEATURES

- 80C51 central processing unit
- 8k × 8 ROM expandable externally to 64k bytes
- An additional 16-bit timer/counter coupled to four capture registers and three compare registers
- Two standard 16-bit timer/counters
- 256 × 8 RAM, expandable externally to 64k bytes
- Capable of producing eight synchronized, timed outputs
- A 10-bit ADC with eight multiplexed analog inputs
- Two 8-bit resolution, pulse width modulation outputs
- Five 8-bit I/O ports plus one 8-bit input port shared with analog inputs
- I<sup>2</sup>C-bus serial I/O port with byte oriented master and slave functions
- Full-duplex UART compatible with the standard 80C51
- On-chip watchdog timer
- Three speed ranges:
  - 3.5 to 16MHz
  - 3.5 to 24MHz (ROM, ROMless only)
  - 3.5 to 30MHz (ROM, ROMless only)
- Three operating ambient temperature ranges:
  - PCB83C552–5: 0°C to +70°C
  - PCF83C552–5: –40°C to +85°C (XTAL frequency max. 24 MHz)
  - PCAB83C552–5: –40°C to +125°C (XTAL frequency max. 16 MHz)

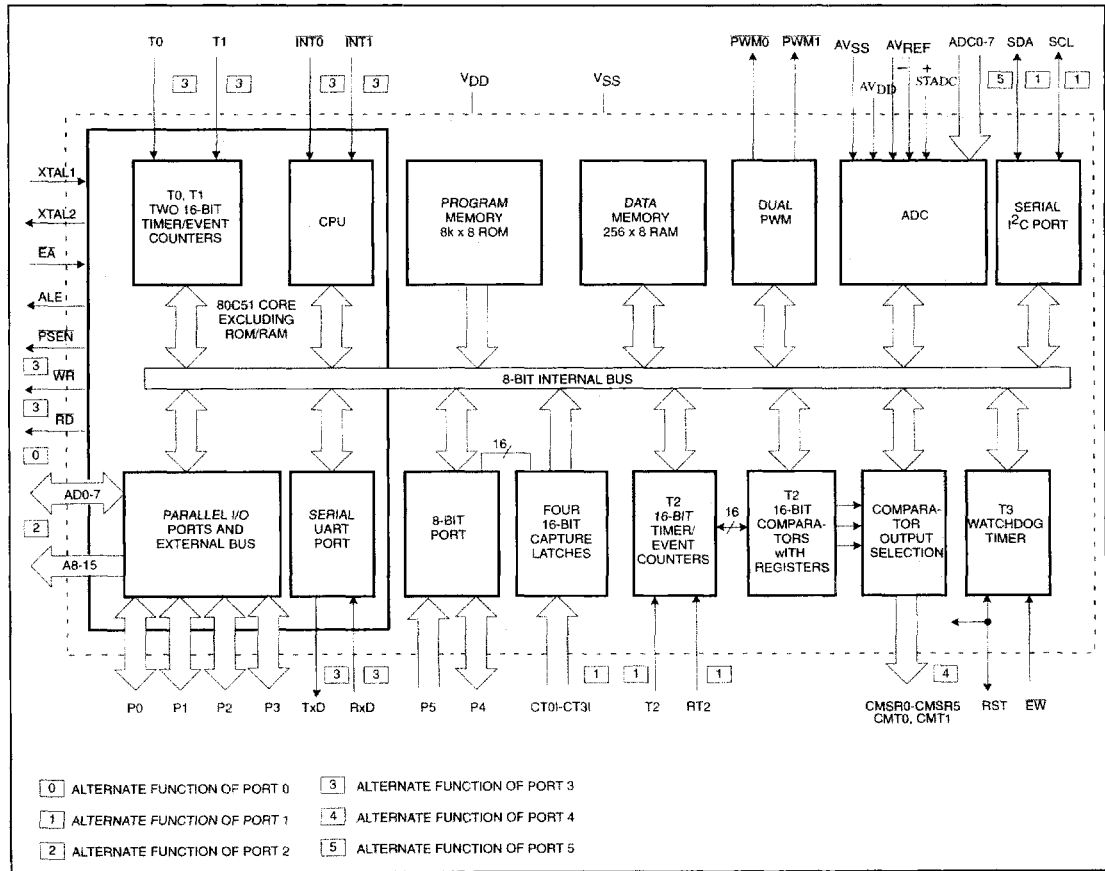
## LOGIC SYMBOL



# Single-chip 8-bit microcontroller

# 80C552/83C552

## BLOCK DIAGRAM



## Single-chip 8-bit microcontroller

80C552/83C552

## ORDERING INFORMATION

PHILIPS PART ORDER NUMBER PART MARKING		NORTH AMERICA PHILIPS PART ORDER NUMBER			DRAWING NUMBER	TEMPERATURE (°C) AND PACKAGE	FREQ (MHz)
ROMless	ROM <sup>1</sup>	ROMless	ROM	EPROM <sup>2</sup>			
PCB80C552-5-16WP	PCB83C552-5WP/xxx	S80C552-4A68	S83C552-4A68	S87C552-4A68	SOT188-3	0 to +70, Plastic Leaded Chip Carrier	16
PCB80C552-5-16H	PCB83C552-5H/xxx	S80C552-4B	S83C552-4B	S87C552-4BA	SOT318-2	0 to +70, Plastic Quad Flat Pack	16
PCF80C552-5-16WP	PCF83C552-5WP/xxx	S80C552-5A68	S83C552-5A68	S87C552-5A68	SOT188-3	-40 to +85, Plastic Leaded Chip Carrier	16
PCF80C552-5-16H	PCF83C552-5H/xxx	S80C552-5B	S83C552-5B		SOT318-2	-40 to +85, Plastic Quad Flat Pack	16
PCA80C552-5-16WP	PCA83C552-5WP/xxx	S80C552-6A68	S83C552-6A68		SOT188-3	-40 to +125, Plastic Leaded Chip Carrier	16
PCA80C552-5-16H	PCA83C552-5H/xxx	S80C552-6B	S83C552-6B		SOT318-2	-40 to +125, Plastic Quad Flat Pack	16
PCB80C552-5-24WP	PCB83C552-5WP/xxx	S80C552-AA68	S83C552-AA68		SOT188-3	0 to +70, Plastic Leaded Chip Carrier	24
PCB80C552-5-24H	PCB83C552-5H/xxx	S80C552-AB	S83C552-AB		SOT318-2	0 to +70, Plastic Quad Flat Pack	24
PCF80C552-5-24WP	PCF83C552-5WP/xxx	S80C552-BA68	S83C552-BA68		SOT188-3	-40 to +85, Plastic Leaded Chip Carrier	24
PCF80C552-5-24H	PCF83C552-5H/xxx	S80C552-BB	S83C552-BB		SOT318-2	-40 to +85, Plastic Quad Flat Pack	24
PCB80C552-5-30WP	PCB83C552-5WP/xxx	S80C552-CA68	S83C552-CA68		SOT188-3	0 to +70, Plastic Leaded Chip Carrier	30
PCB80C552-5-30H	PCB83C552-5H/xxx	S80C552-CB	S83C552-CB		SOT318-2	0 to +70, Plastic Quad Flat Pack	30

## NOTE:

- xxx denotes the ROM code number.
- For EPROM device specification, refer to 87C552 datasheet.