

# CMOS single-chip 8-bit microcontroller with on-chip EEPROM

## 80C851/83C851

### DESCRIPTION

The Philips 80C851/83C851 is a high-performance microcontroller fabricated with Philips high-density CMOS technology. The 80C851/83C851 has the same instruction set as the 80C51. The Philips CMOS technology combines the high speed and density characteristics of HMOS with the low power attributes of CMOS. The Philips epitaxial substrate minimizes latch-up sensitivity.

The 80C851/83C851 contains a  $4k \times 8$  ROM with mask-programmable ROM code protection, a  $128 \times 8$  RAM,  $256 \times 8$  EEPROM, 32 I/O lines, two 16-bit counter/timers, a seven-source, five vector, two-priority level nested interrupt structure, a serial I/O port for either multi-processor communications, I/O expansion or full duplex UART, and on-chip oscillator and clock circuits.

In addition, the 80C851/83C851 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 port, and interrupt system to continue functioning. The power-down mode saves the RAM and EEPROM contents but freezes the oscillator, causing all other chip functions to be inoperative.

### FEATURES

- 80C51 based architecture
  - $4k \times 8$  ROM
  - $128 \times 8$  RAM
  - Two 16-bit counter/timers
  - Full duplex serial channel
  - Boolean processor
- Non-volatile  $256 \times 8$ -bit EEPROM (electrically erasable programmable read only memory)
  - On-chip voltage multiplier for erase/write
  - 50,000 erase/write cycles per byte
  - 10 years non-volatile data retention
  - Infinite number of read cycles
  - User selectable security mode
  - Block erase capability
- Mask-programmable ROM code protection
- Memory addressing capability
  - 64k ROM and 64k RAM
- Power control modes:
  - Idle mode
  - Power-down mode
- CMOS and TTL compatible
- 1.2 to 16MHz
- Three package styles
- Three temperature ranges
- ROM code protection

### ORDERING INFORMATION

| PHILIPS<br>PART ORDER NUMBER<br>PART MARKING |             | NORTH AMERICA PHILIPS<br>PART ORDER NUMBER |              | TEMPERATURE RANGE °C<br>AND PACKAGE       | FREQ.<br>(MHz) | DRAWING<br>NUMBER     |
|----------------------------------------------|-------------|--------------------------------------------|--------------|-------------------------------------------|----------------|-----------------------|
| ROMless<br>Version                           | ROM Version | ROMless<br>Version                         | ROM Version  |                                           |                |                       |
| P80C851 FBP                                  | P83C851 FBP | S80C851-4N40                               | S83C851-4N40 | 0 to +70, Plastic Dual In-line Package    | 1.2 to 16      | SOT129-1              |
| P80C851 FBA                                  | P83C851 FBA | S80C851-4A44                               | S83C851-4A44 | 0 to +70, Plastic Leaded Chip Carrier     | 1.2 to 16      | SOT187-1              |
| P80C851 FBB                                  | P83C851 FBB | S80C851-4B44                               | S83C851-4B44 | 0 to +70, Plastic Quad Flat Pack          | 1.2 to 16      | SOT307-2 <sup>1</sup> |
| P80C851 FFP                                  | P83C851 FFP | S80C851-5N40                               | S83C851-5N40 | -40 to +85, Plastic Dual In-line Package  | 1.2 to 16      | SOT129-1              |
| P80C851 FFA                                  | P83C851 FFA | S80C851-5A44                               | S83C851-5A44 | -40 to +85, Plastic Leaded Chip Carrier   | 1.2 to 16      | SOT187-1              |
| P80C851 FFB                                  | P83C851 FFB | S80C851-5B44                               | S83C851-5B44 | -40 to +85, Plastic Quad Flat Pack        | 1.2 to 16      | SOT307-2 <sup>1</sup> |
| P80C851 FHP                                  | P83C851 FHP | S80C851-6N40                               | S83C851-6N40 | -40 to +125, Plastic Dual In-line Package | 1.2 to 16      | SOT129-1              |
| P80C851 FHA                                  | P83C851 FHA | S80C851-6A44                               | S83C851-6A44 | -40 to +125, Plastic Leaded Chip Carrier  | 1.2 to 16      | SOT187-1              |
| P80C851 FHB                                  | P83C851 FHB | S80C851-6B44                               | S83C851-6B44 | -40 to +125, Plastic Quad Flat Pack       | 1.2 to 16      | SOT307-2 <sup>1</sup> |

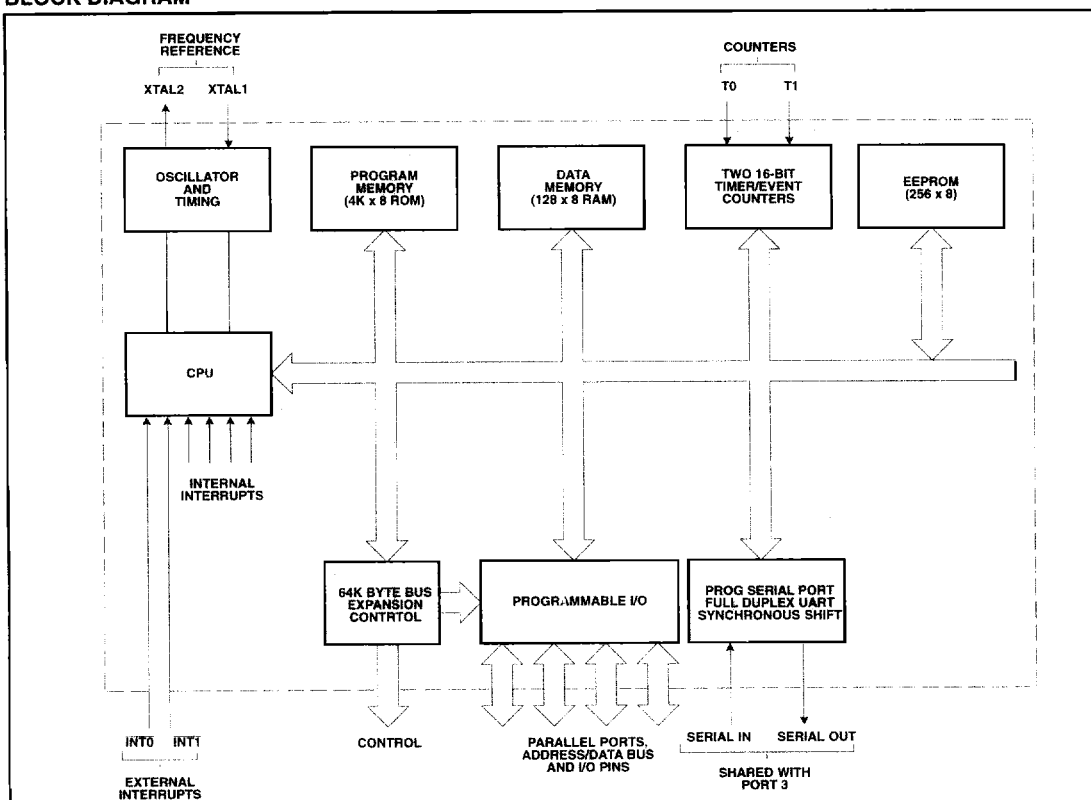
#### NOTE:

1. SOT311 replaced by SOT307-2.

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## BLOCK DIAGRAM



## LOGIC SYMBOL

