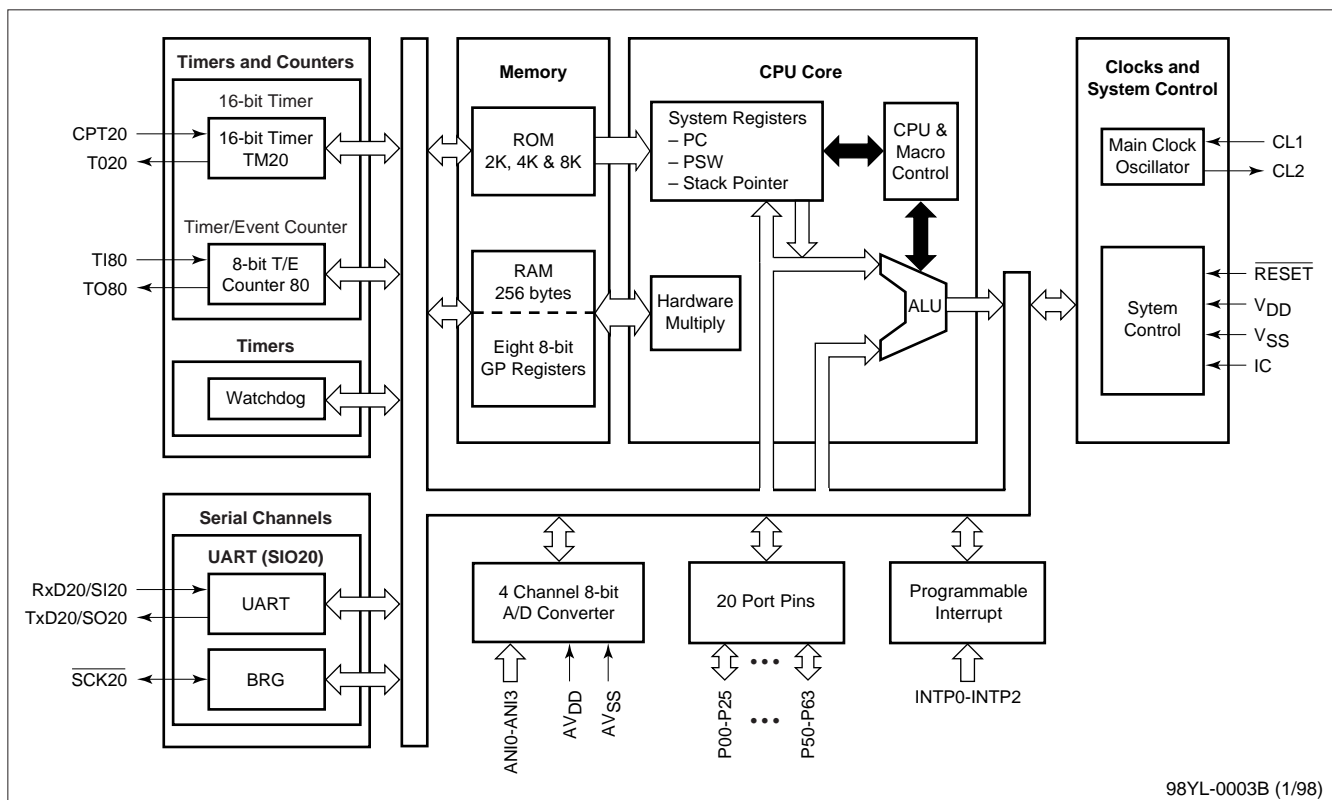


### Description

The μPD7891xx microcontrollers are new members of NEC's low-cost K0S 8-bit microcontroller family. They offer a system clock choice of an RC circuit or resonator, and are available with an 8- or 10-bit A/D converter. The μPD7891xx family is fabricated using an 0.35-micron CMOS process for low power consumption and minimal cost. With 28- or 30-pin package options, these devices are ideal for cost-sensitive consumer applications needing analog interfaces.

These microcontrollers are supported by an extensive tool chain, compatible across NEC's entire K Series® line of 8- and 16-bit microcontrollers. The tools contain a software simulator, C compiler, relocatable assembler, screen debugger, and in-circuit emulator.

**Figure 1. Block Diagram**



## Specifications

- Clock frequency
  - RC oscillator up to 4 MHz
  - Ceramic oscillator up to 5 MHz
- Minimum instruction execution time
  - RC oscillator –0.5  $\mu$ s
  - Ceramic oscillator –0.4  $\mu$ s
- Operating voltage: 1.8 to 5.5 volts
- Operating temperature: –40 to +85°C
- 0.35-micron CMOS process technology
- Power consumption
  - 3.0 mW (normal mode)
  - 2.7 mW (halt mode)
  - 0.00015 mW (stop mode)
- Packages
  - 28-pin SDIP (400 mil)
  - 30-pin SSOP (300 mil)

## Features

- Architecture
  - 8-bit CPU
  - Bit, byte, or word instruction set with 8 x 8 multiply instruction
  - Minimum instruction execution time
    - 400 ns using XTAL
    - 500 ns using RC oscillation
  - Eight 8-bit registers
- Memory
  - 64K linear address space
  - 2K to 16K internal ROM
  - 16K flash version
  - Fully static 256-byte internal RAM
- Clock sources
  - Resonator: 1 to 5 MHz ( $\mu$ PD78910x/911x)
  - RC circuit: 0.4 to 4 MHz ( $\mu$ PD78912x/913x)
- Interrupts
  - Three external maskable interrupts
  - Six internal maskable interrupts
  - Automatic release of halt and stop modes
- Peripherals
  - Twenty general-purpose I/O pins
  - One 16-bit timer/counter
  - One 8-bit timer/event counter with PWM mode
  - One watchdog/interval timer

- One serial channel
  - UART with baud rate generator
  - Three-wire synchronous mode
- Four-channel 8- or 10-bit A/D converter

**Table 1. Power-Saving Features**

| Voltage | Mode and Typical Power at 5 MHz <sup>Note</sup>     |   |                              |
|---------|---|---|------------------------------|
|         | Normal Mode: Chip 100% On<br>(Main System Clock On) | Halt Mode: CPU Clock Off<br>and Main Clock On | Stop Mode: Main Clock<br>Off |
| 5 volts | 10.5 mW   | 8 mW  | 0.0005 mW                    |
| 3 volts | 3 mW  | 2.7 mW  | 0.0001 mW                    |

**Note:** Target specification

**Table 2. Ordering Information**

| Part Number     | Internal ROM     | A/D    | Main Clock Source | RAM |
|-----------------|------------------|--------|-------------------|-----|
| μPD789101CT/GS  | 2K mask ROM      | 8-bit  | Ceramic resonator | 256 |
| μPD789102CT/GS  | 4K mask ROM      | 8-bit  |                   |     |
| μPD789104CT/GS  | 8K flash memory  | 8-bit  | RC clock          |     |
| μPD789111CT/GS  | 2K mask ROM      | 10-bit |                   |     |
| μPD789112CT/GS  | 4K mask ROM      | 10-bit |                   |     |
| μPD789114CT/GS  | 8K flash memory  | 10-bit |                   |     |
| μPD78F9116CT/GS | 16K flash memory | 10-bit |                   |     |
| μPD789121CT/GS  | 2K mask ROM      | 8-bit  |                   |     |
| μPD789122CT/GS  | 4K mask ROM      | 8-bit  |                   |     |
| μPD789124CT/GS  | 8K flash memory  | 8-bit  |                   |     |
| μPD789131CT/GS  | 2K mask ROM      | 10-bit |                   |     |
| μPD789132CT/GS  | 4K mask ROM      | 10-bit |                   |     |
| μPD789134CT/GS  | 8K flash memory  | 10-bit |                   |     |
| μPD78F9136CT/GS | 16K flash memory | 10-bit |                   |     |

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## **NEC Electronics Inc.**

CORPORATE HEADQUARTERS  
2880 Scott Boulevard  
Santa Clara, CA 95050-2554  
TEL 408-588-6000

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