# SIEMENS

# C513-Family
# Your Solution for a Low Cost/
# Low Power Design

The C 513, C 513A and C 513AO are low cost members of the Siemens C 500 family of 8-bit microcontrollers which is compatible to the 80C51/C52 standard architecture. A wide range of tools such as HLL compilers, debuggers, starter kits and emulators are available.

Among other segments, the low power design makes the C 513 family of microcontrollers ideal for telecom and consumer applications as well as industrial solutions.
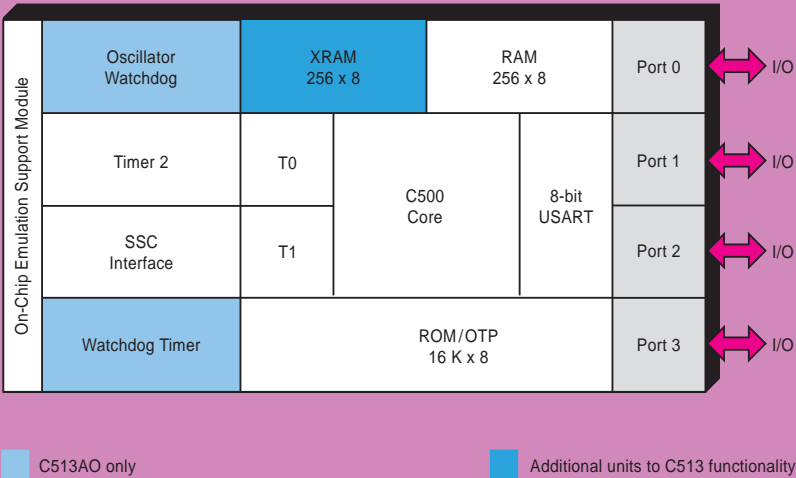
## The C513 family at a glance:

| Device | ROM | OTP | RAM | XRAM | Timer | Serial IO |
|---|---|---|---|---|---|---|
| C513-1R | 8KB | – | 256B | . | T0, T1, T2 | SSC, USART |
| C513A-R | 12KB | – | 256B | 256B | T0, T1, T2 | SSC, USART |
| C513A-2R | 16KB | – | 256B | 256B | T0, T1, T2 | SSC, USART |
| C513A-L | – | – | 256B | 256B | T0, T1, T2 | SSC, USART |
| C513A-2E (C513AO-2E) | – | 16K | 256B | 256B | T0, T1, T2 | SSC, USART |

## Features

- Fully software/toolset compatible to standard 80C51/80C52 microcontrollers
- Up to 16MHz Operating Frequency
  – 750ns instruction cycle time at 16MHz
- 256 Byte On-chip RAM
- 256 Byte on-chip Extended RAM (C513A only)
- Up to 16Kbyte ROM Version
- 16Kbyte On-chip OTP (C513A-2E and C513AO-2E only)
- Four 8-bit I/O Ports

- Three 16-bit Timers/Counters (Timer 2 with Up/Down and 16-bit auto-reload features)
- Synchronous Serial Channel (SSC) – SPI compatible
- Full Duplex Serial Interface (USART)
- Up to Seven Interrupt Sources with two priority levels
- On-chip Emulation Support logic (Enhanced Hooks)
- EMC Optimised
- Oscillator Watchdog (C513AO only)
- Fast Power On Reset (C513AO only)

- Power Saving Modes
  – Slow Down Mode (C513AO only)
  – Idle mode
  – Software Power down with optional wakeup capability (C513AO only)
- Available in P-DIP40, P-LCC-44 and P-MQFP-44-2 packages
- Fully pin compatible to C501, C504, C505C and C505CA family
- Starter Kits are available for use as low cost programming tools.
- Temperature ranges: Standard (0 Deg C to 70 Deg C) Extended (–40 Deg C to 85 Deg C)

# C513-Family
# Block Diagram

On-Chip Emulation Support Module

| Oscillator Watchdog | XRAM 256 x 8 | RAM 256 x 8 | Port 0 | I/O |
| Timer 2 | T0 | C500 Core | 8-bit USART | Port 1 | I/O |
| SSC Interface | T1 | | | Port 2 | I/O |
| Watchdog Timer | ROM/OTP 16 K x 8 | | Port 3 | I/O |

C513AO only

Additional units to C513 functionality

# C513-Family
# Pin Configuration

P1.4/ST0  6
P1.3/SRI  5
P1.2/SCLK  4
P1.1/T2EX  3
P1.0/T2  2
N.C.  1
$V_{CC}$  44
P0.0/AD0  43
P0.1/AD1  42
P0.2/AD2  41
P0.3/AD3  40

P1.5/$\overline{SLS}$  7
P1.6  8
P1.7  9
RESET  10
P3.0/RXD  11
N.C.  12
P3.1/TXD  13
P3.2/$\overline{INT0}$  14
P3.3/$\overline{INT1}$  15
P3.4/T0  16
P3.5/T1  17

C511
C511A
C513
C513A
C513A-H

39  P0.4/AD4
38  P0.5/AD5
37  P0.6/AD6
36  P0.7/AD7
35  $\overline{EA}$
34  N.C.
33  ALE
32  $\overline{PSEN}$
31  P2.7/A15
30  P2.6/A14
29  P2.5/A13

18  P3.6/$\overline{WR}$
19  P3.7/$\overline{RD}$
20  XTAL2
21  XTAL1
22  $V_{SS}$
23  N.C.
24  P2.0/A8
25  P2.1/A9
26  P2.2/A10
27  P2.3/A11
28  P2.4/A12

MCP02410

Published by Semiconductor Group

Siemens Aktiengesellschaft