# SIEMENS

# C517A
# Standard Microcontroller
# improves Control Applications



Microcontrollers

**The Siemens C517A improves the well known microcontroller SAB 80C517A in terms of performance and technology without loosing compatibility to the standard product.**

**The optimized C500-Kernel has an Instruction cycle of 600ns (external clock rate of 24MHz), features a powerful arithmetic unit and offers comprehensive peripherals such as an 12-Channel 10-Bit A/D Converter and a 21-Channel Capture/Compare and PWM generation unit.**

**High I/O-functionality and a allround set of peripherals meets the growing requirements of control tasks of today. An Onchip Memory of 32K Byte ROM and 2K Byte of XRAM supports high level language program development.**

**Typical applications for the C517A are motor management systems and other sophisticated control applications for the industrial and consumer market.**

- Enhanced 8-Bit C500-CPU – Fully Software/Toolset Compatible to Standard 80C51/80C52 Microcontrollers
- Fully Upward Compatible with SAB 80C517A and other 80C51x-Derivatives
- 500 ns Instruction Cycle Time at 24 MHz Frequency Clock
- 17 Interrupt Vectors with 4 Priority Levels selectable
- 256 Byte On-Chip Internal RAM (IRAM)
- 2K Byte On-Chip Extended RAM (XRAM)
- 8 Datapointers with 16 Bit for Indirect Addressing of Program and Data Memory
- Supports external Address Range up to 64K Byte Program Memory
- 32K Byte On-Chip ROM. ROM-Protection available

- Arithmetic Unit with Fast 32-Bit Division (3,0 µs), 16-Bit Multi-plication (2 µs), 32-Bit Normalize and Shift (3,0 µs) at 24MHz
- Four 16-Bit Timer/Counters.
- 12-Channel 10-bit A/D Converter with Programmable Sample and Conversion Clock (Minimum Conversion Time is 7 µs). A/D Converter Inputs can be used as Digital Inputs.
- 2 Full Duplex Serial Interface with Asynchronous and Synchronous Mode and Programmable Baudrate Generators
- Up to 21 Channel Capture / Compare Unit for PWM Generation with 16-Bit Compare Timer (Minimum Resolution of 83 ns)
- 56 Multifunctional Input/Output Pins

- Enhanced Fail Safe Mechanism with Programmable Watchdog Timer and Oscillator Watchdog
- Extended Power Saving Modes
- Fast Power-On Reset
- 100-Pin P-MQFP Package – Pin-Compatible to SAB 80C517A-M and C509-LM
- 84-Pin P-LCC Package is only available for SAB 80C517A-N and SAB 83C517A-5N
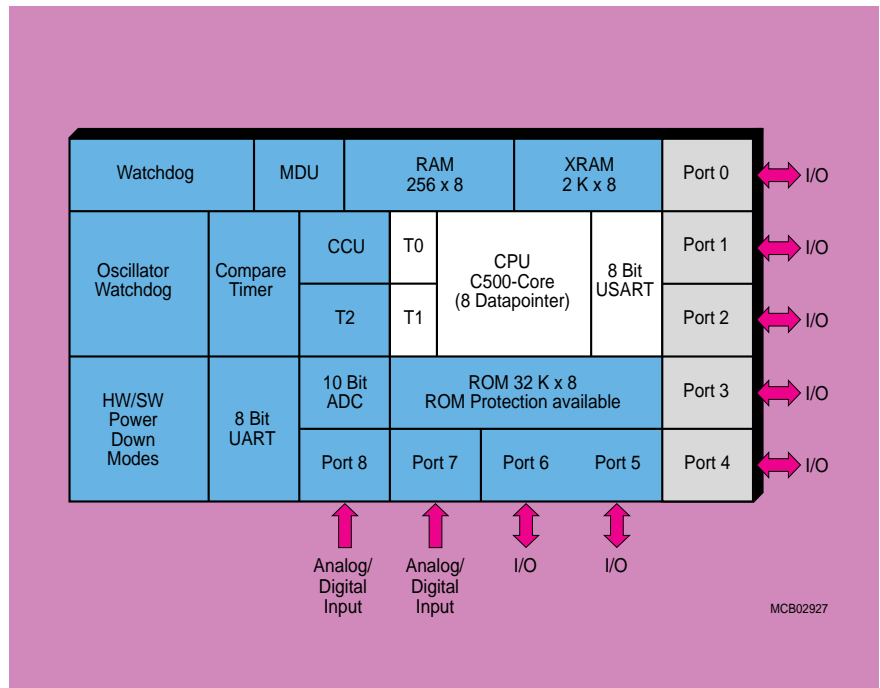- Temperature ranges:
  Standard     $0^{\circ}$C to   $70^{\circ}$C
  Extended   $-40^{\circ}$C to $+85^{\circ}$C
                  $-40^{\circ}$C to $+110^{\circ}$C

# C517A
# Block Diagram

| Watchdog | MDU | RAM 256 x 8 | XRAM 2 K x 8 | Port 0 | ⟷ I/O |
| Oscillator Watchdog | Compare Timer | CCU / T2 | T0 / T1 | CPU C500-Core (8 Datapointer) | 8 Bit USART | Port 1 | ⟷ I/O |
| | | | | | | Port 2 | ⟷ I/O |
| HW/SW Power Down Modes | 8 Bit UART | 10 Bit ADC | ROM 32 K x 8 ROM Protection available | Port 3 | ⟷ I/O |
| | | Port 8 | Port 7 | Port 6 | Port 5 | Port 4 | ⟷ I/O |

Port 8 ↑ Analog/Digital Input
Port 7 ↑ Analog/Digital Input
Port 6 ⟷ I/O
Port 5 ⟷ I/O

MCB02927

# C517A
# Pin Configuration

Top pins (100 ... 81):
P1.5/T2EX, P1.6/CLKOUT, P1.7/T2, P3.7/RD, P3.6/WR, P3.5/T1, P3.4/T0, P3.3/INT1, P3.2/INT0, P3.1/TxD0, P3.0/RxD0, N.C., N.C., P7.0, P7.1, P7.2, P7.3, P7.4, P7.5, P7.6

Left pins (1 ... 30):
CC4/INT2/P1.4 — 1
N.C.
N.C.
N.C.
N.C.
CC3/INT6/P1.3
CC2/INT5/P1.2
CC1/INT4/P1.1
CC0/INT3/P1.0
$V_{SS}$
$V_{CC}$
XTAL2
XTAL1
P2.0
P2.1
P2.2
P2.3
P2.4
P2.5
P2.6
P2.7
PSEN
ALE
EA
N.C.
P0.0
P0.1
N.C.
N.C.
P0.2 — 30

Right pins (80 ... 51):
P7.7 — 80
$V_{AGND}$
$V_{AREF}$
N.C.
N.C.
N.C.
N.C.
RESET
P4.7/CM7
P4.6/CM6
P4.5/CM5
P4.4/CM4
P4.3/CM3
PE/SWD
P4.2/CM2
P4.1/CM1
P4.0/CM0
$V_{CC}$
$V_{SS}$
RO
P8.3
P8.2
P8.1
P8.0
P6.7
P6.6
P6.5
N.C.
N.C. — 51

Bottom pins (31 ... 50):
P0.3, P0.4, P0.5, P0.6, P0.7, HWPD, CCM7/P5.7, CCM6/P5.6, CCM5/P5.5, CCM4/P5.4, CCM3/P5.3, CCM2/P5.2, CCM1/P5.1, CCM0/P5.0, OWE, ADST/P6.0, RxD1/P6.1, TxD1/P6.2, P6.3, P6.4

100 — corner
81, 80
30 — 31 (bottom left)
51 — 50 (bottom right)

SAB-C517A-4RM
SAB-C517A-LM
(P-MQFP-100-2)

MCP02151