8xC557Ex
Embedded Microcontroller Family

The P8xC557Ex single-chip 8-bit microcontroller family is manufactured in an advanced CMOS technology and is a derivative of the 80C51 microcontroller. The P8xC557Ex has the same instruction set as the 80C51 microcontroller family.
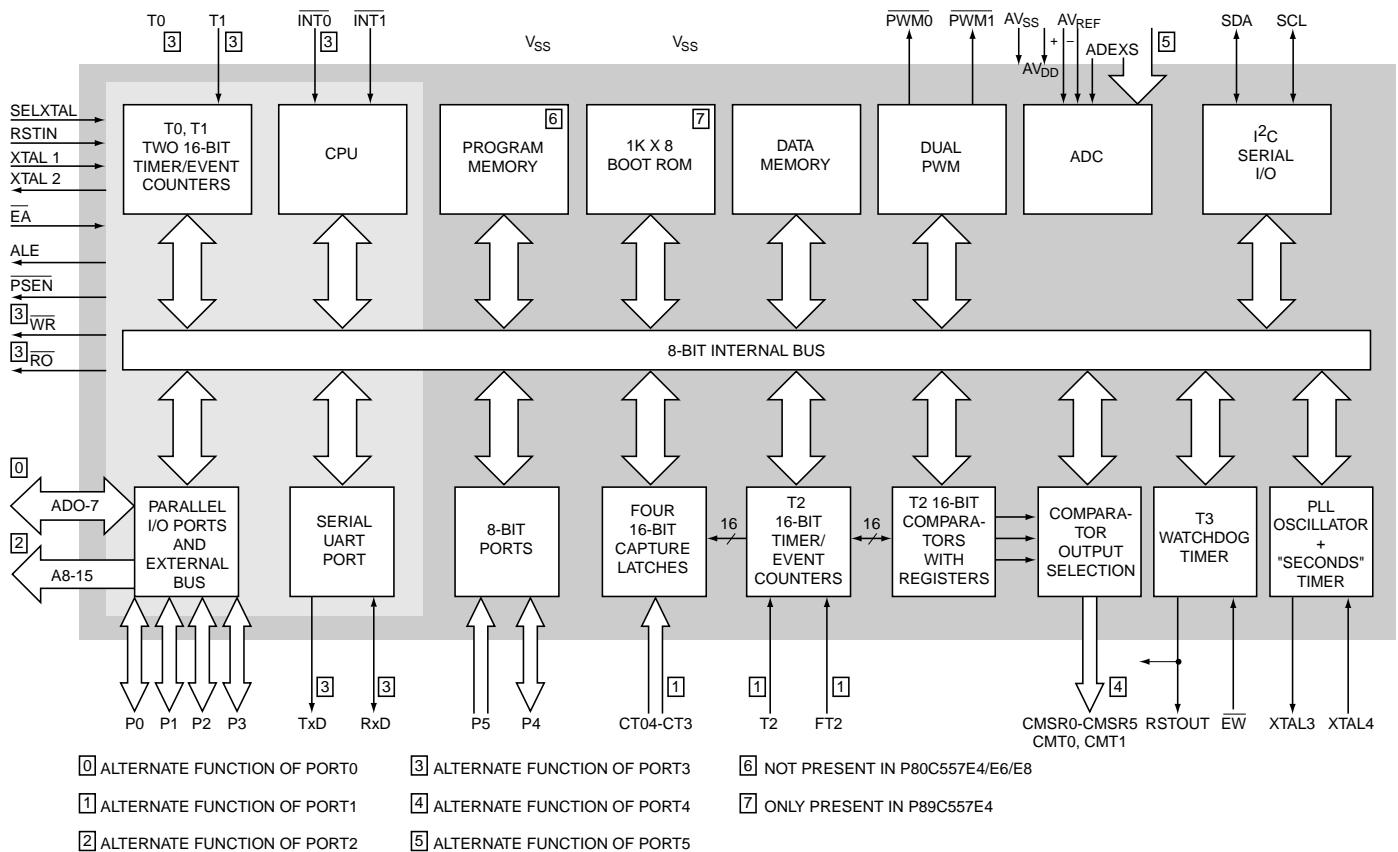
Key Features
- Up to 64kbytes of internal program memory
- ISP (In System Programmable) version available
  — On-chip programming voltage generation
  — On-chip erase and write timing generation
- ROM/EPROM/FEEPROM Code protection
- Up to 2048 bytes of internal RAM
- 10-bit ADC with eight multiplexed analog inputs
- Programmable ADC-autoscan mode
- Fast I2C-bus (up to 400 kHz) serial I/O port with byte oriented master and slave functions
- Frequency range for 80C51-family standard oscillator: 3.5 MHz to 16 MHz
- PLL oscillator with 32 kHz reference and software-selectable system clock frequency
- Software enable/disable of ALE output pulse
- Electromagnetic compatibility improvements
- Wake-up from power-down by external interrupt or internal seconds interrupt

Three Memory Size Derivatives
- P8xC557E4—32K bytes program memory, 1024 bytes RAM
- P8xC557E6—48K bytes program memory, 1536 bytes RAM
- P8xC557E8—64K bytes program memory, 2048 bytes RAM

Four Program Memory Types Available
- P80C557Ex—ROMless
- P83C557Ex—Mask ROM
- P87C557E8—OTP EPROM
  One time programmable EPROM
  E8 available, E4,E6 in preparation
- P89C557E4—MTP FEEPROM
  Multiple Time Programmable Flash-EEPROM
  with ISP feature. Only E4 available

0 ALTERNATE FUNCTION OF PORT0
1 ALTERNATE FUNCTION OF PORT1
2 ALTERNATE FUNCTION OF PORT2
3 ALTERNATE FUNCTION OF PORT3
4 ALTERNATE FUNCTION OF PORT4
5 ALTERNATE FUNCTION OF PORT5
6 NOT PRESENT IN P80C557E4/E6/E8
7 ONLY PRESENT IN P89C557E4

PHILIPS

Analog/Digital Converter (ADC)
- 10-bit resolution
- Eight multiplexed analog inputs
- Programmable autoscan of the analog inputs
- Bit-oriented 8-bit scan-select register to select analog inputs
- Continuous scan or one-time scan configurable from one to eight analog inputs
- Eight 10-bit buffer registers, one register for each analog input channel

Electromagnetic Compatibility Improvements
The 8xC557Ex has several features to reduce the electromagnetic emission and improve the electromagnetic susceptibility. Four supply voltage pins (VDD) and four ground pins (VSS) with pairs of VDD and VSS at two adjacent pins at each side of the package. The ALE output signal (pulses at a frequency of $f_{CLK}/6$) can be disabled under software control.

Security
The security feature protects against software piracy and prevents the content of the internal program memory (ROM/EPROM/FEEPROM) from being read if activated.

32kHz PLL Oscillator with Seconds Timer
- Pierce oscillator with on-chip C1, C2, R_f
- Cheap, small external crystal of 32768 Hz
- System clock frequency selectable by software
- Seconds timer

The 32kHz oscillator consists of an inverter, which forms a Pierce oscillator with the on-chip components C1, C2, Rf and an external crystal of 32768 Hz. A current-controlled oscillator (CCO) generates the internal system clock controlled by the PLL, with the 32kHz oscillator as reference. The system clock frequency can be selected by software. The seconds timer provides an overflow signal every second. Seconds timer interrupt can wake up the controller from power down mode.

Flash EEPROM (89C557E4)
- 32 kbytes electrically erasable internal program memory (Flash)
- On-chip programming voltage generation
- On-chip erase and write timing generation (5 ms erase /2,5ms write)
- Full-, block-, and page erase possible (32kbyte, 256byte or 32 byte)
- 10 years data retention

Parallel Programming
- 87C51 compatible programming
- Only one programming pulse

Unlike standard EPROM programming, no high programming voltage must be applied to the EA pin and only one programming pulse must be applied to the ALE/WE pin.

Serial- "In System Programming"
- Serial in-circuit programming via RS232 under boot ROM program control
- Internal fixed boot ROM (Mask ROM)
- Auto baud rate selection
- Standard Intel hex file format
- User program can call boot ROM routines for erase, write and verify of the FEEPROM

Serial programming (boot mode) is entered if during and after RESET, PSEN and EA are pulled down (PSEN via 3.3kW resistor to VSS). A baud rate of 4800 or 9600 is possible if the PLL oscillator is selected. The receive and transmit channel have the same baud rate.

8xC557Ex Ordering Information (80-pin QFP, 3.5 to 16 MHz, -40 to 85°C)

North American Part Type	Worldwide Part Type	12NC	Memory (Bytes)	Type	RAM (Bytes)
P80C557E4 B	P80C557E4EFB/01	9352 631 56557	—	ROM-less	1024
P83C557E4 B	P83C557E4EFB/xxx	depends on ROM	32K	ROM	1024
P89C557E4 B	P89C557E4EFB/01	9352 631 22557	32K	Flash	1024
P80C557E6 B	P80C557E6EFB/01	9352 631 58557	—	ROM-less	1536
P83C557E6 B	P83C557E6EFB/xxx	depends on ROM	48K	ROM	1536
P80C557E8 B	P80C557E8EFB/00	9352 631 59557	—	ROM-less	2048
P83C557E8 B	P83C557E8EFB/xxx	depends on ROM	64K	ROM	2048
P87C557E8 B	P87C557E8EFB/01	9352 631 60557	64K	OTP	2048

Notes:
1. ROM devices are custom devices that are ordered under special agreement. Contact Philips directly.
2. Tape and reel also available. Contact Philips directly.

9397-750-05844