

### 4-BIT SINGLE-CHIP MICROCONTROLLER

The μPD17135A and μPD17137A are 4-bit single-chip microcontrollers containing four channels of 8-bit A/D converters, two channels of 8-bit timers, an AC zerocross detector, a power-on reset circuit, and a serial interface in one chip.

For the CPU, the 17K architecture is used. This enables accumulator direct data memory manipulation, facilitating effective programming. Every instruction is one word long, consisting of 16 bits.

Since the μPD17135A and μPD17137A have the on-chip A/D converters and AC zerocross detector, they can provide economical electronic control in appliances.

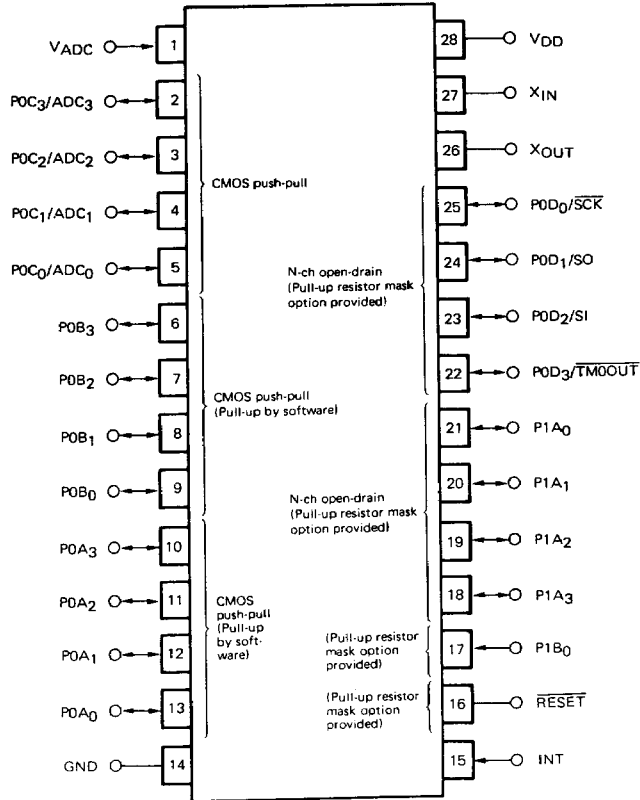
For the evaluation of the μPD17135A and μPD17137A or small production, the μPD17P137A, in which a program can be written once, is provided.

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#### FEATURES

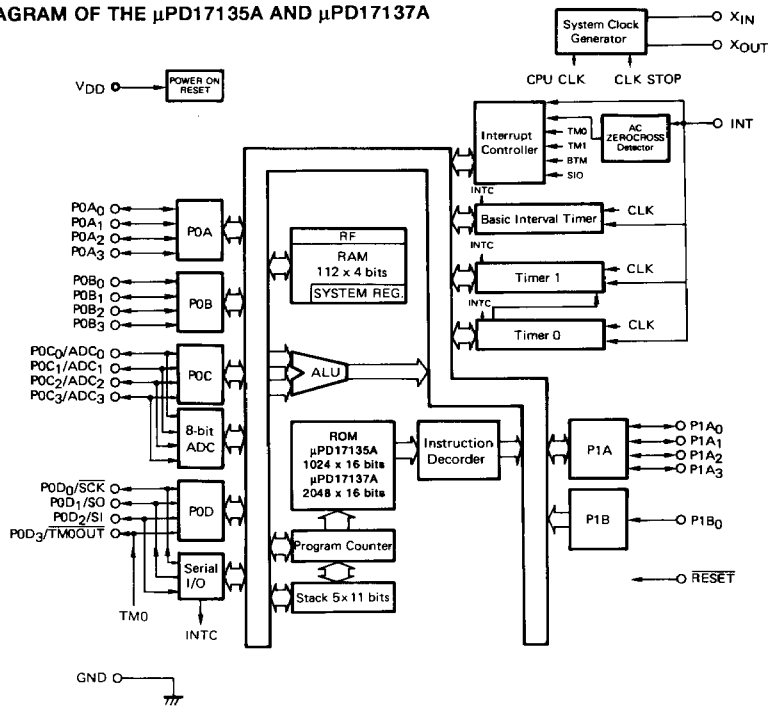
- Program memory (ROM)
  - μPD17135A: 2 K bytes (1024 x 16 bits)
  - μPD17137A: 4 K bytes (2048 x 16 bits)
- Data memory (RAM): 112 words (112 x 4 bits)
- 35 easy-to-understand instructions
- Instruction execution time: 2 μs (at 8 MHz) with ceramic/crystal source when  $V_{DD} = 5 V$
- Stack level: 5 levels (interrupt: 3 levels)
- Vectored interrupt function:
  - 5 interrupt sources (INT pin, timer 1, timer 0, basic interval timer, and serial interface)
- 8-bit A/D converter: 4 channels
  - Absolute accuracy
  - ± 1.5 LSB or higher (on 5 V ± 10 %)
- AC zerocross detector: 1 input (also used as INT pin)
- 8-bit timer: 2 channels
  - Timer 0 count clock ( $f_x/16$ ,  $f_x/64$ ,  $f_x/256$ , INT pin input)
  - Timer 1 count clock ( $f_x/256$ ,  $f_x/512$ ,  $f_x/2048$ , incrementing timer 0)
- 8-bit basic interval timer: 1 channel. Can be used as watchdog timer.
  - Basic interval timer count clock
  - (INT pin input, incrementing timer 0,  $f_x/4096$ ,  $f_x/8192$ )
- 3-wire serial interface: 1 channel
- On-chip power-on reset circuit
- I/O pin: 21 pins
- Standby function (HALT/STOP) provided
- Operating temperature: -40 to +85 °C
- Operating voltage: 2.7 to 6.0 V
- CMOS low power consumption

**PIN CONFIGURATION FOR THE μPD17135A AND μPD17137A (Top View)**



28-pin shrink DIP  
28-pin SOP

BLOCK DIAGRAM OF THE μPD17135A AND μPD17137A



MICROCONTROLLER FAMILY FOR SMALL WHITE GOODS APPLIANCES

Item	μPD17134A	μPD17136A	μPD17135A	μPD17137A	Remarks
ROM size	1024 x 16 bits	2048 x 16 bits	1024 x 16 bits	2048 x 16 bits	
RAM size	112 x 4 bits	112 x 4 bits	112 x 4 bits	112 x 4 bits	
Number of I/O port lines	21 lines				Including 8 N-ch open-drain lines
Analog input	4 channels				Also used as port pins
Timer	3 timers				
Serial interface	1 channel				Also used as port pin
Stack	5 levels				
Power-on reset	Provided				
System clock	RC source		Ceramic/crystal source		
Standby function	Provided				STOP/HALT
Power supply	2.7 to 6.0 V				5 V ±10 % for A/D
Package	28-pin shrink DIP 28-pin SOP				
PROM version	μPD17P136A		μPD17P137A		