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"[Embedded - Microcontrollers](#)" refer to small, integrated circuits designed to perform specific tasks within larger systems. These microcontrollers are essentially compact computers on a single chip, containing a processor core, memory, and programmable input/output peripherals. They are called "embedded" because they are embedded within electronic devices to control various functions, rather than serving as standalone computers. Microcontrollers are crucial in modern electronics, providing the intelligence and control needed for a wide range of applications.

### Applications of "[Embedded - Microcontrollers](#)"

#### Details

|                            |                                                                                                                                                                   |
|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product Status             | Active                                                                                                                                                            |
| Core Processor             | PIC                                                                                                                                                               |
| Core Size                  | 8-Bit                                                                                                                                                             |
| Speed                      | 20MHz                                                                                                                                                             |
| Connectivity               | -                                                                                                                                                                 |
| Peripherals                | Brown-out Detect/Reset, POR, WDT                                                                                                                                  |
| Number of I/O              | 24                                                                                                                                                                |
| Program Memory Size        | 3KB (2K x 12)                                                                                                                                                     |
| Program Memory Type        | FLASH                                                                                                                                                             |
| EEPROM Size                | 64 x 8                                                                                                                                                            |
| RAM Size                   | 132 x 8                                                                                                                                                           |
| Voltage - Supply (Vcc/Vdd) | 2V ~ 5.5V                                                                                                                                                         |
| Data Converters            | A/D 8x8b                                                                                                                                                          |
| Oscillator Type            | Internal                                                                                                                                                          |
| Operating Temperature      | -40°C ~ 85°C (TA)                                                                                                                                                 |
| Mounting Type              | Surface Mount                                                                                                                                                     |
| Package / Case             | 28-SSOP (0.209", 5.30mm Width)                                                                                                                                    |
| Supplier Device Package    | 28-SSOP                                                                                                                                                           |
| Purchase URL               | <a href="https://www.e-xfl.com/product-detail/microchip-technology/pic16f570t-i-ss">https://www.e-xfl.com/product-detail/microchip-technology/pic16f570t-i-ss</a> |

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## 28-Pin, 8-Bit 'Enhanced Baseline' Microcontroller Product Brief

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### Description:

This document describes the 28-pin 'Enhanced Baseline' device with Flash program memory self-write capability, interrupts and op amps.

### Processor Features:

- Interrupt Capability
- PIC16F570 Operating Speed:
  - DC – 20 MHz Crystal oscillator
  - DC – 200 ns Instruction cycle
- High Endurance Program and Flash Data Memory Cells:
  - 2048 x 12 user execution memory
  - 64 x 8 self-writable data memory
  - 100,000 write program memory endurance
  - 1,000,000 write Flash data memory endurance
  - Program and Flash data retention: >40 years
- General Purpose Registers (SRAM):
  - 132 x 8 memory
- Only 36 Single-Word Instructions to Learn:
  - Modified baseline CPU
  - Added `RETURN` and `RETFIE` instructions
  - Added `MOVLB` instruction
- All Instructions are Single-Cycle except for Program Branches which are Two-Cycle
- Four-Level Deep Hardware Stack
- Direct, Indirect and Relative Addressing modes for Data and Instructions

### Peripheral Features:

- Device Features:
  - 24 I/Os
  - Individual direction control
  - High-current source/sink
- 8-Bit Real-Time Clock/Counter (TMR0) with 8-Bit Programmable Prescaler
- In-Circuit Serial Programming™ (ICSP™) via Two External Pin Connections
- Analog Comparator (CMP):
  - Two analog comparators
  - Absolute and programmable references
- Analog-to-Digital Converter (ADC):
  - 8-bit resolution
  - 8 external input channels
  - 0.6V reference input
- Operational Amplifiers (op amps):
  - Two operational amplifiers
  - Fully-accessible visibility

### Microcontroller Features:

- Brown-out Reset (BOR)
- Power-on Reset (POR)
- Device Reset Timer (DRT)
- Watchdog Timer (WDT) with its own on-chip RC Oscillator for Reliable Operation
- Programmable Code Protection (CP)
- Power-Saving Sleep mode with Wake-up on Change Feature
- Selectable Oscillator Options:
  - INTOSC: Precision 4 or 8 MHz internal oscillator
  - EXTRC: Low-cost external RC oscillator
  - LP: Power-saving, low-frequency crystal
  - XT: Standard crystal/resonator
  - HS: High-speed crystal/resonator
  - EC: High-speed external clock
- Variety of Packaging Options:
  - 28-Lead SPDIP, SOIC, SSOP, QFN

### CMOS Technology:

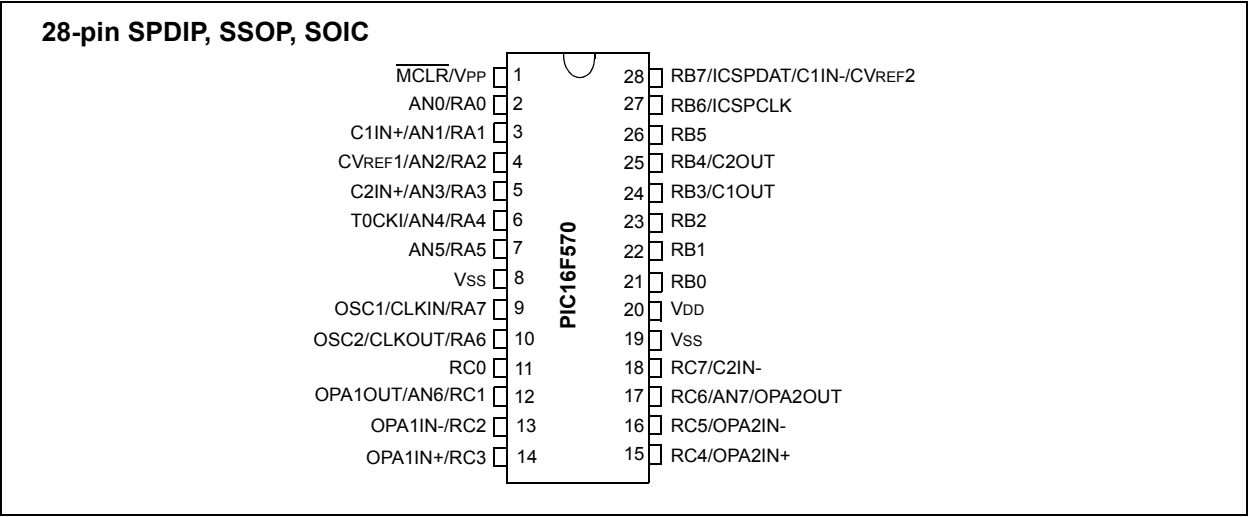
- Low-Power, High-Speed CMOS Flash Technology
- Fully-Static Design
- Wide Operating Voltage and Temperature Range:
  - Industrial: 2.0V to 5.5V
  - Extended: 2.0V to 5.5V
- Operating Current:
  - 170 uA @ 2V, 4 MHz, typical
  - 15 uA @ 2V, 32 kHz, typical
- Standby Current:
  - 100 nA @ 2V, typical

# PIC16F570

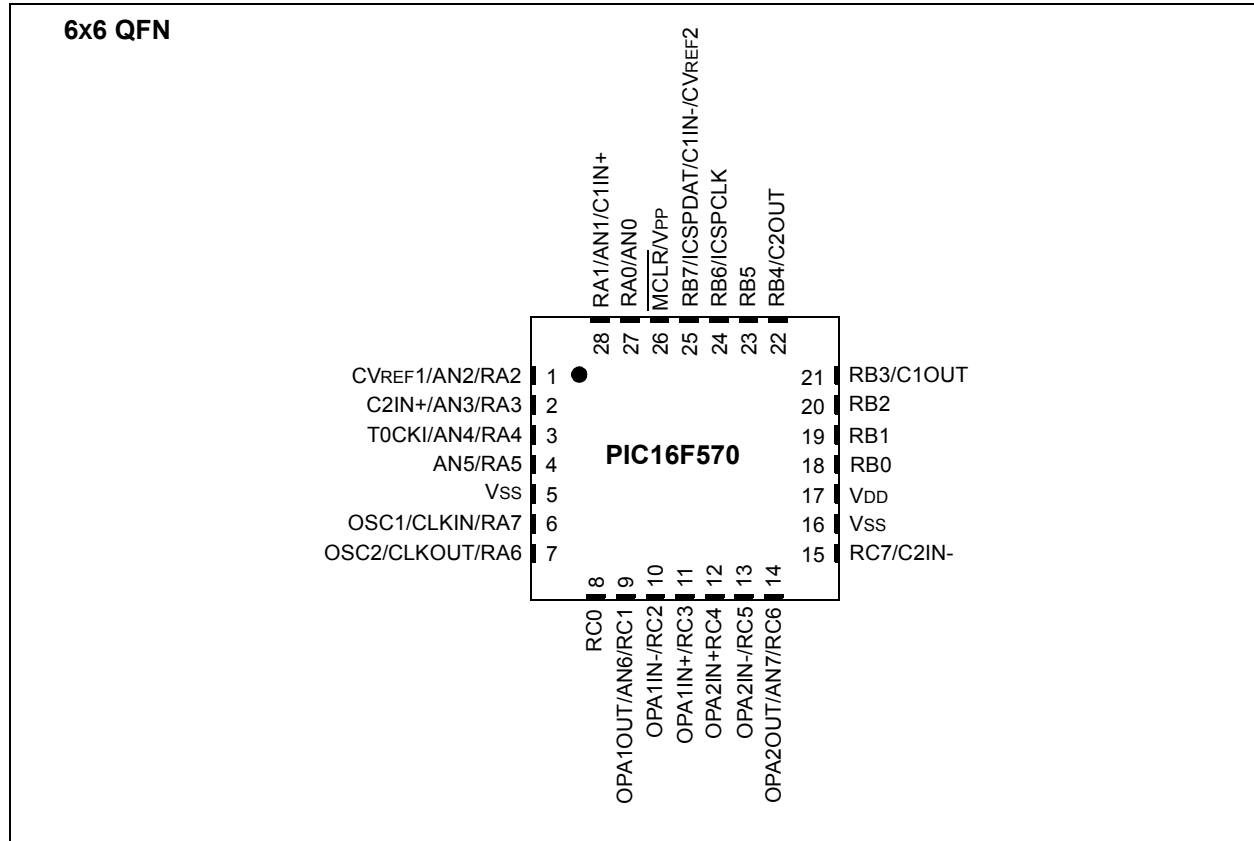
PIC16F570 Family Types

| Device    | Pins/I/O Pins | Flash | Data EE (B) | SRAM (B) | 8-Bit ADC Channels | Op Amp | Comparator | 8-Bit Timers | BOR | Stack Levels | Interrupts | 8 MHz Int. Osc. | Interrupt-on-change Pins | Weak Pull-up Pins |
|-----------|---------------|-------|-------------|----------|--------------------|--------|------------|--------------|-----|--------------|------------|-----------------|--------------------------|-------------------|
| PIC16F570 | 28/24         | 2KW   | 64          | 132      | 8                  | 2      | 2          | 1            | Y   | 4            | Y          | Y               | 8                        | 8                 |

FIGURE 1: 28-PIN PDIP, SOIC, SSOP DIAGRAM FOR PIC16F570



**FIGURE 2: 28-PIN QFN DIAGRAM FOR PIC16F570**



# PIC16F570

**TABLE 1: PIC16F570 PIN SUMMARY**

| I/O             | 28-Pin SPDIP | 28-Pin QFN | A/D | Reference | Comparator | Op Amp  | Timers | IOC | Pull-up | Basic                   |
|-----------------|--------------|------------|-----|-----------|------------|---------|--------|-----|---------|-------------------------|
| MCLR            | 1            | 26         | —   | —         | —          | —       | —      | N   | Y       | MCLR<br>V <sub>PP</sub> |
| RA0             | 2            | 27         | AN0 | —         | —          | —       | —      | N   | N       | —                       |
| RA1             | 3            | 28         | AN1 | —         | C1IN+      | —       | —      | N   | N       | —                       |
| RA2             | 4            | 1          | AN2 | CVREF1    | —          | —       | —      | N   | N       | —                       |
| RA3             | 5            | 2          | AN3 | —         | C2IN+      | —       | —      | N   | N       | —                       |
| RA4             | 6            | 3          | AN4 | —         | —          | —       | T0CKI  | N   | N       | —                       |
| RA5             | 7            | 4          | AN5 | —         | —          | —       | —      | N   | N       | —                       |
| RA6             | 10           | 7          | —   | —         | —          | —       | —      | N   | N       | OSC2<br>CLKOUT          |
| RA7             | 9            | 6          | —   | —         | —          | —       | —      | N   | N       | OSC1<br>CLKIN           |
| RB0             | 21           | 18         | —   | —         | —          | —       | —      | Y   | Y       | —                       |
| RB1             | 22           | 19         | —   | —         | —          | —       | —      | Y   | Y       | —                       |
| RB2             | 23           | 20         | —   | —         | —          | —       | —      | Y   | Y       | —                       |
| RB3             | 24           | 21         | —   | —         | C1OUT      | —       | —      | Y   | Y       | —                       |
| RB4             | 25           | 22         | —   | —         | C2OUT      | —       | —      | Y   | Y       | —                       |
| RB5             | 26           | 23         | —   | —         | —          | —       | —      | Y   | Y       | —                       |
| RB6             | 27           | 24         | —   | —         | —          | —       | —      | Y   | Y       | ICSPCLK                 |
| RB7             | 28           | 25         | —   | CVREF2    | C1IN-      | —       | —      | Y   | Y       | ICSPDAT                 |
| RC0             | 11           | 8          | —   | —         | —          | —       | —      | N   | N       | —                       |
| RC1             | 12           | 9          | AN6 | —         | —          | OPA1OUT | —      | N   | N       | —                       |
| RC2             | 13           | 10         | —   | —         | —          | OPA1IN- | —      | N   | N       | —                       |
| RC3             | 14           | 11         | —   | —         | —          | OPA1IN+ | —      | N   | N       | —                       |
| RC4             | 15           | 12         | —   | —         | —          | OPA2IN+ | —      | N   | N       | —                       |
| RC5             | 16           | 13         | —   | —         | —          | OPA2IN- | —      | N   | N       | —                       |
| RC6             | 17           | 14         | AN7 | —         | —          | OPA2OUT | —      | N   | N       | —                       |
| RC7             | 18           | 15         | —   | —         | C2IN-      | —       | —      | N   | N       | —                       |
| V <sub>DD</sub> | 20           | 17         | —   | —         | —          | —       | —      | —   | —       | V <sub>DD</sub>         |
| V <sub>SS</sub> | 8, 19        | 5, 16      | —   | —         | —          | —       | —      | —   | —       | V <sub>SS</sub>         |

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 Printed on recycled paper.

ISBN: 9781620766255

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