PIC16F170X/171X 8-bit Microcontrollers
Cost-Efficient, Intelligent Analog MCUs with eXtreme Low Power (XLP) Technology

Summary
PIC16F170X/171X microcontrollers (MCUs) combine Intelligent Analog integration with low cost and eXtreme Low Power (XLP) to suit a variety of cost-sensitive general-purpose applications. These devices deliver on-chip analog features (op amps, ADC and DAC) along with other Core Independent Peripherals (CIP) in 14-, 20-, 28- and 40-pin packages. PIC16F170X/171X MCUs also feature Peripheral Pin Select (PPS) and Zero Cross Detect, to provide increased design flexibility.

The eleven members of the PIC16F170X/171X family are based on Microchip’s Enhanced Mid-Range Core architecture and offer up to 16 Kwords of Flash program memory, up to 2 KB of RAM, SPI/I2C™. These MCUs, with their low cost and Intelligent Analog integration, are designed for applications that would benefit from both the board space and design cost savings.

Key Features
- Intelligent Analog: Integrates up to two op amps, to up to two high-speed comparators, up to 28 input channels of 10-bit ADC and up to one 5-bit/8-bit DAC, saving both board space and design BOM costs.
- Configurable Logic Cell (CLC): Create custom combinational and sequential logic using this integrated configurable logic cell module. Using CLC, you can also bring external gates and state functions into the MCU itself.
- Numerically Controlled Oscillator (NCO): Linearly adjusts the frequency output with very fine steps. The NCO provides high-resolution oscillator capabilities to control applications such as lighting ballast, radio and tone generator.
- Complementary Output Generator (COG): Provides a complementary waveform with rising and falling edge dead band control, enabling high-efficiency synchronous switching with no processor overhead. The COG also incorporates auto shutdown and auto restart and can directly interface with other peripherals/external inputs. It also incorporates blanking and phase control.
- Zero Cross Detect (ZCD): AC high-voltage zero crossing detection for simplifying TRIAC control, synchronized switching control and timing.
- Peripheral Pin Select (PPS): Configure any digital peripheral to any pin via an internal MUX to ensure layout flexibility and completely eliminate pin overlap.
- High-Endurance Flash (HEF)
  - 128 B Non-volatile data storage
  - 100 K Erase/write cycles

Why PIC16F170X/171X?
- Flexible Intelligence: Wide array of analog features, Core Independent Peripherals and traditional peripherals to enable thousands of applications in consumer electronics, lighting, medical, safety/security, home appliance, industrial and other markets.
- eXtreme Low Power (XLP): With 35 nA standby current and 30 μA/MHz active current typical, these MCUs are highly suitable for battery-powered applications.
- Low Cost: Designed to enable highly efficient applications while promoting cost savings.

Additional Information
- PIC16(L)170X/1X Product Brief, (DS40001708)
- PIC16(L)1703/7 Datasheet, (DS40001722)
- PIC16(L)1704/8 Datasheet, (DS40001715)
- PIC16(L)1705/9 Datasheet, (DS40001729)
- PIC16(L)1713/6 Datasheet, (DS40001726)
- PIC16(L)1717/8/9 Datasheet, (DS40001740)
- 8-bit PIC® Microcontroller Solutions Brochure, DS30009630
- Focus Product Selector Guide, DS00001308
- Quick Guide to Microchip Development Tools Brochure, DS50001894
### PIC16F170X/171X Microcontrollers

| Device          | Program Memory (words) | HEF (B) | SRAM (Bytes) | I/O Pins | 8/16-bit Timers | High Speed Comparators | Op Amp | 10-bit ADC (ch) | 5-/8-bit DAC | Zero Cross | CCP | PWM | COG | MSSP (I²C™/SPI) | EUSART | PPS | CLC | NCO | XLP |
|-----------------|------------------------|---------|--------------|----------|-----------------|------------------------|--------|-----------------|-------------|------------|-----|-----|-----|----------------|--------|-----|-----|-----|-----|-----|
| PIC16(L)F1703   | 2K                     | 128     | 256          | 12       | 2/1             | 0                      | 2      | 8              | 0           | 1          | 2   | 0   | 0   | ✓              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1704   | 4K                     | 128     | 512          | 12       | 4/1             | 2                      | 2      | 8              | 0/1         | 1          | 2   | 2   | 1   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1705   | 8K                     | 128     | 1K           | 12       | 4/1             | 2                      | 2      | 8              | 0/1         | 1          | 2   | 2   | 1   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1707   | 2K                     | 128     | 256          | 18       | 2/1             | 0                      | 2      | 8              | 0           | 1          | 2   | 0   | 1   | 0              | ✓      | ✔   | ✔   | ✔   | ✔   |
| PIC16(L)F1708   | 4K                     | 128     | 512          | 18       | 4/1             | 2                      | 2      | 12             | 0/1         | 1          | 2   | 2   | 1   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1709   | 8K                     | 128     | 1K           | 18       | 14/1            | 2                      | 2      | 12             | 0/1         | 1          | 2   | 2   | 1   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1713   | 4K                     | 128     | 512          | 25       | 4/1             | 2                      | 2      | 17             | 1/1         | ✓          | 1   | 2   | 2   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1716   | 8K                     | 128     | 1K           | 25       | 4/1             | 2                      | 2      | 17             | 1/1         | ✓          | 1   | 2   | 2   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1717   | 8K                     | 128     | 1K           | 36       | 4/1             | 2                      | 2      | 28             | 1/1         | ✓          | 1   | 2   | 2   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1718   | 16K                    | 128     | 2K           | 25       | 4/1             | 2                      | 2      | 17             | 1/1         | ✓          | 1   | 2   | 2   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |
| PIC16(L)F1719   | 16K                    | 128     | 2K           | 36       | 4/1             | 2                      | 2      | 28             | 1/1         | ✓          | 1   | 2   | 2   | 1              | ✓      | ✓   | ✓   | ✓   | ✓   |

**Development Made Easy**

The PIC16F170X/171X family provides a low-cost development experience from code creation to integration into the end application.

**Development Tools from Microchip**

- PICkit™ 3 In-Circuit Debugger (PG164130)
- Curiosity Development Board (DM164137)
- MPLAB® ICD 3 In-Circuit Debugger (DV164035)
- F1 Evaluation Platform (DM164130-1)
- F1 Evaluation Kit (DV164132)
- PICDEM™ Lab Development Kit (DM163045)
- PICDEM 2 Plus Demonstration Board (DM163022-1)
- MPLAB PM3 Universal Device Programmer (DV007004)