

PIC16F157X 8-bit Microcontrollers

Small Form Factor with High-Resolution 16-bit PWMs

Overview

The use of high-resolution PWMs is becoming more common in today's applications, most notably in LED lighting and color mixing, motor control and switch mode power supplies. In the past, designers turned to devices with higher pin counts and more memory to support their design requirements. Now, however, they have a different option. The PIC16F157X family of MCUs combines 16-bit PWM drive, closed loop control and communication capabilities into a small form factor, enabling increased precision for drive and control in cost-sensitive applications.

Core Independent Pulse Drive

The integrated 16-bit PWMs bring advanced capabilities beyond those found in typical PWM modules. These multi-function peripherals offer the flexibility to be used in many applications. The 16-bit PWMs can be optimized for precision, efficiency and EMI performance or they can be configured as general purpose timers, providing four additional 16-bit timers. Once configured, the 16-bit PWM peripherals run completely independent of the core, which allows the core to perform other tasks. Any of the 16-bit PWMs can be used with the Complementary Waveform Generator (CWG), which enables automated complementary output control with control of key parameters such as dead-band and auto-shutdown.

Flexibility

PIC16F157X microcontrollers are well suited for a variety of applications where high PWM resolution is needed, including many general purpose, LED lighting, motor control and power supply applications. The Core Independent Peripherals and EUSART enable closed-loop feedback and communication for use in multiple market segments with non-volatile data storage via High-Endurance Flash (HEF). These products feature Microchip's eXtreme Low Power (XLP) technology, offering operating currents as low as 30 μ A/MHz and sleep currents as low as 20 nA, which is ideal for lower-power applications. The product family is available in several pin counts and packages, including a 3×3 μ DFN, a leadless option with a footprint that is 30% the size of our standard packaging*. The Peripheral Pin Select (PPS) functionality allows for I/O pin remapping of the digital peripherals for increased flexibility, ease of PCB layout, and improved utilization through accessing multiple peripherals on the same I/O port.

Communication

The PIC16F157X devices offer an Enhanced Universal Synchronous Asynchronous Receiver Transceiver (EUSART) to enable serial communication, including LIN for automotive and industrial applications as well as DMX for lighting applications. This allows for intelligent applications where remote devices communicate with a host or master device.



PIC16F157X

- High-Resolution 16-bit PWMs
- Integrated Analog
- XLP Technology

Integrated Analog

The on-board 10-bit Analog-to-Digital Converter (ADC), 5-bit Digital-to-Analog Converter (DAC), internal voltage references and comparators can be connected internally to create closed-loop feedback without requiring pins or using PCB space. This results in lower BOM costs, increased flexibility and simplified PCB design.

Microchip's 16-bit PWM Features

- Additional PWM modes
 - Center-aligned mode to improve EMI
 - Set/toggle on register match to add flexibility
- Independent timers to drive separate power stages or motors and improve configurability
- Multiple internal compare modes

Additional Information

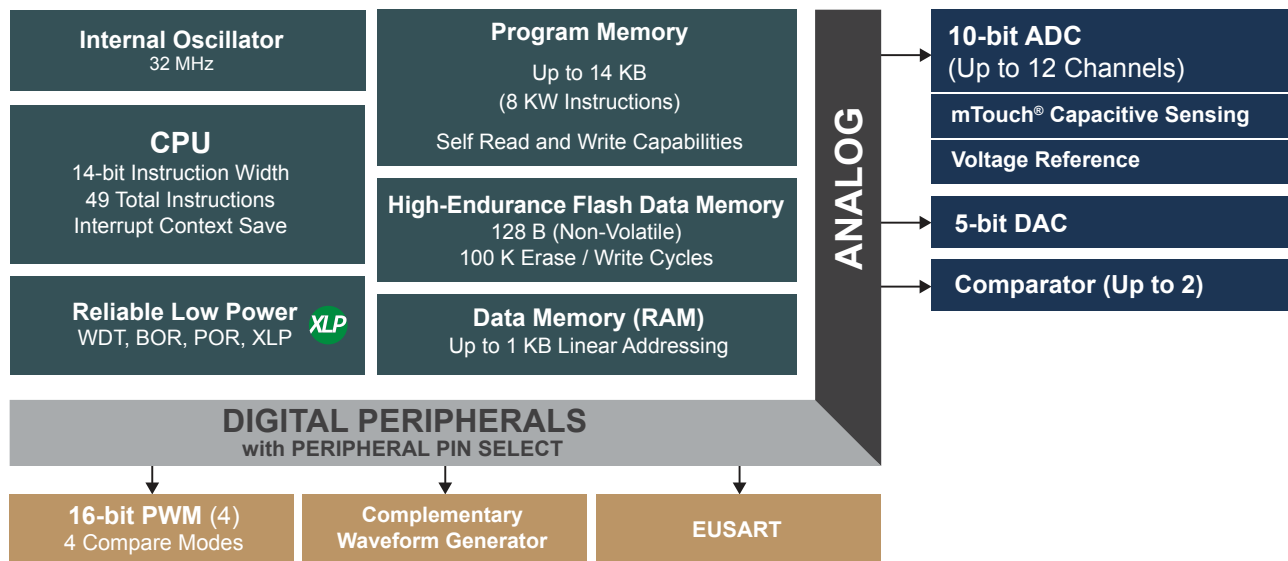
- PIC16F157X Family Page: www.microchip.com/pic16f157x
- PIC12(L)1571/2 Datasheet, DS40001723
- PIC16(L)1574/5/8/9 Datasheet, DS40001782
- High-Resolution RGB LED Color Mixing Application Note (AN1562)
- 8-bit PIC® Microcontroller Solutions Brochure, DS30009630
- Intelligent Lighting and Control Brochure, DS00001036
- Focus Product Selector Guide, DS00001308

Links

- Online Sampling: www.sample.microchip.com
- Core Independent Peripherals Information: www.microchip.com/cip
- Intelligent Analog Information: www.microchip.com/intelligentanalog

*The 8-pin standard package option is SOIC.

PIC16F157X Block Diagram



*Additional general purpose 16-bit timers available when PWM outputs are not used

PIC12/PIC16F157X Microcontrollers													
Device	Program Memory Flash (KB)	HEF (B)	Data SRAM (Bytes)	I/O Pins	8/16-bit Timers	16-bit PWMs	10-bit ADC (ch)	Comparators	5-bit DAC	CWG***	EUSART	PPS	Package
PIC12(L)F1571	1.75	128	128	6	2/4*	3	4	1	1	1	0	—	SOIC, 3 × 3 UDFN, MSOP, PDIP
PIC12(L)F1572	3.5	128	256	6	2/4*	3	4	1	1	1	1	—	SOIC, 3 × 3 UDFN, MSOP, PDIP
PIC16(L)F1574	7	128	512	12	2/5**	4	8	2	1	1	1	✓	SOIC, TSSOP, UQFN, PDIP
PIC16(L)F1575	14	128	1K	12	2/5**	4	8	2	1	1	1	✓	SOIC, TSSOP, UQFN, PDIP
PIC16(L)F1578	7	128	512	18	2/5**	4	12	2	1	1	1	✓	SOIC, SSOP, UQFN, PDIP
PIC16(L)F1579	14	128	1K	18	2/5**	4	12	2	1	1	1	✓	SOIC, SSOP, UQFN, PDIP

*Three additional general purpose 16-bit timers available when PWM outputs are not used

**Four additional general purpose 16-bit timers available when PWM outputs are not used

***For more information about the Complementary Waveform Generator (CWG), go to www.microchip.com/CWG

Development Made Easy

The PIC16(L)F157X 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)
- MPLAB® ICD 3 In-Circuit Debugger (DV164035)
- Curiosity Development Board (DM164137)
- MPLAB Code Configurator

Reference Design Link



RGB Badge Demonstration Platform:
www.microchip.com/rgbbadge



Visit our web site for additional product information and to locate your local sales office.

Microchip Technology Inc. • 2355 W. Chandler Blvd. • Chandler, AZ 85224-6199

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