PIC16(L)F1507

20-Pin 8-Bit Flash Microcontroller Product Brief

High-Performance RISC CPU:

- C Compiler Optimized Architecture
- Only 49 Instructions
- Up to 3.5 Kbytes Linear Program Memory Addressing
- Up to 128 bytes Linear Data Memory Addressing
- Operating Speed:
  - DC – 20 MHz clock input
  - DC – 125 ns instruction cycle
- Interrupt Capability with Automatic Context Saving
- 16-Level Deep Hardware Stack with Optional Overflow/Underflow Reset
- Direct, Indirect and Relative Addressing modes:
  - Two full 16-bit File Select Registers (FSRs)
  - FSRs can read program and data memory

Flexible Oscillator Structure:

- 16 MHz Internal Oscillator Block:
  - Accurate to ±1%, typical
  - Software selectable frequency range from 16 MHz to 31 kHz
- 31 kHz Low-Power Internal Oscillator
- Three External Clock modes up to 20 MHz

Special Microcontroller Features:

- Operating Voltage Range:
  - 1.8V to 3.6V (PIC16LF1507)
  - 2.3V to 5.5V (PIC16F1507)
- Self-Programmable under Software Control
- Power-on Reset (POR)
- Power-up Timer (PWRT)
- Programmable Low-Power Brown-Out Reset (LPBOR)
- Extended Watch-Dog Timer (WDT):
  - Programmable period from 1 ms to 256s
- Programmable Code Protection
- In-Circuit Serial Programming™ (ICSP™) via two pins
- Enhanced Low-Voltage Programming (LVP)
- Power-Saving Sleep mode

Low-Power Features (PIC16LF1507):

- Standby Current:
  - 30 nA @ 1.8V, typical
- Operating Current:
  - 30 μA per MHz @ 1.8V, typical
- Low-Power Watchdog Timer Current:
  - 300 nA @ 1.8V, typical
- Secondary Oscillator:
  - 600 nA @ 32 kHz

Analog Features:

- Analog-to-Digital Converter (ADC):
  - 10-bit resolution
  - Up to 12 channels
  - Auto acquisition capability
  - Conversion available during Sleep
  - FVR available as channel
- Voltage Reference module:
  - Fixed Voltage Reference (FVR) with 1.024V, 2.048V and 4.096V output levels

Peripheral Features:

- Up to 18 I/O Pins and 1 Input-only Pin:
  - High current sink/source 25 mA/25 mA
  - Individually programmable weak pull-ups
  - Individually programmable interrupt-on-change (IOC) pins
- Timer0: 8-Bit Timer/Counter with 8-Bit Programmable Prescaler
- Enhanced Timer1:
  - 16-bit timer/counter with prescaler
  - External Gate Input mode
- Timer2: 8-Bit Timer/Counter with 8-Bit Period Register, Prescaler and Postscaler
- Four 10-bit PWM modules
- Two Configurable Logic Cell (CLC) modules:
  - 12 selectable input source signals
  - Four inputs per module
  - Software control of combinational/sequential logic/state/clock functions
  - AND/OR/XOR/XOD/SR/JK
  - External or internal inputs/outputs
  - Operation while in Sleep
- Direct Digital Synthesis (DDS):
  - 24-bit Accumulator
  - 16-bit Addend
  - True linear frequency control
  - High-speed clock input
  - Selectable Output modes
    - Fixed Duty Cycle (FDC)
    - Pulse Frequency Modulation (PFM)
- Complementary Waveform Generator (CWG):
  - 6 selectable signal sources
  - Selectable falling and rising edge deadband control
  - Polarity control
  - 2 auto-shutdown sources
  - Multiple input sources: PWM, CLC, DDS

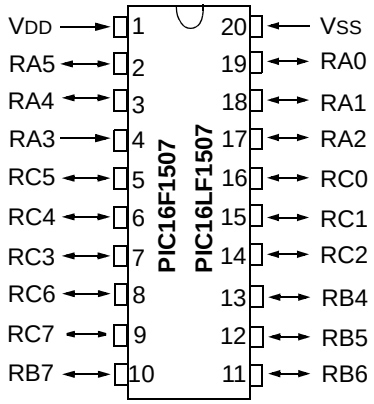
TABLE 1: PIC16(L)F1507 FAMILY TYPES

Device	Program Memory Flash (words)	SRAM (bytes)	I/Os	10-bit A/D (ch)	Timers 8/16-bit	PWM	CWG	CLC	DDS
PIC16F1507 PIC16LF1507	2048	128	18	12	2/1	4	Yes	2	Yes

Note: Pin details are subject to change.

FIGURE 1: 20-PIN PDIP, SOIC, SSOP PACKAGE DIAGRAM FOR PIC16(L)F1507

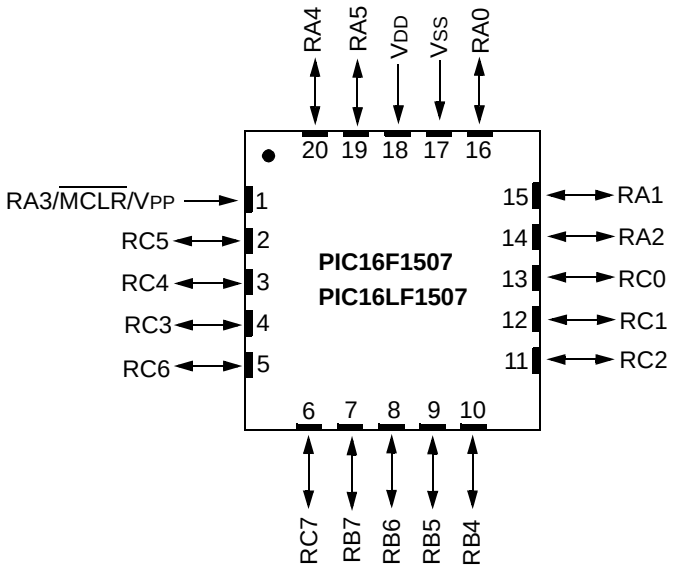
PDIP, SOIC, SSOP



Note: See Table 2 for location of all peripheral functions.

FIGURE 2: 20-PIN QFN PACKAGE DIAGRAM FOR PIC16(L)F1507

QFN 4x4



Note: See Table 2 for location of all peripheral functions.

TABLE 2: 20-PIN ALLOCATION TABLE (PIC16(L)F1507)

I/O	20-Pin PDIP/SOIC/SSOP	20-Pin QFN	A/D	Reference	CWG	DDS	CLC	Timers	PWM	Interrupt	Pull-up	Basic
RA0	19	16	AN0	—	—	—	—	—	—	IOC	Y	ICSPDAT/ICDDAT
RA1	18	15	AN1	VREF+	—	—	—	—	—	IOC	Y	ICSPCLK/ICDCLK
RA2	17	14	AN2	—	$\overline{\text{CWGFLT}}$	—	CLC1OUT(2)	T0CKI	PWM3	INT/ IOC	Y	—
RA3	4	1	—	—	—	—	CLC1IN0	—	—	IOC	Y	$\overline{\text{MCLR}}$ VPP
RA4	3	20	AN3	—	—	—	—	$\overline{\text{T1G}}$	—	IOC	Y	CLKOUT
RA5	2	19	—	—	—	—	—	T1CKI	—	IOC	Y	CLKIN
RB4	13	10	AN10	—	—	—	—	—	—	IOC	Y	—
RB5	12	9	AN11	—	—	—	—	—	—	IOC	Y	—
RB6	11	8	—	—	—	—	—	—	—	IOC	Y	—
RB7	10	7	—	—	—	—	—	—	—	IOC	Y	—
RC0	16	13	AN4	—	—	—	CLC2OUT	—	—	—	—	—
RC1	15	12	AN5	—	—	DDS1OUT(2)	—	—	PWM4	—	—	—
RC2	14	11	AN6	—	—	—	—	—	—	—	—	—
RC3	7	4	AN7	—	—	—	CLC2IN0	—	PWM2	—	—	—
RC4	6	3	—	—	CWGB	—	CLC2IN1	—	—	—	—	—
RC5	5	2	—	—	CWGA	—	CLC1OUT(1)	—	PWM1	—	—	—
RC6	8	5	AN8	—	—	DDS1OUT(1)	—	—	—	—	—	—
RC7	9	6	AN9	—	—	—	CLC1IN1	—	—	—	—	—
VDD	1	18	—	—	—	—	—	—	—	—	—	VDD
VSS	20	17	—	—	—	—	—	—	—	—	—	VSS

Note 1: Pin function is selected via APFCON register.
2: This is default location for this pin function.

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ISBN: 978-1-60932-832-0

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