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### What is "[Embedded - Microcontrollers](#)"?

"[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                      | 32MHz                                                                                                                                                             |
| Connectivity               | I <sup>2</sup> C, LINbus, SPI, UART/USART                                                                                                                         |
| Peripherals                | Brown-out Detect/Reset, POR, PWM, WDT                                                                                                                             |
| Number of I/O              | 25                                                                                                                                                                |
| Program Memory Size        | 7KB (4K x 14)                                                                                                                                                     |
| Program Memory Type        | FLASH                                                                                                                                                             |
| EEPROM Size                | 128 x 8                                                                                                                                                           |
| RAM Size                   | 512 x 8                                                                                                                                                           |
| Voltage - Supply (Vcc/Vdd) | 2.3V ~ 5.5V                                                                                                                                                       |
| Data Converters            | A/D 17x10b; D/A 3x5b, 3x10b                                                                                                                                       |
| Oscillator Type            | Internal                                                                                                                                                          |
| Operating Temperature      | -40°C ~ 125°C (TA)                                                                                                                                                |
| Mounting Type              | Surface Mount                                                                                                                                                     |
| Package / Case             | 28-UQFN Exposed Pad                                                                                                                                               |
| Supplier Device Package    | 28-UQFN (6x6)                                                                                                                                                     |
| Purchase URL               | <a href="https://www.e-xfl.com/product-detail/microchip-technology/pic16f1773-e-mx">https://www.e-xfl.com/product-detail/microchip-technology/pic16f1773-e-mx</a> |

# PIC16(L)F1773/6/7/8/9

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## 28/40/44-Pin, 8-Bit Flash Microcontroller Product Brief

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### Description

PIC16(L)F177X microcontrollers feature a high level of integration of intelligent analog and digital peripherals for a wide range of applications, such as lighting, power supplies, battery charging, motor control and other general purpose applications. These devices deliver multiple op amps, 5-/10-bit DACs, high-speed comparators, 10-bit ADC, 10-/16-bit PWMs, programmable ramp generator (PRG) and other peripherals that can be connected internally to create closed loop systems without using pins or PCB area. The 10-/16-bit PWMs, digital signal modulators and tri-state output op amp can be used together to create a LED dimming engine for lighting applications. The peripheral pin select (PPS) functionality provides flexibility, eases PCB layout and peripheral utilization by allowing digital peripheral pin mapping to an I/O.

### Core Features

- C Compiler Optimized RISC Architecture
- Only 49 Instructions
- Operating Speed:
  - DC – 32 MHz clock input
  - 125 ns minimum instruction cycle
- Interrupt Capability
- 16-Level Deep Hardware Stack
- Five 8-Bit Timers
- Three 16-Bit Timers
- Low-Current Power-on Reset (POR)
- Configurable Power-up Timer (PWRT)
- Brown-out Reset (BOR) with Selectable Trip Point
- Extend Watchdog Timer (EWDT):
  - Low-power 31 kHz WDT
  - Software selectable pre-scaler
  - Software selectable enable

### Memory

- Up to 28 Kbytes Program Flash Memory (PFM)
- Up to 2 Kbytes Data RAM
- Direct, Indirect and Relative Addressing modes
- High-Endurance Flash (HEF):
  - 128B of nonvolatile data storage
  - 100K Erase/Write cycles

### Operating Characteristics

- Operating Voltage Range:
  - 1.8V to 3.6V (PIC16LF1773/6/7/8/9)
  - 2.3V to 5.5V (PIC16F1773/6/7/8/9)
- Temperature Range:
  - Industrial: -40°C to 85°C
  - Extended: -40°C to 125°C

### eXtreme Low-Power (XLP) Features

- Sleep mode: 50 nA @ 1.8V, typical
- Watchdog Timer: 500 nA @ 1.8V, typical
- Secondary Oscillator: 500 nA @ 32 kHz
- Operating Current:
  - 8 uA @ 31 kHz, 1.8V, typical
  - 32 uA/MHz @ 1.8V, typical

### Intelligent Analog Peripherals

- 10-Bit Analog-to-Digital Converter (ADC):
  - Up to 28 external channels
  - Conversion available during Sleep
- Up to Four Operational Amplifiers (OPA):
  - Selectable internal and external channels
  - Tri-state output
  - Part of LED dimming engine
  - Selectable internal and external channels
- Up to Eight High-Speed Comparators (HS Comp):
  - Up to nine external inverting inputs
  - Up to 12 external noninverting inputs
  - Fixed voltage reference at inverting and noninverting input(s)
  - Comparator outputs externally accessible
- Digital-to-Analog Converters (DAC):
  - Up to four 10-bit resolution DACs
  - 10-bit resolution, rail-to-rail
  - Conversion during Sleep
  - Internal connections to ADCs and HS Comparators
- Voltage Reference:
  - Fixed Voltage Reference (FVR)
  - 1.024V, 2.048V and 4.096V output levels
- Zero-Cross Detector (ZCD):
  - Detect high-voltage AC signal
- Up to Four Programmable Ramp Generators (PRG):
  - Slope compensation
  - Ramp generation
- Two High-Current Drive I/Os:
  - Up to 100 mA sink or source @ 5V

# PIC16(L)F1773/6/7/8/9

## Digital Peripherals

- Up to Four Configurable Logic Cells (CLC):
  - Integrated combinational and state logic
- Up to Four Complementary Output Generators (COG):
  - Push-pull, Full-Bridge and Steering modes
- Up to Four Capture/Compare/PWM (CCP) Modules
- Pulse-Width Modulator (PWM):
  - Up to four 16-bit PWMs
  - Independent timers
  - Multiple output modes (edge-, center-aligned, set and toggle on register match)
  - User settings for phase, duty cycle, period, offset and polarity
  - 16-bit timer capability
  - Up to four 10-bit PWMs
- Up to Four Data Signal Modulators (DSM):
  - Modulates a carrier signal with a digital data to create custom carrier synchronized output waveforms
  - Part of LED dimming engine

- Peripheral Pin Select (PPS):
  - I/O remapping of digital peripherals
- Serial Communications:
  - Enhanced USART (EUSART)
  - SPI, I<sup>2</sup>C™, RS-232, RS-485, LIN compatible
  - Auto-Baud Detect, auto-wake-up on start
- Up to 38 I/O Pins:
  - Individually programmable pull-ups
  - Slew rate control
  - Interrupt-on-change with edge-select

## Clocking Structure

- Precision Internal Oscillator:
  - ±1% at calibration
  - Selectable frequency range 32 MHz to 31 kHz
- 31 kHz Low-Power Internal Oscillator
- 4x Phase-Locked Loop (PLL) for up to 32 MHz Internal Operation
- External Oscillator Block with Three External Clock modes up to 32 MHz

**TABLE 1: PIC16(L)F1773/6/7/8/9 FAMILY TYPES**

| Device        | Data Sheet Index | Program Flash Memory (bytes) | Program Flash Memory (word) | High Endurance Flash (B) | Data SRAM (Bytes) | I/O Pins <sup>(1)</sup> | 8-Bit/16-Bit Timers | High-Speed Comparator | 10-bit ADC (ch) | 5/10-bit DAC | CCP | 10-bit/16-bit PWM | COG | CLC | Op Amp | Zero Cross Detect | Data Signal Modulator | Programmable Ramp Gen | High-Current I/Os | Peripheral Pin Select | EUSART | I <sup>2</sup> C™/SPI | Debug <sup>(2)</sup> |
|---------------|------------------|------------------------------|-----------------------------|--------------------------|-------------------|-------------------------|---------------------|-----------------------|-----------------|--------------|-----|-------------------|-----|-----|--------|-------------------|-----------------------|-----------------------|-------------------|-----------------------|--------|-----------------------|----------------------|
| PIC16(L)F1773 | (A)              | 7K                           | 4K                          | 128                      | 512               | 25                      | 5/3                 | 6                     | 17              | 3/3          | 3   | 3/3               | 3   | 4   | 3      | 1                 | 3                     | 3                     | 2                 | Y                     | 1      | 1                     | I                    |
| PIC16(L)F1776 | (A)              | 14K                          | 8K                          | 128                      | 1K                | 25                      | 5/3                 | 6                     | 17              | 3/3          | 3   | 3/3               | 3   | 4   | 3      | 1                 | 3                     | 3                     | 2                 | Y                     | 1      | 1                     | I                    |
| PIC16(L)F1777 | (B)              | 14K                          | 8K                          | 128                      | 1K                | 36                      | 5/3                 | 8                     | 28              | 4/4          | 4   | 4/4               | 4   | 4   | 4      | 1                 | 4                     | 4                     | 2                 | Y                     | 1      | 1                     | I                    |
| PIC16(L)F1778 | (B)              | 28K                          | 16K                         | 128                      | 2K                | 25                      | 5/3                 | 6                     | 17              | 3/3          | 3   | 3/3               | 3   | 4   | 3      | 1                 | 3                     | 3                     | 2                 | Y                     | 1      | 1                     | I                    |
| PIC16(L)F1779 | (B)              | 28K                          | 16K                         | 128                      | 2K                | 36                      | 5/3                 | 8                     | 28              | 4/4          | 4   | 4/4               | 4   | 4   | 4      | 1                 | 4                     | 4                     | 2                 | Y                     | 1      | 1                     | I                    |

**Note 1:** One pin is input-only.

**Note 2:** I – Debugging integrated on chip

### Data Sheet Index:

- A:** Future Release PIC16(L)F1773/6 Data Sheet, 24-Pin, 8-bit Flash Microcontrollers  
**B:** Future Release PIC16(L)F1777/8/9 Data Sheet, 24/40/44-Pin, 8-bit Flash Microcontrollers

**Note:** For other small form-factor package availability and marking information, please visit <http://www.microchip.com/packaging> or contact your local sales office.

**TABLE 2: PACKAGES**

| Packages      | SPDIP | PDIP | SOIC | SSOP | UQFN | TQFP |
|---------------|-------|------|------|------|------|------|
| PIC16(L)F1773 | X     |      | X    | X    | X    |      |
| PIC16(L)F1776 | X     |      | X    | X    | X    |      |
| PIC16(L)F1777 |       | X    |      |      | X    | X    |
| PIC16(L)F1778 | X     |      | X    | X    | X    |      |
| PIC16(L)F1779 |       | X    |      |      | X    | X    |

**Note:** Pin details are subject to change.

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## PIN DIAGRAMS

FIGURE 1: 28-PIN SPDIP, SOIC, SSOP



FIGURE 2: 28-PIN UQFN (6x6x0.5 mm)



**FIGURE 3: 40-PIN PDIP**



**FIGURE 4: 40-PIN UQFN (5x5x0.5 mm)**



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FIGURE 5: 44-PIN TQFP (4x4 mm)



## PIN ALLOCATION TABLES

TABLE 3: 28-PIN ALLOCATION TABLE (PIC16(L)F1773/6/8)

| I/O | 28-Pin SPDIP/SOIC/SSOP | 28-Pin UQFN | ADC          | Voltage Reference                                                          | DAC      | Op Amp                          | Comparator                                               | Zero Cross | Programmable Ramp Generator | Timer                | PWM | CCP | COG | CLC                   | Modulator             | EUSART | MSSP | Interrupts | Pull-ups | High Current | Basic |
|-----|------------------------|-------------|--------------|----------------------------------------------------------------------------|----------|---------------------------------|----------------------------------------------------------|------------|-----------------------------|----------------------|-----|-----|-----|-----------------------|-----------------------|--------|------|------------|----------|--------------|-------|
| RA0 | 2                      | 27          | AN0          | —                                                                          | —        | —                               | C1IN0-<br>C2IN0-<br>C3IN0-<br>C4IN0-<br>C5IN0-<br>C6IN0- | —          | —                           | —                    | —   | —   | —   | CLCIN1 <sup>(1)</sup> | —                     | —      | —    | IOC        | —        | —            | —     |
| RA1 | 3                      | 28          | AN1          | —                                                                          | —        | OPA1OUT<br>OPA2IN1+<br>OPA2IN1- | C1IN1-<br>C2IN1-<br>C3IN1-<br>C4IN1-                     | —          | PRG1IN0<br>PRG2IN1          | —                    | —   | —   | —   | CLCIN2 <sup>(1)</sup> | —                     | —      | —    | IOC        | —        | —            | —     |
| RA2 | 4                      | 1           | AN2<br>VREF- | DAC1REF0-<br>DAC2REF0-<br>DAC3REF0-<br>DAC4REF0-<br>DAC5REF0-<br>DAC7REF0- | DAC1OUT1 | —                               | C1IN0+<br>C2IN0+<br>C3IN0+<br>C4IN0+<br>C5IN0+<br>C6IN0+ | —          | —                           | —                    | —   | —   | —   | —                     | —                     | —      | —    | IOC        | —        | —            | —     |
| RA3 | 5                      | 2           | AN3<br>VREF+ | DAC1REF0+<br>DAC2REF0+<br>DAC3REF0+<br>DAC4REF0+<br>DAC5REF0+<br>DAC7REF0+ | —        | —                               | C1IN1+                                                   | —          | —                           | —                    | —   | —   | —   | —                     | MD1CL <sup>(1)</sup>  | —      | —    | IOC        | —        | —            | —     |
| RA4 | 6                      | 3           | —            | —                                                                          | DAC4OUT1 | OPA1IN0+                        | —                                                        | —          | PRG1R <sup>(1)</sup>        | T0CKI <sup>(1)</sup> | —   | —   | —   | —                     | MD1CH <sup>(1)</sup>  | —      | —    | IOC        | —        | —            | —     |
| RA5 | 7                      | 4           | AN4          | —                                                                          | DAC2OUT1 | OPA1IN0-                        | —                                                        | —          | PRG1F <sup>(1)</sup>        | —                    | —   | —   | —   | —                     | MD1MOD <sup>(1)</sup> | —      | SS   | IOC        | —        | —            | —     |
| RA6 | 10                     | 7           | —            | —                                                                          | —        | —                               | CLKOUT<br>C6IN1+                                         | —          | —                           | —                    | —   | —   | —   | —                     | —                     | —      | —    | IOC        | —        | —            | OSC2  |
| RA7 | 9                      | 6           | —            | —                                                                          | —        | —                               | CLKIN                                                    | —          | —                           | —                    | —   | —   | —   | —                     | —                     | —      | —    | IOC        | —        | —            | OSC1  |

- Note**
- 1: Default peripheral input. Input can be moved to any other pin with the PPS input selection register.
  - 2: All pin outputs default to PORT latch data. Any pin can be selected as a digital peripheral output with the PPS output selection registers.
  - 3: These peripheral functions are bidirectional. The output pin selections must be the same as the input pin selections.

**TABLE 3: 28-PIN ALLOCATION TABLE (PIC16(L)F1773/6/8) (CONTINUED)**

| I/O | 28-Pin SPDIP/SOIC/SSOP | 28-Pin UQFN | ADC    | Voltage Reference      | DAC                                                                  | Op Amp                          | Comparator                           | Zero Cross | Programmable Ramp Generator | Timer                | PWM | CCP                 | COG                   | CLC                   | Modulator             | EUSART | MSSP | Interrupts | Pull-ups | High Current | Basic             |
|-----|------------------------|-------------|--------|------------------------|----------------------------------------------------------------------|---------------------------------|--------------------------------------|------------|-----------------------------|----------------------|-----|---------------------|-----------------------|-----------------------|-----------------------|--------|------|------------|----------|--------------|-------------------|
| RB0 | 21                     | 18          | AN12   | HIB0                   | —                                                                    | —                               | C2IN1+                               | ZCD        | —                           | —                    | —   | —                   | COG1IN <sup>(1)</sup> | —                     | —                     | —      | —    | IOC        | —        | —            | —                 |
| RB1 | 22                     | 19          | AN10   | HIB1                   | —                                                                    | OPA2OUT<br>OPA1IN1+<br>OPA1IN1- | C1IN3-<br>C2IN3-<br>C3IN3-<br>C4IN3- | —          | PRG1IN1<br>PRG2IN0          | —                    | —   | —                   | COG2IN <sup>(1)</sup> | —                     | —                     | —      | —    | IOC        | —        | —            | —                 |
| RB2 | 23                     | 20          | AN8    | —                      | DAC3OUT1                                                             | OPA2IN0-                        | —                                    | —          | —                           | —                    | —   | —                   | COG3IN <sup>(1)</sup> | —                     | —                     | —      | —    | IOC        | —        | —            | —                 |
| RB3 | 24                     | 21          | AN9    | —                      | —                                                                    | OPA2IN0+                        | C1IN2-<br>C2IN2-<br>C3IN2-           | —          | —                           | —                    | —   | —                   | —                     | —                     | MD3CL <sup>(1)</sup>  | —      | —    | IOC        | —        | —            | —                 |
| RB4 | 25                     | 22          | ADCACT | —                      | —                                                                    | —                               | C3IN1+                               | —          | —                           | T5G <sup>(1)</sup>   | —   | —                   | —                     | —                     | MD3CH <sup>(1)</sup>  | —      | —    | IOC        | —        | —            | —                 |
| RB5 | 26                     | 23          | AN13   | DAC5REF1-<br>DAC7REF1- | —                                                                    | —                               | C4IN2-                               | —          | —                           | T1G <sup>(1)</sup>   | —   | CCP3 <sup>(1)</sup> | —                     | —                     | MD3MOD <sup>(1)</sup> | —      | —    | IOC        | —        | —            | —                 |
| RB6 | 27                     | 24          | —      | DAC5REF1+<br>DAC7REF1+ | —                                                                    | —                               | C4IN1+                               | —          | —                           | —                    | —   | —                   | —                     | CLCIN3 <sup>(1)</sup> | —                     | —      | —    | IOC        | —        | —            | ICSPCLK<br>ICDCLK |
| RB7 | 28                     | 25          | —      | —                      | DAC1OUT2<br>DAC2OUT2<br>DAC5OUT2<br>DAC3OUT2<br>DAC4OUT2<br>DAC7OUT2 | —                               | C5IN1+                               | —          | —                           | T6CKI <sup>(1)</sup> | —   | —                   | —                     | CLCIN4 <sup>(1)</sup> | —                     | —      | —    | IOC        | —        | —            | ICSPDAT<br>ICDDAT |

- Note**
- 1: Default peripheral input. Input can be moved to any other pin with the PPS input selection register.
  - 2: All pin outputs default to PORT latch data. Any pin can be selected as a digital peripheral output with the PPS output selection registers.
  - 3: These peripheral functions are bidirectional. The output pin selections must be the same as the input pin selections.

**TABLE 3: 28-PIN ALLOCATION TABLE (PIC16(L)F1773/6/8) (CONTINUED)**

| I/O                | 28-Pin SPDIP/SOIC/SSOP | 28-Pin UQFN | ADC  | Voltage Reference | DAC      | Op Amp   | Comparator                                               | Zero Cross | Programmable Ramp Generator | Timer                                                              | PWM                                          | CCP                  | COG                                                                                                      | CLC                                      | Modulator                  | EUSART                        | MSSP                                                   | Interrupts | Pull-ups | High Current | Basic       |
|--------------------|------------------------|-------------|------|-------------------|----------|----------|----------------------------------------------------------|------------|-----------------------------|--------------------------------------------------------------------|----------------------------------------------|----------------------|----------------------------------------------------------------------------------------------------------|------------------------------------------|----------------------------|-------------------------------|--------------------------------------------------------|------------|----------|--------------|-------------|
| RC0                | 11                     | 8           | —    | —                 | DAC5OUT1 | —        | —                                                        | —          | —                           | T1CKI <sup>(1)</sup><br>T3CKI <sup>(1)</sup><br>T3G <sup>(1)</sup> | —                                            | —                    | —                                                                                                        | —                                        | —                          | —                             | —                                                      | IOC        | —        | —            | —           |
| RC1                | 12                     | 9           | —    | —                 | DAC7OUT1 | —        | —                                                        | —          | PRG2R <sup>(2)</sup>        | —                                                                  | —                                            | CCP2 <sup>(1)</sup>  | —                                                                                                        | —                                        | —                          | —                             | —                                                      | IOC        | —        | —            | —           |
| RC2                | 13                     | 10          | AN14 | —                 | —        | —        | C5IN2-<br>C6IN2-                                         | —          | PRG2F <sup>(1)</sup>        | T5CKI <sup>(1)</sup>                                               | —                                            | CCP1 <sup>(1)</sup>  | —                                                                                                        | —                                        | —                          | —                             | —                                                      | IOC        | —        | —            | —           |
| RC3                | 14                     | 11          | AN15 | —                 | —        | —        | C1IN4-<br>C2IN4-<br>C3IN4-<br>C4IN4-<br>C5IN4-<br>C6IN4- | —          | —                           | T2CKI <sup>(1)</sup>                                               | —                                            | —                    | —                                                                                                        | —                                        | MD2CL <sup>(1)</sup>       | —                             | SD <sup>(1)</sup><br>SDA <sup>(1,3)</sup>              | IOC        | —        | —            | —           |
| RC4                | 15                     | 12          | AN16 | —                 | —        | —        | C5IN3-<br>C6IN3-                                         | —          | PRG3R <sup>(1)</sup>        | T8CKI <sup>(1)</sup>                                               | —                                            | —                    | —                                                                                                        | —                                        | MD2CH <sup>(1)</sup>       | —                             | SCL <sup>(1)</sup><br>SCK <sup>(1,3)</sup>             | IOC        | —        | —            | —           |
| RC5                | 16                     | 13          | AN17 | —                 | —        | OPA3IN0+ | —                                                        | —          | PRG3F <sup>(1)</sup>        | T4CKI <sup>(1)</sup>                                               | —                                            | —                    | —                                                                                                        | —                                        | MD2MOD <sup>(1)</sup>      | —                             | —                                                      | IOC        | —        | —            | —           |
| RC6                | 17                     | 14          | AN18 | —                 | —        | OPA3OUT  | C5IN1-<br>C6IN1-                                         | —          | PRG3IN0                     | —                                                                  | —                                            | —                    | —                                                                                                        | —                                        | —                          | CK <sup>(1)</sup>             | —                                                      | IOC        | —        | —            | —           |
| RC7                | 18                     | 15          | AN19 | —                 | —        | OPA3IN0- | —                                                        | —          | —                           | —                                                                  | —                                            | —                    | —                                                                                                        | —                                        | —                          | RX <sup>(1,3)</sup>           | —                                                      | IOC        | —        | —            | —           |
| RE3                | 1                      | 26          | —    | —                 | —        | —        | —                                                        | —          | —                           | —                                                                  | —                                            | —                    | —                                                                                                        | —                                        | —                          | —                             | —                                                      | IOC        | —        | —            | MCLR<br>ICD |
| VDD                | 20                     | 17          | —    | —                 | —        | —        | —                                                        | —          | —                           | —                                                                  | —                                            | —                    | —                                                                                                        | —                                        | —                          | —                             | —                                                      | —          | —        | —            | VDD         |
| VSS                | 8                      | 5           | —    | —                 | —        | —        | —                                                        | —          | —                           | —                                                                  | —                                            | —                    | —                                                                                                        | —                                        | —                          | —                             | —                                                      | —          | —        | —            | VSS         |
| VSS                | 19                     | 16          | —    | —                 | —        | —        | —                                                        | —          | —                           | —                                                                  | —                                            | —                    | —                                                                                                        | —                                        | —                          | —                             | —                                                      | —          | —        | —            | VSS         |
| OUT <sup>(2)</sup> | —                      | —           | —    | —                 | —        | —        | C1OUT<br>C2OUT<br>C3OUT<br>C4OUT<br>C5OUT<br>C6OUT       | —          | —                           | —                                                                  | PWM1<br>PWM2<br>PWM3<br>PWM4<br>PWM5<br>PWM6 | CCP1<br>CCP2<br>CCP3 | COG1A<br>COG1B<br>COG1C<br>COG1D<br>COG2A<br>COG2B<br>COG2C<br>COG2D<br>COG3A<br>COG3B<br>COG3C<br>COG3D | CLC1OUT<br>CLC2OUT<br>CLC3OUT<br>CLC4OUT | MD1OUT<br>MD2OUT<br>MD3OUT | DT <sup>(3)</sup><br>TX<br>CK | SDO<br>SDA <sup>(3)</sup><br>SCK<br>SCL <sup>(3)</sup> | —          | —        | —            | —           |

**Note** 1: Default peripheral input. Input can be moved to any other pin with the PPS input selection register.  
2: All pin outputs default to PORT latch data. Any pin can be selected as a digital peripheral output with the PPS output selection registers.  
3: These peripheral functions are bidirectional. The output pin selections must be the same as the input pin selections.

**TABLE 4: 40/44-PIN ALLOCATION TABLE (PIC16(L)F1777/9)**

| I/O | 40-Pin PDIP | 40-Pin UQFN | 44-Pin TQFP | ADC | Voltage Reference                                                                                    | DAC      | Op Amp                          | Comparator                                                                   | Zero Cross | Programmable Ramp Generator | Timers               | PWM | CCP | COG | CLC | Modulator             | EUSART | MSSP | Interrupt | Pull-ups | High Current | Basic |
|-----|-------------|-------------|-------------|-----|------------------------------------------------------------------------------------------------------|----------|---------------------------------|------------------------------------------------------------------------------|------------|-----------------------------|----------------------|-----|-----|-----|-----|-----------------------|--------|------|-----------|----------|--------------|-------|
| RA0 | 2           | 17          | 19          | AN0 | —                                                                                                    | —        | —                               | C1IN0-<br>C2IN0-<br>C3IN0-<br>C4IN0-<br>C5IN0-<br>C6IN0-<br>C7IN0-<br>C8IN0- | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —    | IOC       | —        | —            | —     |
| RA1 | 3           | 18          | 20          | AN1 | —                                                                                                    | —        | OPA1OUT<br>OPA2IN1+<br>OPA2IN1- | C1IN1-<br>C2IN1-<br>C3IN1-<br>C4IN1-                                         | —          | PRG1IN0<br>PRG2IN1          | —                    | —   | —   | —   | —   | —                     | —      | —    | IOC       | —        | —            | —     |
| RA2 | 4           | 19          | 21          | AN2 | DAC1REF0-<br>DAC2REF0-<br>DAC3REF0-<br>DAC4REF0-<br>DAC5REF0-<br>DAC6REF0-<br>DAC7REF0-<br>DAC8REF0- | DAC1OUT1 | —                               | C1IN0+<br>C2IN0+<br>C3IN0+<br>C4IN0+<br>C5IN0+<br>C6IN0+<br>C7IN0+<br>C8IN0+ | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —    | IOC       | —        | —            | —     |
| RA3 | 5           | 20          | 22          | AN3 | DAC1REF0+<br>DAC2REF0+<br>DAC3REF0+<br>DAC4REF0+<br>DAC5REF0+<br>DAC6REF0+<br>DAC7REF0+<br>DAC8REF0+ | —        | —                               | C1IN1+                                                                       | —          | —                           | —                    | —   | —   | —   | —   | MD1CL <sup>(1)</sup>  | —      | —    | IOC       | —        | —            | —     |
| RA4 | 6           | 21          | 23          | —   | —                                                                                                    | —        | OPA1IN0+                        | —                                                                            | —          | PRG1R <sup>(1)</sup>        | T0CKI <sup>(1)</sup> | —   | —   | —   | —   | MD1CH <sup>(1)</sup>  | —      | —    | IOC       | —        | —            | —     |
| RA5 | 7           | 22          | 24          | AN4 | —                                                                                                    | DAC2OUT1 | OPA1IN0-                        | —                                                                            | —          | PRG1F <sup>(1)</sup>        | —                    | —   | —   | —   | —   | MD1MOD <sup>(1)</sup> | —      | SS   | IOC       | —        | —            | —     |
| RA6 | 14          | 29          | 31          | —   | —                                                                                                    | —        | —                               | CLKOUT<br>C6IN1+                                                             | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —    | IOC       | —        | —            | OSC2  |
| RA7 | 13          | 28          | 30          | —   | —                                                                                                    | —        | —                               | CLKIN                                                                        | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —    | IOC       | —        | —            | OSC1  |

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**TABLE 4: 40/44-PIN ALLOCATION TABLE (PIC16(L)F1777/9) (CONTINUED)**

| I/O | 40-Pin PDIP | 40-Pin UQFN | 44-Pin TQFP | ADC    | Voltage Reference      | DAC      | Op Amp                          | Comparator                           | Zero Cross | Programmable Ramp Generator | Timers                                                             | PWM | CCP                 | COG                   | CLC | Modulator             | EUSART | MSSP                                       | Interrupt | Pull-ups | High Current | Basic             |
|-----|-------------|-------------|-------------|--------|------------------------|----------|---------------------------------|--------------------------------------|------------|-----------------------------|--------------------------------------------------------------------|-----|---------------------|-----------------------|-----|-----------------------|--------|--------------------------------------------|-----------|----------|--------------|-------------------|
| RB0 | 33          | 8           | 8           | AN12   | HIB0                   | —        | —                               | C2IN1+                               | ZCD        | —                           | —                                                                  | —   | CCP4 <sup>(1)</sup> | COG1IN <sup>(1)</sup> | —   | MD4CL <sup>(1)</sup>  | —      | —                                          | IOC INT   | —        | —            | —                 |
| RB1 | 34          | 9           | 9           | AN10   | HIB1                   | —        | OPA2OUT<br>OPA1IN1+<br>OPA1IN1- | C1IN3-<br>C2IN3-<br>C3IN3-<br>C4IN3- | —          | PRG4R <sup>(1)</sup>        | —                                                                  | —   | —                   | COG2IN <sup>(1)</sup> | —   | MD4CH <sup>(1)</sup>  | —      | —                                          | IOC       | —        | —            | —                 |
| RB2 | 35          | 10          | 10          | AN8    | —                      | —        | OPA2IN0-                        | —                                    | —          | PRG4F <sup>(1)</sup>        | —                                                                  | —   | —                   | COG3IN <sup>(1)</sup> | —   | MD4MOD <sup>(1)</sup> | —      | —                                          | IOC       | —        | —            | —                 |
| RB3 | 36          | 11          | 11          | AN9    | —                      | —        | OPA2IN0+                        | C1IN2-<br>C2IN2-<br>C3IN2-           | —          | —                           | —                                                                  | —   | —                   | COG4IN <sup>(1)</sup> | —   | MD3CL <sup>(1)</sup>  | —      | —                                          | IOC       | —        | —            | —                 |
| RB4 | 37          | 12          | 14          | ADCACT | —                      | —        | —                               | C3IN1+                               | —          | —                           | T5G <sup>(1)</sup>                                                 | —   | —                   | —                     | —   | MD3CH <sup>(1)</sup>  | —      | —                                          | IOC       | —        | —            | —                 |
| RB5 | 38          | 13          | 15          | AN13   | DAC5REF1-<br>DAC7REF1- | —        | —                               | C4IN2-                               | —          | —                           | T1G <sup>(1)</sup>                                                 | —   | CCP3 <sup>(1)</sup> | —                     | —   | MD3MOD <sup>(1)</sup> | —      | —                                          | IOC       | —        | —            | —                 |
| RB6 | 39          | 14          | 16          | —      | DAC5REF1+<br>DAC7REF1+ | —        | —                               | C4IN1+                               | —          | —                           | —                                                                  | —   | —                   | —                     | —   | —                     | —      | —                                          | IOC       | —        | —            | ICSPCLK<br>ICDCLK |
| RB7 | 40          | 15          | 17          | —      | —                      | DACxOUT2 | —                               | C5IN1+                               | —          | —                           | T6CKI <sup>(1)</sup>                                               | —   | —                   | —                     | —   | —                     | —      | —                                          | IOC       | —        | —            | ICSPDAT<br>ICDDAT |
| RC0 | 15          | 30          | 32          | —      | —                      | DAC5OUT1 | —                               | —                                    | —          | —                           | T1CKI <sup>(1)</sup><br>T3CKI <sup>(1)</sup><br>T3G <sup>(1)</sup> | —   | —                   | —                     | —   | —                     | —      | —                                          | IOC       | —        | —            | —                 |
| RC1 | 16          | 31          | 35          | —      | —                      | DAC7OUT1 | —                               | —                                    | —          | PRG2R <sup>(1)</sup>        | SOSCO                                                              | —   | CCP2 <sup>(1)</sup> | —                     | —   | —                     | —      | —                                          | IOC       | —        | —            | —                 |
| RC2 | 17          | 32          | 36          | AN14   | —                      | —        | —                               | C5IN2-<br>C6IN2-                     | —          | PRG2F <sup>(1)</sup>        | T5CKI <sup>(1)</sup>                                               | —   | CCP1 <sup>(1)</sup> | —                     | —   | —                     | —      | —                                          | IOC       | —        | —            | —                 |
| RC3 | 18          | 33          | 37          | AN15   | —                      | —        | —                               | —                                    | —          | —                           | T2CKI <sup>(1)</sup>                                               | —   | —                   | —                     | —   | MD2CL <sup>(1)</sup>  | —      | SDI <sup>(1)</sup><br>SDA <sup>(1,3)</sup> | IOC       | —        | —            | —                 |
| RC4 | 23          | 38          | 42          | AN16   | —                      | —        | —                               | C5IN3-<br>C6IN3-                     | —          | PRG3R <sup>(1)</sup>        | T8CKI <sup>(1)</sup>                                               | —   | —                   | —                     | —   | MD2CH <sup>(1)</sup>  | —      | SCL <sup>(1)</sup><br>SCK <sup>(1,3)</sup> | IOC       | —        | —            | —                 |

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**TABLE 4: 40/44-PIN ALLOCATION TABLE (PIC16(L)F1777/9) (CONTINUED)**

| I/O | 40-Pin PDIP | 40-Pin UQFN | 44-Pin TQFP | ADC  | Voltage Reference      | DAC      | Op Amp                          | Comparator                                                                   | Zero Cross | Programmable Ramp Generator | Timers               | PWM | CCP | COG | CLC | Modulator             | EUSART | MSSP                | Interrupt | Pull-ups | High Current | Basic       |
|-----|-------------|-------------|-------------|------|------------------------|----------|---------------------------------|------------------------------------------------------------------------------|------------|-----------------------------|----------------------|-----|-----|-----|-----|-----------------------|--------|---------------------|-----------|----------|--------------|-------------|
| RC5 | 24          | 39          | 43          | AN17 | —                      | —        | OPA3IN0+                        | —                                                                            | —          | PRG3F <sup>(1)</sup>        | T4CKI <sup>(1)</sup> | —   | —   | —   | —   | MD2MOD <sup>(1)</sup> | —      | —                   | IOC       | —        | —            | —           |
| RC6 | 25          | 40          | 44          | AN18 | —                      | —        | OPA3OUT<br>OPA4IN1+<br>OPA4IN1- | C5IN1-<br>C6IN1-<br>C7IN1-<br>C8IN1-                                         | —          | PRG3IN0<br>PRG4IN1          | —                    | —   | —   | —   | —   | —                     | —      | CK <sup>(1)</sup>   | IOC       | —        | —            | —           |
| RC7 | 26          | 1           | 1           | AN19 | —                      | —        | OPA3IN0-                        | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | RX <sup>(1,3)</sup> | IOC       | —        | —            | —           |
| RD0 | 19          | 34          | 38          | AN20 | —                      | —        | OPA4IN0+                        | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RD1 | 20          | 35          | 39          | AN21 | —                      | —        | OPA4OUT<br>OPA3IN1+<br>OPA3IN1- | C1IN4-<br>C2IN4-<br>C3IN4-<br>C4IN4-<br>C5IN4-<br>C6IN4-<br>C7IN4-<br>C8IN4- | —          | PRG3IN1<br>PRG4IN0          | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RD2 | 21          | 36          | 40          | AN22 | —                      | —        | OPA4IN0-                        | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RD3 | 22          | 37          | 41          | AN23 | —                      | —        | —                               | C8IN2-                                                                       | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RD4 | 27          | 2           | 2           | AN24 | —                      | —        | —                               | C7IN2-                                                                       | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RD5 | 28          | 3           | 3           | AN25 | —                      | —        | —                               | C7IN3-<br>C8IN3-                                                             | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RD6 | 29          | 4           | 4           | AN26 | —                      | —        | —                               | C7IN1+                                                                       | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RD7 | 30          | 5           | 5           | AN27 | —                      | —        | —                               | C8IN1+                                                                       | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | —           |
| RE0 | 8           | 23          | 25          | AN5  | DAC6REF1+<br>DAC8REF1+ | —        | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | IOC       | —        | —            | —           |
| RE1 | 9           | 24          | 26          | AN6  | DAC6REF1-<br>DAC8REF1- | —        | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | IOC       | —        | —            | —           |
| RE2 | 10          | 25          | 27          | AN7  | —                      | DAC6OUT1 | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | IOC       | —        | —            | —           |
| RE3 | 1           | 16          | 18          | —    | —                      | DAC8OUT1 | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | IOC       | —        | —            | MCLR<br>ICD |
| VDD | 11          | 7           | 7           | —    | —                      | —        | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | VDD         |
| VDD | 32          | 26          | 28          | —    | —                      | —        | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | VDD         |
| VSS | 12          | 6           | 6           | —    | —                      | —        | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | VSS         |
| VSS | 31          | 27          | 29          | —    | —                      | —        | —                               | —                                                                            | —          | —                           | —                    | —   | —   | —   | —   | —                     | —      | —                   | —         | —        | —            | VSS         |

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|--------------------|-------------|-------------|-------------|-----|-------------------|-----|--------|----------------------------------------------------------------------|------------|-----------------------------|--------|--------------------------------------------------------------|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|--------------------------------------|-------------------------------|--------------------------------------------------------|-----------|----------|--------------|-------|
| OUT <sup>(2)</sup> | —           | —           | —           | —   | —                 | —   | —      | C1OUT<br>C2OUT<br>C3OUT<br>C4OUT<br>C5OUT<br>C6OUT<br>C7OUT<br>C8OUT | —          | —                           | —      | PWM1<br>PWM2<br>PWM3<br>PWM4<br>PWM5<br>PWM6<br>PWM7<br>PWM8 | CCP1<br>CCP2<br>CCP3<br>CCP4 | COG1A<br>COG1B<br>COG1C<br>COG1D<br>COG2A<br>COG2B<br>COG2C<br>COG2D<br>COG3A<br>COG3B<br>COG3C<br>COG3D<br>COG4A<br>COG4B<br>COG4C<br>COG4D | CLC1OUT<br>CLC2OUT<br>CLC3OUT<br>CLC4OUT | MD1OUT<br>MD2OUT<br>MD3OUT<br>MD4OUT | DT <sup>(3)</sup><br>TX<br>CK | SDO<br>SDA <sup>(3)</sup><br>SCK<br>SCL <sup>(3)</sup> | —         | —        | —            | —     |

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NOTES:

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