Summary
As the complexity of applications increase, many designers are facing challenges such as handling multiple functions and interfacing with a wide range of system inputs and communications. The PIC16F183XX products feature a number of Core Independent Peripherals (CIPs) that can be combined to perform a wide variety of functions with little or no core involvement. This integration allows interconnections that bring a new level of interaction between peripherals, enabling unsurpassed flexibility in creating functions for a wide range of applications including consumer electronics, Internet of Things (IoT), safety critical and wearable technology. These products also incorporate new power conserving functionality, including IDLE/DOZE operating modes and Peripheral Module Disable (PMD), in addition to eXtreme Low Power (XLP) technology.

Safety and Monitoring
Using the integrated Windowed Watchdog Timer (WWDT) and Cyclic Redundancy Check (CRC) peripherals simplifies the implementation of safety and system management functionality. These Core Independent Peripherals automate the monitoring hardware-based events as well as verify the integrity of program memory, data EE and communications.

Signal Generation
The multiple 10-bit PWMs and Capture/Compare/PWMs (CCP) can be used to create pulse outputs for motor, LED, power supplies and other applications. Any of these peripherals can be combined with the Complementary Waveform Generator (CWG), which enables automated complementary output control with control of dead-band and auto-shutdown modes. Once configured, the complementary outputs run completely independent of the core, allowing the core to perform other tasks.

Integrated Analog
Interfacing with external signals, inputs and sensors can be handled with the integrated analog peripherals. This product family features the first MCU with an Analog-to-Digital Converter (ADC) with additional computation functionality, such as automated averaging, accumulation and low-pass filter calculations. The on-board 10-bit 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 PCB space, or they can be used for other functions within the applications. The versatile 10-bit ADC can be used to implement buttons or sliders using Microchip's mTouch® capacitive sensing solution.

Increased Low-Power Functionality
New IDLE and DOZE low-power modes allow applications to optimize device performance and power consumption. The Peripheral Module Disable (PMD) allows unused peripherals to be turned off individually, further reducing power consumption.

Flexible PCB Routing
The Peripheral Pin Select (PPS) functionality allows for I/O pin remapping of the digital peripherals for increased flexibility and ease of PCB layout. Hardware utilization is also improved by enabling access to multiple peripherals from the same I/O port.

Communication
These products include SPI, I²C™ and EUSART peripherals, which enable a wide range communication protocols. Using external modules, these peripherals enable other wired and wireless communications such as Ethernet, WiFi®, Bluetooth® Low Energy and LoRa™. This allows for intelligent applications where communication with a server in the cloud or with a host/master device is required.

Product Family Highlights
- 10-bit ADC with computation
- IDLE, DOZE low-power operating modes
- Up to 56 KB of program memory
- Safety-critical functionality
- Peripheral pin select
- Bootloader capable
## Featured Products

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<th>Program Memory (Words)</th>
<th>Program Flash Memory (KB)</th>
<th>Data SRAM (KB)</th>
<th>I/O Pins</th>
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<th>5-bit DAC</th>
<th>Comparator</th>
<th>8-/16-bit Timer</th>
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<th>Watchdog Timer</th>
<th>CCP/32-bit Timer</th>
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## Development Made Easy

You can easily create projects using the MPLAB® X IDE environment, MPLAB XC8 compiler, MPLAB Code Configurator and Development boards. The MPLAB Code Configurator utilizes a graphical user interface to configure peripherals, along with drivers, to seamlessly generate code that can be inserted into your project. It is integrated into the MPLAB X IDE to provide a powerful and extremely easy-to-use platform that greatly reduces design time. The code generated is reliable and designed for efficient use of CPU and memory resources. For additional information, please visit [www.microchip.com/mcc](http://www.microchip.com/mcc).

### Development Tools from Microchip

- MPLAB X IDE
- MPLAB Code Configurator
- MPLAB XC8 Compiler
- PICkit™ 3 In-Circuit Debugger (PG164130)
- MPLAB ICD 3 In-Circuit Debugger (DV164035)
- Curiosity Development Board (DM164137)

### Links

- Online Sampling: [www.sample.microchip.com](http://www.sample.microchip.com)
- Core Independent Peripherals Information: [www.microchip.com/cip](http://www.microchip.com/cip)
- Intelligent Analog Information: [www.microchip.com/intelligentanalog](http://www.microchip.com/intelligentanalog)

### IoT Sensor Badge Demonstration

The 20-pin PIC16F18345-based IoT Sensor Badge demonstrates the capabilities of Core Independent Peripherals by interfacing with multiple sensors, sound buzzer, communication module and RGB LEDs to perform various application functions, including communication with a smartphone application via a Bluetooth LE module.

For more information, visit [www.microchip.com/IoTSensorBadge](http://www.microchip.com/IoTSensorBadge).