MPLAB® Harmony for PIC32
Integrated, Single Platform Firmware Development Environment

Summary
MPLAB Harmony is a flexible, abstracted, fully integrated firmware development environment for PIC32 microcontrollers. It enables robust framework development of interoperable RTOS-friendly libraries with quick and extensive Microchip support for third party software integration. MPLAB Harmony includes a set of peripheral libraries, drivers and system services that are readily accessible for application development. The code development format allows for maximum re-use and reduces time-to-market.

Benefits
- Faster time-to-market
  - Production ready libraries provide seamless system integration
  - Integrated single platform enables shorter development time
  - Tested and debugged libraries give customers more time for application development
- Improved code interoperability
  - Modular architecture allows drivers and libraries to work together with minimal effort
  - Application software can be easily scaled to different end-systems
- Simplified support
  - Common software platform with standard interface ensures efficient Microchip support
- Improved 32-bit scalability
  - MPLAB Harmony allows for easier PIC32 part-to-part portability
- Enhanced third party software integration
  - Smooth integration of third party solutions (RTOS, middleware, drivers) to the software network
  - Direct re-sell and front line support provided by Microchip for select third party solutions

PIC32 Software Development Tools Available with MPLAB Harmony

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<tr>
<td>Graphics applications</td>
<td>OSAL interface with “basic” and “none” implementation</td>
<td>Graphics, TCP/IP, USB, Cryptographic libraries, File systems, System services</td>
<td>ADC, Ethernet media access controller, Ethernet PHY interface, Controllerless graphics, Epson LCD controller, Non-volatile memory, SPI, USART, high-speed USB, Timer, parallel master port</td>
<td>MPLAB® X IDE, MPLAB XC32++</td>
<td>FreeRTOS*, OpenRTOS*, TCP/IP*, SSL libraries</td>
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<td>TCP/IP applications and utilities</td>
<td>OSAL implementation for FreeRTOS</td>
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<td>USB applications</td>
<td>OSAL implementation for Micrium µC/OS-III</td>
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Additional software components planned
*Sold and front line support provided directly by Microchip
MPLAB Harmony Block Diagram

Application Layer
- Implements desired overall behavior
- Abstracted hardware access
- Allows for easy port across PIC32 parts

Common System Services
- Provides common functionality to avoid duplication and conflicts
- Eliminates complex interactions and interdependencies between modules
- OSAL provides OS compatibility and interface
- Manages shared resources
- Supports low-level configuration and board support package

Middleware Layer
- Implements complex libraries and protocols (USB, TCP/IP, file systems, graphics)
- Provides a highly abstracted application program interface
- Libraries are thread safe and RTOS ready
- Built on drivers, PLIBS, system services
- Supports third party library integration

Device Driver Layer
- Provides highly-abstracted interface to peripheral
- Controls access to the peripheral
- Manages multiple hardware instances and software clients with select drivers
- Manages peripheral state and multiple peripheral instances
- Accesses hardware via PLIB
- Supports blocking or non-blocking code

Peripheral Libraries (PLIB) Layer
- Provide functional interface for Microchip PIC32 scalability
- Implements part-specific features

Easy to Start • Easy to Develop • Easy Support

www.microchip.com/harmony
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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