

## Integrated Software Framework v2.03b

### STANDARD FEATURES

- MPLAB® Harmony is a flexible, abstracted, fully integrated firmware development platform for PIC32 microcontrollers
- Broad range of Middleware Stack/Libraries, including: USB, TCP/IP, Wi-Fi™, File System, Graphics, Bootloaders, Bluetooth™, Audio, DSP, Math, Cryptography, Drivers, System Services, and more
- Over 160 Application Demonstrations with up to 600 application configurations to accelerate application development
- Seamlessly integrates third-party solutions (RTOS, Middleware, Drivers, etc.) into the software framework
- RTOS support, which includes: FreeRTOS™, OPENRTOS, Express Logic Thread X, SEGGER embOS®, Micrium® µC/OS-II™, Micrium µC/OS-III™
- Middleware support, which includes: SEGGER emWin®, InterNiche Technologies, Inc., wolfSSL, and PubNub®
- Both free and enabling license terms provided

For a detailed list of features, please visit the MPLAB Harmony Web page at:

[www.microchip.com/harmony](http://www.microchip.com/harmony)

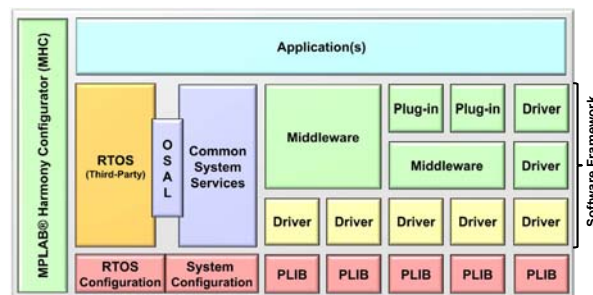
From the landing page, scroll down and select the **Features** tab.

### DESCRIPTION

MPLAB Harmony is a flexible, abstracted, fully integrated firmware development platform for PIC32 microcontrollers. MPLAB Harmony's modular architecture allows drivers and libraries to work together with minimal effort. It is scalable across PIC32 Microchip devices to custom fit customers' requirements.

MPLAB Harmony takes key elements of modular and object oriented design, adding an Operating System Abstraction Layer (OSAL) that provides the flexibility to use a Real-Time Operating System (RTOS) or work without one, and provides a framework of software modules that are easy to use, configurable for your specific needs, and that work together in complete harmony.

In addition, the MPLAB Harmony Configurator (MHC) and code development format allows for maximum reuse and reduces time to market.



### COMPLIANCE

Compliant with MISRA-C:2012 Mandatory Standards:

- MPLAB Harmony Peripheral Libraries

### DEVELOPMENT TOOLS

- MPLAB X IDE v3.60 or later is required
- MPLAB XC32 C/C++ Compiler v1.43 (ISO 26262)
- MPLAB X IDE plug-ins:
  - MPLAB Harmony Configurator (MHC) v2.03.xx

### THIRD-PARTY DEVELOPERS

Microchip offers a range of documentation to assist you with the design of your own software offerings for MPLAB® Harmony. These documents, which are provided with the installation Help, are also available for download from the MPLAB Harmony website (see **“Download Information”** for details).

- MPLAB Harmony Overview
- MPLAB Harmony Compatibility Guide
- MPLAB Harmony Tutorial
- MPLAB Harmony Driver Development Guide
- MPLAB Harmony Configurator User's Guide
- MPLAB Harmony Configurator Developer's Guide
- MPLAB Harmony Graphics Composer User's Guide
- MPLAB Harmony Test Harness User's Guide
- MPLAB Harmony Compatibility Checklist Worksheet

# MPLAB HARMONY v2.03b

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## v2.03b FEATURE UPDATES AND ADDITIONS

### Updated Graphics Toolschain:

- Added PIC32MZ DA Family of devices
  - Included Display Manager support for GLCD driver generation
  - Updated graphics applications
  - Adds new application to demonstrate clipping/movement functions
  - Added double buffering with support for Vsync
  - Adding new fully featured multi-layer application
  - Added PIC32MZ DA GPU support with blit stretch function
  - Added GPU library and API documentation
- Added external display controller support:
  - OTM2201A - updated to support newer displays
  - S1D13517
  - SSD1926
  - Added configurations to support PIC32MX on PICtail boards
- Improved LCCG Driver functionality:
  - Added WVGA support
  - Added external SRAM support
  - Added double buffering support
- Improved performance of Aria graphics library:
  - Overall redraw speed improved
  - Removed redundant per-pixel logic and unnecessary branching
  - Added additional user drawing controls with ability for user to designate caching of the background of a widget
- MHGC Improvements
  - Updated layer capability with support for multi-layer controller
  - Enabled selection of single or double buffer, external/internal memory
- Added resistive touch ADC functionality:
  - New driver for the PIC32MZ EF Family devices
  - New application configuration
- Improved List Wheel widget functions
  - Drawing speed and gesture updates
  - Added momentum, analogue movement, and visual improvement
- Display Manager tool updated:
  - Now supports different display controllers
- Added support for maXTouch
  - MXT336 driver (single touch and motion events)
  - Updated graphics applications with new driver configuration
  - Enabled touch system service
  - Enabled BSPs with support for maXTouch

### Updated Audio Solutions:

- Added BM64 radio support
  - New driver for Bluetooth A2DP, BLE and HFP
  - New application to demonstrate BM64 radio features
- Audio applications updates:
  - Revised USB audio apps to prevent some audio streaming artifacts
  - Updated applications to use graphics output with new Composer Suite
  - Updated applications to use new OTM2201 driver

### Additional Updates:

- Added new application templates for USB HID
- Added support for KSZ8061 Ethernet PHY
- Added support for the PIC32MK GP/MC Family of devices
- Added support for the PIC32MX1XX/2XX 28/44-pin XLP Family of devices
- Upgraded the wolfSSL Library to version 3.10
- Added support for the WINC1500 Wi-Fi Driver

## DOWNLOAD INFORMATION

MPLAB Harmony, including the current release notes and Software License Agreement, is available for download by visiting:

<http://www.microchip.com/mplabharmony>

## ADDITIONAL RESOURCES

**MPLAB Harmony TV** offers a wide range of getting started and training videos. The video content is available by scrolling to the bottom of the MPLAB Harmony webpage at:

<http://www.microchip.com/mplabharmony>

The **Microchip Developer Site** provides short introductory videos, self-paced training modules, and answers to frequently asked questions.

<http://microchip.wikidot.com/harmony:start>

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**Note the following details of the code protection feature on Microchip devices:**

- Microchip products meet the specification contained in their particular Microchip Data Sheet.
- Microchip believes that its family of products is one of the most secure families of its kind on the market today, when used in the intended manner and under normal conditions.
- There are dishonest and possibly illegal methods used to breach the code protection feature. All of these methods, to our knowledge, require using the Microchip products in a manner outside the operating specifications contained in Microchip's Data Sheets. Most likely, the person doing so is engaged in theft of intellectual property.
- Microchip is willing to work with the customer who is concerned about the integrity of their code.
- Neither Microchip nor any other semiconductor manufacturer can guarantee the security of their code. Code protection does not mean that we are guaranteeing the product as “unbreakable.”

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