

Integrated Software Framework v2.05

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

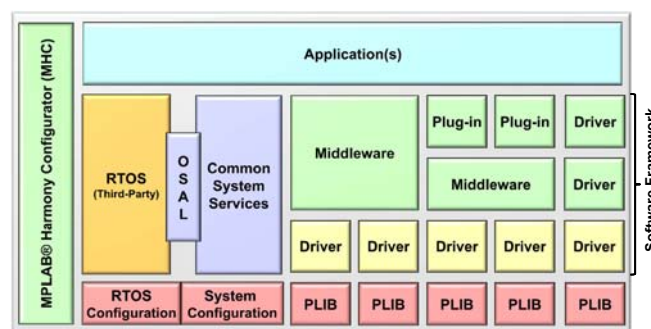
From the landing page, scroll down and select the **Features** tab.

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
- TCP/IP Library

DEVELOPMENT TOOLS

- MPLAB X IDE v4.0 or later is required
- MPLAB XC32 C/C++ Compiler v1.44 (ISO 26262) with v1.44(B) Part Support Patch
- MPLAB X IDE plug-ins:
 - MPLAB Harmony Configurator (MHC) v2.0.5.2

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 Creating Your First Project 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 v2.05

v2.05 FEATURE UPDATES AND ADDITIONS

Aria User Interface Library:

- Improved performance in painting and screen transitions
- Added RTOS support
- Multiple widget updates including multi-line text support
- Added direct blit function to support video
- Added GPU support with internal SRAM

MPLAB Harmony Graphics Composer:

- Updated new project wizard
- Updated import features from prior versions
- Added support for GPU prerendering
- Updated reporting of graphics resources

Audio:

- Added support of USB host headset functions
- Added audio encoder functions
- Added high-resolution/High-Speed USB (96 kHz @ 24-bit)
- Added multiple new audio codec drivers

New Application Examples:

- Graphics raw video player
- Graphics benchmarking
- Graphics PIC32MZ DA GPU with internal SRAM only (no DDR)
- Updated graphics external resources (USB and Flash memory storage)
- Audio 96 kHz @ 24-bit high-resolution on USB 1.1 Audio Device Class
- Audio USB headset host
- Graphics “no library” starter project for third-party support
- Multiple new configurations of existing projects
- Graphics update of PIC32MZ DA applications with full GPU use
- WILC1000 Wi-Fi™ demonstration
- USB Dual Role MSD Host HID Mouse Device Demonstration

Assert and Exception Handling:

- New exception handlers are available
- Assert options
- MHC support is available

MPLAB Harmony USB Stack:

- Added support for USB Dual Role applications
- Dual Role support is available for PIC32MZ devices only

Third Party:

- Updated SEGGER emWin® Graphics Library to v5.42g
- Added SEGGER emWin applications configurations for PIC32MZ DA and PIC32MX devices

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>

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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