Integrated Software Framework v2.06

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®, Micriμm® μC/OS-II™, Micriμm 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

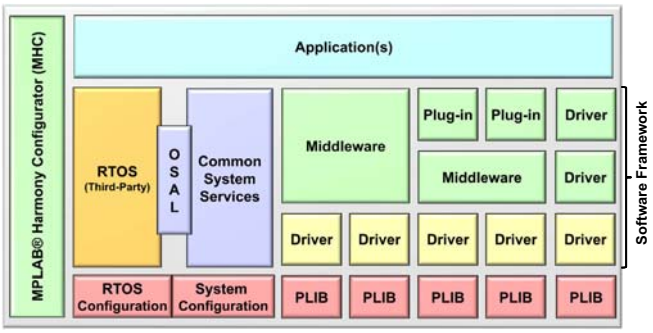
From the landing page, scroll down and select the **Features** tab.

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 v4.20 is required
- MPLAB XC32 C/C++ Compiler v2.10 (ISO 26262)
- MPLAB X IDE plug-ins:
  - MPLAB Harmony Configurator (MHC) v2.0.6.0

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 Graphics Composer User's Guide
- MPLAB Harmony Test Harness User's Guide

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v2.06 FEATURE UPDATES AND ADDITIONS

MPLAB Graphics Composer:

- Added string table import / export
- Added scheme import / export
- Added DDR memory manager
- Improved accuracy of heap estimator
- Added new widgets to toolbox

Aria Graphics User Interface Library:

- Added arc drawing primitive
- Added circular gauge widget
- Added circular slider widget
- Added bar graph widget
- Added line graph widget
- Added pie chart widget
- Added image plus widget
- Added radial menu widget
- Improved list wheel widget
- Improved keypad widget
- Added multi-line text support to widgets
- Improved RTOS integration (PIC32MZ DA)
- Improved GPU driver performance (PIC32MZ DA)

Touch Functionality:

- Added multi-finger gesture support
- Added Input system service (performance enhancement)
- Deprecated touch system service
- Added resistive touch to input system service
- Added resistive touch calibration example

New Applications:

- Aria Adventure graphic (parallax animation)
- Aria Image Viewer graphics (2-finger pinch gesture/zoom)
- Aria Showcase Reloaded (new widget examples)
- Aria Radial Menu (radial menu views)
- Aria Touch ADC Calibrate
- Real-time FFT (audio inputs, FFT DSP, display)
- Smart speaker (echo cancellation example)
- Data voice control (Bluetooth SPP to Google voice cloud recognition)
- Example for third party display port (external control / third party touch)
- Resistive touch calibration
- Added Speex encoder to universal audio encoders

Audio:

- Added examples for Google voice
- Added example for acoustic echo cancellation
- Updated AK4954 audio codec driver
- Updates PIC32MZ DSP fractional math library
- Added Speex encoder API

MPLAB Harmony TCP/IP Stack:

- TFTP server support added to the stack
- Added ICMP support for broadcast pings
- Added two new FTP commands - DELETE and NOOP
- Added announce console command
- Added heap high watermark functionality
- The mail SMTPC module has been added to the standard demonstrations. The old SMTP module has been marked as deprecated.

New Tutorial:

- Creating a MPLAB Harmony Graphics Application Using a Third-Party Display.

New Example:

- Graphics Event Testbed (./apps/examples/events_testbed)
- Remote Device Symmetric Key Authentication with secure element ATECC608A. (./apps/crypto/ecc_symmetric)
- Remote Device Asymmetric Key Authentication with secure element ATECC608A. (./apps/crypto/ecc_asymmetric)

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:

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- 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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