MPLAB® Harmony v3
Unified Software Development Framework for 32-bit MCUs and MPUs

Summary
A unified and powerful content development and delivery environment, MPLAB® Harmony Software Framework v3 together with MPLAB X Integrated Development Environment (IDE), enhances your application development experience with a set of optimized peripheral libraries, simplified drivers and modular software downloads.

MPLAB Harmony v3 provides a unified platform with flexible choices spanning architectures, performance and application focus. It enables development of robust, interoperable, RTOS-friendly applications with quick and extensive support for third-party software integration. The improved MPLAB Harmony Configurator (MHC), now with a modular download manager, alleviates you from non-differentiating tasks to select and configure all MPLAB Harmony components in a graphical way, including middleware, system services and peripherals.

Key Highlights
- Unified Development Platform supports both PIC® and SAM 32-bit microcontrollers and microprocessors
- MPLAB Harmony Configurator (MHC) enables easy setup configurators for clock, I/O pin, ADC, interrupt, DMA, MPU, Event, QTouch®, as well as Harmony Graphics Composer and Display Manager
- FreeRTOS integration optional available
- MPLAB Harmony is delivered via GitHub to streamline application development:
  - Optimized peripheral libraries for size and performance
  - Simplified drivers supporting development at silicon level
  - Smaller/Modular downloads of software or services
- Powerful Middleware
  - TCP/IP, Wi-Fi®
  - TLS (wolfSSL TLS), Crypto
  - USB Device and Host
  - Audio and Bluetooth®: USB Audio, Hardware Codec, Software Codec, BT/BLE
  - Graphics: MPLAB Harmony Graphics Composer, Screen Designer, Display Manager
  - Many more: Motor Control, QTouch, Bootloaders, DSP/Math, etc.
Tools and Demo Examples

Development Kits

**ATSAMC21N-XPRO/ATSAMD21-XPRO**
The SAMC21N/SAMD21 Xplained Pro Evaluation Kits

**ATSAME54-XPRO**
The SAM E54 Xplained Pro Evaluation Kit is a hardware platform for evaluating SAM D5x/E5x series microcontrollers (MCUs).

**DM320007-C/DM320010-C**
PIC32MZ EF (Connectivity)/PIC32MZ DA (Graphics) Starter Kits

**DM320104**
The Curiosity PIC32MZEF Development Board, including on board Wi-Fi module

**DM320113**
The SAM E70 Xplained Ultra Evaluation Kit is a hardware platform for evaluating the ATSAME70 and ATSAMS70 families of microcontrollers (MCU).

**ATSAMA5D2C-XULT/ATSAM9X60-EK**
The SAMA5D2 Evaluation Kit is a fast prototyping and evaluation platform for the SAMA5D2 series of MPUs. The SAM9X60 Evaluation Kit is ideal for evaluating and prototyping with the high performance, ultra-low power SAM9X60 ARM926EJ-S based MPU.

MPLAB Harmony v3: Demo Examples

<table>
<thead>
<tr>
<th>Connectivity (TCP/IP, USB)</th>
<th>Audio</th>
<th>Graphics</th>
<th>Motor Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCP/IP Demo</td>
<td>Audio Microphone</td>
<td>Aria Quickstart (gateway demo)</td>
<td>AN2757: Sensored FOC Speed Control for a PMSM and Flux Weakening</td>
</tr>
<tr>
<td>Wi-Fi® Demo</td>
<td>Encoders and decoders</td>
<td>Aria Benchmark (graphics performance measuring)</td>
<td></td>
</tr>
<tr>
<td>USB Demo</td>
<td>USB Speaker, microphone USB Smart Speaker</td>
<td>Aria Showcase</td>
<td></td>
</tr>
<tr>
<td>Bluetooth® Demo</td>
<td>Audio + Bluetooth</td>
<td>Aria Weather Forecast</td>
<td></td>
</tr>
</tbody>
</table>

Available Resources

- **MPLAB Harmony v3 Landing Page**: https://www.microchip.com/mplab/ mplab-harmony
- **GitHub MPLAB Harmony v3 User Guide**: https://microchip-mplab-harmony.github.io/

Complementary Devices

- **Wireless Connectivity**: Wi-Fi, Bluetooth, BLE, LoRa, IEEE 802.15.4, Sub-G
- **Wired Connectivity and Interface**: CAN Transceivers, Ethernet PHY
- **Industrial Networking**: EtherCAT
- **CryptoAuthentication Device**: ATECC608A, ATSHA204A
- **Clock and Timing**: MEMs Oscillator
- **Analog**: Op Amp, Motor Driver
- **Power Management**: Linear and Switching Regulators

Services and Third Party

- **Microchip Training**: www.microchip.com/training/
- **Third Party Solutions**: FreeRTOS, Micrium and wolfSSL
- **Integrated Development Environment**: IAR