MPLAB® XC Compilers

Microchip's line of award-winning MPLAB® XC C Compilers provides a comprehensive solution for your project's software development and is offered in free, unrestricted-use downloads. Finding the right compiler to support your device is simple:

- MPLAB XC8 supports all 8-bit PIC MCUs
- MPLAB XC16 supports all 16-bit PIC MCUs and dsPICs
- MPLAB XC32/32++ supports all 32-bit PIC MCUs

Features

When combined with Microchip's award-winning, free integrated development environment, MPLAB® X IDE, the full graphical frontend provides:

- Editing errors and breakpoints that match corresponding lines in the source code
- Single stepping through C and C++ source code to inspect variables and structures at critical points
- Data structures with defined data types, including floating point, display in watch windows

MPLAB® XC Compiler Optimizations

 The optimizations found on MPLAB® XC C Compilers provide code size reductions and speed enhancements that benefit your design projects. PRO license is available for designs that require maximum code reductions and best performance. The MPLAB® XC C Compiler contains a free, 60-day trial of a PRO license for evaluation when activated.

MPLAB® XC C Compiler Licenses – Go PRO

Need to optimize your code size reduction or get better speed from your project's software? PRO licenses are available to unlock the full potential of the MPLAB XC C compiler's advanced-level optimizations. See our list of flexible licensing options in the Features section below.

Features Extended

License Types

MPLAB XC C Compiler licenses come in a wide variety of licensing options and most come with one year of High Priority Access (HPA), which provides:
- Unlimited advanced optimizations on new compiler versions
    - New architecture support
    - Bug fixes
    - Priority technical support
    - Free shipping on Microchip Direct for all development tool orders

Workstation License

The workstation license is installed on the user's workstation and comes with three activations for a single user. This is the most commonly used license type.

- Intended for use by a single user
- Can be installed on up to three workstations (desktops and laptops)
- Available in PRO Edition only

For more information see:

- MPLAB® XC8 Workstation license page

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- [MPLAB® XC16 Workstation license page](#)
- [MPLAB® XC32 Workstation license page](#)

Subscription License

The subscription license is installed on a workstation and is automatically renewed every month through purchasing information stored in a Microchip Direct account and an internet connection, using MPLAB X IDE version 3.15 and later.

- One user per license
- Comes in PRO Edition
- Can be cancelled or renewed in one-month increments at will through the user's my Software account and MPLAB X IDE
- Cancellation takes place when the subscription month has expired
- Requires MPLAB X IDE version 3.15 and later for automated renewal
- Includes unlimited updates to new compiler versions without the need for HPA
- Requires an internet connection for automatic renewal
  - License files are loaded automatically through MPLAB X IDE every month while the subscription is active

For more information see:

- [MPLAB XC8 Subscription license page](#)
- [MPLAB XC16 Subscription license page](#)
- [MPLAB XC32/32++ Subscription license page](#)

Site License

The site license is installed on a network and can be quoted for seats of five and greater, which can be mixed between any of the compilers: MPLAB XC8, MPLAB XC16 and MPLAB XC32. Please contact a local sales office for more information and a quote:

- Intended to have one user per seat and installed on a network
- Restricted to the number of seats purchased
- Allows for volume pricing
- Has a loan-out feature, so the license can be used like a node locked license for a specific amount of time (one month maximum on loan out)
- Available in Pro Edition only

For more information visit the [MPLAB XC Site License page](#).

Network Server License

- Intended to have multiple users and can be installed on a network
- Restricted to use by one user at a time. The license is available to the other users one hour after a compile takes place.
- Might otherwise require a large number of compilers
- Great for use by global companies with multiple design centers
- Has a loan-out feature so that a license can be run like node locked for a specific amount of time (one month maximum on loan out)
- Available in Pro Edition only

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Virtual Machine License

The MPLAB® XC Virtual Machine License for Network Licenses is an add-on license for:

- MPLAB XC8, XC16 and XC32 PRO Network Server Licenses
- MPLAB XC8, XC16 and XC32 PRO Site Licenses

This add-on license allows network licenses to be compatible with a virtual machine. One license will be needed for each virtual machine network and must be installed in addition to a network server or site license. More information can be found on the MPLAB XC Virtual Machine License page.

Dongle License

The MPLAB® XC Dongle License is a plug-and-play license that can be used interchangeably among workstations and users.

- License file is installed on a dongle (USB flash drive)
- Intended for multiple users and mobile use – plug into the workstation's USB and go
- Includes unlimited updates to new compiler versions without the need for HPA (perpetual license)
- One dongle license is needed for each compiler type – MPLAB XC8, MPLAB XC16 and MPLAB XC32/XC32++

More information can be found on the MPLAB XC Dongle License pages:

- MPLAB XC8 PRO License Dongle
- MPLAB XC16 PRO License Dongle
- MPLAB XC32/XC32++ PRO License Dongle

Trial 60-Day PRO License

A trial PRO license for the MPLAB XC C Compiler can be activated to give 60-days of PRO compiler operation for evaluation. The trial can be activated when installing the compiler either by clicking on a link during installation, or by clicking here: Evaluation License.

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License Type	Installs On	# of Activations	# of Users	Wait Time Between Users	HPA
Workstation License	Workstation	3	1	None	Yes
Subscription License	Workstation	1	1	None	No
Site License	Network	1	Varies by Seat	None	Yes
Network Server License	Network	1	Unlimited	One Hour	Yes
Virtual Machine *	Network	1	N/A	N/A	No
Dongle License	Dongle	N/A	Unlimited	None	No

MPLAB XC32++: Compiler - Free Offer

The MPLAB XC32++ compiler adds the flexibility to develop and reuse C++ projects and components for all 32-bit MCU devices with the following benefits:

- Compliant with the majority of C++98 and C++ 2003 ANSI standards
- Includes Dinkumware Standard C++ Library
- Can be used with all C++ or mixed C/C++ projects in MPLAB XC
- All Microchip C language extensions are available for use

Microchip is offering a special edition of our C++ compiler software completely free for filling out a short registration.

High Priority Access (HPA) - Compiler Maintenance and Support

Compiler Maintenance and Support

MPLAB XC PRO comes with 12 months of High Priority Access (HPA), a support and maintenance service. HPA must be renewed at the end of twelve months. HPA includes:

- Priority technical support
- New part support
- New architecture support
- New compiler version and patch level updates
- Free shipping on Microchip Direct for all development tool orders

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Overview of MPLAB XC32 Compiler-

The MPLAB® XC32 language toolsuite for PIC32 MCUs consists of a C compilation driver (xc32-gcc), a C++ compilation driver (xc32-g++), an assembler (xc32-as), a linker (xc32-ld), and an archiver/ librarian (xc32-ar). Additional tools distributed with this release include a binary to Intel[intl] Hex converter (xc32-bin2hex) and miscellaneous binary utilities (xc32-strip, xc32-objdump, xc32-readelf, etc). For more information on these tools, see the *MPLAB® XC32 Compiler for PIC32 MCUs User's Guide* and the *MPLAB® XC32 Assembler, Linker, and Utilities User's Guide*.

As described in the user's guides, all of the language tools are sensitive to letter case on the command line, including the case of file names. In particular, the compilation drivers (xc32-gcc & xc32-g++) require that C source files be named on the command-line with a lower-case .c extension. If an upper-case .C filename extension is used, the compiler assumes that the file is a C++ file. Microchip recommends the lower-case .cpp extension for C++ source files. Similarly, the compilation driver passes a file with an upper-case. S filename extension through the C preprocessor before passing it to the assembler, but it passes a file with a lower-case. s extension directly to the assembler.

System Requirements

- The MPLAB XC C compilers and the licensing software they utilize are available for a variety of operating systems, including Professional editions of Microsoft Windows 7, Windows 8, and Windows 10; Ubuntu 10.04; or Mac OS X 10.5. The compiler might also run on the various other Linux distributions, such as Oracle Enterprise Linux, Ubuntu, & Red Hat Enterprise Linux.
- If you are running a network license server, only computers with operating systems supported by the compilers may be used to host the license server. As of xclm version 2.0, the network license server can be installed on a Microsoft Windows Server platform, but the license server does not need to run on a server version of the operating system.

Notes:

1. **PIC32MZ** devices require MPLAB® XC32 Compiler for PIC32 MCUs **v1.30** or newer
2. **MEC14xx** devices require MPLAB® XC32 Compiler for PIC32 MCUs **v1.33** or newer
3. **PIC32MM** devices require MPLAB® XC32 Compiler for PIC32 MCUs **v1.34** or newer
4. **MGC34xx** devices require MPLAB® XC32 Compiler for PIC32 MCUs **v1.34** or newer
5. **PIC32WKxx** devices require MPLAB® XC32 Compiler for PIC32 MCUs **v1.41** or newer
6. **USB49XX** devices require MPLAB® XC32 Compiler for PIC32 MCUs **v1.43** or newer

New Features in MPLAB® XC32 v1.43

- **New Part Support** -- Support for several new PIC32 MCUs was added for this release. See Devices Supported for a full list of devices.
- **Special Function Register (SFR) Access Efficiency** -- This feature adds the address attribute to Peripheral SFRs defined in the processor header file. With this added information, a new compiler optimization reduces the number of registers required to access multiple SFRs within a single function. This also allows the compiler to remove redundant load instructions. Enabled by default at optimization levels -O2, -Os, & -O3. **NOTE:** If you are building a static library that accesses an SFR and you want that same prebuilt library to work across devices that may have the SFRs located at a different address (e.g. TMR1 is at different addresses on device A and device B), compile your library with the -mno-hi-addr-opt option. This will result in larger code, but the SFR address will be determined at link time.
- **Improved coherent attribute** -- The linker now groups all coherent attributed variables together and aligns them on a cache-line boundary.

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- **64-bit long double handing in stdio** -- This release adds support for the 'L' and 'll' size specifiers for 64-bit long doubles in stdio.
- **Multilib variant for -fno-short-double** -- There is now a copy of the standard Lib C prebuilt for 64-bit doubles. Passing -fno-short-double to the linker as part of the additional **driver** options causes system libraries built with 64-bit double support to be linked instead of the default -fshort-double libraries. Be sure to pass the same -fno-short-double/-fshort-double option to *both the compiler and the linker*.
- **C++ Exception Support in standard Libraries** -- C++ exceptions are now enabled by default in the system libraries. You can still disable exceptions for your application code in the xc32-g++ project properties.
- **Optional Newlib Standard C Library** -- You may now optionally select the Newlib Standard C Library rather than the Legacy LibC, HTC LibC, or Dinkumware LibC. Pass the new -mnewlib-libc option to xc32-gcc or xc32-g++ both when compiling and linking. This option is primarily intended for applications being ported to XC32 from other compilers that use the Newlib Standard C Library.
- **Free C++ Licensing** -- Previous releases of the C++ compiler required you to fill out a web form to obtain a free C++ license. This step is no longer required for the free C++ license. You can still purchase a Pro C++ license for High Priority Access (HPA) and full optimizations. For more information, visit http://www.microchip.com/mplab/compilers
- **IPL*n*SAVEALL interrupt priority specifier** -- This release adds a new IPL*n*SAVEALL specifier for use with the interrupt attribute. Use this new specifier in place of IPL*n*SOFT to force software context saving of all software-saved general registers even if they are not used within the Interrupt Service Routine (ISR). This attribute can be useful for some RTOS implementations.
- **keep_interrupts_masked function attribute** -- The attribute keep_interrupts_masked can be combined with the interrupt attribute. This attribute causes the Interrupt Service Routine (ISR) prologue code to not re-enable interrupts. Application code may then choose whether and when to re-enable interrupts in the ISR.
- **Library source now provided as pic32-libs.zip** -- The library source code, previously provided in the pic32-libs sub directory, is now provided as a zip file. When you need to inspect this source code, extract the files from the zip file.

Customer Support

Microchip provides online support via our home page at:
http://www.microchip.com

Technical support is available through the web site at:
techsupport1@logicpower.co.in, logicpower@logicpower.co.in & http://www.microchip.com/support

A forum for discussion of Microchip products and tools is available at:
http://www.microchip.com/forums

Microchip PIC32 documentation and product info is available at:
http://www.microchip.com/pic32

Microchip MPLAB XC Compiler info is available at:
http://www.microchip.com/MPLABXCcompilers