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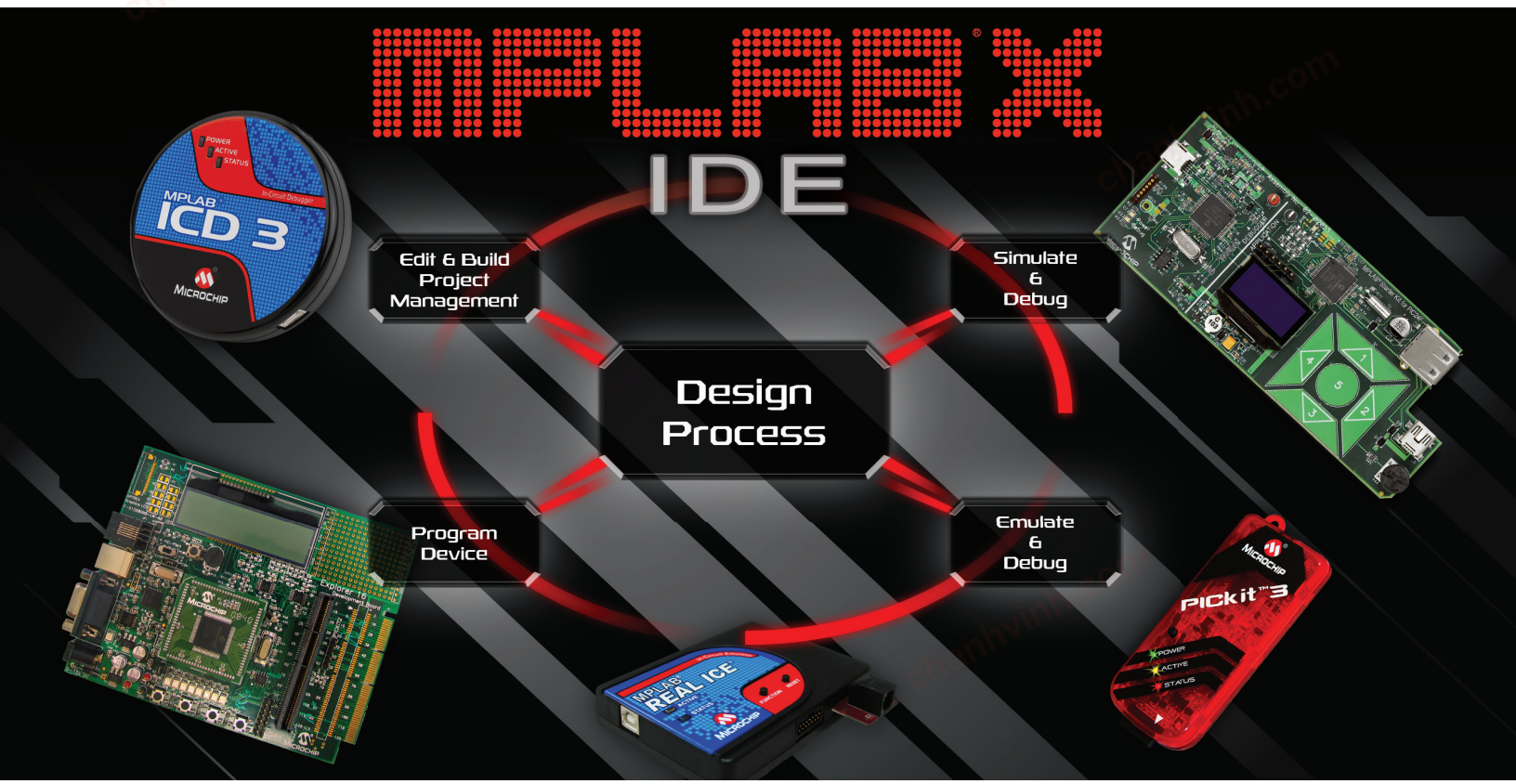
Development Tools

MICROCHIP

Quick Guide to Microchip Development Tools



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MPLAB® X IDE and Software Tools

Introduction

Microchip produces approximately 900 different development tools, of which only a selection are featured in this document. For the full listing of Microchip's development tools, please visit the online Development Tool Selector at www.microchip.com/dts, or visit our application sites on www.microchip.com.

MPLAB X IDE

MPLAB X IDE is the latest generation of Microchip's free integrated development environment. Incorporating a powerful and highly functional set of features, it allows you to easily develop applications for Microchip's PIC® microcontrollers and dsPIC® digital signal controllers. It is based on the NetBeans IDE from Oracle and runs on Windows®, Linux® and Mac® OS X. Its unified graphical user interface (GUI) helps to integrate software and hardware development tools from Microchip and third party sources to give you high-performance application development and extensive debugging capabilities.

The flexible and customizable interface allows you to have multiple debug tools connected to your computer at the same time. You can select any tool you desire for a specific project or configuration within a project. With complete project management, visual call graphs, a configurable watch window and a feature-rich editor that includes code-completion and hyperlink navigation, MPLAB X IDE is fully equipped to meet the needs of experienced users while remaining flexible and user-friendly for even those who are new to the IDE.

Features

Feature-Rich Editor

- Color syntax highlighting
- Smart code completion makes suggestions and provides hints as you type
- Automatic code formatting based on user-defined rules
- Refactoring tools to intelligently restructure code
- Live parsing

User-Friendly, Customizable Interface

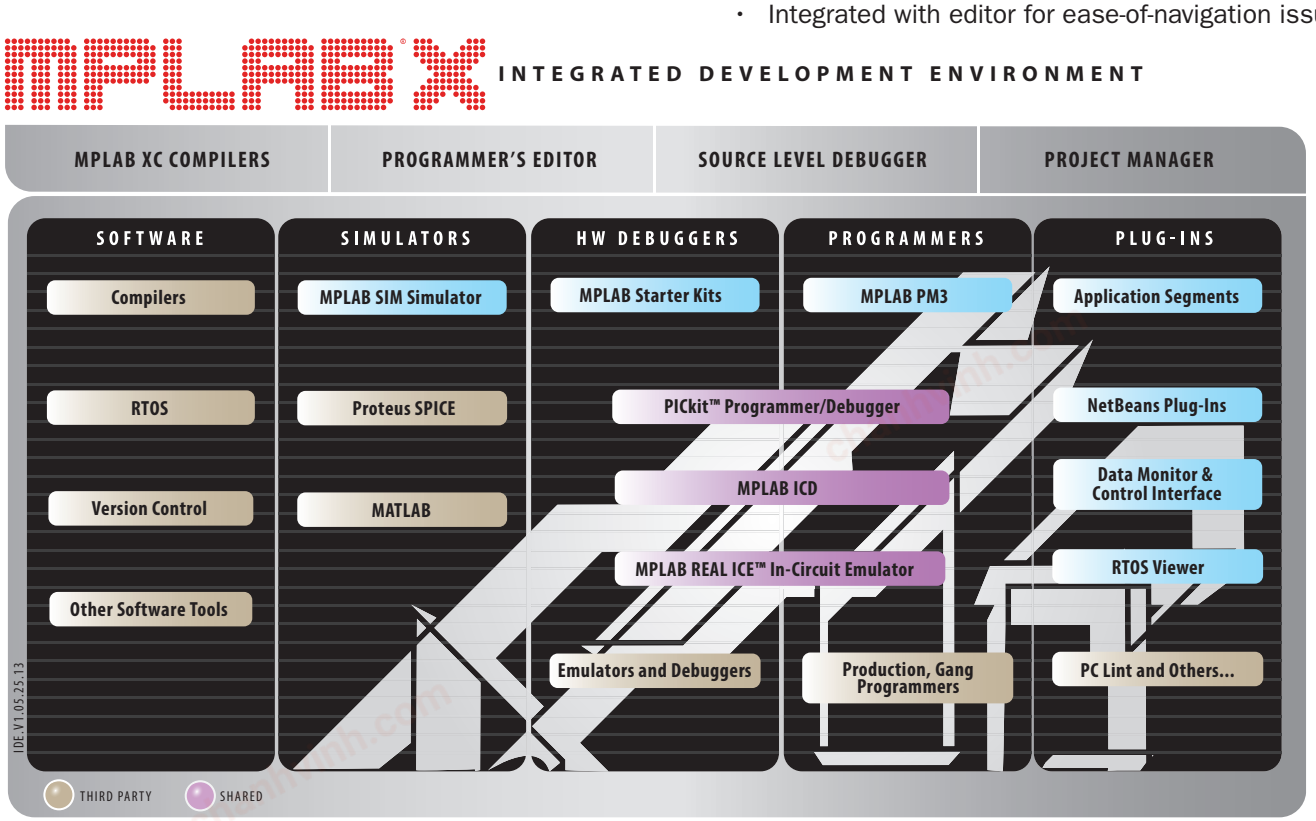
- Fully customizable interface: toolbars, toolbar buttons, windows, window placement, etc.
- Call graph window
- Plug-in feature extensions

Navigation Features

- Powerful navigation tools:
  - Go to file, Go to type, Go to symbol, Go to header, Go to declaration, hyperlinks using 'Ctrl + mouse over'
- Tasks navigator with user-defined bookmarks
  - e.g. `//TODO, //FIXME`
- Project-based workspaces:
  - Multiple projects, tools and configurations
  - Simultaneous debugging sessions

File History and Bug Tracking

- Local file history feature
  - NetBean plug-ins for revision control systems also available
- Built-in support for Bugzilla issue tracker
  - Integrated with editor for ease-of-navigation issues



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Microchip MPLAB XC Compilers

MPLAB XC Compilers

MPLAB® XC8 PIC10/12/16/18	MPLAB XC16 PIC24 and dsPIC® DSCs
MPLAB XC32/XC32++ PIC32	

Optimizations

MPLAB XC Compilers produce highly optimized code. The PRO edition has the most features and produces the best code optimization. A low-cost option of the compiler is also available as the Standard Edition. MPLAB XC licenses are also available as Free editions and have the option of a 60-day PRO evaluation trial.

Microchip now offers Free and PRO Editions of the MPLAB XC32++ Compiler, which adds the flexibilty to develop and reuse C++ projects and components.

The Free editions support all devices and commands of the PRO edition. They have no time or memory restrictions and offer an unrestricted-use license with optimization sufficient for most uses.

An evaluation key is available to enable full use of the PRO edition features and optimizations of the compilers when applied. After the 60-day evaluation period, the compiler will revert back to the Free edition functionality.

The Free edition is available for download from: www.microchip.com/free.

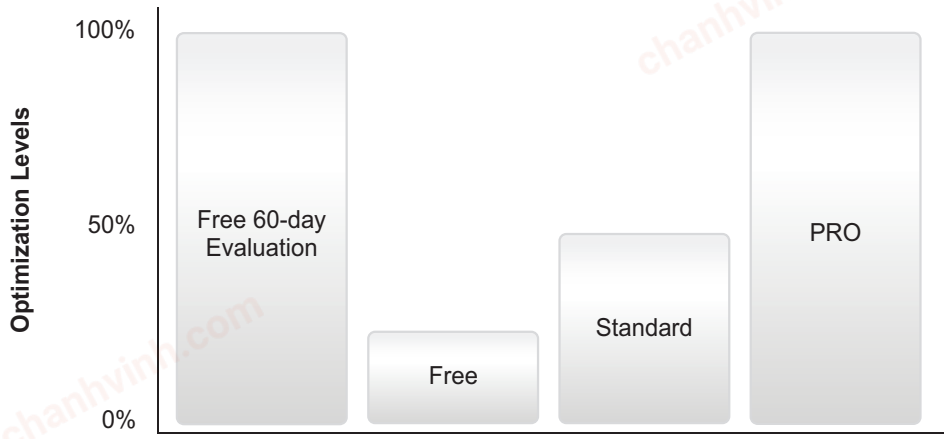
Awards for MPLAB® X IDE	Awards for MPLAB XC Compilers
ECN Readers Choice TECH AWARDS 2011 EDN 2012 HOT 10 Elektra 2011 European Electronics Industry Awards WINNER	 *ACE Products of the Year* EE Times China EDN 2012 HOT 10

Features

- ANSI Compliant
- Extensive libraries including Microchip peripheral libraries
- Runs on Windows, Linux or Mac OS X
- Integrates with MPLAB X IDE to provide a full, graphical front end
  - Editing errors and breakpoints match the corresponding lines in source code
  - Single step 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

License Types

- *Single-user licenses*: Workstation licenses
- *Network Server Licenses*: Can be run from a server and shared between multiple machines in different locations
  - These licenses are restricted to one compile at a time. When a user compiles, another user cannot compile for one hour.
- *High Priority Access (HPA)*: 12-month maintenance and support contract:
  - Priority technical support
  - New part support
  - New architecture support
  - New compiler patch-level updates



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In-Circuit Emulators and Debuggers

Microchip offers three universal debuggers. They share design platforms, support all microcontroller and DSC families, are USB-powered and fully integrated with MPLAB X IDE. MPLAB ICD 3 offers debugging and hardware features sufficient for the needs of most users. PICkit™ 3 Debugger/Programmer is the economical choice for basic debugging functions. MPLAB REAL ICE™ In-Circuit Emulator offers advanced features—like data capture, trace, logic triggers and high-speed debugging up to 10 feet—usually available only on expensive and high-end emulators. Both MPLAB REAL ICE In-Circuit Emulator and MPLAB ICD 3 can be used as programmers in a production environment.

MPLAB ICD 3 Debugger/Programmer (DV164035)



MPLAB ICD 3 In-Circuit Debugger System is Microchip's most cost-effective high-speed hardware debugger/programmer for Microchip Flash Digital Signal Controller (DSC) and microcontroller (MCU) devices. It debugs and programs PIC Flash microcontrollers and dsPIC DSCs with the powerful, yet easy-to-use graphical user interface of MPLAB Integrated Development Environment (IDE). The MPLAB ICD 3 In-Circuit Debugger probe is connected to the design engineer's PC using a high-speed USB 2.0 interface and is connected to the target with a connector compatible with the MPLAB REAL ICE In-Circuit Emulator systems (RJ-11).

- MPLAB ICD 3 In-Circuit Debugger is designed to support high-speed processors running at maximum speeds, allowing embedded engineers to debug applications on their own hardware in real time.
- Protection circuitries are added to the probe drivers to guard the probe kit from power surges from the target. V_{DD} and V_{PP} voltage monitors protect against over-voltage conditions, and all lines have over-current protection. The unit can provide power to a target (up to 100 ma).
- Housed in a small (3.7" × .8") and attractive enclosure, the MPLAB ICD 3 In-Circuit Debugger is powered by the USB port so an external power adapter is not required. MPLAB ICD 3 In-Circuit Debugger is CE and RoHS-compliant.
- Fast programming allows both quick firmware reload for fast debugging and for in-circuit re-programming. Programming times are improved up to 15× over MPLAB ICD 2.
- MPLAB ICD 3 supports target supply voltages from 2.0–5.5V.
- Included with every MPLAB ICD 3 is a test module to test I/O lines to confirm the unit is working properly.
- Adding new device support and advanced features to MPLAB ICD 3 In-Circuit Debugger is as simple as installing later versions of the MPLAB X IDE, downloadable for free. MPLAB ICD 3 In-Circuit Debugger is field upgradeable through a firmware download from MPLAB X IDE.
- Allows debugging with MPLAB X IDE, supporting multiple breakpoints, stopwatch, source code file debugging in MPLAB's editor for quick program modification/debug.

PICkit 3 In-Circuit Debugger (PG164130)



The PICkit 3 Debug Express allows debugging and programming of PIC Flash microcontrollers and dsPIC DSCs using the powerful graphical user interface of the MPLAB X IDE.

- USB (Full speed 12 Mbits/s interface to host PC)
- Real-time execution
- Firmware upgradeable from PC/web download
- Totally enclosed
- Supports low voltage to 2.0V (2.0–6.0V range)
- Diagnostic LEDs (power, busy, error)
- Read/write program and data memory of microcontroller
- Erase of program memory space with verification
- Freeze-peripherals at breakpoint

MPLAB REAL ICE In-Circuit Emulator (DV244005)



MPLAB REAL ICE In-Circuit Emulator System is Microchip's next generation high-speed emulator for Microchip Flash DSC and MCU devices. It debugs and programs PIC and dsPIC Flash microcontrollers with the easy-to-use but powerful graphical user interface of the MPLAB X IDE, included with each kit. The MPLAB REAL ICE In-Circuit Emulator probe is connected to the design engineer's PC using a high-speed USB 2.0 interface and is connected to the target with either a connector compatible with the popular MPLAB ICD 3 system (RJ11) or with the high-speed, noise-tolerant, low-voltage differential signal (LVDS) interconnection (CAT5).

MPLAB REAL ICE In-Circuit Emulator is field upgradeable through future firmware downloads in MPLAB X IDE. In upcoming releases of MPLAB X IDE, new devices will be supported and new features added.

- Real-time execution and real-time trace collection
- Stopwatch
- Real-time watch
- Full hardware debugging: breakpoints, single-step, variable inspect/modify
- Logic probe inputs/outputs (8)
- I/O Port trace and SPI trace options for high-speed upload of trace data
- High-speed/LVDS communication via the MPLAB REAL ICE In-Circuit Emulator Performance Pak (AC244002)
- Debugging of low pin-count devices and devices without debugging capabilities via the MPLAB REAL ICE In-Circuit Emulator Processor Extension Paks (various)
- Emulation of high-voltage AC applications via the MPLAB REAL ICE In-Circuit Emulator Isolator (AC244005)
- PIC32 4-wire JTAG connectivity via the MPLAB REAL ICE In-Circuit Emulator JTAG Adapter (AC244007)
- Power measurement and power profiling via the MPLAB REAL ICE In-Circuit Emulator Power Monitor (AC244008)

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In-Circuit Emulators and Debuggers

In-Circuit Emulators and Debuggers

Feature	PICkit™ 3	MPLAB® ICD 3	MPLAB REAL ICE™ In-Circuit Emulator
USB Speed	Full Only	High and Full	High and Full
USB Driver	HID	Microchip	Microchip
USB Powered	Yes	Yes	Yes
Programmable V_{PP}	Yes	Yes	Yes
Power to Target	Yes	Yes	No
Programmable V_{DD}	Yes	Yes	Yes
V_{DD} Drain from Target	20 mA	< 1 mA	< 1 mA
Over Voltage/Current Protection	Yes, SW	Yes, HW	Yes, HW
Emulation Support	Full Speed	Full Speed	Full Speed
Breakpoints	Simple	Complex	Complex
Software Breakpoints	Yes	Yes	Yes
Program Memory Image Size	512 Kbytes	No	No
Serialized USB	Yes	Yes	Yes
Trace, Native	No	No	Yes
Trace, Other (SPI, PORT, Inst)	No	No	Yes
Data Capture	No	No	Yes
Logic/Probe Triggers	No	No	Yes
High Speed Performance PAK (LVDS)	No	No	Yes
Production Programmer	No	Yes	Yes

Third Party Tools

Microchip also offers a great collection of tools from third party vendors. These tools are carefully selected to offer good value and unique functionality.

- **Device Programmers and Gang Programmers** from companies such as SoftLog, EETools and CCS
- **Compilers** from companies such as CCS, microEngineering Labs and MikroElectronika
- **Software Tools** from companies such as Gimpel and Trace Systems
- **Protocol Analyzers** from companies such as Saleae and Total Phase
- **Development Boards** from companies such as Digilent, Nurve Networks, and MikroElectronika
- **Embedded Ethernet and Connectivity Solutions** from companies such as CCS, IPLogika and Embed
- **Innovative Cable Solutions** from companies such as Tag-Connect

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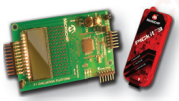
Getting Started

Starter Kits

Starter Kits are complete, affordable, turnkey solutions consisting of hardware and software sufficient for exploring specific applications or the features of the device family they represent. Most kits include an on-board or separate debugger and tutorials. To get started, simply install and start MPLAB X IDE, connect the hardware and step through the easy-to-follow tutorials.

F1 Evaluation Kit (DV164132)



The F1 Evaluation Kit is a demonstration/ development tool for Enhanced Mid-Range PIC microcontrollers (PIC12F1XXX/ PIC16F1XXX) and includes the PICkit 3 for quick programming and development. Populated with a PIC16LF1937 featuring XLP technology, this platform consists of a 44-pin development board with prototyping space, 3V LCD glass, support for the Motor Control add-on and support for PICkit 3 and PICkit Serial Analyzer. This kit provides a platform for general purpose development, and includes demonstrations focusing on low power, LCD and motor control.

MPLAB Starter Kit for PIC18 MCU (DM180021)



This kit includes an on-board debugger/ programming capability as well as USB communication, a capacitive touch pad, potentiometer, acceleration sensor, MicroSD™ memory card and an OLED display. The board can function as a USB mouse, joystick or mass storage device (thumb drive) all using the on-board capacitive touch sense pads.

PIC18 Development Kit (DV164136)



This kit includes a PIC18 Explorer board, PICkit 3 Debugger/Programmer, USB cable and a 9V universal power supply. The PIC18 Explorer board includes both the PIC18F8722 and PIC18F87J11 microcontrollers and supports dozens of general purpose PIC18 families using various processor Plug-in Modules (PIMs). PICtail™ daughter boards enable many different accessory boards to connect to the PIC18 Explorer.

MPLAB Starter Kit for PIC24H MCUs (DM240021)



The PIC24H Starter Kit is a complete hardware and software kit for exploring the power of PIC24H family of MCUs including a built-in debugger on the board. A tri-axial accelerometer is provided for acceleration detection. The starter kit also showcases a low-cost audio playback with an on-board speaker and an OLED display running the Microchip Graphics library.

MPLAB Starter Kit for PIC24F MCUs (DM240011)



This kit includes an integrated in-circuit debugger and programmer, USB device and host connectors, tri color LED, capacitive touch pad and an OLED display. Menu driven demonstration software supports data logging, thumb drive and graphics applications to test the PIC24F MCU.

Explorer 16 Starter Kit (DV164037)



This kit is a complete set of tools for application development supporting Microchip's PIC24 and dsPIC33 16-bit and PIC32 32-bit microcontrollers. This kit includes a MPLAB ICD 3 In-Circuit Debugger, an Explorer 16 Development Board, a 9V universal power supply for use with either the Explorer 16 board or the MPLAB ICD, a serial cable and both a PIC24FJ128GA010 and a dsPIC33F256GP710 device (mounted on plug-in modules for quick replacement).

MPLAB Starter Kit for dsPIC DSCs (DM330011)



This starter kit introduces users to the dsPIC Digital Signal Controller device using its speech and audio processing capabilities. The kit is USB-powered, has on-board debug circuitry and 24-bit codec for high-quality audio applications. Also on the board are reconfigurable switches, potentiometers, a temperature sensor and a 4 Mb serial EEPROM to store data such as audio samples.

PIC32 Starter Kit (DM320001)



With over 35 source code examples to the "Getting Started" project, this kit includes everything needed to write, program, debug and execute code on a high-performance PIC32 microcontroller.

PIC32MX1/MX2 Starter Kit (DM320013)



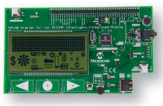
The PIC32MX1/MX2 Starter kit is a complete solution for exploring the low-cost, high-performance PIC32MX1/MX2 devices. This kit is perfect for providing an introduction to basic user interfaces with mTouch™ senging solutions buttons and high-quality audio.

PIC32 USB Starter Kit II (DM320003-2)



This kit provides the easiest and lowest cost method to experience the USB and CAN functionality of the PIC32 microcontrollers. Users can develop CAN applications using PIC32 expansion boards. The board contains everything needed to develop USB embedded host/ device/OTG applications when combined with Microchip's free USB software.

MPLAB Starter Kit for PIC24F Intelligent Integrated Analog (DM240015)



The MPLAB Starter Kit for PIC24F Intelligent Integrated Analog is a standalone board showcasing the advantages of lower BOM cost, faster throughput and lower noise analog, and features an on-board programmer/debugger.

PICkit 3 Starter Kit (DV164130)



This Demo Kit contains one assembled board with area for prototyping circuits. The assembled board is populated with the PIC16F1829-I/P. It also ships with a sample of PIC18F14K22-I/P (20-pin) MCU.

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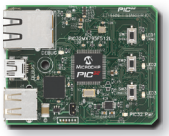
Getting Started

PIC32 Ethernet Starter Kit (DM320004)



The PIC32 Ethernet Starter Kit provides the easiest and lowest cost method to experience 10/100 Ethernet development with PIC32. Combined with Microchip's free TCP/IP software, your project will be running in no time. The PIC32 has an available CAN2.0b peripheral and USB host/device/OTG.

PIC32 I/O Expansion Board (DM320002)



This I/O expansion board provides PIC32 starter board (DM320001, DM320003) users with full access to MCU signals, JTAG debugging, ICSP™ development and connection of PICtail Plus daughter cards.

PICkit 3 Debug Express (DV164131)



The PICkit 3 Debug Express combines a 44-pin demo board with a PIC18F45K20 microcontroller and a PICkit 3 debugger/programmer.

MPLAB Starter Kit for Serial Memory Products (DV243003)



This kit includes everything necessary to quickly develop a robust and reliable Serial EEPROM design, and greatly reduces the time required for system integration and hardware/software fine-tuning. Supports Microchip UNI/O bus, I²C™, SPI and Microwire Serial EEPROMs.

PIC24E (DM240012) and dsPIC33E USB Starter Kits (DM330012)



These starter kits provide a low-cost method for the development and testing of USB devices, embedded host and On-The-Go applications using the PIC24E MCU and dsPIC33E DSC families. Included on each board are three user-programmable LEDs, three push button switches and an expansion header compatible with the Multimedia Expansion Board (DM320005) and I/O Expansion Board (DM320002). The starter kits come preloaded with basic Communication Device Class (CDC) demonstration software.

Microsticks for 3V and 5V PIC24F K-Series (DM240013-1/DM240013-2)

Microsticks for 3V & 5V PIC24F K-series (DM240013-1 and DM240013-2) are flexible USB powered development platforms. They provides everything you need to get started at a very low cost and are the perfect solutions for those looking to get started with Microchip's low cost 16-bit microcontroller families—The DM240013-1 supports the 3V PIC24F "KL", "KM" and "KA" devices while the DM240013-2 supports the 5V PIC24FV "KM" and "KA"—for extremely cost sensitive consumer, medical and industrial applications. Both the Microsticks include an integrated programmer/debugger and can work as a stand-alone development board or plugged into a prototyping board.

MPLAB Starter Kit for Digital Power (DM330017)

The MPLAB Starter Kit for Digital Power allows the user to easily explore the capabilities and features of the dsPIC33F GS Digital Power Conversion family. It is a digitally controlled power supply board that consists of one independent DC/DC synchronous Buck converter and one independent DC/DC Boost converter. Each power stage includes a MOSFET controlled 5W resistive load. The kit features an on-board programmer/debugger, LCD display and an on-board temperature sensor.

Microstick II (DM330013-2)

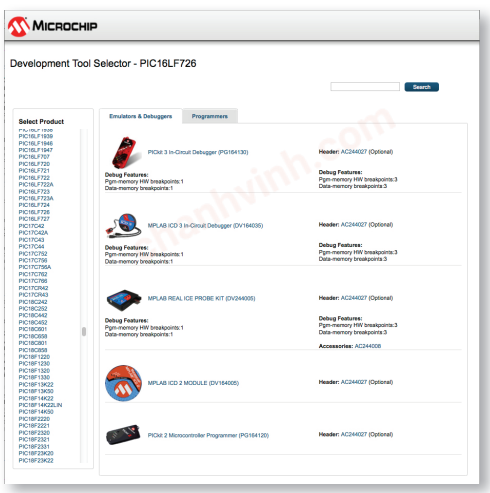
Microstick II delivers a complete development hardware platform for Microchip's 16-bit and 32-bit microcontrollers and digital signal controllers. It's the perfect solution for those looking for a low-cost, easy-to-use development platform and supports all 3.3V PIC24FJ, PIC24H, dsPIC33, and PIC32 SPDIP packaged devices.

PICDEM™ PIC18 Explorer Board (DM183032)

This low-cost demo board features a PIC18F8722 MCU which is the superset of the traditional PIC18 general purpose 5V family. The board also comes with the PIC18F87J11 processor PIM which is the superset of the PIC18 J-series of 3V MCUs for cost-sensitive applications. This single development board supports dozens of general purpose PIC18 families using various processor Plug-In Modules (PIMs).

Development Tools Selector

Microchip's Development Tools Selector (DTS) is an on-line application that allows a user to view development tools through a graphical user interface (GUI) with filter and search capabilities to easily find development tools associated to the Microchip products. Just enter either a development tool or Microchip device in the search box and it quickly displays all related tools and devices. Updated after every MPLAB X IDE release, it is available online and offline at: www.microchip.com/dts.



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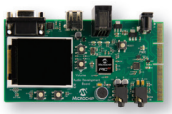
Application-Specific Development Tools

Audio

Audio Development Board for PIC32 (DM320011)



The audio development board for PIC32 provides developers with a flexible platform for 24-bit audio record and playback, USB digital audio, MP3 decode and sample rate conversion. Key features include PIC32MX795F512, 24-bit Wolfson codec, USB Type A interface, on-board microphone, headphone out and line in, high-quality 2" color LCD and MFi Dock Edge connector.

PIC32 USB Digital Audio Accessory Board (DM320014)



The PIC32 USB Digital Audio Accessory Board showcases a 16/24-bit quality digital stereo audio development platform using the PIC32 microcontroller. It can be used for 16/24-bit stereo audio playback and recording with a sample rate of up to 48 kHz. This accessory board is powered by the USB Host and can be used with any personal computer (PC), tablet, gaming station, or mobile device that supports the USB Audio Device Class.

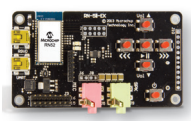
Bluetooth®

RN42 Bluetooth Evaluation Kit (RN-42-EK)



The RN-42-EK is a fully certified Class 2 Bluetooth evaluation kit for the RN42-I/RM module. It has the flexibility to connect directly to a PC via a standard USB interface or to embedded processors through the TTL UART interface. The status LEDs, switches and signal headers enable rapid prototyping and integration into existing systems.

RN52 Audio Bluetooth Evaluation Kit (RN-52-EK)



The RN-52-EK is an evaluation kit for the RN52, a fully certified Bluetooth version 3.0 audio module which is fully compatible with Bluetooth version 2.1+EDR. This kit demonstrates the key features of the RN52 allowing designers to quickly and easily evaluate and develop prototypes. The RN-52-EK has the ability to pair with any smartphone, stream music, and take hands-free calls. It also supports multiple Bluetooth profiles and codecs. The RN-52-EK includes RN52 evaluation board, USB cable, two stereo mini-speakers and microphone.

PIC32 Bluetooth Audio Development Kit (DV320032)



The PIC32 Bluetooth Audio Development Kit with PIC32MX450F256L onboard offers an excellent means for designing and developing a low-cost Bluetooth audio system. The features include Bluetooth audio streaming with low-cost HCI radio module, compatibility with Bluetooth-enabled smartphones and portable music players, USB memory stick support, 2 inch color LCD display, high-quality 24-bit, 192 kHz audio conversion for line or headphones.

Ethernet

Ethernet PICtail Plus Daughter Board (AC164123)



This board is populated with the 28-pin ENC28J60 Ethernet controller which interfaces to the RJ-45 connector. It can be plugged into the Explorer 16 development board (DM240001), allowing connection to any of Microchip's 16- and 32-bit products when used in conjunction with the free Microchip TCP/IP stack.

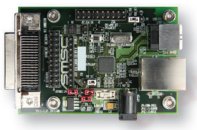
Fast 100 Mbps Ethernet PICtail Plus Daughter Board (AC164132)

This board is populated with a 64-pin ENC624J600 Ethernet controller and interfaces to the RJ-45 connector. It can be plugged into the Explorer 16 development board (DM240001) and the PIC18 Explorer board (DM183032) allowing connection to any of Microchip's 8, 16- and 32-bit products.

PICDEM.net™ 2 Development Board (DM163024)

This Internet/Ethernet development board supports both the ENC28J60 Ethernet controller and the single-chip Ethernet PIC18F97J60 MCU. With this board and Microchip's free TCP/IP stack, a web server can be developed showcasing the capability to remotely monitor and control embedded applications over the Internet.

LAN9500A Hi-Speed USB 2.0 to 10/100 Ethernet Bridge Controller (EVB-LAN9500A-MII/EVB-LAN9500A-LC)



The EVB-LAN9500A-MII is used to evaluate our LAN9500A Hi-Speed USB 2.0 to Fast Ethernet Bridge Controller solution. Using an existing USB port with our LAN9500A allows designers to add Ethernet connectivity to their system architectures.

Application-Specific Development Tools

eXtreme Low Power

nanoWatt XLP 16-bit Development Board (DM240311)



This development board provides a low-cost, highly configurable development system for Microchip's line of extreme low power 16-bit PIC24F microcontrollers featuring sleep currents down to 20 nA. The board supports development on PIC24F16KA102, PIC24FJ64GA102 and PIC24F64GB002 families of MCUs. This board can be powered by more than five sources including batteries and energy harvesting modules and supports a variety of common components that can be selectively enabled.

XLP 8-Bit Development Board (DM240313)

This development board is designed as a true platform for low power development, enabling designs with sleep currents as low as 20 nA. The board has connections for in-circuit programming and debugging and a USB interface for power and PC communication. The board comes with the PIC18F87K22 installed along with a PIC16LF1947 Plug-in Module and can be powered by six different sources.

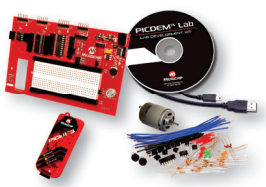
General Purpose

PIC10F32X Development Board (AC103011)



The PIC10(L)F32X Development Board is intended to be a learning tool for individuals interested in PIC microcontroller design and developing applications using the Configurable Logic Cell, Complimentary Waveform Generator and Numerically Controlled Oscillator peripherals. The PIC10F322 microcontroller is ideal for use on the PIC10(L)F32X Development Board due to its small size, high efficiency, speed and peripheral configurations.

PICDEM Lab Development Kit (DM163045)



The PICDEM Lab Development Kit is designed to provide a comprehensive development and learning platform for virtually all of Microchip's Flash-based 6-, 8-, 14-, 18-, and 20-pin, 8-bit PIC microcontrollers. Geared toward first-time PIC microcontroller users and university students, the PICDEM Lab Development Kit is supplied with five of our most popular 8-bit PIC microcontrollers and a host of discrete components used to create a number of commonly used circuits. Expansion headers provide complete access/connectivity to all pins on the connected PIC microcontrollers and all mounted components. This kit includes a PICkit 3 In-Circuit Debugger.

Graphics and LCD

Remote Control Demo Board (DM240315-2)



This board integrates graphics, mTouch, USB and RF4CE into a single demo. The board demonstrates a remote populated with PIC24FJ256DA210 MCU, 3.5" graphical TFT LCD with resistive touch screen, capacitive touch keys with plastic overlay, MRF24J40 2.4 GHz transceiver and ZENATM wireless adapter.

PIC24FJ256DA210 Development Board (DM240312)

The PIC24FJ256DA210 Development Board is a low-cost and efficient development board to evaluate the features and performance of the PIC24FJ256DA210 with integrated graphics, mTouch technology and USB. This board is an ideal platform for developing graphical human interface applications.

VGA Camera Sensor (VCS) PICtail Plus Board (AC164150)



This board brings basic vision and surveillance to PIC32 based systems. Onboard is a 640 × 480 VGA color CMOS sensor. This board interfaces to the I/O expansion board with a PIC32 Starter Kit, Epson graphics development board and a VGA display.

Low-Cost Controllerless (LCC) Graphics PICtail Plus Daughter Board (AC164144)

The Low-Cost Controllerless (LCC) Graphics PICtail Plus Daughter Board enables development of graphics solutions without an external graphics controller, thus reducing system BOM cost for many applications. The board is designed to attach to a PIC32 Starter Kit (DM320001, DM320003-2, DM320004) or an Explorer 16 Development Board (DM240001).

For more advanced graphics or larger display sizes, there are several boards using external graphics controllers which can be used with the Explorer 16 or a PIC32 Starter Kit:

- Solomon Systech SSD1926 Graphics Board (AC164127-5)
- Epson S1D13517 Graphics Board (AC164127-7)

The graphics development boards above can be used with these flexible graphical display boards ranging from 3.2" to 7".

- QVGA 3.2" Graphics Display Truly 240 × 320 Board (AC164127-4)
- WQVGA 4.3" Graphics Display Powertip 480 × 272 Board (AC164127-6)
- VGA 5.7" Graphics Display Truly 640 × 480 Board (AC164127-8)
- WVGA 7" Graphics Display Truly 800 × 480 Board (AC164127-9)

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Application-Specific Development Tools

LCD Explorer Development Board (DM240314)

The LCD Explorer Development Board supports Microchip's 100-pin microcontrollers with ×8 common segment LCD drivers. The LCD Explorer provides an ideal platform for a customer to evaluate an MCU with a common LCD driver on a 38 segment ×8 common LCD display. PICtail Plus connections allow a customer to evaluate the selected MCU in a complex system by adding Microchip's PICtail Plus daughter boards.

Lighting

Lighting Communication Development Platform (DM160214)



The Lighting Communications Development Platform provides a universal lighting development platform for the creation of communications enabled lighting applications. The platform consists of a main board and various communications interface adapters to support in the development of DALI, DMX512A as well as future protocols.

Machine-to-Machine

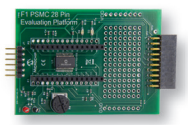
Machine-to-Machine (M2M) PICtail Daughter Board (AC320011)



Microchip's M2M PICtail Daughter Board based upon u-blox GPS and GSM/GPRS modules makes it easy to create low-cost M2M applications with location-awareness capabilities. The daughter board can be interfaced with PIC32 Multimedia Expansion Board and a PIC32 Starter Kit to provide developers with a turn-key platform to get started developing remote monitoring applications with texting and GPS capabilities

Motor Control and Power Conversion

F1 PSMC 28-pin Evaluation Platform (DM164130-10)



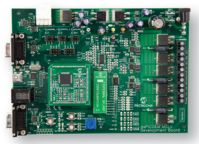
This development board is designed for customers who already have a set of PIC microcontroller development tools and wish to add the capability to evaluate the PIC16F178X device capabilities.

F1 LV Evaluation Platform (DM164130-5)



The F1 Low Voltage Evaluation Platform is a development tool for Enhanced Mid-range PIC microcontrollers (PIC12F1XXX/PIC16F1XXX). Populated with a PIC16LF1947, featuring XLP technology and MCP1624 for low voltage single cell battery support, this provides a platform for general purpose and low voltage development and gives you the ability to develop code for any PIC12F1XXX/PIC16F1XXX microcontroller. Quick and easy development is ensured with the integrated functionality including prototyping area, LCD control, system current monitoring, temperature sensing, Real-Time Clock, LED drive, button control, USB interface, various power sources and BLDC/BDC/Unipolar/Bipolar motor control.

dsPICDEM™ MCLV-2 Development Board (DM330021-2)



The dsPICDEM MCLV-2 Development Board provides a cost-effective method of evaluating and developing sensored or sensorless Brushless DC (BLDC) and Permanent Magnet Synchronous motor control applications. The board supports Microchip's 28-pin SOIC and a variety of Plug-In Modules with dsPIC33F/E Digital Signal Controllers. With the MCLV-2 either the internal, on chip op amps or the external op amps on the MCLV-2 board can be used. Microchip provides PIMs for using either the internal or external op amps. The MCLV-2 is fully backwards compatible with the original MCLV and all MC PIMs. The board is capable of controlling motors rated up to 48V and 15 Amps. This board is designed to work with the 24V BLDC Motor (AC300020) and the 24V motor power supply (AC002013) to create a complete 24V BLDC development kit. This board also supports multiple communications channels such as USB, CAN, LIN and RS-232.

dsPICDEM MCHV-2 Development System (DM330023-2)



The Microchip dsPICDEM MCHV-2 Development System enables rapid development of a wide variety of high voltage motor control applications using a dsPIC Digital Signal Controller (DSC), including Brushless DC (BLDC) motors, Permanent Magnet Synchronous Motors (PMSM), and AC Induction Motors (ACIM), in sensor or sensorless operation. The MCHV-2 outputs up to 1000W at 400V from 85–285 VAC input and has an integrated power factor correction stage. The MCHV-2 supports the dsPIC33F/E Motor Control device families and offers a mounting option to connect either a 28-pin SOIC device or a generic 100-pin Plug-in Module PIM. With the MCHV-2 either internal, on chip op amps found on certain dsPIC DSC devices or the external op amps on the MCHV-2 board can be used. Microchip provides PIMs for using either the internal or external op amps.

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Application-Specific Development Tools

dsPICDEM MCSM Development Board (DM330022)

This development board is intended for low-voltage (up to 80 volts at 3 amps) 2-phase uni-polar or bi-polar stepper motor (4, 6 or 8 wire) applications. It provides a low-cost system for users to evaluate and develop applications using dsPIC33F motor control DSCs via a Plug-In Module (PIM) or 28-pin SOIC socket. A USB serial interface for RTDM is provided. Feedback support includes current and voltage. Demo software to run motors in open-loop or closed-loop with full or variable micro-stepping is provided. A DMCI/RTDM GUI for controlling step commands, motor parameter input and operation modes is included.

Buck/Boost Converter PICtail Plus Card (AC164133)

A low-cost development platform for dsPIC33FGS SMPS devices, the buck/boost converter PICtail Plus card has two buck stage outputs and one boost stage output. This board can be used with either the Explorer 16 board or the 16-bit 28-pin starter board and the dsPIC33FGS SMPS and digital power conversion devices.

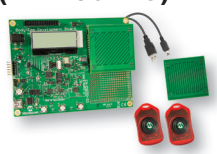
Security

KEELOQ® Security ICs 3 Development Kit (DM303008)



The low-cost KeeLoq Security ICs 3 Development Kit is designed to help engineers get up to speed quickly on PIC microcontrollers. The kit provides everything you need to program, debug and develop secure authentication applications for a variety of markets such as security systems (keypads, remote sensors, and access control), remote keyless entry (automotive) and authentication (identity and property) applications.

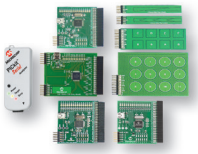
BodyCom™ Technology Development Kit (DM160213)



The BodyCom Technology Development Kit is designed to help engineers get up to speed quickly using this new technology. Utilizing Microchip's PIC microcontrollers and analog components, it provides everything needed to program, debug and develop secure communication systems for a variety of applications including access control or passive keyless entry.

Touch Sensing Technology

Enhanced mTouch Capacitive Touch Evaluation Kit (DM183026-2)



The enhanced mTouch Capacitive Touch Evaluation Kit provides a simple platform for developing a variety of capactive touch sense applications using PIC16F, PIC24F and PIC32 microcontrollers.

Metal Over Cap Accessory Kit (AC183026)



The Metal Over Cap Accessory Kit contains two daughter boards showcasing Metal Over Cap technology. One board has a stainless steel cover and the other board has a plastic cover. This kit provides an easy way to evaluate Microchip's unqiue technology when used in conjunction with the mTouch Capacitive Touch Evaluation Kit (DM183026-2).

mTouch AR1000 Development Kit (DV102011)



This kit provides everything designers need to get started using AR1000 resistive controllers for a turn-key, cost-effective solution. The kit includes the AR1000 development board, a 7" four-wire resistive touch screen, a PICkit Serial Analyzer and all necessary interface cables, as well as a CD containing technical documentation and all necessary software.

mTouch AR1100 Development Kit (DV102012)



The mTouch AR1100 Development Kit provides everything designers need to get started using AR1100 resistive controller for a turn-key, cost-effective USB solution.

PIC32 GUI Development Board with Projected Capacitive Touch (DM320015)



This board enables development of cost-effective multi-touch graphical user interfaces. It is based on the PIC32MX795F512H and projected capacitive touch controller, MTCH6301. The board provides USB host and device connectivity and supports I/O) connections via through-hole pads for custom board attachment.

MGC3130 Single Zone Evaluation Kit "Sabrewing" (DM160217)



A complete solution for exploring the MCG3130 3D hand tracking and gesture recognition controller based on electrical near-field sensing. Features a 7" sensing electrode, USB interface and the GestIC® Technology Colibri Suite.

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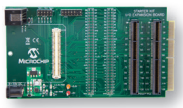
Application-Specific Development Tools

USB

PIC32 I/O Expansion Board (DM320002)



This I/O expansion board provides PIC32 starter board (DM320001, DM320003) users with full access to MCU signals, JTAG debugging, ICSP development and connection of PICtail Plus daughter cards.

PICDEM FS USB Demonstration Kit (DM163025-1)

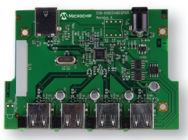


The PICDEM FS USB Demonstration Kit is designed as an easy-to-use evaluation platform for Microchip's PIC18F2X/4XK50 family of USB MCUs. These devices support full-speed USB communication without the need for an external crystal, which allows significant cost savings and reduced design effort. The demo kit provides all of the hardware needed to demonstrate and develop a complete USB communication solution. Additional software is available for free at Microchip's online software libraries.

USB PICtail Plus Daughter Board (AC164131)

This daughter board enables USB connectivity when using a PIC24 or PIC32 USB PIM in conjunction with the Explorer 16 board.

USB2514B Hi-Speed USB 2.0 Multi-TT 4-Port Hub with Battery Charging Support (EVB-USB2514BC)



USB2514B MultiTRAK™ Hub Controller is a low-power, full-featured, OEM configurable Hi-Speed USB 2.0 compliant hub with four downstream ports. Each of these downstream ports in the USB2514B device is capable of supporting battery charging per the USB battery charging specification.

USB2640 USB 2.0 Port Hub with Ultra Fast Flash Media Controller Evaluation Board (EVB-USB2640)



The USB2640 is an Ultra Fast USB 2.0 Hub, Flash media controller, and protocol bridge combo. The EVB-USB2640 Evaluation Board demonstrates a stand-alone application for developers of applications such as Flash media card reader/writer, printers, desktop and mobile PCs, consumer A/V, and flat panel displays.

Wi-Fi

RN171 Wi-Fi Evaluation Kit (RN-171-EK)



The RN-171-EK is an 802.11 b/g Wi-Fi evaluation kit for the RN171 module. It can be used to quickly add Wi-Fi connectivity to embedded applications. It has the flexibility to connect directly to a PC via a standard USB interface or to embedded processors through the TTL/UART interface. The board includes two convenient pushbuttons for controlling both SoftAP and WPS mode without software configuration. The status LEDs and jumpers enable rapid prototyping and integration into existing systems.

Wi-Fi Comm Demo Board (DV102411)



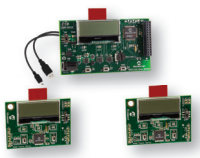
The Wi-Fi Comm Demo board provides a compact development platform for customers to evaluate Microchip's Wi-Fi product offerings. The demo board comes with a PIC32 MCU as well as an onboard MRF24WB0MA Wi-Fi module which is FCC/IC/ETSI certified.

Wi-Fi G Demo Board (DV102412)



The Wi-Fi G Demo Board is a compact demonstration platform for customers to easily evaluate and configure the fully certified MRF24WG0MA 802.11 b/g Wi-Fi module. The demo board is a fully functional standalone web server powered by two AAA batteries. It comes with the MRF24WG0MA Wi-Fi module connected to a PIC32 with TCP/IP stack pre-configured to serve web pages and show SoftAP, Wi-Fi Direct client, and WPS functions.

MiWi™ Wireless Networking Protocol to Wi-Fi Wireless Demo Kit (DM182018)



The MiWi Wireless Networking Protocol to Wi-Fi Wireless Demo Kit allows developers to evaluate and experiment with MiWi wireless networking protocol to Wi-Fi gateway solutions. The kit includes a wireless evaluation board with both MiWi wireless networking protocol and Wi-Fi transceivers. It also includes two MiWi wireless networking protocol demo boards to create a three node MiWi wireless networking protocol network. The MiWi Wireless Networking Protocol to Wi-Fi Demo Kit is pre-programmed with a wireless demo program, which demonstrates how to commission and control the MiWi wireless networking protocol P2P network from a web browser.

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Analog Development Tools

Analog-to-Digital Converters

MCP3911 ADC Evaluation Board for 16-bit MCUs (ADM00398)



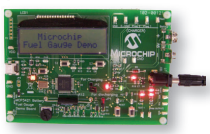
The MCP3911 ADC Evaluation Board for 16-Bit MCUs system provides the ability to evaluate the performance of the MCP3911 dual-channel ADC. It also provides a development platform for 16-bit PIC-based applications using existing 100-pin PIM systems compatible with the Explorer-16 and other high pin count PIC demo boards. The system comes with a programmed PIC24FJ256GA110 PIM module that communicates with the included PC software for data exchange and ADC configuration.

MCP3421 Weight Scale Demo Board (MCP3421DM-WS)



The MCP3421 Weight Scale Demo Board is designed to evaluate the performance of the low-power consumption, 18-bit ADC in an electronic weight scale design. Next to the MCP3421 there is a low-noise, auto-zero MCP6V07 op amp. This can be used to investigate the impact of extra gain added before the ADC for performance improvement. The PIC18F4550 controls the LCD and the USB communication with the PC. The GUI is used to indicate the performance parameters of the design and for calibration of the weight scale.

MCP3421 Battery Fuel Gage Demo Board (MCP3421DM-BFG)



The MCP3421 Battery Fuel Gauge Demo Board demonstrates how to measure the battery voltage and discharging current using the MCP3421.

The MCU algorithm calculates the battery fuel being used. The demo board displays the following parameters:
(a) Measured battery voltage
(b) Measured battery discharging current
(c) Battery fuel used (calculated)

Although the MCP3421 Battery Fuel Gauge Demo Board can charge a single-cell 4.2V Li-Ion battery, this feature is disabled by firmware since the demo kit is shipped with a non-rechargeable 1.5V AAA battery.

CAN and LIN Interface Products

MCP2515 PICtail Plus Daughter Board (MCP2515DM-PTPLS)



This daughter board is a simple Controller Area Network (CAN) board designed to be used with boards containing the PICtail Plus connector. The board also has the PICkit Serial connector for interfacing to the PICkit Serial Analyzer tool. The CAN node consists of the MCP2515 stand-alone CAN controller and MCP2551 CAN transceiver. The PICkit Plus and PICkit Serial connectors allow the board to be interfaced to a variety of PIC MCUs so that the user can develop a CAN node.

MCP2515 CAN Bus Monitor Demo Board (MCP2515DM-BM)

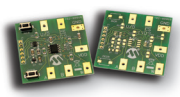
The MCP2515 CAN Bus Monitor demo board kit contains two identical boards which can be connected together to create a simple two-node CAN bus, which can be controlled and/or monitored via the included PC interface. The board(s) can also be connected to an existing CAN bus.

PICDEM CAN-LIN Demo Board (DM163011)

This demo board supports 28-pin SDIP PIC18F258 and PIC18F268X devices, 40-pin PDIP PIC18F458 and PIC18F468X devices and 20-pin PDIP PIC16C432 with integrated LIN Bus transceiver.

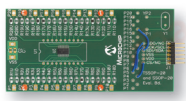
Digital Potentiometers

MCP402X Non-Volatile Digital Potentiometer Evaluation Board (MCP402XEV)



This low-cost board demonstrates the features of the MCP401X and MCP402X devices. The kit includes one populated and one unpopulated PCB. The populated board has an MCP4021-103E/SN digital potentiometer configured as a “windowed” potentiometer using a 2.5 kΩ pull-up and a 2.5 kΩ pull-down resistor. The PCB supports the 8-pin SOIC, SOT-23-6 and SOT-23-5 package variations. The unpopulated PCB allows users to build the exact combination of components their applications require.

MCP43XX Evaluation Board (MCP43XXEV)



The MCP43XX Evaluation Board allows the system designer to quickly evaluate the operation of Microchip's MCP4361 Digital Potentiometer device. The board uses the TSSOP20EV Generic PCB and has been populated for the MCP4361. The 6-pin header (PICkit Serial) has been jumpered to the MCP4361’s appropriate pins. This allows the PICkit Serial to communicate with the device.

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Analog Development Tools

Digital-to-Analog Converters

MCP4725 SOT-23-6 Evaluation Board (MCP4725EV)



The MCP4725 SOT-23-6 Evaluation Board is a quick and easy evaluation tool for the MCP4725 12-bit DAC device. It works with Microchip's popular PICkit Serial Analyzer or independently with the customer's applications board. The PICkit Serial Analzyer is sold separately.

MCP4728 Evaluation Board (MCP4728EV)

This evaluation board allows quick and easy evaluation of the MCP4728 4-channel 12-bit DAC device. It contains the MCP4728 device and connection pins for Microchip's PICkit Serial Analyzer. When the MCP4728 evaluation board is connected to the PICkit Serial Analyzer and the DAC input data is entered into the PC Graphical User Interface program, the serial analyzer automatically sends the user's data to the DAC device.

Energy Meters

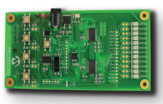
MCP3905A Energy Meter Reference Design (MCP3905RD-PM1)



This low-cost energy meter board acts as a stand-alone energy meter or as the analog front-end design for LCD microcontroller-based meters. The MCP3905A design is specified with an energy measurement error of 0.1% typical across 1:500 dynamic range for high-accuracy energy meter designs. The board is compliant with EMC requirements per energy metering standards IEC62053 and legacy IEC61036, IEC1046 and IEC687.

I/O Expanders

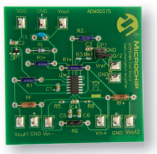
MCP23X17 16-bit GPIO Expander Evaluation Board (MCP23X17EV)



This board demonstrates the simple input/output functionality of the MCP23017 (I^2C interface) and the MCP23S17 (SPI interface). The system demonstrates the simplicity of monitoring four pins configured as inputs and applying a predetermined pattern on LEDs connected to the remaining 12 pins configured as outputs.

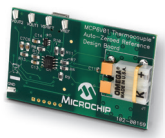
Operational Amplifiers

MCP6H04 Evaluation Board Instrumentation Amplifier (ADM00375)



The MCP6H04 Instrumentation Amplifier board highlights the implementation of the MCP6H04 in a three op amp instrumentation amplifier circuit with buffered reference voltage.

MCP6V01 Thermocouple Auto-Zeroed Reference Design Board (MCP6V01RD-TCPL)



The MCP6V01 design board demonstrates how to use a difference amplifier system to measure Electromotive Force (EMF) voltage at the cold junction of thermocouple in order to accurately measure temperature of the thermocouple bead. The MCP6V01 auto-zeroed op amp, with its ultra low offset voltage (V_{OS}) and high Common Mode Rejection Ratio (CMRR), provides a way to capture this measurement.

MCP651 Input Offset Evaluation Board (MCP651EV-VOS)

This evaluation board provides a simple means to measure the board's op amp input offset voltage under a variety of operating conditions. The measured input offset voltage (V_{OST}) includes the input offset voltage specified in the datasheet (V_{OS}) plus changes due to power supply voltage (PSRR), common mode voltage (CMRR), output voltage (AOL), input offset voltage drift over temperature ($\Delta V_{OS}/\Delta T_A$) and 1/f noise.

MCP6V01 Input Offset Demo Board (MCP6V01DM-VOS)

This demo board provides a simple means to measure the MCP6V01/2/3 op amps input offset voltage under a variety of bias conditions. This V_{OS} includes the specified input offset voltage value found in the datasheet plus changes due to power supply voltage, common mode voltage, output voltage and temperature.

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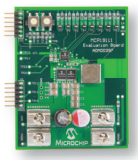
Analog Development Tools

Power Management

MCP19111 Evaluation Board (ADM00397)



The MCP19111 Evaluation Board demonstrates how the MCP19111 device operates in a synchronous buck topology over a wide input voltage and load range. Nearly all operational and control system parameters are programmable by utilizing the integrated PIC microcontroller core. MPLAB X IDE can be used in conjunction with a Graphical User Interface (GUI) plug-in to easily configure the MCP19111. Alternatively, users can program the MCP19111 using their own firmware, tailoring it to their applications. The evaluation board contains headers for ICSP™ (In-Circuit Serial Programming™) as well as I²C communication, pull-up and pull-down resistor pads and test point pads on each GPIO pin, and two push buttons for system development.

MCP19035 300 kHz Synchronous Buck Controller Evaluation Board (ADM00434)



The MCP19035 300 kHz Synchronous Buck Controller Evaluation Board provides a compact, low-cost and highly efficient step-down conversion for low to medium output currents.

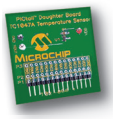
MCP1640 Synchronous Boost Converter Evaluation Board (MCP1640EV-SBC)



This board uses the MCP1640 in a high-efficiency (up to 96%), fixed frequency (500 MHz), step-up DC-DC converter. It demonstrates a minimum number of external component power supply solutions for applications powered by alkaline, NiCd/NiMH or one-cell Li-Ion or Li-Polymer batteries.

Thermal Management

TC1047A Temp-to-Voltage Converter PICtail Demo Board (TC1047ADM-PICTL)



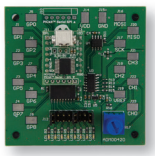
This board demonstrates how to integrate an analog temperature sensor into a system, using a TC1047A interfaced to a MCU. It connects directly to the PICkit 3 Starter Kit, providing a platform for code development and evaluation.

MCP9700 Thermistor Demo Board (MCP9700DM-TH1)

This demo board contains analog circuitry to measure temperature. The board uses BC Components' 232264055103 NTC thermistor to convert temperature to resistance. The thermistor is placed in a voltage divider which converts resistance to voltage. This voltage is filtered and placed at the MCP6S22 Programmable Gain Amplifier's (PGA) CH0 input. The PGA gains and buffers the thermistor.

USB Peripherals

MCP2210 Evaluation Kit (ADM00421)



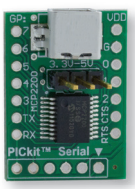
The MCP2210 Evaluation Kit is a development and evaluation platform for the MCP2210 device. The MCP2210 is a USB to SPI (Master) device which allows control of SPI peripheral devices. A DLL package is available that allows development of custom software using the MCP2210. This board includes several SPI Slave devices (8-bit I/O expander, 4 channel, 12-bit ADC, Serial EEPROM and a temperature sensor).

MCP2210 Breakout Module (ADM00419)



The MCP2210 Breakout Module can be used with either the MCP2210 Motherboard or as a standalone USB to SPI (Master) bridge module. The breakout board provides all the signals needed to assist the users in building their own boards using the MCP2210. The MCP2210 Utility software allows custom device configuration. In addition, a DLL package is available to allow development of custom software utilizing the MCP2210.

MCP2200 Breakout Module (ADM00393)



The MCP2200 Breakout Module is a development and evaluation platform for the USB-to-UART (Universal Serial Bus-to-Universal Asynchronous Receiver/Transmitter) serial converter MCP2200 device. The module is comprised of a single Dual In-Line Package (DIP) form-factor board.

UCS1002 USB Charging Controller – SMBus (ADM00497)

Microchip's UCS1001 USB port power controller provides a single USB port power switch capable of up to 2.5 amps of continuous current as well as a USB 2.0 compliant data switch. When a portable device is plugged in, it can auto-cycle through up to seven preloaded charger emulation profiles until charging commences. The embedded profiles are compatible with BC1.2 CDP, DCP, YD/T-1591 as well as most Apple® and RIM® portable devices. It also allows portable device charging when an application or host is in standby or in a sleep state.

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