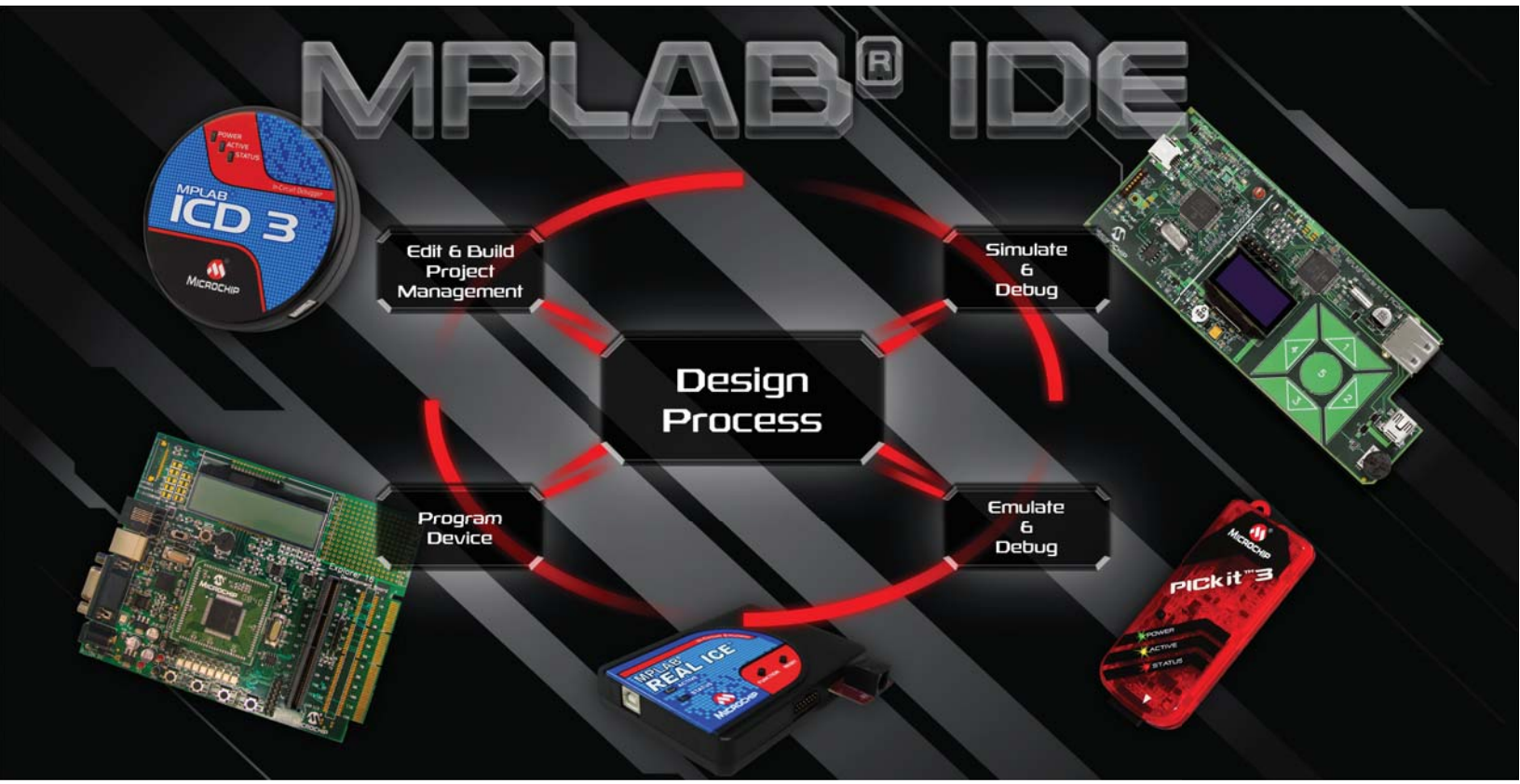
Development Tools

MICROCHIP

Quick Guide to Microchip Development Tools



www.microchip.com/tools

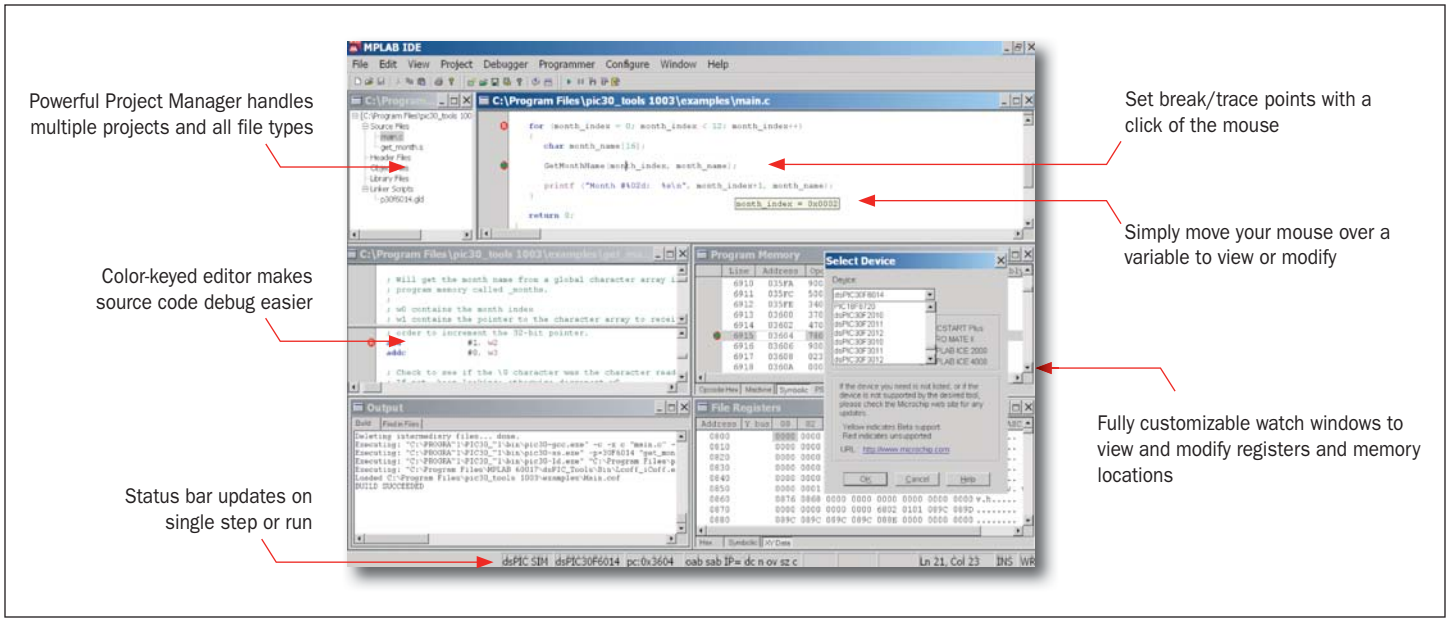
Integrated Development Environment and Software Tools

MPLAB® IDE

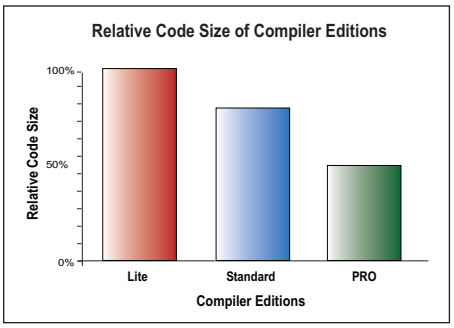
MPLAB IDE is Microchip's free, integrated toolset for the development of PIC® microcontroller and dsPIC® digital signal controller embedded applications. MPLAB IDE runs as a 32-bit application on MS Windows® , is easy to use and includes a host of free software components for fast application development and super-charged debugging. MPLAB IDE also serves as a single, unified graphical user interface for additional Microchip and third-party software/hardware development tools. Moving between tools is easy, and upgrading from the free MPLAB SIM simulator to MPLAB ICD 3 In-Circuit Debugger or the MPLAB REAL ICE™ In-Circuit Emulator is effortless, since MPLAB IDE has the same user interface for all tools.

Download MPLAB IDE and use the MPLAB IDE Quick Start manual to discover how easy it is to create an application. Write code, build and assemble your project with MPLAB wizards, then test your code with the built-in simulator and debugger. Explore the capabilities of all Microchip microcontrollers. When you are ready to test your application, use a PICkit™ 3 or MPLAB ICD 3 to program a device and analyze your hardware, or choose a production-graded, universal MPLAB PM3 programmer to program your code. For the ultimate in analysis, rely upon the MPLAB REAL ICE in-circuit emulator to help find the toughest bugs and fine tune your application.

- **MPLAB SIM** – High-speed software simulator features peripheral simulation, complex stimulus injection and register logging. MPLAB SIM executes your code and can be exercised with stimulus signals from files, from mouse clicks and from easily set up waveforms. The contents of variables and special function registers can be logged to a file for analysis.
- **Programmer's Text Editor** – Color-coded context easily shows typos and incorrect assembler and C statements. Full debugging is performed while in the editor window, including setting breakpoints, displaying variable values with mouse over and setting trace ranges.
- **Full-Featured Debugger** – Watch windows show C structures and arrays, as well as all variables from C and assembler source. Step-over, step-into, step-out and run to cursor allow quick inspection of code operations.
- **Data Monitor Control Interface (DMCI)** – Provides a graphical method to input and adjust software motor parameters. Plots can be used to show a time history of control variables so that the motor dynamic response can by analyzed. Useful for tweaking software parameters and visualizing historical data during debug sessions.
- **Version Control Support** – For MS Source Safe, CVS, PVCS and Subversion.
- **Macro Assembler** – For all current Microchip devices, with linker and librarian for building reusable code libraries. These can be used for assembly language programming and are also delivered with the Microchip C Compilers.
- **Graphical Project Manager** – Source files can be instantly opened and edited, different optimizations can be applied to different source files and all project files are displayed in the project window.



Microchip Compilers



Microchip offers two C compiler families: MPLAB C Compiler and HI-TECH C® Compiler. Both compilers produces highly optimized codes, are integrated with MPLAB IDE, compatible with Microchip debuggers and emulators and are available as the freeware Lite and evaluation editions.

The Lite editions support the same devices and commands as the Standard or PRO editions, and have no time or memory restrictions, however code optimizations are limited. The Lite editions offer unrestricted-use license so they are ideal as a low-cost tool for academic or commercial use. The evaluation editions enable full use of features and optimizations of the compilers. After the evaluation period, the compiler will revert to the Lite edition functionality. Both Lite and evaluation editions are available for free download at **www.microchip.com/free**

HI-TECH C compilers are available for all Microchip microcontrollers and DSCs. MPLAB C compilers are available for 8-bit PIC18, 16-bit and 32-bit microcontrollers.

MPLAB C® Compilers

High Optimization and Performance at a Low-cost

Microchip's MPLAB C compilers are full-featured, ANSI- compliant high-performance tools that are tightly integrated with MPLAB IDE. Source level debugging allows single- stepping through C source code and inspecting variables and structures at critical points in the code. Being integrated with MPLAB IDE allows a single environment to write source code, debug with the free MPLAB SIM simulator, and full hardware debugging with MPLAB ICD 3 and MPLAB REAL ICE. Compiler switches and linker customizations are done within the MPLAB IDE to provide a full graphical front end to these powerful compilers. Editing errors and breakpoints instantly switch to the corresponding lines in source code. Watch windows show data structures with defined data types, including floating point.

Microchip's C Compilers for 16-bit and 32-bit MCUs and DSCs are based upon open source GCC code, and source code is freely available.

- ANSI-compliant, with standard math, memory, data conversion and math libraries
- Generates relocatable object modules and libraries for enhanced code reuse
- Strong support for in-line assembly when total control is absolutely necessary
- Allows complete freedom to mix C and assembler modules in a single project
- Extensive libraries including Microchip peripheral libraries
- Full user control over data and code memory allocation
- Full interrupt support
- Free upgrades
- Support for DSP intrinsics (for dsPIC DSCs)

HI-TECH C® Compilers

Featuring Omniscient Code Generation™

HI-TECH C compilers are enabled with Omniscient Code Generation (OCG), a whole-program compilation technology, to facilitate more intelligent, state-of-the-art code generation and enhance product usability. Rather than relying completely on the linker to uncover errors in independently compiled modules, an OCG compiler completes the initial stages of compilation for each module separately, but defers object code generation until the point at which a view of the whole program is available. Information gathered from a global view of the program, can be used to provide better detection of potential errors in the user's code, and to better optimize the output. HI-TECH C compilers can deliver denser code, improve RAM utilization and reduce interrupt latency.

- The all-seeing nature of OCG enables the compiler to determine if a variable is being used in the program. Unused variables are removed, thus saving RAM.
- OCG enables a compiler to determine which variables are used in a program. Those which are not used are removed to save RAM.
- The compiler knows exactly which registers are in both interrupt and mainline context, so it can generate code accordingly, minimizing both the code size and cycles required to switch contexts.
- OCG allows automatic allocation of data into RAM banks eliminating the need for the programmer to specify the location of the variables.
- OCG has the ability to generate a printf function that is customized for the program at hand. It does this by scanning the user's code and only includes those features of printf that were detected. This results in a huge saving in program memory but also saves you valuable RAM space.
- By only including the features of printf in the user's code, OCG has the ability to generate a printf function that is customized for the program at hand, saving significant amounts of program memory and valuable RAM space.
- The compiler detects how frequently each variable is used and which are dependent, enabling it to optimize pointers and position objects in the most efficient memory spaces, eliminating the need for this to be done manually with non-standard C language extensions.
- Fully ANSI-compliant
- Includes Library source – for standard libraries and sample code for I/O drivers
- Includes macro assembler, linker, preprocessor and one-step driver
- Runs on Windows, Linux and Mac® OS X

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 IDE. MPLAB ICD 3 offers debugging and hardware features that would satisfy the needs of most users. PICkit 3 Debugger/Programmer is the economical choice when basic debugging functions are desired. MPLAB REAL ICE emulator offers advanced features usually available only on expensive and high-end emulators, like data capture, trace, logic triggers and high-speed debugging up to 10 feet. Both MPLAB REAL ICE 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 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" x .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 15x over MPLAB ICD 2.
- MPLAB ICD 3 supports target supply voltages from 2.0 to 5.5 volts.
- 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 IDE, downloadable free. MPLAB ICD 3 In-Circuit Debugger is field upgradeable through a firmware download from MPLAB IDE.
- Allows debugging with MPLAB 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 Integrated Development Environment (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 2.0 volts (2.0V 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™ 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 Integrated Development Environment (IDE), included with each kit. The MPLAB REAL ICE 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 is field upgradeable through future firmware downloads in MPLAB IDE. In upcoming releases of MPLAB 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

In-Circuit Emulators and Debuggers

In-Circuit Emulators and Debuggers

Feature	PICkit™ 3	MPLAB® ICD 3	MPLAB REAL ICE™
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 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, SMH Technologies and CCS
- **Compilers** from companies such as CCS, microEngineering Labs and IAR Systems
- **Software Tools** from companies such as Gimpel and Trace Systems
- **Protocol Analyzers** from companies such as Saleae and Total Phase
- **Demo Boards** from companies such as Evidence SRL, Nurve Networks, Bartek Technologies and Schmartboard
- **Embedded Ethernet and Connectivity Solutions** from companies such as CCS and Embed
- **Innovative Cable Solutions** from companies such as Tag-Connect

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, a CD containing MPLAB IDE and Lite compiler editions and tutorials. To get started, simply install the software, start MPLAB 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 PIC24F, PIC24H 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.

Getting Started

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.

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 need to develop USB embedded host/device/OTG applications by combining this board with Microchip's free USB software.

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)

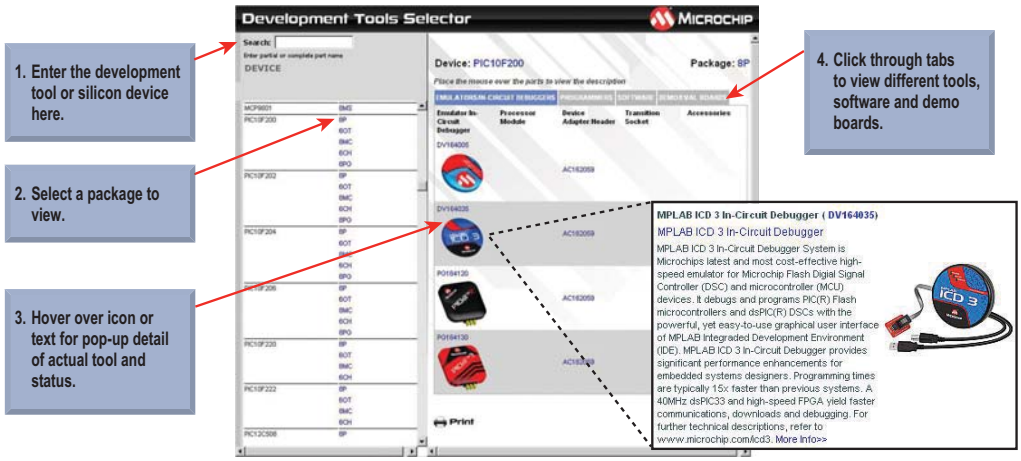
The PICkit 3 Debug Express combines a 44-pin demo board with a PIC18F45K20 microcontroller and a PICkit 3 debugger/programmer.

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.

Development Tools Selector

Microchip's Development Tools Selector (DTS) is software 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 silicon products. Just enter either a development tool or silicon device in the search box and it quickly displays all related tools and devices. Updated after every MPLAB® IDE release, it is available online and offline at: www.microchip.com/select



Application Specific Development Tools

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.

Ethernet PICtail™ Daughter Board (AC164121)

Provides a cost-effective method of evaluating and developing Ethernet-control applications. This board is populated with a 28-pin Ethernet controller, which interfaces to the RJ-45 female connector. Designed for flexibility, this board can be plugged into the popular PICDEM HPC Explorer board (DM183022).

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.

PICDEM PIC18 Explorer Board (DM183032)

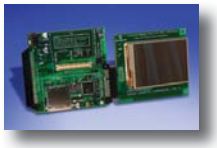
This low-cost demo board features a PIC18F8722 MCU which is the superset of the traditional PIC18 general purpose 5V family. The board also comes with the PIC18F87J11 processor PIM which is the superset of the PIC18 J-series of 3V MCUs for cost sensitive applications. This single development board supports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

PIC18F4XK20 Starter Kit (DM164124)

This starter kit is a demonstration and development platform for Microchip's K20 series microcontrollers. The board provides a platform to highlight this families benchmark for lower power consumption, low-cost and high-performance operation. It includes the development board, PICkit 3 development programmer/debugger and programming lessons.

Graphics and LCD

Graphics PICtail™ Plus Daughter Board with 3.2″ Display Kit (AC164127-3)



This kit provides a cost-effective method for evaluating and developing graphics display applications for 16- and 32-bit microcontrollers. It includes a Graphics LCD Controller PICtail Plus SSD1926 board (AC164127-5) and a Graphics Display Truly 3.2″ 240 x 320 board (AC164127-4). The kit is compatible with the Explorer 16 development board (DM240001) or one of the PIC32 starter boards (DM320001, DM320003).

Graphics Display Powertip 4.3″ 480 x 272 Board (AC164127-6)

This demonstration board is used to evaluate Microchip's graphic display solution and graphics library for 16- and 32-bit microcontrollers. It is an expansion board compatible with the LCD controller boards such as Graphics LCD Controller PICtail Plus SSD1926 board (AC164127-5)

Motor Control and Power Conversion

dsPICDEM™ MCLV Development Board (DM330021)

This development board is intended for low-voltage (up to 48 volts at 10 amps) BLDC sensored or sensorless 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. Serial interfaces include: RS-232C, CAN, LIN and USB (for RTDM). Feedback support includes: Hall-Effect Sensors, Shaft Encoder, Back EMF voltages and single or dual shunt resistors for current. PICkit™ 3 In-Circuit Debugger, MPLAB ICD 3 In-Circuit Debugger or REAL ICE In-Circuit Emulator is required for programming or debugging operations..

Application Specific Development Tools

dsPICDEM™ MCHV Development System (DM330023)

This development system is intended for high-voltage (up to 400 volts at 6.5 amps) BLDC, PMSM and ACIM sensored or sensorless applications. It provides a low-cost Integrated Power Module (IPM) based system for users to evaluate and develop applications using dsPIC33F motor control DSCs via a Plug-In Module (PIM) or a 28-pin SOIC socket. Isolated serial interfaces include RS-232C and USB (for RTDM). Feedback support includes: Hall-Effect Sensors, Shaft Encoder, Back EMF voltages and single or dual current shunt resistors. A PFC circuit is provided to meet regulatory requirements. An isolated built-in debugger (similar to a starter kit programmer/debugger) permits a direct connection with a PC.

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.

dsPICDEM™ MCSM Stepper Motor Development Board Kit (DV330021)

The kit includes the dsPICDEM MCSM board, a stepper motor and a 24-volt power supply. PICkit 3 In-Circuit Debugger, MPLAB ICD 3 In-Circuit Debugger or REAL ICE In-Circuit Emulator is required for programming or debugging operations.

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.

Touch Sensing Technology

mTouch™ Capacitive Touch Evaluation Kit (DM183026)

Includes two main boards: one populated with a PIC16F72X 8-bit MCU and the other with a PIC24F256GB110 16-bit MCU; and four daughter boards for developing keys, sliders and a matrix.

PIC10F Capacitive Touch Board (AC103003)

This board demonstrates the simple implementation of a single capacitive touch key or proximity sensor using a PIC10F204/6 MCU.

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 necesssary interface cables, as well as a CD containing technical documentation and all necessary software.

PICDEM™ Inductive Touch Development Kit (DM183027)

This kit is an evaluation and development platform for Microchip's Inductive Touch Technology. Factory programmed firmware provides immediate access to all board features using the MPLAB mTouch plug-in. Using a PICkit Serial analyzer to communicate with the PC, it allows the user to analyze application critical information in real-time as it relates to sensor behavior.

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)

This demo kit is an easy-to-use evaluation platform for Microchip's Full-Speed USB solution. The family of full-speed USB microcontrollers fully support USB 2.0 and serial communications of up to 12 Mbit/s. All of the hardware and software needed to demonstrate and develop a complete USB communication solution is included.

PIC18F14K50 Low Pin Count USB Development Kit (DV164126)

This development kit provides an easy, low cost way to evaluate the functionality of Microchip's PIC18F14K50 and PIC18F13K50 20-pin USB microcontrollers. The kit contains the hardware, software and code examples necessary to take your USB design from concept to prototype.

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.

Analog Development Tools

Analog-to-Digital Converters

MCP3901 ADC Evaluation Board for 16-bit MCUs (MCP3901EV-MCU16)

This evaluation board for 16-bit MCUs provides the ability to evaluate the performance of the MCP3901 Dual Channel ADC. It also provides a development platform for 16-bit PIC MCU based applications.

MCP3421 Battery Fuel Gauge Demo Board (MCP3421DM-BFG)

This board demonstrates how to measure the battery voltage and discharging current using the MCP3421. The MCU algorithm calculates the battery fuel being used.

MCP355X Tiny Application Sensor Demo Board (MCP355XDM-TAS)

This 1″x 1″ board is designed to demonstrate the performance of the MCP3550/1/3 devices in a simple low-cost application. The circuit uses a ratiometric sensor configuration and uses the system power supply as the voltage reference. The extreme common mode rejection capability of the MCP355X devices, along with their excellent normal mode power supply rejection at 50 and 60 Hz, allows for excellent system performance.

CAN & 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)

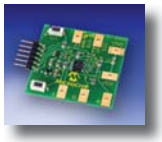
The MCP2515 CAN Bus Monitor demo board kit contains two identical boards which can be connected together to create a simple two node Controller Area Network (CAN) bus, which can be controlled and/or monitored via the included PC interface. The board(s) can also be connected to an existing CAN bus.

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. 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 user’s to build the exact combination of components their application requires.

MCP42XX PICtail™ Plus Daughter Board (MCP42XXDM-PTPLS)

This daughter board is used to demonstrate the operation of the MCP42XX Digital Potentiometers. The operation of the MCP41XX devices is similar to the MCP42XX devices. Therefore, this demo board can be used as a development platform for either device family. This board is designed to be used in conjunction with either the PIC24 Explorer 16 demo board or the PICkit Serial Analyzer.

Digital-to-Analog Converters

MCP4725 PICtail™ Plus Daughter Board (MCP4725DM-PTPLS)

This daughter board demonstrates the MCP4725 (12-bit DAC with non-volatile memory) features using the Explorer 16 development board and the PICkit Serial Analyzer.

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. Connect the MCP4728 evaluation board to the PICkit Serial Analyzer and enter the DAC input data in the PC Graphical User Interface program. The serial analyzer then sends the user's data to the DAC device automatically.

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.

Analog Development Tools

MCP3909 3-Phase Energy Meter Reference Design (MCP3909RD-3PH1)

This reference design is a fully functional 3-phase energy meter including PC software used for automated calibration. The reference design consists of two boards: the main metering board with the MCP3909 devices and PIC18F2520 that performs the power calculations, and the USB interface module which uses the PIC18F4550. The meter design contains serially accessible registers and is intended to be flexible and upgraded with a variety of PIC microcontrollers using the included firmware.

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.

IrDA®

MCP212X Developer's Daughter Board (MCP212XEV-DB)

Evaluates and demonstrates the MCP2122 or MCP2120 IrDA Standard Encoder/ Decoder devices. A header allows the MCP212X daughter board to be easily jumpered into systems for development purposes. This board also interfaces with the PICDEM HPC Explorer, PICDEM FS USB and PICDEM LCD demo boards.

MCP215X/40 Developer's Daughter Board (MCP215X/40EV-DB)

This daughter board evaluates and demonstrates the MCP2150, MCP2155 or the MCP2140 IrDA Standard Protocol Handler with Encoder/Decoder devices. Headers allow the MCP215X/40 Developer's daughter board to be easily jumpered into systems for development purposes. This board also interfaces with the PICDEM HPC Explorer, PICDEM FS USB and PICDEM LCD demo boards.

Operational Amplifiers

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. This can be done by using the MCP6V01 auto-zeroed op amp because of its ultra low offset Voltage (V_{OS}) and high Common Mode Rejection Ratio (CMRR).

MCP651 Input Offset Evaluation Board (MCP651EV-VOS)

This evaluation board provides a simple means to measure the boards 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 data sheet (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 data sheet plus changes due to power supply voltage, common mode voltage, output voltage and temperature.

Power Management

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.

MCP1630 Boost Mode LED Driver Demo Board (MCP1630DM-LED2)

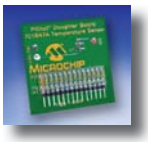
This demo board is a step-up, switch-mode, DC-DC converter used for power LED applications. The demo board provides a 350 mA or 700 mA constant current source with a jumper selection. The input operating voltage range is 9-16V DC and the board can supply up to 30W to a string of power LEDs.

MCP1631HV Multi-Chemistry Battery Charger Reference Design (MCP1631RD-MCC2)

This reference design board is used to charge one to five NiMH or NiCd batteries, charge one or two cell Li-Ion batteries, or drive one or two 1W LEDs. The board uses the MCP1631HV high speed analog PWM and PIC16F833 to generate the charge algorithm for NiMH, NiCd or Li-Ion batteries.

Thermal Management

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



This board demonstrates how to interface the TC1047A device to a MCU. Connects directly to the PICkit 3 Starter Kit, providing a platform for code development and evaluation. Demonstrates a good example of how to integrate an analog temperature sensor into a system.

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.

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