microSOLUTIONS JAN 2010

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Microchip Technology Acquires ZeroG Wireless for Embedded Wi-Fi® Solutions for PIC® MCUs

Microchip Technology is pleased to announce that it has acquired **ZeroG Wireless, Inc.,** an innovator in low-power embedded Wi-Fi® solutions based in Sunnyvale, CA.

ZeroG is a privately held fabless semiconductor developer of Wi-Fi-certified transceivers and FCC-certified modules. This aquisition further strengthens Microchip's wireless offerings by enabling embedded designers to easily connect to this ubiquitous networking protocol with any 8-, 16- or 32-bit PIC microcontroller.

ZeroG's customers should continue to contact ZeroG through the normal sales and support channels that existed prior to this acquisition announcement. For more information, please visit ZeroG's web site at: **http://www.zerogwireless.com** or contact ZeroG at 408-738-7600.

The **ZeroG Wireless ZG2100M** and **ZG2101M Wi-Fi Modules**, **ZeroG IEEE 802.11 Development Kit for Explorer 16** (part # AC164136) and the **ZeroG Wi-Fi PICtail™/PICtail Plus Daughter Board** (part # AC164136-2) will continue to be available at **microchipDIRECT** and through the Microchip sales team. For additional information, contact any Microchip sales representative or visit Microchip's online Wireless Design Center at: **http://www.microchip.com/WiFi**

The **ZeroG 802.11 Development Kit for Explorer 16** demonstrates 802.11 connectivity via the **ZeroG ZG2100M PICtail™ board** for the PIC microcontroller based Explorer 16 Development Board. This kit includes a wireless router, a ZeroG PICtail Board, and a pre-programmed plug-in module with Microchips free TCP/IP stack and radio driver. The development kit provides everything the user needs to begin development of an 802.11 network.

The **ZeroG 802.11 PICtail™ Plus Daughter Board** is a demonstration board for evaluating Wi-Fi connectivity using PIC microcontrollers and the **ZeroG ZG2100M module**. This product is compatible with the **Explorer 16 Development Board** and other Microchip development platforms with the PICtail/PICtail Plus connector.

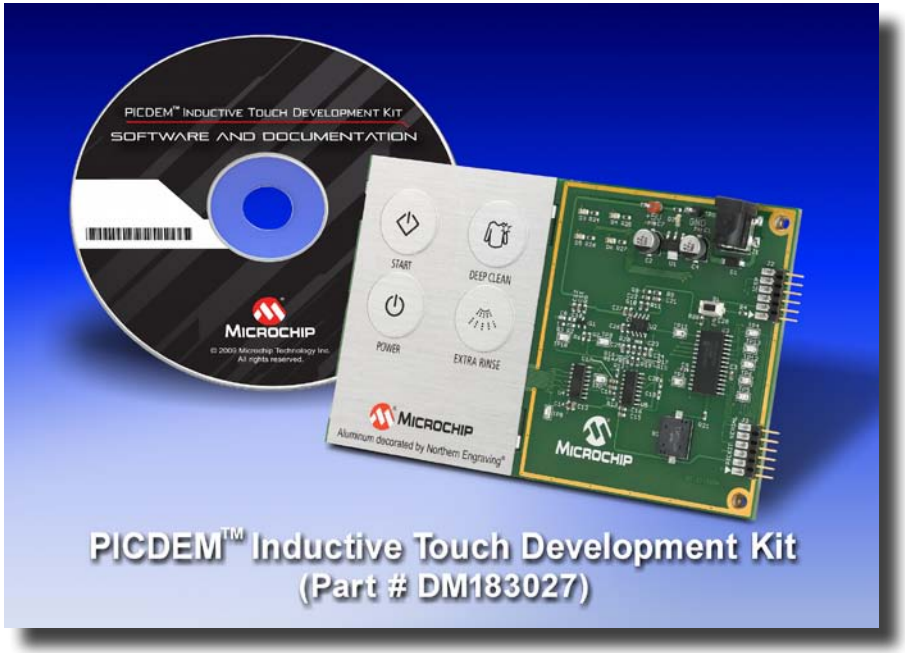
For more information on the acquisition, visit:
http://www.microchip.com/stellent/idcplg?IdcService=SS_GET_PAGE&nodeId=2018&mcparam=en546701

Simplify Development of Inductive Touch-Sensing Applications with the New PICDEM™ Inductive Touch Development Kit

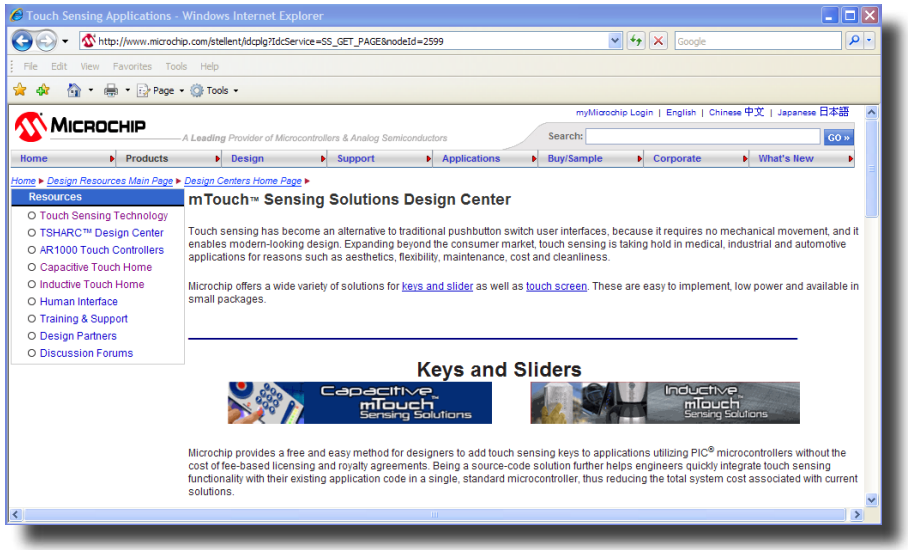
Microchip Technology's new **PICDEM™ Inductive Touch Development Kit** makes it easy and inexpensive to develop inductive touch-sensing applications using standard 8-, 16- or 32-bit PIC® microcontrollers (MCUs), or 16-bit dsPIC® Digital Signal Controller (DSCs). The kit includes a fully-developed inductive-touch board, complete with embossed metal front panel, source code, schematics and a diagnostic software tool that enables designers to evaluate their application.

Inductive touch sensing's fundamental operating principles enable it to work through a front panel, such as plastic, stainless steel or aluminum, providing a completely sealed user interface that works through gloves and on surfaces that may be expanded to liquids. Major applications for inductive touch-sensing user interfaces include those in the appliance market because of the possibility of a stainless-steel front panel; the industrial market because of the technology's robustness; and the automotive market because of the technology's sleek aesthetics and ability to reduce accidental touch triggers.

The PICDEM Inductive Touch Development Kit (part #DM183027) is available for purchase today and costs $69.99.



Click on the image above to view the Inductive Touch Demonstration video. To view Microchip's YouTube channel, click HERE.



For more information, visit Microchip's Online Touch Sensing Design Center at http://www.microchip.com/touch

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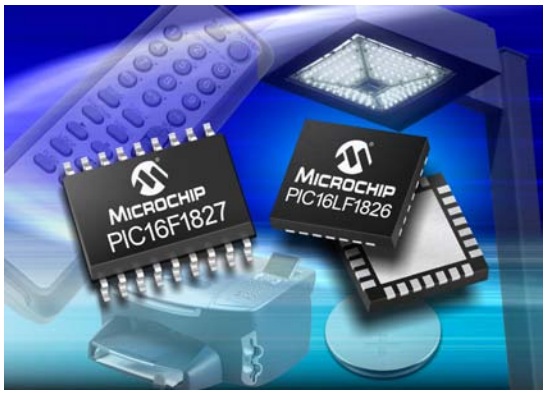
Increase Performance and Code Efficiency with 18-pin PIC® MCUs Featuring Enhanced Mid-Range Core, Industry-Leading eXtreme Low Power Consumption



The **PIC16(L)F1826** and **PIC16(L)F1827** general-purpose 8-bit Microcontrollers (MCUs) are the latest PIC MCUs to feature Microchip's **Enhanced Mid-Range core**. The first extension of this core into the 18-pin range, the PIC16(L)F1826/7 MCUs provide an advanced peripheral set that includes an **mTouch™** capacitive touch-sensing module and dual I²C™/SPI interfaces, along with "LF" versions featuring industry-leading low power consumption via Microchip's **nanoWatt XLP eXtreme Low-Power technology**. The MCUs' increased speed, ease-of-use and low cost provide an excellent pin-compatible migration path for legacy 18-pin PIC MCUs still used in many designs, today.

In a May 2009 **IEEE Spectrum article**, the **PIC16C84** was recognized as one of the "25 Microchips That Shook the World."* The PIC16(L)F1826/7 MCUs are a natural extension of this enduring legacy. With Microchip's Enhanced Mid-Range architecture, the MCUs provide a 50% increase in performance and 14 new instructions that make programming with the C language more efficient, resulting in up to 40% better code efficiency over previous-generation 8-bit PIC MCUs. In addition to the mTouch capacitive touch-sensing module and dual I²C/SPI interfaces, peripheral enhancements include enhanced PWM functionality, and a digital signal modulator that enables designers to customize communication interfaces, and combine many functions into a single MCU. nanoWatt XLP technology enables market-leading current consumption, improving overall energy efficiency and/or extending battery life in a broad range of applications.

Example applications for the PIC16(L)F1826/7 MCUs include those in the consumer (e.g. laser printers, remote controls); industrial (e.g. "green" lighting, embedded network gateways, traffic monitors, touch panels, metering); and automotive markets (e.g. LED daytime running lights and tail lights).

The **PICkit™ 2 18-pin Demonstration Board** (part #DM164120-4) provides a quick and easy way to evaluate and develop with the PIC16(L)F1826/7 MCUs. The board includes four LEDs, a potentiometer for an Analog-to-Digital Converter (ADC), a pushbutton, a prototyping area, a 6-pin connector for the **PICkit 3 In-Circuit Debugger/Programmer** (part #PG164130), as well as two bare boards for designers to use for their own project. The PICkit 2 18-pin Demonstration Board is priced at $23.99 and is expected to be updated with the PIC16F1827 MCU sample in calendar Q1 2010.

Feature	PIC16(L)F1826/7 MCUs
Max. Frequency	32 MHz
Internal Oscillator	32 kHz/31.25 kHz to 32 MHz, Software Selectable
Program Memory	Up to 7 KB Flash
Data EEPROM	256 Bytes
SRAM	Up to 384 Bytes
Timers	Up to 4 x 8-bit, 1 x 16-bit
Communication	2 x MI²C/SPI 1 x EUSART
Analog-to-Digital Converter	12 x 10-bit
Comparators	2 x with Rail-to-Rail Inputs
PWM Channels	Up to 4
Operating Voltage	1.8-5.5V
Standby Current	0.030 µA @ 1.8V, Typical
Other Capabilities	mTouch™ Capacitive Touch Sensing, Digital Signal Modulator

Microchip's complete suite of standard development tools can be used with the PIC16(L)F1826/7 MCUs, including the user-friendly and free **MPLAB® IDE**, along with the **HI-TECH C® compiler for PIC16 MCUs**. The HI-TECH C Lite edition is a completely free, fully-functional compiler with no time limitations. For applications with limited program space, the Standard and PRO editions offer denser code and improved performance. Additionally, there is a variety of debugging hardware, from the popular **PICkit 3 In-Circuit Debugger/Programmer** ($44.95), to the **MPLAB ICD 3 In-Circuit Debugger** ($219.99), **MPLAB PM3 Universal Device Programmer** ($895), and **MPLAB REAL ICE™ In-Circuit Emulator** ($495.00).

*Source: IEEE Spectrum, "25 Microchips That Shook the World," by Brian R. Santo, pgs. 34-36, May 2009.

For more information, visit: http://www.microchip.com/enhanced

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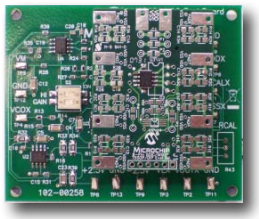
Three Microchip Products Make the EDN Hot 100

Each year, **EDN's** editors offer up their list of the year's 100 most significant amplifiers, CPUs, ICs, LEDs, microcontrollers, vector network analyzers and more. Microchip is proud to once again make EDN's Hot 100 Electronic Products list in three categories.

Analog ICs: MCP651/2/5 Offset-voltage-corrected Operational Amplifier



Microchip offers a demonstration board to allow you to evaluate the offset-voltage-calibration capabilities of the MCP652 op amp.

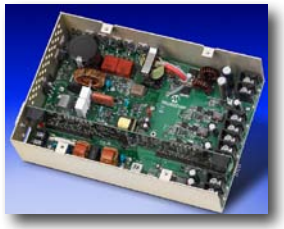
Microchip's MCP651/2/5 operational amplifier targets use in microphone preamplifiers, optical-detector circuitry, digital scales, industrial instrumentation, H-bridge drivers, bar-code scanners, transmission-line drivers, and medical equipment for patient monitoring and ultrasound functions. The device has a maximum supply voltage of 5.5V and a minimum supply voltage of 2.5V. Input-noise voltage density is 7 nV/√Hz with a flicker-noise corner of 30 kHz. The device has a 50-MHz-gain-bandwidth and can output 95 mA of current. The op amp has rail-to-rail outputs and an in input structure that allows input-common-mode voltages 300 mV below the negative-supply voltage. It requires 1.3V of common-mode head room below the positive-supply voltage. The output-slew rate is 30V/µsec, and the supply current is 6 mA. The typical input-bias current is 6 pA, and the maximum is 5000 pA at 125°C.
*Article written by: Paul Rako, Technical Editor – **EDN**, 5/18/2009*

Microchip's PIC32MX5/6/7/ ICs cover Ethernet, CAN, and USB connectivity

Microcontrollers and Processors: PIC32 Connectivity Microcontrollers

Microchip's PIC32MX5/6/7 family expands the connectivity support of PIC32 processors to cover 10/100-Mbps Ethernet; CAN 2.0b; and USB host, device and OTG (On-The-Go) peripherals. The company offers free TCP/IP (Transmission Control Protocol/Internet Protocol) and USB host- and device-software stacks, including source code, for these families. The 100 Mbps Ethernet MAC (Media-Access Controller) uses an RMII/MII (Reduced Media-Independent Interface/Media-Independent Interface) and includes a unique factory-preprogrammed Ethernet MAC address. The CAN2.0b controllers use system RAM for storing as many as 1024 messages in 32 buffers with as many as 32 filters and four filter masks. Additional available software includes support for AES (Advanced Encryption Standard), multiple file systems, graphics and audio libraries. The 80 MHz, 32-bit processors include as much as 128 Kbytes of RAM, six UARTs (Universal-Asynchronous Transmitter/Receiver) interfaces, five I^2C (inter-integrated-circuit) interfaces and four SPI (Serial-Peripheral-Interface) ports.
*Article written by Robert Cravotta, Technical Editor – **EDN**, 11/18/2009*

Power: dsPIC33F AC/DC Reference Design



The free, downloadable Microchip ac/dc reference design has one four-layer board for digital signals and another for the other power stages

Microchip offers an AC/DC reference design that it based on the new dsPIC33F GS series of digital-power DSCs (Digital Signal Controllers). The unit works with a universal input voltage range and produces three output voltages. The AC input can range from 85 to 265V, and frequencies range from 45 to 65 Hz; continuous-power-output rating is 300W. A front-end PFC (Power Factor Correction) boost circuit converts universal AC-input voltages to a 420V DC bus voltage. Input power factor is greater than 0.98. An isolated buck converter uses the 420V PFC bus to create a 12V, 30A intermediate bus. The converter uses a ZVT (Zero Voltage Transition) circuit to reduce losses, increase efficiency and reduce stress on the power MOSFETs.
The 12V bus then feeds a multiphase synchronous buck converter that can produce 69A at 3.3V. The 12V bus also feeds a single-phase buck converter that produces 23A at 5V.

The reference design has one four-layer board for digital signals and another for the other power stages. The design features soft-start capability and synchronous rectification. One dsPIC33F digital power IC handles the PFC and primary-side ZVT-bridge control, and a second chip provides the control for the converter stages. The design also features automatic fault handling and flexible start-up capabilities, such as sequencing output voltages on and off. Each of the four power stages features efficiencies of greater than 90%. The two DSCs communicate across the isolation boundary through UARTs. The design provides for remote power management.

You can download complete documentation, including software and Gerber files, free from Microchip's web site at: **www.microchip.com/SMPS**
*Article written by Paul Rako, Technical Editor – **EDN**, 4/14/2009*

For more information and to view the complete list of EDN's Hot 100 Electronic Products of 2009, visit: **http://www.edn.com/article/CA6711866.html**

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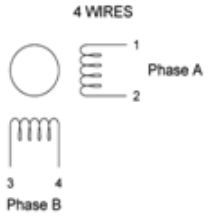
Get Stepping Faster with the dsPIC33F for Stepper Motor Control

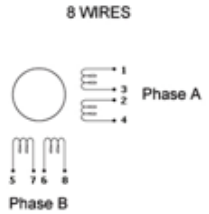
Article written by Patrick Heath, Strategic Marketing Manager, Microchip Technology Inc.

Most of the motors that you use each day are designed to start up and run at either a fixed or variable speed until turned off. Examples include: heater or air conditioner blower fan at home or in your car, an electric toothbrush, razor or hair dryer in your bathroom. Usually, your control is limited simply to an on/off switch or perhaps a fixed speed selection.

Stepper motors operate differently from this typical on/off mode. Instead of constantly running, they are designed to run for a precise distance and to stay on or hold the ending position. Examples include: the focus motor on a camera lens or paper movement motors in copiers or printers.



Because of this non-continuous operation, a stepper motor's design and control is quite different. It is designed to be able to move a small amount or one step at a time. Stepper motors can have two phases or windings (bipolar) or by splitting each, four windings (called unipolar). Directing a PWM signal to each of these windings in a precise sequence causes the motor to move one step. After stepping, a PWM signal is provided to one phase to create holding torque.



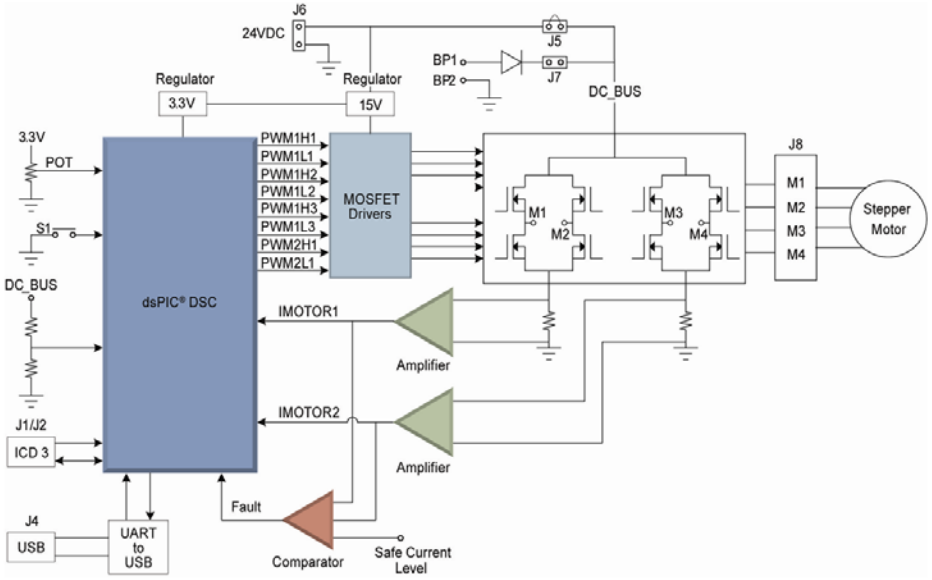
A **PIC16F** device, such as the **PIC16F1933** with one ECCP can steer its PWM output to each of the four phases to take a step. It can also use its on-chip comparator to limit the current to provide holding torque while staying within the motor's current limits. So, why would you need to use a more powerful dsPIC® Digital Signal Controller (DSC) for stepper motor control?

We can take advantage of the dsPIC DSC's capability: to control torque and reduce the back EMF, thereby stepping faster, to use table look-up instructions to implement very small fractional stepping (called micro-stepping), to control current amplitude and phase with a digital PI control loop thereby optimizing holding torque and efficiency, and to output sinusoidal PWM signals which reduce noise.

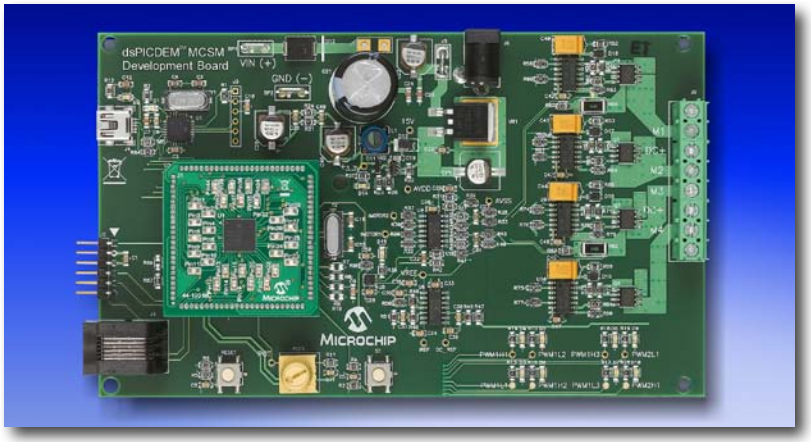
This table summarizes the impressive results from using the **dsPIC33F**.

Criteria	Typical Results	dsPIC® DSC Results	dsPIC® DSC Capability
Motor Speed	240 RPM (spec)	**6000 RPM (25x!)**	Torque PI control loop
Stepping Precision	1, ½ , ¼ - Step	**Up to 1/256 of a step**	Table Look-Up speed
Holding Torque	57 Oz-In	**66 Oz-In (100% spec)**	Current PI control loop
Efficiency	46%	**74%**	Current PI control loop
Noise	38 dB	**12 dB**	Sinusoidal output drive

To promote evaluation of the dsPIC33F for stepper motor control, Microchip recently introduced a low-cost development board called the **dsPICDEM™ MCSM Development Board**. Here is a block diagram of the board:



The **dsPICDEM MCSM Development Board** (part #DM330022) is $129.99, and is also available as the **dsPICDEM MCSM Development Kit** (part #DV330021, $269.99), which includes a stepper motor and 24-volt power supply. The stepper motor can be purchased separately if desired (part #AC300024, $90).



For more information visit: http://www.microchip.com/DSCMotor

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Microchip Technology Selected as Phoenix Business Journal "Best Place to Work" for Third Straight Year

Microchip Technology recently announced it has again been selected as one of the Phoenix Business Journal's "Best Places to Work in the Valley." For the third year in a row, the award places Microchip among the top-30 large companies (250+ employees) to work for in Arizona because of the way it creates an engaged and supportive workforce.

The "Best Places to Work" list, which was started in 2003, recognizes Valley companies that, through a third-party administered employee satisfaction survey, are ranked as being the best places to work. Varied parts of employee life are surveyed, including workplace environment, leadership direction, culture and management practices. Microchip was acknowledged for creating an enjoyable corporate culture and work environment that fosters personal and professional growth for its employees.

"One of our corporate values is that employees are our greatest strength," said Steve Sanghi, Microchip's president and CEO. "The fact that our employees again rated us so highly as an employer proves that we not only talk the talk, but we walk the walk. Even during the recent economic downturn, Microchip is the only company in the semiconductor industry not to have laid off a single employee. As a result, Microchip employees wear their badges IN their hearts, rather than ON their hearts."

For more information about careers at Microchip Technology, please visit **www.microchip.com/careers**

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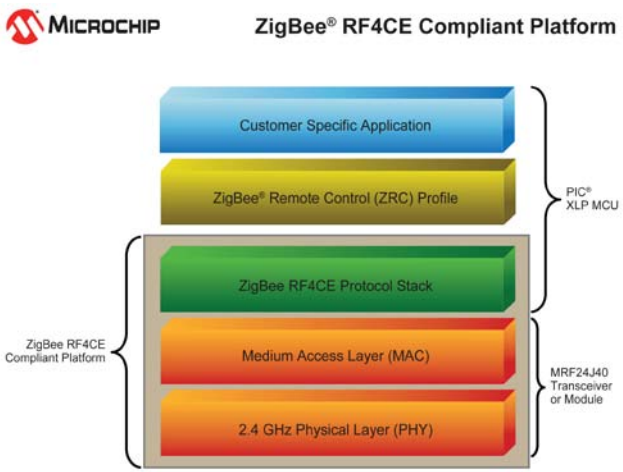
ZigBee® RF4CE Protocol and XLP Compliant Platform for RF Remote Controls and Consumer Electronic

Platform for Next-generation RF Control of Consumer Electronics Consists of eXtreme Low Power Microcontrollers, Compliant Transceiver and the Industry's Smallest Stack



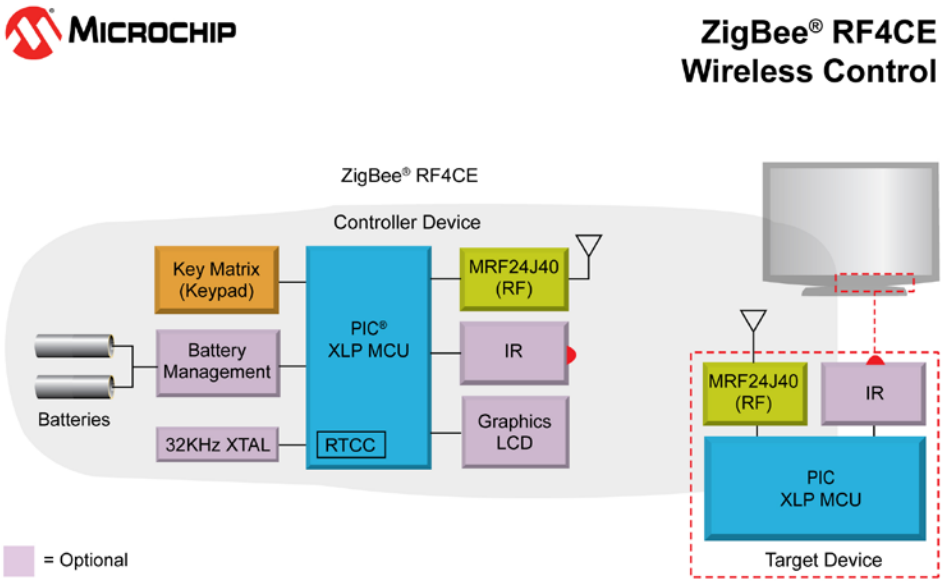
Microchip has achieved certification for its **ZigBee® RF4CE Compliant Platform**, which enables the next generation of RF remote controls and consumer electronics. The platform consists of Microchip's **nanoWatt XLP eXtreme Low Power PIC® Microcontrollers (MCUs)**, the MRF24J40 IEEE 802.15.4 transceivers and FCC-certified modules, and the industry's smallest memory footprint ZigBee RF4CE-certified protocol stack.

The consumer electronics industry is rapidly transitioning from infrared remote controls, which require line-of-sight operation and have limited range, to the more robust and versatile RF wireless technology. The ZigBee RF4CE protocol provides an industry standard for this transition, ensuring interoperability between OEM or aftermarket remote controls and consumer electronics, and facilitating interoperable communication among audio/visual entertainment equipment for an improved user experience.

In addition to low power consumption, the compliant PIC microcontrollers with XLP technology offer a wide range of integrated peripherals for capacitive touch sensing, USB and a host of analog functions. Free software is also provided to enable these peripherals, including Microchip's USB stacks and libraries, and **mTouch™** sensing software. Together with its IEEE 802.15.4 compliant 2.4 GHz MRF24J40 transceiver and agency certified transceiver modules, Microchip provides a highly efficient, cost-effective, platform for implementing the new RF4CE protocol in RF-enabled remote controls and equipment.

Microchip offers a wide range of tools for development with the extreme low power PIC MCUs, including the free **MPLAB® IDE**, the **MPLAB REAL ICE™** emulation system, the **MPLAB ICD 3 in-circuit debugger**, the low-cost **PICkit™ 3 debugger/programmer** and Microchip's free C compilers. All of these tools are available today at **www.microchip.com/XLPtools**

Microchip's certified RF4CE protocol stack is currently available to beta program participants, with general availability planned for March. The MRF24J40 transceiver and FCC-certified modules are available today, as are the compliant families of XLP PIC microcontrollers.



For more information visit: http://www.microchip.com/RF

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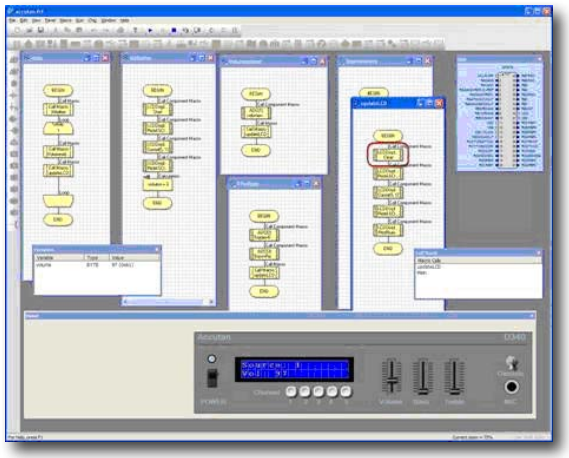
Matrix Multimedia's Flowcode for PIC® Microcontrollers Now Available with Microchip's HI-TECH C® Compiler

For more information contact
Phone: +44 (0) 1422 252 380
sales@matrixmultimedia.co.uk
23 Emscote Street South
Halifax
West Yorkshire
UK
HX1 3AN
http://www.matrixmultimedia.com



You may not have heard of Flowcode, but it is a clever piece of software that allows you to design microcontroller code using standard flow chart symbols. The package is very simple to use. Designers first choose the PIC® Microcontrollers (MCUs) you want to use from the PIC12, PIC16 or PIC18 families. Once the device is chosen, it is displayed on Flowcode's workspace. Then, you assemble your panel using standard components such as switches, LCD displays or keypads and connect them to the microcontroller pins. As shown in the image on the left, Flowcode's drawing tools allow the system to be drawn so that it looks and feels like the final design. Once the system is assembled on the screen, you then drag flow chart icons onto the workspace and edit their properties. You can then simulate the entire system working on-screen – watching the variables change, monitoring the status of pins on the chip, seeing the display update and altering status of switches.

Here is the neat part. When you are happy that your design works, you can compile it to hex code. Flowcode includes 'drivers' for a host of devices and subsystems like LCD displays, keypads and communication systems like SPI, I^2C, etc. In the compilation process, Flowcode first compiles the system to C, then to Assembly and then to hex. A special icon type in Flowcode allows you to enter C or ASM code that is passed to the compiler in this process. This makes Flowcode really flexible as you can design a front panel with basic functionality and still incorporate any time critical or complex code that is already written. The **HI-TECH C® Compiler** can be selected as the default C compiler that is used within Flowcode so the software can be used to help manage and enhance all current Microchip HI-TECH projects.

For more information on Microchip's HI-TECH C compilers, please visit: **www.microchip.com/MPLAB**

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An ***Authorized Microchip Design Partner*** has the unique advantage of helping you get to market faster. This program provides you, as a customer, a specialized resource that has been technically and commercially qualified by Microchip. The Design Partner Program offers special support and technical training to keep its partners current with the latest technology and device offerings from Microchip.

This support is not limited to Microchip's broad line of 8-bit microcontrollers, but also includes the growing line of analog products, 16-bit microcontrollers and digital signal controllers and 32-bit microcontrollers. If your design could use a boost, let a design partner help you get to market faster with Microchip.

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Introducing "MCHP Tube"

Microchip's Academic Program team has launched a brand new YouTube-based show called "**MCHP Tube**". MCHP Tube is an online video newscast for all things Microchip with a focus on Academia. Here you'll find the latest information on new products, technologies and software/ hardware development tools from both Microchip and Third-party sources.

It will be a monthly show targeting academics worldwide and will be divided into four sections as follows:

Headliners – we will discuss new academic-friendly development resources brought to you by Microchip and our authorized Design Partners.

University Student Project – students can submit a video featuring a student project based on Microchip products.

Ask Microchip – viewers can ask a question and a qualified at Microchip support person will answer it.

Where in the World is Marc McComb? – Marc is Microchip's academic sales engineer and in each edition will talk about new products and tools that are a good fit for academics.

To submit a video on a student project or ask a question for the "Ask Microchip" section, email us at **mchptube@microchip.com**.

You can also visit **www.microchip.com/mchptube** for more information on the show.

MCHP Tube provides you, the viewer, the opportunity to interact with Microchip directly!!

Click on the image above to view the 1st episode of MCHP Tube.
To view Microchip's YouTube channel, click HERE.

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Looking to Enhance Your Embedded Control Designs?

In tough economic times, companies often look for ways to trim expenses as a means to cope with a downturn in sales. One of the areas often targeted for cutbacks is employee training. There is not only the direct cost of the training to contend with, but also travel expenses and time an employee spends away from the job. During this challenging business climate, however, competitive pressures and technology changes don't stop and it is training that can help a company be better positioned to take advantage of the potential upswing.

Microchip, with its global network of Regional Training Centers (RTCs) and third-party training partners, is here to help companies stay competitive with cost-effective, local training. To help companies deal with issues of travel expense and time, classes are given not only in Microchip's facilities, but are also taken on the road. Customized customer premise sessions can be scheduled offering the most convenience. Time away can be managed more efficiently with the flexibility of half or full day class sessions.

To be effective in teaching, instruction must take into account the needs and expertise level of the attendee. Microchip's Regional Training Center classes are developed to provide a coordinated flow, enabling engineers to implement a solution to their product development needs. Instruction is developed and presented in product, technology and implementation classes that are grouped into application based curriculum.

Each curriculum flow enables the individual to engage with the training at a level that meets his or her current knowledge and needs. The intent is to provide training that is relevant to each attendee while eliminating the frustration often associated with attending classes that present too much known information or assume a level of knowledge beyond what the attendee currently possesses.

Product/tool classes provide knowledge on how Microchip's products and development tools operate. This knowledge provides the foundation upon which all application instruction is based. Attendance at one of these classes can provide significant value through the reduction in time associated with instruction manuals and data sheet review or trial and error attempts to learn individually. Market forces constantly press companies to add functionality and features to their products often outside their areas of core competence. As a result, engineers must continually broaden their knowledge base. Microchip's technology classes are intended to help engineers gain an understanding of a new field.

Implementation classes combine elements of product and technology instruction to teach engineers how to design a real world application. Classes at this level provide how-to instruction rather than what or why instruction.

Microchip is currently offering classes in the following curriculum: DSP, Ethernet, Human Interface, Motor Control, Power Management, Signal Chain, System Design and USB. Future curriculum is expected to include CAN/LIN, IrDA® , Lighting and RF.

With a worldwide network of Regional Training Centers and certified third-party trainers, Microchip makes it easy to enhance your technical skills, with locations in nearly every metropolitan area across the world!

For those organizations who desire to have a number of employees attend a course at the same time, Microchip can customize any curriculum to meet your specific needs. Our instructors arrive at your location with all presentation materials and equipment, making it easy for your whole team to benefit from a specific course topic in one setting. In addition to the instruction, most Regional Training Center classes offer the opportunity to purchase a set of the development tools used in the class at a discounted price.

If the class you are interested in is not scheduled in your area, you can sign up to receive an alert when a session is scheduled.

For information on scheduling custom in-house training, contact your local RTC directly or visit the Microchip RTC web site: **www.microchip.com/RTC**

MICROCHIP
Regional Training Centers

For a complete list of classes and locations, visit www.microchip.com/RTC

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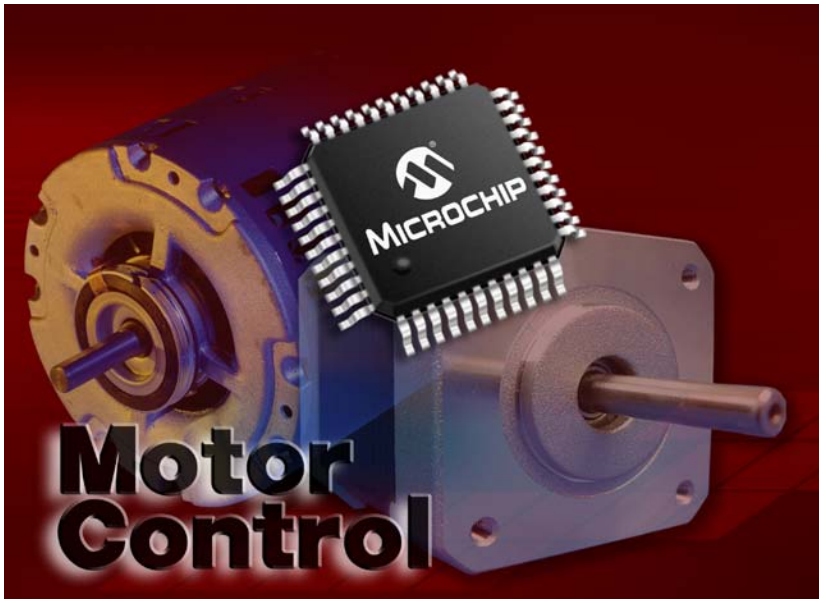
Motor, Drive & Automation Systems 2010

Advancements in Motion Control and Power Electronic Technology

January 28-29 • Orlando, Fla.

Join Patrick Heath, Marketing Manager and Daniel Torres, Application Engineer for Microchip Technology's High-Performance Microcontroller Division as they present...



An Exploration of Ultra-Low Cost Motor Drive Design

Thursday, January 28, 2010 at 1:30 pm

This paper will explore design trade-offs associated with creating ultra-low-cost motor drives, without compromising control techniques, energy efficiency or safety. Three drive designs will be presented. The first is a simple stepper-motor drive for under $50. The second is a standard low-voltage sensorless drive for under $75. The third is a complex isolated high-voltage drive for under $100. The actual Bill of Material (BOM) costs, control techniques, energy efficiency and safety features of the three designs will be compared. Additionally, a package consisting of the BOM, schematics, Gerber files and firmware for all three designs will be available to attendees.

Microchip Technology's Debraj Deb, Applications Engineer, High-Performance Microcontroller Division, will present...

Regenerative Braking of BLDC Motors

Friday, January 29, 2010 at 11:10 am

Regenerative braking is a motor-braking technique that converts kinetic energy from a motor into an electrical output that charges the system's batteries. There are two major advantages associated with regenerative braking. First, it increases the efficiency of the electrical system. Secondly, the life of mechanical brakes increases, as the majority of braking is done through regenerative braking. Depending upon the application, using regenerative brakes can recover 30% to 50% of the system's energy, which is otherwise lost as heat in brake pads. This paper will present a hardware and software implementation of a regenerative braking system for a BLDC motor, and verify its effectiveness through test data.

Register online, today at: http://www.e-driveonline.com/Conf-10/motors_conf10_reg.php

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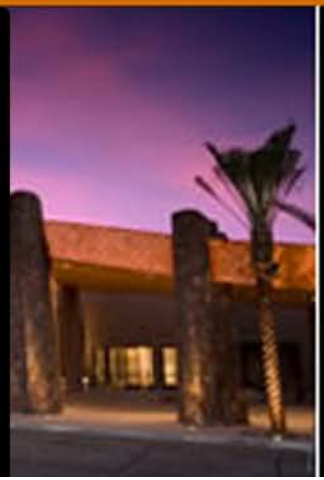
The Applied Power Electronics Conference and Exposition

Check out
Microchip's Session:
Smart Grid:
A dumb idea?
Tuesday, Feb. 23rd
5-6:30 pm



APEC 2010
The Premier Global Event in Applied Power Electronics™

PALM SPRINGS CONVENTION CENTER

February 21 - 25, 2010 • Palm Springs, CA

Microchip Technology's Michael Ballard, Manager, Home Appliance Solutions Group panels...

Session 1: Smart Grid: A dumb idea?

Tuesday, February 23, 2010 at 5:00 pm

There's lots of talk about the "smart grid" and how it saves energy and money. Whose money? Should the local utility company have the ability to shut off your air conditioner or stop your clothes dryer when it wants? Should they be allowed to raise their rates with no warning, just when you need electricity the most? How will solar, wind, and other alternate-energy systems tie into the grid going forward? Who will write the standards? There are very few original IEEE standards that have had much success. Come help us explore what's right and wrong about this concept.

Register online, today at: http://www.apec-conf.org/

METERING INTERNATIONAL | WORLD METER DESIGN CONGRESS | METERING AMERICA BILLING/MDM AMERICA

March 7-10, 2010 **Visit Microchip at Booth #505!** San Diego, CA

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Check out Microchip at Hall 9/9-451

Microchip Technology's Lucio Di Jasio, Marketing Manager, High-Performance Microcontroller Division presents...

Interfacing 16- and 32-bit Microcontrollers to Modern Thin-Film Transistor (TFT) Displays: Cost, Performance and Embedded Control Design in a Fast-Moving Scenario

This presentation focuses on the practical aspects of interfacing modern 16- and 32-bit Microcontroller (MCU) architectures to a QVGA Thin-Film Transistor (TFT) display system. Among the many options available, the paper reviews the specific tradeoffs of performance vs. system complexity and cost, with particular attention devoted to the most recent industry trends in the display industry as relevant to embedded control applications. The pros and cons of utilizing a "smart" chip-on-glass vs. a "dumb" glass display will be discussed, as will the pros and cons associated with using a graphics-controller chip or integrated graphics controller. Additionally, the paper explains serial vs. parallel (8080 bus) vs. RGB direct-drive options for smart glass connection options. When evaluating the parallel bus option, the presentation focuses on the use of 8- and 16-bit parallel ports and their operation in a DMA system. Performance is compared against the needs of modern embedded-control applications with regard to refresh rates and animation support, then weighed against ease-of-use, power consumption and total solution cost. Practical design examples based upon 16- and 32-bit MCUs are presented, with particular reference to an appropriate development platform, as well as an example advanced graphics library.

Microchip Technology's Jonathan Dillon, Senior Applications Engineer, Security, Microcontroller & Technology Development Division presents...

Adding a Capacitive Touch User Interface With Resources Already Present in Your System

With your embedded system already containing a microcontroller, you may be able to replace buttons and proximity sensors with capacitive-touch controls at minimal expense, or even a cost savings. Capacitive-touch user interfaces have become popular for modern applications because of their aesthetically pleasing, sleek controls; the fact that they do not involve any moving parts, they allow the system to be sealed from the elements; and because they enable hi-tech control panels. However, the implementation of capacitive-touch user interfaces has been regarded as a mysterious art. For many systems, the building blocks for implementing capacitive sensing, as either a proximity sensor or a button, are already present in the peripherals of their microcontroller, and these resources may currently be unused. This presentation discusses the following three methods for implementing capacitive touch:

1. Using the onboard timers and analog comparators
2. Capacitive sensing with unused I/O and the internal Analog-to-Digital Converter (ADC)
3. Using the capacitive-sensing circuitry embedded into the I/O pins of a number of microcontrollers

Register online, today at: http://www.embedded-world.eu/

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WHAT'S *New* IN MICROCHIP LITERATURE?

Visit our **Technical Documentation** page on www.microchip.com to view the documents.

Doc. Type	Doc. Title	DS No.
Data Sheet	24AA32A/LC32A Data Sheet	21713K
	24AA512/LC/FC512 Data Sheet	21754L
	11AA0X0 UNI/O® Data Sheet	22067G
	PIC18F1230/1330 Data Sheet	39758D
	PIC24FJ256GB110 Family Data Sheet	39897C
	PIC24FJ256GA110 Family Data Sheet	39905D
	PIC16F193X Data Sheet	41364D
Application Note	An I²C™ Bootloader for the PIC16F1XXX Enhanced Core	01302A
	Software Real-Time Clock and Calendar Using PIC16F1827	01303A
	Stepper Motor Control with dsPIC® DSCs	01307A
Program Specification	PIC18F6XJXX/8XJXX Programming Specification	39644L
	PIC12F635/683/PIC16F631-690 Programming Specification	41204H
	PIC16F785/HV785 Programming Specification	41237D
	PIC12F615/12HV615/PIC16F616/16HV616 Programming Specification	41284D
	PIC16F88X Programming Specification	41287D
	PIC16F/LF720/LF721 Programming Specification	41409A
FRM Chapter	dsPIC33F/PIC24H FRM Section 5. Flash Programming	70191C
	dsPIC33F FRM Section 42. Oscillator (Part IV)	70307C

Doc. Type	Doc. Title	DS No.
Errata	PIC24HJ32GP302/304, PIC24HJ64GPX02/X04 and PIC24HJ128GPX02/X04 Family Silicon Errata and Data Sheet Clarification	80441D
	dsPIC33FJ32MC302/304, dsPIC33FJ64MCX02/X04 and dsPIC33FJ128MCX02/X04 Family Silicon Errata and Data Sheet Clarification	80442D
	dsPIC33FJ32GP302/304, dsPIC33FJ64GPX02/X04 and dsPIC33FJ128GPX02/X04 Family Silicon Errata and Data Sheet Clarification	80443D
	dsPIC33FJ12MC201/202 Family Silicon Errata and Data Sheet Clarification	80461C
	dsPIC33FJ12GP201/202 Family Silicon Errata and Data Sheet Clarification	80462C
	PIC24HJ12GP201/202 Family Silicon Errata and Data Sheet Clarification	80466C
	PIC24HJ256GPX06A/X08A/X10A Family Silicon Errata and Data Sheet Clarification	80482B
	dsPIC33FJ256GPX06A/X08A/X10A Family Silicon Errata and Data Sheet Clarification	80483B
	dsPIC33FJ256MCX06A/X08A/X10A Family Silicon Errata and Data Sheet Clarification	80484B
	PIC24FJ64GA104 Family Silicon/Data Sheet Errata	80486B
	PIC18F45J10 Family Silicon/Data Sheet Errata	80494A
Product Brief	PIC16F1782 Product Brief	41410A
	PIC16F/LF707 Product Brief	41411A

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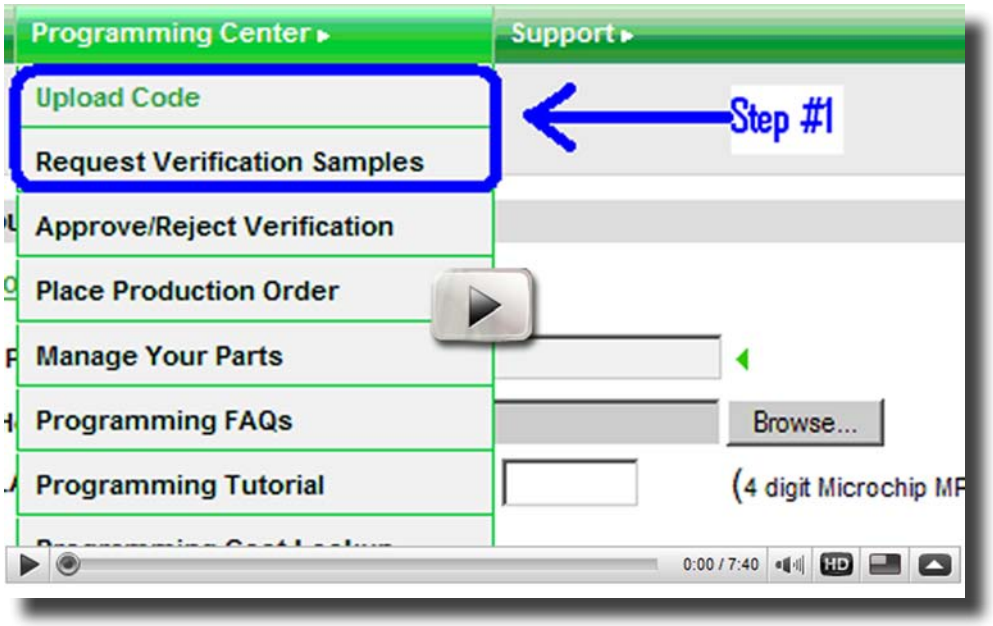
What's New @ microchip DIRECT

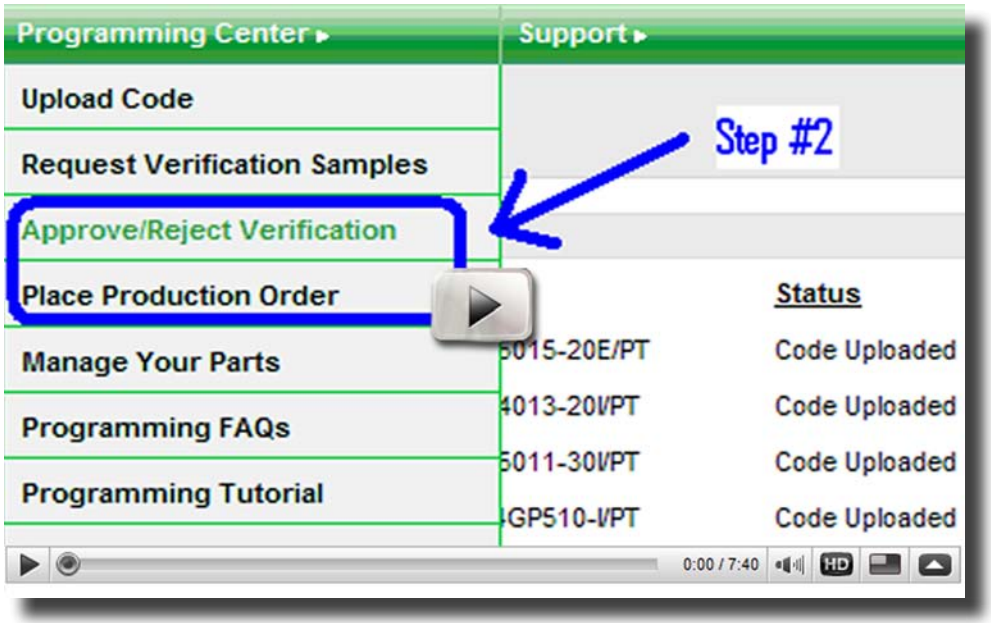
Do you have code and want Microchip to do the programming?

See how the Improved Programming Center at microchipDIRECT can help!
Microchip makes it easy to load and order pre-programmed parts! View programming tutorial here!

Here are two helpful process videos. To view, click on the images below.



Step 1 = Load code and submit verification order.



Step 2 = Accept the verification and place the production programmed order.

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