Microchip Launches 8-bit Microcontrollers With Integrated Configurable Logic in 6- to 20-pin Packages

MCUs Feature Configurable Logic Cells, Complementary Waveform Generator and Numerically Controlled Oscillator; Enabling New Applications for Microcontrollers

At the Embedded Systems Conference in Boston, Microchip announced several new 8-bit PIC® microcontrollers (MCUs) that feature configurable logic and a high level of peripheral integration in 6- to 20-pin packages. The **PIC10F(LF)32X** and **PIC1XF(LF)150X** MCUs each feature new peripherals, including Configurable Logic Cells (CLCs), Complementary Waveform Generators (CWGs) and Numerically Controlled Oscillators (NCOs), enabling functionality that was not possible before with low pincount MCUs. These general-purpose MCUs enable designers to enhance the functionality, reduce design size, and decrease the cost and power consumption of products in the appliance; automotive; consumer; and industrial markets, among others.

The CLC peripherals on the PIC10F(LF)32X and PIC1XF(LF)150X MCUs enable software control of combinational and sequential logic, which increases the on-chip interconnection of peripherals and I/Os, thereby reducing external components, saving code space and adding functionality. The CWG peripheral works with multiple peripherals to generate complementary waveforms with dead-band control and auto shutdown, which provides improved switching efficiencies. Additionally, the NCO peripheral enables linear frequency control and high resolution, which is required for applications such as lighting ballast, tone generation and other resonant control circuits. The MCUs also feature low power consumption, with currents of less than 30 µA/MHz in active mode, and less than 20 nA in sleep; as well as an on-chip 16 MHz internal oscillator, Analog-to-Digital Converter (ADC), and up to 4 Pulse-Width Modulation peripherals. An integrated temperature-indicator module enables low-cost temperature measurements.

These new MCUs expand the reach of the **PIC10F**, **PIC12F** and **PIC16F** families, enabling new applications for microcontrollers that didn't exist before, they provide an unmatched combination of unique functionality, power consumption, size and cost.

To facilitate application development, the **PICDEM™ Lab Development Kit** (part # **DM163045**) now includes samples of both the PIC10F322 and PIC16F1507 MCUs. Additionally, the **F1 Evaluation Platform** (part # **DM164130-1**) is available for development with enhanced mid-range core 8-bit PIC MCUs, including the PIC1XF(LF)150X family. Also available is a free CLC Configuration Tool, to streamline the setup process of the CLC module by simulating the functionality of the registers and combinational logic in a graphical user interface (GUI). This tool is available today and can be downloaded **online**.

All of these new MCUs are supported by Microchip's standard development tools, including the **PICkit™ 3 Debugger/Programmer** (part # **PG164130**), as well as the **MPLAB® IDE**, **MPLAB REAL ICE™ In-Circuit Emulator** and **MPLAB ICD3 In-Circuit Debugger**, and the **Microchip and HI-TECH C® compilers**.

Learn more about the MCP1754, visit:
http://www.microchip.com/wwwproducts/Devices.aspx?dDocName=en555287

MICROCHIP WIRELESS TECHNICAL SEMINARS

Microchip offers designers a one stop solution for developing diverse wireless applications. Join technical experts from Microchip and Avnet Memec for a three-hour technical seminar that will educate attendees about Microchip's wireless solutions and will demonstrate just how easy it is to add wireless functionality to a design using Microchip pre-certified modules.

AGENDA

Data Converter Basics and Architectures

- Wireless in embedded applications
- Different wireless technologies and radio frequencies
- Advantages of modules

Embedded WiFi Overview

- WiFi priorities in embedded applications (low power, form factor, MCU compatibility)

Blueprint for Getting Started

MiWi Networking Protocol Overview

- Leveraging key features such as Mesh networking in your end application

MiWi Networking Protocol Demo

- Evaluating the MiWi protocol using the MiWi card demos

Embedded WiFi Demo

- Evaluating Microchip's WiFi module using the WiFi card demos

EVENT DETAILS

- Each event will be ~3 hours (See website for start and end times)
- Continental breakfast and lunch will be served.
- **Cost: No Charge**
- Attendees will receive a discount coupon for Microchip Wireless development tools.

REGISTER NOW

COMING TO A CITY NEAR YOU!

City	Date
Atlanta	Oct-18
San Jose	Oct-25
Irvine	Oct-27
Chicago	Nov-01
Milwaukee	Nov-02
Minneapolis	Nov-03
Cedar Rapids	Nov-04
Salt Lake City	Nov-15
Denver	Nov-17
Detroit	Nov-29
Grand Rapids	Nov-30

Learn more about Microchip's Wireless Technical Seminars, visit:
http://www.em.avnet.com/microchipwireless

Save 20% on Energy Harvesting Kits! Offer Ends 12/1/11

20% off the Powercast Energy Harvesting Development Kit for Wireless Sensors with Code TPXH9K2

The Lifetime Power® Energy Harvesting Development Kit for Wireless Sensors enables the development of battery-free wireless sensor applications using RF energy as the power source and Microchips **PIC** with **nanoWatt XLP Technology**. Powercasts P2110 Power harvester Receiver converts RF energy into DC micro-power, and provides a regulated output voltage to a wireless sensor node.

Contents of the kit include:

- 1 - 915 MHz Powercaster Transmitter (TX91501-03-ID)
- 2 - P2110 evaluation boards with two antennas and expansion connector (P2110-EVB)
- 2 - Wireless sensor modules preloaded with operating software
- 1 - **Microchip XLP 16-bit Development Board** (**DM240311**) with USB cable, pre-loaded with access point software
- 1 - **Microchip MRF24J40MA PICtail Daughter Board** (**AC164134-1**) - 802.15.4, 2.4 Ghz radio module
- 1 - **Microchip PICkit 3 programmer with USB cable** (**PG164130**)

Buy Now!

Microchip Launches Embedded Code Source, an Application Store and Social Community for Downloading and Rating Free PIC® MCU Code

Site Includes Free Third-Party Code; Accelerates Code Development and Time to Market

Microchip announced the **Embedded Code Source**, an application store for the embedded community that provides free software and firmware for **PIC**® microcontrollers, along with the ability to rate and review each download. This interactive site includes free code from both Microchip and its large network of third-party developers, who are also available for expert advice and contract programming.

Recent surveys have shown that a majority of embedded designers consider software tools to be a critical factor in choosing a processor, and that the largest portion of most development teams is comprised of software engineers. These trends, combined with the increasing popularity of open-source and freeware code, point to the need for more embedded software resources. The Embedded Code Source combines Microchip's extensive code repository with those of its large third-party network to provide a comprehensive, free and easily searchable resource for the embedded community.

"Microchip is continually looking for ways to help customers get to market faster," said Ken Pye, Microchip's vice president of Worldwide Applications. "With engineering budgets and schedules under constant pressure, software engineers need fast access to code that they can use, new ideas and feedback on what others have found beneficial. Patterned after popular mobile-application stores, the new Embedded Code Source fulfills this need."

Designers can begin downloading from the Embedded Code Source today, by browsing its list of intuitive categories or performing a keyword search at **http://www.embeddedcodesource.com**.
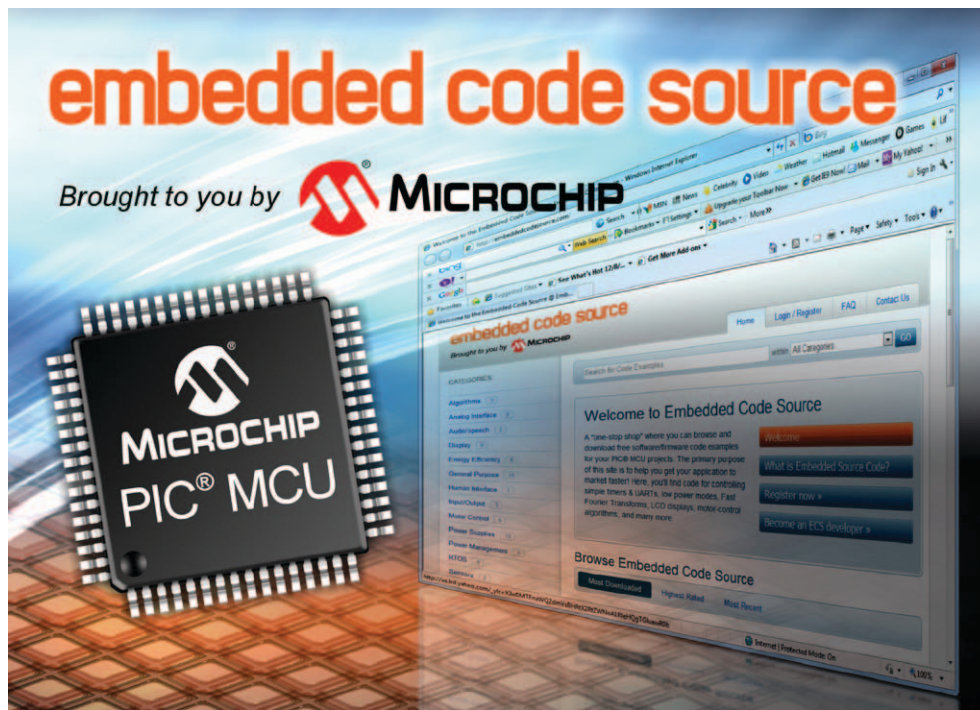
Watch the video about the Embedded Code Source

To learn more about Embedded Code Source, visit:
http://www.embeddedcodesource.com

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Microchip Technology Delivers 10 Billionth PIC® Microcontroller to Samsung Electronics Co.

Samsung Takes Delivery of 32-bit PIC32 Microcontroller

Microchip announced the shipment of its 10 billionth **PIC® microcontroller** (MCU) to Samsung Electronics Co., Ltd. Microchip delivered this 10 billionth microcontroller, the 32-bit **PIC32MX340F256**, approximately 10 months after delivering its nine billionth.

Today's announcement demonstrates the industry's continued acceptance of Microchip's **8-**, **16-** and **32-bit** PIC microcontrollers as the high-performance, low-power, cost-effective solution for embedded-control designs and, in particular, offers further evidence of the accelerating growth of the Company's 32-bit PIC32 microcontroller line.

"The shipment of our 10 billionth PIC microcontroller is a remarkable achievement, and shipping it to a giant in the electronics industry like Samsung makes it even more satisfying," said Microchip's president and CEO Steve Sanghi.

According to Sanghi, going from nine to 10 billion in less than a year is a significant accomplishment for Microchip, as it continues to gain worldwide market share. "We have reached this milestone because our PIC microcontroller portfolio, **MPLAB®** development systems, direct sales and sales-channel partners provide maximum benefits for customers to reach their design goals."

A customer for many years, Samsung uses a broad range of Microchip's embedded-control solutions across many of its diverse product lines, including 8-, 16- and 32-bit PIC microcontrollers, analog and interface ICs, serial EEPROM memory devices, RF power amplifiers, and Flash memory devices.

"Our longstanding relationship with Microchip Technology has been beneficial to both parties, and we are quite pleased with the high performance provided by their growing 32-bit PIC32 microcontroller portfolio," said Sang Ryong Kim, vice president of R&D, Samsung Electronics, Digital Imaging Division. "We are honored to be the recipient of Microchip's 10 billionth PIC microcontroller."

Microchip serves more than 70,000 customers in over 65 countries, has shipped more than 1.15 million development tools to date, and partners with more than 130 global third-party tool manufacturers. Additionally, Microchip has a broad portfolio of more than 800 8-, 16- and 32-bit PIC microcontrollers, and is the only company to support all of its microcontrollers and digital signal controllers under a single integrated development environment—the free **MPLAB X IDE**, which is now open source and enables cross-platform development using the Linux, Mac OS® and Windows® operating systems.

To learn more about Microchips PIC portfolio, visit:
http://www.microchip.com/PIC

What is the single most important thing Microchip could do to help make you more effective in your day-to-day work?

Microchip is conducting a brief survey on this topic and would like to hear from you!

Click here to take the survey!

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The rise of the machines: M2M communications

Technologies that enable either wired or wireless communication among two or more machines with minimal human intervention is referred to as Machine 2 Machine (M2M) communications. M2M communications usually employs a sensor that acquires data of an event which is then transmitted via a wireless or wired network to application software that in turn translates the captured data into meaningful information.

One of the most popular applications of M2M technologies is fleet management where vehicle information is relayed wirelessly to a fleet operator's base station. To improve the logistics and avoid downtime of a fleet in time updates are critical, with the aid of GSM/GPRS and GPS technologies these updates can be automatically transmitted to the fleet management supervisor. When fuel is low in a machine it can request for a fuel delivery service, alert messages can be sent to reduce the risk of equipment theft when a machine leaves the premises and maintenance issues can be easily tackled by sending a warning signal to fleet management system when a part of the machine is broken preventing the machine from running at optimum performance. M2M enabled fleet management solution gives necessary details of the total fleet and can schedule maintenance and operation tasks to improve productivity and reduce idle time.

Apart from fleet management M2M provides benefits to many applications across various industries like utility metering, transportation/navigation, retail, security and healthcare.

Accelerate your M2M Design with Microchip's New M2M PICTail™ Daughter Board

The Microchip M2M PICtail daughter board (referred to as the M2M Board) developed by u-blox contains many features including GSM, GPRS and GPS. It is designed to connect directly to the PICtail interface of the Multimedia Expansion Board (MEB) which uses Microchip's PIC32 starter kit collection as the primary controller source.

This suite makes it easy to start and implement embedded controller projects due to it's:

- Built-in debugger
- USB power source
- On-board header for easy attachment to PCBs
- **PIC32** device with high-speed performance and no peripheral loss
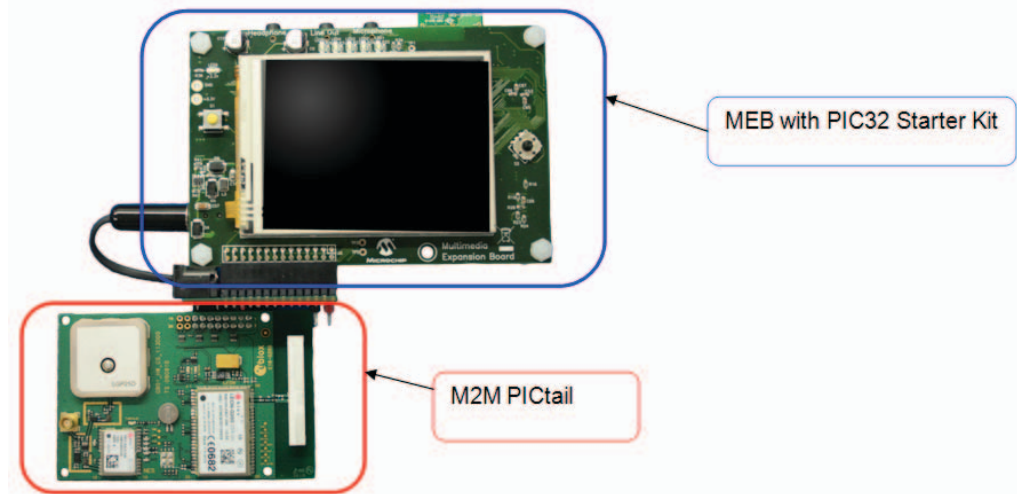
New M2M PICTail™ Daughter Board

The M2M PICtail Board is built around two controller modules, the LEON-G200 and the NEO-6Q, which are available from u-blox AG. The LEON-G200 is a Quad Band GSM/GPRS data and voice module. Communications to the module are through AT commands. The UART module on the PIC32 device handles the AT commands. The LEON-G200 handles the GPS communications to the NEO-6Q module. The module also contains 1 MB of non-volatile memory that can be used for storing local or Internet files. The NEO-6Q GPS module uses the u-blox six positioning engine for its GPS positions support. In this hardware setup, it acts as a slave to the LEONG200, but can be a stand-alone module with its own set of AT commands.

The M2M PICtail daughter board provides developers with a turn-key platform to get started with apps such as texting, email and GPS. Beginners can implement basic real-time M2M applications by avoiding deployment issues (which usually involve installation of modems, application software, database and central servers) with this easy plug and play device. The device comes with a free built in demo code.

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Third-Party News

Microchip makes a lot of great development tools, but there are also plenty of unique and innovative tools created by Third-Party partners. Here is the latest news about Third-Party tools available on microchipDIRECT:

New Products

Bartek PTB-X Prototyping Extension Board is an advanced prototyping board for MCU and USB applications. Connects to an **Explorer 16** or **PIC32** Expansion Board, with all **PICtail** I/O signals clearly marked on two full-length headers. Also can be used in stand-alone mode with USB power. Includes double-size breadboard area, negative voltage generator (-3.3V or -5V), 4 push buttons and USB port with **MCP2200** serial interface chip. (**TPDPTBX**)

MCE Wireless Kit GSM features a **PIC18F14K50** with USB support and GSM radio for text messaging and cellular communications. Includes pushbuttons, LEDs, temperature sensor and two 6A relays for remote control of systems. Comes with firmware installed that communicates using simple AT commands and a terminal program on your PC, or can be re-programmed for custom applications. Documentation, drivers and firmware source code available by download. Requires a valid SIM card and 9V DC supply. (**TMCE002**)
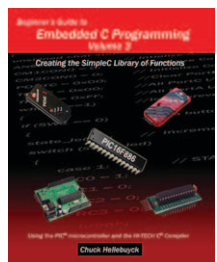
Beginner's Guide to Embedded C Programming. In volume 3 of this popular series, author Chuck Hellebuyck takes another leap forward with the SimpleC library that makes programming in C even easier. Shows the reader how to create their own functions and expand the library so that creating microcontroller projects is much quicker than writing in plain C. The SimpleC library includes functions for Digital I/O, A/D Conversion, LCDs, PWM output, communication via SPI and I^{2}C, external EEPROMs, and more. Examples use the **PIC16F886** microcontroller. (**BK0009**)

Getting Started with chipKIT is an entry level guide to the **chipKIT**™ Uno32 development board. Includes step-by-step installation on Windows and Mac computers with the Multi-Platform IDE. Using a series of very simple example sketches (sketch is a software program in the Arduino™ world) this book demonstrates how to use digital inputs, digital outputs, analog inputs and analog outputs. Requires a few simple components such as LEDs, resistors, etc. (**BK0010**)

MPLAB X y Técnicas de Programación con Librerías de Microchip Conocé el nuevo entorno de desarrollo multiplataforma MPLABX y aprendé a utilizar los periféricos de PIC programando en lenguaje C. Incluye prácticas listas para simular y compilar con el MPLAB. Además tutoriales y ejemplos concretos para reducir el tiempo de desarrollo utilizando las librerías de Microchip. En este libro: ethernet y WI-FI, Robótica, USB, GSM y Control discreto.

El DVD incluye más de 40 horas de tutoriales y clases a cargo de ingenieros de aplicación. (**BK0011**)

Recent Updates

PICBASIC Pro Compiler Version 3 (Gold Edition) is the industry standard BASIC programming language for Microchip **PIC**® microcontrollers. Version 3 is a major evolution of this popular product, making it even more capable, stable, and reliable. Supports more than 500 MCUs (**PIC10**/**12**/**16**/**18**), includes a newly revised 300 page manual, and is compatible with **MPLAB** v8 and **MPLAB X** IDE. (**SW500041**)

TCPmaker PRO version 1.50 is a quick and easy way to make embedded web devices. TCPmaker PRO includes a revolutionary drag and drop Visual Page Designer to make great looking interactive web pages with 3D pushbuttons, sliders, bar gauges, and indicators. Version 1.50 uses the latest version of Microchip's TCP/IP stack, with improvements to Wi-Fi support, SNMP protocol support, and many other new features. (**SW500052**)

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FEATURED

MICROCHIP AUTHORIZED DESIGN PARTNER

IP LOGIKA ®

Internet Protocolo Lógica SL, IPLógiKa, is a high-technology Spanish company specializing in the development and manufacturing of terminals for communications over internet.

For more information, please contact:

Ramón y Cajal

5. 28100 Alcobendas, España

iplogika@iplogika.es

Ph: (+34) 91 490 56 93

www.iplogika.es

Third-Party Products for Getting Wired Broadband and Voice Applications to Market Faster

Designed with Microchip's product lines in mind

IPLógiKa is a technology-based company located in Spain and was founded in 2007. The company began with the help of two engineers and entrepreneurs, who were extremely familiar with Microchip's products. In just over four years, IPLógiKa has grown to be highly specialized in both software and hardware designs utilizing Microchip's broad line of **PIC® Microcontrollers**, **dsPIC Digital Signal Controllers** and **Analog** product families.

IPLógiKa's has developed several product lines geared towards wired broadband access and voice data. For such embedded applications, IPLógiKa is a perfect electronics partner to help integrate intelligence designs that may require a PIC MCU or dsPIC Digital Signal Controller. With IPLógiKa's design help and expertise, customers will be able to speed up their time to market, reduce development costs and ultimately go to market with an optimized solution to meet their needs.

Some areas of expertise include:

- Suite of TCP / IP (TCP, UDP, FTP, TFTP, HTTP, SMTP)
- Ethernet protocols (IEEE 802.1Q VLAN, IEEE 802.3af, PoE)
- SIP signaling protocol 2.00 (RFC3261)
- Audio encoders: G729a, GSM 06.10
- Web Servers with inter-active web pages 2.00
- PC applications for improving inter-action with the broadband equipment based on Microchip's PIC MCUs
- Suite of TCP / IP (TCP, UDP, FTP, TFTP, HTTP, SMTP)
- Transport of video for industrial applications is currently under development (both logical (FW) and Physical (HW) will be available
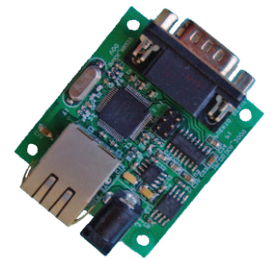
In summary, IPLógiKa offers everything needed to transmit data, voice (and soon video) of cable or WiFi (for data). To learn more about IPLógiKa's evaluation kits, click on the links below:
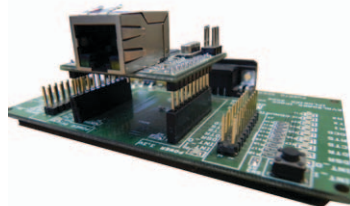
Evaluation Kit EVP400 (Part # TIPL400)

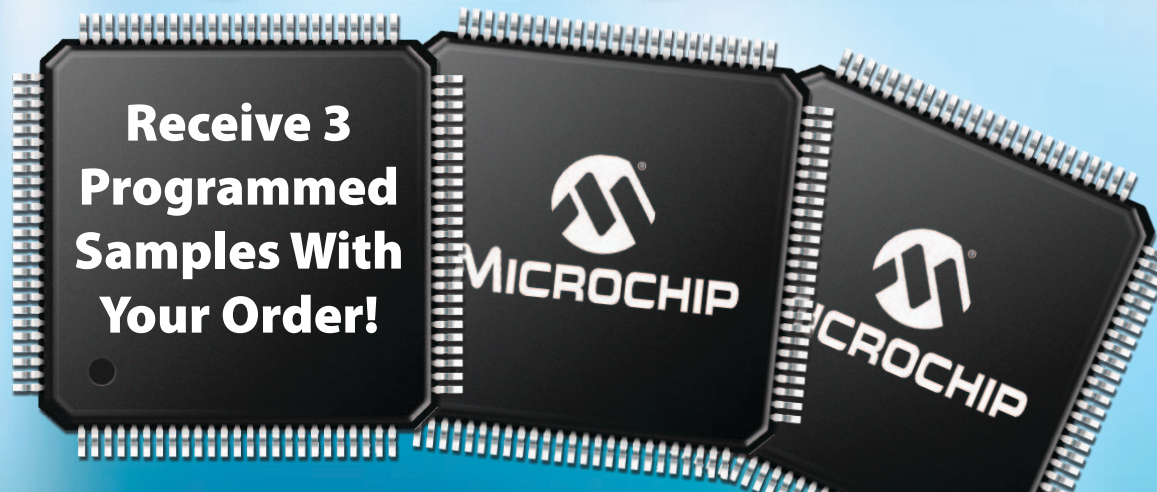**Serial Gateway to Ethernet P401 (Part # TIPL401)**

RS232 Gateway to Ethernet (Part # TIPL402)

For more information about IPLógiKa, please click here

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Microchip Around Town – Get the latest updates by clicking HERE!

Microchip MASTERs Conference
Celebrating 15 years of Continuous Education

Microchip's MASTERs Conference recently took place in Phoenix, Arizona and was a huge success. As we continue to wind down from the event, we want to take this time to thank all of you that participated and attended the Conference. It was a special year as this was our 15th Annual Worldwide MASTERs Conference. Since 1997 we have gone from offering 34 classes, to currently offering over 90+ classes to embedded control engineers who want to learn more about Microchips products, as well as network with others in the engineering community. Not only has our class list grown over the years, but our locations have grown as well. MASTERs is now offered around the world in China, Korea, India, Argentina, Brazil & Russia.

Each year we continue to expand and offer more benefits to those attending the MASTERs Conference. Through the years we've added; Pre-Conference days (two extra days of classes), more hands on classes, additional "evening" classes, a larger exhibitor lobby, many sponsorships, more fab tour seats, and introduced complimentary daytime events for the attendee guests & families. As MASTERs has grown over the years, we've moved to larger venues to accommodate the growing number of attendees and classes. The Conference was held at the J.W. Marriot Desert Ridge this year and we had 30 different classrooms and ran more than 250 class sessions. Some of the most popular classes this year were on topics such as RTOS, wireless networking, communicating over a power line and using the new MPLAB X.

For our 15th year we wanted to add some extra flare. Comedian Don McMillan, entertained us on Thursday night with his witty, engineer based comedy routine and PowerPoint presentation. We had many family friendly events including jewelry making and kid movies during the day, engineering trivia, a Texas Hold Em' tournament, Wildlife World Zoo animals, foam boat races, hover mice and the ever popular Casino night in the evenings. Casino night seems to be a favorite among attendees as it's held the last night and people can unwind and win great prizes in our raffle. It's definitely the most highly attended event.

Next year's Worldwide MASTERs will be located at the JW Marriott Desert Ridge Resort in Phoenix, Arizona from August 6th – 11th.

Be sure to watch our website for updates and we hope that you can join us in 2012!
www.microchip.com/masters

Cornerstone attendees
(have been at MASTERs every year)

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Join Microchip At The Following Worldwide Events

Free Live Webinar!
Smart Grid Roundtable
Wednesday, October 19, 2011
2:00pm ET / 11:00am PT
Duration: 60 Minutes

Sponsored by:

MICROCHIP

Electronic Design's Smart Grid Roundtable

The Smart Grid is without doubt a transformative technology that will change the way consumers deal with energy suppliers over the next ten years or so. At the heart of the Smart Grid is the smart meter, which extends all the way back to the electric utility on one side and throughout all the electric appliances in the home on the other. There will come a day – and that day is soon – when appliances like refrigerators, air conditioners, washing machines, driers, televisions and other electrical and electronic appliances will be imbued with "smarts" so that each can talk, via a home area network, to the smart meter and then to the electric utility.

But getting from here to there demands a great deal of engineering savvy. In this Smart Grid Roundtable, presented by Electronic Design, two of the leading companies in the Smart Grid space, Microchip and Freescale answer questions from a leading authority on the Smart Grid, Electronic Design's power editor, Don Tuite, about all facets of the Smart Grid and where the U.S. and most other countries around the globe are headed in the near future. If you are working on the Smart Grid now or are planning to do so in the future, you won't want to miss this Roundtable presentation.

Who Should Attend This Event?

- Design engineers involved in designing the electronics that will interface with smart meters
- Design engineers involved with creating home networks that will carry information from smart appliances to the smart meter
- Engineering managers who want to understand some of the technical details and challenges behind the transition from today's electrical grid to tomorrow's Smart Grid

Register now for this live webinar

Energy Efficiency: Motor & Drives

Online Until January 1st 2012

Join Microchip's Charlie Ice, Product Marketing Manager, as he participates in the online webinar "Energy and Efficiency in Motors and Drives" which looks at the changes that have occurred in recent years. Plants are much more concerned these days about energy consumption. For one, energy efficient equipment sends savings to the bottom line. In addition to the positive value of savings from efficiency, plants are also concerned about their carbon footprint. For most companies, the reduction in energy consumption has become an overriding goal. Efficient motors and drives contribute to the goal.

Design News Senior Editor for Automation and Control Rob Spiegel hosts a webinar panel discussion featuring senior industry experts, including Charlie Ice.

Register online at: **https://event.on24.com**

Motor, Drive & Automation Systems

March 13-14, Orlando FL

Join Microchip's Patrick Heath, Senior Manager, Strategic Marketing, as he presents "New Motor Controllers Lead the Way With Analog Circuit Integration". Implementing sensorless motor-control algorithms requires measuring the phase currents from a three-phase motor. Currently, this is accomplished using shunt resistors and operational amplifiers (op amps) in circuits that are external to the Digital Signal Controller (DSC) or microcontroller (MCU) that is running the sensorless motor-control algorithms. Analog circuits such as op amps and analog comparators are now often integrated onto the DSC or MCU. This presentation will survey op-amp integration, and investigate the resultant motor-control-system cost impact and tradeoffs, along with other integration choices, such as integrated power modules.

Register online at: **http://www.e-driveonline.com**

Register for one or more of these great events at the links above!

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Looking to Enhance Your Embedded Control Designs?

MICROCHIP®

Regional Training Centers

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**

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

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WHAT'S New IN MICROCHIP LITERATURE?

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

Doc. Type	Doc. Title	DS No.
Data Sheet	MCP6L1/1R/2/4 - 2.8 MHz, 200 uA Op Amps	22135B
	MCP6L01/1R/1U/2/4 Data Sheet	22140B
	MCP6L91/1R/2/4 Data Sheet	22141B
	MCP660/1/2/3/4/5/9 60 MHz, 6 mA Op Amps	22194B
	MCP6401/1R/1U/2/4/6/7/9 - 1 MHz, 45 uA Op Amps	22229D
	MCP65R41 - 3 µA Comparator with Integrated Reference Voltage	22269B
	MCP4706 Data Sheet	22272B
	MCP7940N Data Sheet	25010B
	MCP73830/L - Single-Cell Li-Ion/Li-Polymer Battery Charge Management Controllers in 2x2 TDFN	25049A
	PIC16(L)F1824/28 Data Sheet	41419C
	PIC16(L)F720/721 Data Sheet	41430C
	PIC16(L)F1503 Data Sheet	41607A
Errata	PIC18F85J11 Family Errata	80383E
	PIC18F87J90 Family Data Sheet Errata	80432F
	dsPIC30F5011/5013 Family Silicon Errata and Data Sheet Clarification	80453G
	PIC16(L)F1934/6/7 Errata	80479G
	PIC18F85J90 Family Silicon/Data Sheet Errata	80488C
	PIC18F87J11 Family Silicon/Data Sheet Errata	80495E
	PIC24FJ256GB210 Family Silicon Errata	80504E
	PIC24FJ256DA210 Family Silicon Errata	80505E
	PIC18F8672/87J72 Data Sheet Errata	80508C
	PIC16(L)F1824/1828 Errata	80510D
	PIC18F66K80 Family Errata	80519C
	PIC10(L)F320/322 Errata	80529A
	PIC16(L)F1503 Errata	80530A
Programming Specification	PIC16(L)F151X/152X Memory Programming	41442B

Doc. Type	Doc. Title	DS No.
FRM Section	PIC32 Family Reference Manual Section 6. Oscillators	61112G
	PIC32 Family Reference Manual - Section 1. Introduction	61127D
	PIC32 Family Reference Manual - Section 34. Controller Area Network (CAN)	61154B
	dsPIC33F/PIC24H Family Reference Manual - Section 2. CPU	70204C
	dsPIC33F/PIC24H Family Reference Manual - Section 11. Timers	70205D
	dsPIC33F/PIC24H Family Reference Manual - Section 18. SPI	70206D
	dsPIC33F/PIC24H Family Reference Manual - Section 6. Interrupts	70184C
User's Guide	PICDEM™ 2 Plus Demo Board User's Guide	41584B
	MCP1640 Reference Design User's Guide	51922B
	MCP1630 SEPIC Automotive LED Driver Reference Design User's Guide	51955A
	MCP1640 12V/50 mA Two Cells Input Boost Converter Reference Design User's Guide	51999A
Application Note	Grid-Connected Solar Microinverter Reference Design Using a dsPIC® Digital Signal Controller	01338D
Migration Guide	dsPIC33FJ32MC202 to dsPIC33FJ16MC101/102 or PIC24FJ16MC101/102 Migration Guide	70667B

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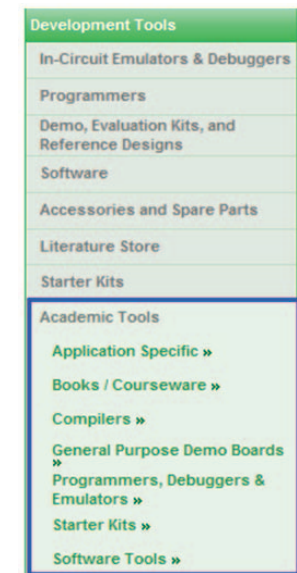**Select the products pull-down menu:**
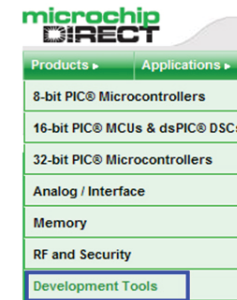
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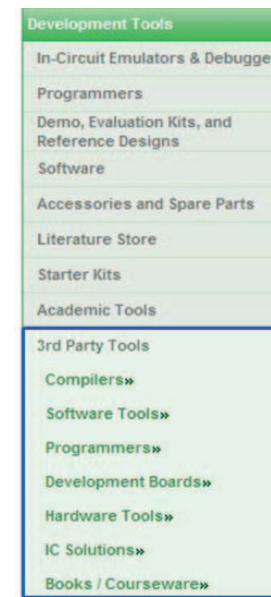
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