



**dsPIC® Digital Signal Controllers**

**dsPIC®**  
**Digital Signal Controllers**

A large, stylized graphic with a background of flowing, metallic-looking waves in shades of purple, blue, and orange. The text 'dsPIC' is rendered in a large, 3D, metallic font, with 'ds' in red and 'PIC' in silver. A horizontal line separates the product name from the text 'Digital Signal Controllers' below it, which is also in a bold, metallic font.

# Digital Signal Controller Solutions

**Building on the legacy of Microchip's world-leading 8-bit PIC® microcontrollers, 16-bit dsPIC® Digital Signal Controllers (DSCs) deliver a large product portfolio to make your demanding applications more competitive by providing lower system cost and improved efficiency.**

## Reduce Development Risk

*Natural step up for 8-bit MCU users needing more performance/memory*

- Industry's largest DSC portfolio for optimal product fit
- Extensive software and application design support
- Same Integrated Development Environment for 8/16/32-bit MCUs
- Extensive web seminars and training courses

## Save System Cost

*Simplify your design through integration and efficiency*

- Best in class 'C' efficiency enables reduced Flash size
- Low pin count packages provide lower product cost
- Replace complex analog filters with digital filters
- Highly Integrated DSCs reduce external components

## Discover New Design Options

*Transform ideas into reality*

- Add powerful features with DSC capabilities
- Employ advanced algorithms to improve efficiency
- Explore innovative ways to protect your design
- Use industry's smallest DSC to shrink product size

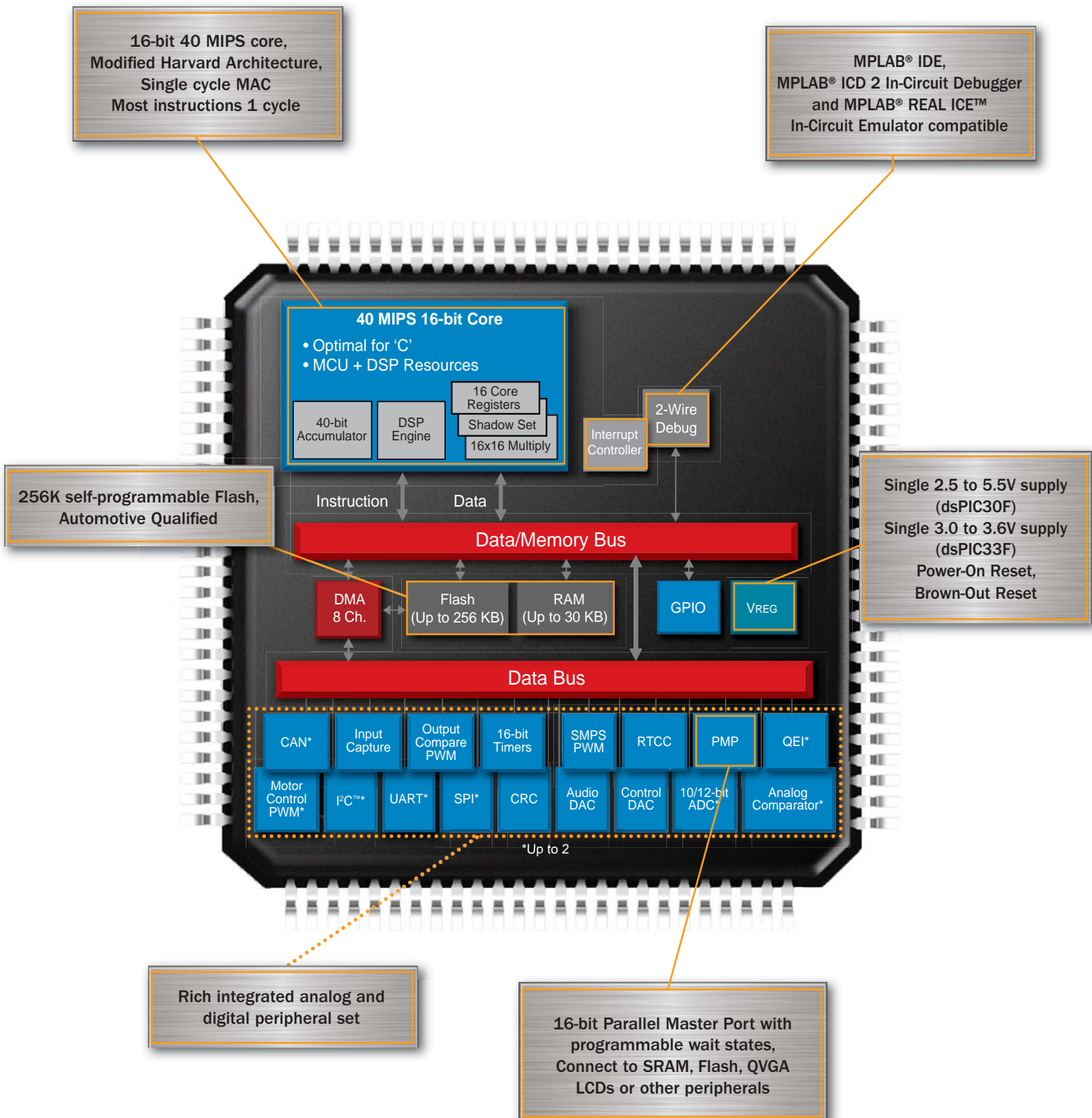
## Complete Project on Schedule

*Leverage existing software, unprecedented compatibility and powerful graphical tools*

- Free software, code examples and peripheral libraries
- Extensive family compatibility maximizes reuse
- Powerful graphical tools for rapid product development
- High-level application libraries add features, not time



# Inside the dsPIC® Digital Signal Controller



# Developing with dsPIC® Digital Signal Controllers

Microchip is the only silicon vendor with a full 8-, 16- and 32-bit microcontroller portfolio supported by a unified development environment. Our MPLAB® IDE is free and easy to use.



## dsPIC® Starter Kit (DM330011)

Getting started is easy with the fully integrated dsPIC Starter Kit featuring simple installation, getting started tutorial and dsPIC Starter Kit board with easy USB connection to your PC.

The Starter Kit features:

- MPLAB IDE and MPLAB C Compiler for dsPIC DSCs†
- dsPIC Starter Kit Board with Integrated Debugger
- Code Examples, Tutorials and Sample Projects

## MPLAB® C Compiler

The MPLAB C Compiler for dsPIC DSCs is a full-featured, ANSI compliant optimizing compiler. The Compiler includes a complete ANSI C standard library, including string manipulation, dynamic memory allocation, data conversion, timekeeping and math libraries. The MPLAB C Compiler has a powerful code optimizer; other 16-bit MCUs generate as much as 165 percent larger code for the same application.

## Explorer 16 Development Board (DM240001)



A low-cost modular development system for Microchip's 16- and 32-bit microcontrollers. Add MPLAB® ICD 2 or MPLAB REAL ICE™ in-circuit debugger/programmer for software development.

## Explorer 16 Motor Control Development System for dsPIC33F



The Explorer 16 Motor Control environment is an excellent platform to develop and prototype BLDC, PMAC and ACIM applications. Microchip offers free motor control source code to jump start your designs.

## Plug-In Modules for Explorer 16 Development Board

Controller	Pin Adaptation	Part Number	Notes
dsPIC33FJ256GP710	100 pin to 100 pin	MA330011	included in DM240001
dsPIC33FJ256MC710	100 pin to 100 pin	MA330013	Purchase separately
dsPIC33FJ12MC202	28 pin to 100 pin	MA330014	Purchase separately
dsPIC33FJ12GP202	28 pin to 100 pin	MA330015	Purchase separately
dsPIC33FJ32GP204	44 pin to 100 pin	MA330016	Purchase separately
dsPIC33FJ32MC204	44 pin to 100 pin	MA330017	Purchase separately
dsPIC33FJ128GP804	44 pin to 100 pin	MA330018	Purchase separately
dsPIC33FJ128MC804	44 pin to 100 pin	MA330019	Purchase separately

## PICtail™ Plus Daughter Boards with dsPIC33F Family Supported Devices

Development Tool	Description	Part Number
PICtail Plus Daughter Boards For use with the Explorer 16 Development Board (DM240001)	Wireless Communications PICtail™ Plus Daughter Board	AC163027-4
	PICtail Plus Daughter Board for Secure Digital (SD)/Multimedia Card (MMC) to SPI interface	AC164122
	ECAN/LIN PICtail Plus Daughter Board	AC164130
	Audio PICtail Plus Daughter Board	AC164129
	Ethernet PICtail Plus Daughter Board	AC164123
	IrDA® PICtail Plus Daughter Board	AC164124
	Speech Playback PICtail Plus Daughter Board	AC164125
	Prototype PICtail Plus Daughter Board	AC164126
	Graphic PICtail Plus Daughter Board	AC164127
	Motor Interface PICtail Plus Daughter Board	AC164128

†Student Edition is a full feature compiler for the first 60 days.

## 16-Bit dsPIC® Digital Signal Controller (DSC) Products

Family	Program Memory (Kbytes)	RAM (Bytes)	Pins	Max Speed	A/D Ch.	A/D Res. (bits)	A/D Sample (ksp/s)	Comp	8/16/32-bit Timers (x8, x16, x32)	Communication Peripherals	PWM Ch.	PWM Type	Other Features
<b>16-Bit DSCs – General Purpose (24-bit Instruction Word), ICSP™, Self-Write, Sensor</b>													
dsPIC30FXXX	12-144	1K-8K	18-80	30 MIPS	8-16	12	200	–	3-5 x16	UART, I <sup>2</sup> C™, SPI, CAN, DCI (AC97/I <sup>2</sup> S)*	2-8	Standard	CodeGuard™, EEPROM
dsPIC33FXXX	12-256	1K-30K	18-100	40 MIPS	6-32	10 or 12	500 or 1.1M	0-2	3-9 x16	UART w/IrDA, I <sup>2</sup> C, SPI, ECAN, DCI	2-8	Standard	CodeGuard, JTAG, DMA, PMP*, RTCC*, DAC*, CRC*
<b>16-Bit DSCs – Motor Control (24-bit Instruction Word), ICSP, Self-Write</b>													
dsPIC30FXXX	12-144	512-8K	28-80	30 MIPS	6-16	10	1.0M	–	3-5 x16	UART, I <sup>2</sup> C/SPI, QEI, CAN	6-8	Motor Ctrl.	CodeGuard, EEPROM
dsPIC33FXXX	12-256	1K-30K	20-100	40 MIPS	4-24	10 or 12	500 or 1.1M	0-2	3-9 x16	UART w/IrDA, I <sup>2</sup> C, SPI, QEI, ECAN	6-8	Motor Ctrl.	CodeGuard, JTAG, DMA*, PMP*, RTCC*, CRC*
<b>16-Bit DSCs – SMPS and Digital Power Conversion (24-bit Instruction Word), ICSP, Self-Write</b>													
dsPIC30FXXX	6-12	256-512	28-44	30 MIPS	6-12	10	2.0M	2-4	2-3 x16	UART, I <sup>2</sup> C, SPI	4-8	High-speed	CodeGuard

\*Availability of listed feature dependent on product.

## Microchip Software Libraries, Application Algorithms and Reference Designs

For a complete list visit: [www.microchip.com/libraries](http://www.microchip.com/libraries)

Digital Signal Processing	dsPICworks™ DSP Software Digital Filter Design DSP Libraries MPLAB® support of Simulink and MATLAB	Free Low-cost Free Free
Connectivity	Microchip TCP/IP Microchip TCP/IP with BSD Sockets IrDA® Stack ZigBee® Protocol Stack MiWi™ Protocol Stack V.22bis/V.22 Soft Modem Library V.32bis Soft Modem Library	Free Free Free Free Free Free Free Eval
USB	USB Host USB Device USB Class Drivers – HID, MSD, CDC, Custom, etc. USB On-The-Go	Free Free Free Free
Graphics	Microchip Graphic Library	Free
Motor Control	Numerous Application Solutions for BLDC, ACIM and PMSM	Free
Digital Power Conversion	Digital Power Factor Correction Software SMPS Topologies Application Note SMPS Buck Board Application Solution Power Design and Simulation Tool	Free Free Low-cost Eval Free
Speech & Audio	Noise Suppression Library Acoustic Echo Cancellation Library Line Echo Cancellation Library Speech Recognition System Speex Speech Encoding/Decoding Library G.711 Speech Encoding/Decoding Library G.726A Speech Encoding/Decoding Library	Free Eval Free Eval Free Eval Free Eval Free Eval Free Free Eval
Encryption	Symmetric Key Embedded Encryption Library Asymmetric Key Embedded Encryption Library Triple DES/AES Encryption Libraries	Low-cost Eval Low-cost Eval Low-cost Eval
Basic Libraries	16-bit File System Library Math Library Peripheral Library	Free Free Free

## Web Seminars, Application Notes and Code Examples

Microchip offers extensive on-line resources for designers to learn and apply dsPIC Digital Signal Controller. These helpful resources are available at:

[www.microchip.com/webseminar](http://www.microchip.com/webseminar)  
[www.microchip.com/codeexamples](http://www.microchip.com/codeexamples)  
[www.microchip.com/appnotes](http://www.microchip.com/appnotes)  
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## Microchip Regional Training Centers

Microchip's Regional Training Center classes enable engineers to implement the right solution for their development needs. Our training is presented in product, technology and implementation classes that are grouped into application based curricula that provides the foundational tool and product knowledge to quickly begin designs and help speed time to market. Engineers looking to gain in depth knowledge of dsPIC DSCs are encouraged to take one or more of our classes. For the latest training schedule visit [www.microchip.com/training](http://www.microchip.com/training).

For the most up-to-date information about our 16-bit dsPIC DSC portfolio and related development tools and technical support, visit:  
[www.microchip.com/DSC](http://www.microchip.com/DSC)

## Support

Microchip is committed to supporting its customers in developing products faster and more efficiently. We maintain a worldwide network of field applications engineers and technical support ready to provide product and system assistance. In addition, the following service areas are available at [www.microchip.com](http://www.microchip.com):

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- **Training** link offers webinars, registration for local seminars/workshops and information on annual MASTERS events held throughout the world: [www.microchip.com/training](http://www.microchip.com/training)
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Microchip Technology Inc. • 2355 W. Chandler Blvd. • Chandler, AZ 85224-6199

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