



dsPIC Digital Signal Controllers

A large graphic featuring the text 'dsPIC' in a bold, 3D, metallic font. The 'ds' is red, and 'PIC' is silver. Below it, the words 'Digital Signal Controllers' are written in a bold, white, sans-serif font with a black outline. The background is a dynamic, abstract pattern of purple and orange wavy lines.

dsPIC
Digital Signal Controllers

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. A Digital Signal Controller is a single-chip embedded controller that seamlessly integrates the control attributes of a microcontroller (MCU) with the computation and throughput capabilities of a Digital Signal Processor (DSP).

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

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

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

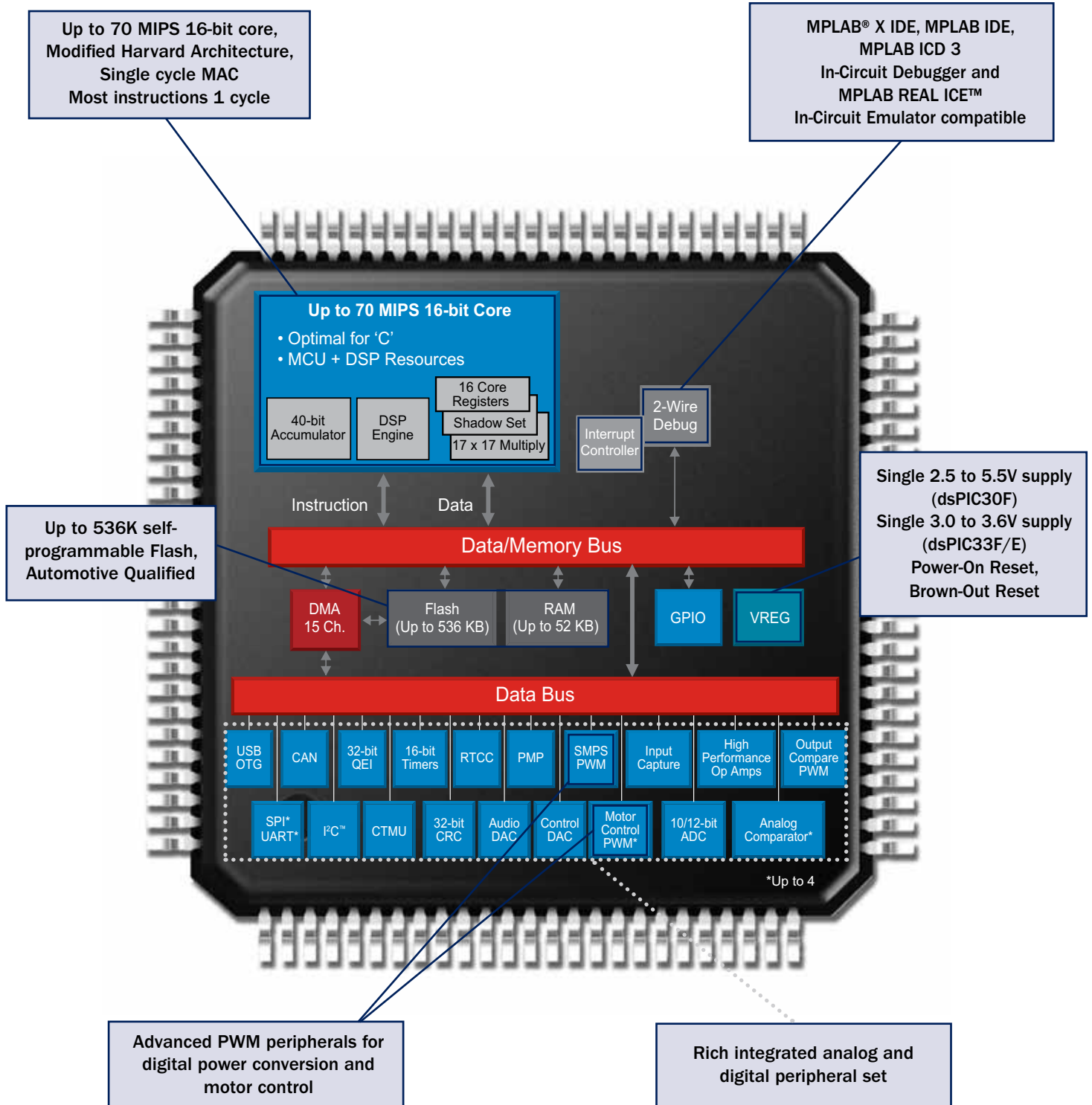
Complete Project on Schedule

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 provide innovative features



Inside the dsPIC Digital Signal Controller



Products, Libraries and Reference Designs

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 (KSPS)	Comp	8/16/32-bit Timers (× 8, × 16, × 32)	Communication Peripherals	PWM Ch.	PWM Type	Other Features
16-bit DSCs: General Purpose (24-bit Instruction Word), ICSP™, Self-Write													
dsPIC30FXXX	12–144	1K–8K	18–80	30 MIPS	8–16	12	200	–	3–5 × 16	UART, I ² C™, SPI, ECAN, DCI (AC97/I ² S)*	2–8	Standard	Flash security, EEPROM
dsPIC33FXXX/A**	12–256	1K–30K	18–100	40 MIPS	6–32	10 or 12	500 or 1.1M	0–2	3–9 × 16	UART w/IrDA, I ² C, SPI, ECAN, DCI	2–8	Standard	Flash security, JTAG, DMA*, PMP*, RTCC*, DAC*, CRC*
dsPIC33EPXXGP50X***	32–512	4–48K	28–64	70 MIPS	6–16	10 or 12	500 or 1.1M	4	5 × 16	UART, I ² C, SPI, ECAN	8	Standard	On-chip op amps, mTouch, JTAG, Flash security, DMA, CRC
16-bit DSCs: Motor Control (24-bit Instruction Word), ICSP Self-Write													
dsPIC30FXXX	12–144	512–8K	28–80	30 MIPS	6–16	10	1M	–	3–5 × 16	UART, I ² C, SPI, ECAN	6–8	Motor Ctrl.	Flash security, EEPROM, QEI*
dsPIC33FXXX/A**	12–256	1K–30K	20–100	40 MIPS	4–24	10 or 12	500 or 1.1M	0–2	3–9 × 16	UART w/IrDA, I ² C, SPI, ECAN	6–8	Motor Ctrl.	Flash security, JTAG, DMA*, PMP*, RTCC*, CRC*, QEI*
dsPIC33EPXXX/MUXXX	280–536	28K–52K	64–144	60 MIPS	24–32	10 or 12	500 or 1.1M	3	9 × 16	UART, I ² C, SPI, ECAN, USB-OTG	14	High-speed	Flash security, JTAG, DMA, PMP RTCC, CRC, QEI
dsPIC33EPXXMC20X/50X***	32–512	4–48K	28–64	70 MIPS	6–16	10 or 12	500 or 1.1M	4	5 × 16	UART, I ² C, SPI, ECAN	6	Motor Ctrl.	On-chip op amps, mTouch, JTAG, Flash security, DMA, CRC, QEI
16-bit DSCs: Digital Power Conversion and Motor Control (24-bit Instruction Word), ICSP Self-Write													
dsPIC30FXXX	6–12	256–512	28–44	30 MIPS	6–12	10	2M	2–4	2–3 × 16	UART, I ² C, SPI	4–8	High-speed	Flash security
dsPIC33FJXXGSXXX	6–64	256–9K	18–100	50 MIPS	6–24	10	2M or 4M	0–4	2–5 × 16	UART, I ² C, SPI, ECAN	4–18	High-speed	Flash security, JTAG, DMA*, 10-bit DAC Output*

*Availability of listed feature dependent on product.

**Parts available with High Temperature options.

***Check www.microchip.com for availability.

All parts available with Industrial and Extended Temperature options.

Microchip Software Libraries, Application Algorithms and Reference Designs

For a complete list of software libraries visit: www.microchip.com/libraries

Application	Application Library	Part Number
Speech, Audio and Communication	dsPIC® DSC Noise Suppression Library	SW300040-5K*, SW300040-EVAL
	dsPIC DSC Acoustic Echo Cancellation Library	SW300060-5K*, SW300060-EVAL
	dsPIC DSC Line Echo Cancellation Library	SW300080-5K*, SW300080-EVAL
	dsPIC DSC Equalizer Library	–
	dsPIC DSC Automatic Gain Control Library	–
	PIC24/dsPIC DSC G.711 Speech Encoding/Decoding Library	SW300026
	dsPIC DSC G.726A Speech Encoding/Decoding Library	SW300090
	dsPIC DSC Speex Speech Encoding/Decoding Library	SW300070
	dsPIC DSC Speech and Audio Fast Forward (SAFF) Tool	–
	DTMF (Generation & Detection) Library	–
Encryption and Security	dsPIC DSC Symmetric Key Embedded Encryption Library	SW300050-5K*, SW300050-EVAL
	dsPIC DSC Asymmetric Key Embedded Encryption Library	SW300055-5K*, SW300055-EVAL
	Triple DES/AES Encryption Libraries	SW300052
DSP and Math	dsPIC DSC DSP Library	Included in MPLAB® C Compiler
	PIC24/dsPIC DSC Floating Point Math Library	Included in MPLAB C Compiler
	PIC24/dsPIC DSC Fixed Point Math Library	Included in MPLAB C Compiler
Peripherals	PIC24/dsPIC DSC Peripheral Library	Included in MPLAB C Compiler
Graphics	Microchip Graphics Library	–
Wired and Wireless Connectivity	Microchip TCP/IP Stack Software	–
	Microchip USB Framework	–
	IEEE 802.15.4: MiWi™ and MiWi P2P	–
	IEEE 802.15.4: ZigBee®, ZigBee PRO, ZigBee Smart Energy Profile Suite	–
	IrDA® Stack	–
	Bluetooth® Stack	SW500151
File System and Memory	Microchip FAT File System for PIC24 & PIC32 MCUs and dsPIC DSCs	–
	Data EEPROM Emulation for PIC18, PIC24 & PIC32 MCUs and dsPIC DSCs	–
	SD/MMC Library	–
Other	PMBus Stack	–
	Class B Safety Software Library for PIC® MCUs and dsPIC DSCs	–

*Software library license up to 5K units

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.

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.

dsPIC33E USB Starter Kit (DM330012)



This starter kit provides a low-cost modular development system for Microchip's enhanced 16-bit DSCs. It comes with preloaded demo software for the user to explore the new features of the dsPIC33E DSC family.

Motor Control and Digital Power Development Systems for dsPIC33



Microchip offers complete Motor Control development systems to develop and prototype BLDC, PMSM and ACIM applications. Microchip also offers digital power conversion reference designs for

applications in AC to DC converters, DC to DC converters, Uninterruptible Power Supply (UPS), Interleaved Power Factor Correction (PFC), solar micro inverter, HID and LED lighting.

Plug-in Modules Supporting Explorer 16 Development and Other Development Boards

A Plug-in Module (PIM) is a daughter board with a PIC MCU or dsPIC DSC soldered on top and header socket strips on the bottom. This method allows for easy swapping of devices onto the various development boards, without having to un-solder and re-solder parts.

PICtail™ Plus Daughter Boards

PICtail Plus daughter boards allow for the easy addition of complex hardware and easy evaluation of software libraries. These daughter boards also provide expansion for application specific hardware.

Description	Part Number
Consumer-band BPSK 7.2 kbps PLM PICtail™ Plus Daughter Boards (includes 2 daughter boards and 2 HV Adapters)	AC164142
Utility Band Power Line Soft Modem PICtail Plus Daughter Board	AC164145
Consumer Band Power Line Soft Modem PICtail Plus Daughter Board	AC164142
Wireless PICtail Plus Daughter Board: 2.4 GHz daughter card with the Microchip MRF24J40 transceiver	AC163027
CAN/LIN PICtail Plus Daughter Board: Two CAN MCP2551 transceivers and two LIN MCP2021-330 transceivers	AC164130-2
PICtail Plus Daughter Board for SD/MMC: SPI to SD/MMC interface	AC164122
Ethernet PICtail Plus Daughter Board: Stand Alone ENC24J60 10Base-T Ethernet controller	AC164123
IrDA® PICtail Plus Daughter Board: IrDA transceiver for IrDA enabled UART	AC164124
Speech Playback PICtail Plus Daughter Board: Low cost PWM-based speech playback	AC164125
Prototype PICtail Plus Daughter Board: PICtail Plus expansion board	AC164126
Graphic PICtail Plus Daughter Board: Enables Graphics display via PMP	AC164127
Audio PICtail Plus Daughter Board: Full Duplex Speech and Audio applications	AC164129
Buck/Boost Converter PICtail Plus Daughter Board: Two independent DC/DC synchronous buck converters and independent DC/DC boost converter	AC164133
Thermal/Linear Intelligent Sensor PICtail Plus Daughter Board: Signal input and conditioning for thermocouples and linear sensors and TC1047/1047A Temperature to Voltage Converter	AC164135
MCP2515 PICtail Plus Daughter Board: Stand Alone CAN Controller expansion board	MCP2515DM
MCP42XX PICtail Plus Daughter Board: MCP42XX Digital Potentiometer expansion board	MCP42XXDM
MCP4725 PICtail Plus Daughter Board: 12-bit DAC + non-volatile memory	MCP4725DM

MPLAB Starter Kit for dsPIC Digital Signal Controllers (DM330011)



The MPLAB starter kit for dsPIC Digital Signal Controllers is an excellent low cost platform to evaluate or learn about the dsPIC architecture. It is equipped with the hardware and software

necessary to code and debug simple applications and also demonstrates the audio capability of the dsPIC DSC.

Explorer 16 Development Board (DM240001)



A low-cost modular development system for Microchip's 16- and 32-bit microcontrollers. Add MPLAB ICD 3 or MPLAB REAL ICE™ in-circuit debugger/programmer for software development.

Microstick II (DM330013-2)



Microstick II delivers a complete development hardware platform for Microchip's 16-bit and 32-bit microcontrollers and digital signal controllers. The USB-powered kit includes an on-board debugger/programmer, a DUT socket for easy device swapping, a user LED and reset button.

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:

- **Support** link provides a way to get questions answered fast: <http://support.microchip.com>
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Training

If additional training interests you, then Microchip can help. We continue to expand our technical training options, offering a growing list of courses and in-depth curriculum locally, as well as significant online resources – whenever you want to use them.

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- eLearning: www.microchip.com/webseminars
- Resources from our Distribution and Third Party Partners www.microchip.com/training

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