



**PIC32 Microcontroller Families**

*With USB, CAN and Ethernet*

**PIC<sup>®</sup>32<sup>®</sup>**

**PIC<sup>®</sup> MCU to the power of 32**

# Performance Leading PIC32 Microcontrollers

*Building on the heritage of Microchip Technology's world-leading 8- and 16-bit PIC® microcontrollers, the PIC32 family delivers 32-bit performance and more memory to solve increasingly complex embedded system design challenges.*

## Broad Portfolio

*From simple USB device connectivity to RTOS driven graphical user interface applications with advanced audio processing, there is a PIC32 device to meet your design challenges.*

- Up to 80 MHz, 1.65 DMIPS/MHz MIPS M4K Core
- Fast interrupts and context switch
- 16 KB to 512 KB Flash
- 4 KB to 128 KB RAM for data and program execution
- Devices AEC-Q100 qualified to +105°C
- Low pin count devices with Peripheral Pin Select (PPS) for pin remapping of most digital I/O
- Fast interrupts and context switch

## Industry-Leading Compatibility

*Create scalable products in a consistent environment.*

- Common MPLAB® X development tools
- Pin and peripheral compatible with 16-bit PIC MCUs
- Common software stacks across MCUs
- Common tools environment over 800 PIC MCUs

## Fast, Easy Development

*Shorten your project design cycle.*

- Free MPLAB X Integrated Development Environment supporting all Microchip MCUs
- Free MPLAB XC Compiler
- Free demo code to get you started with communications, graphics, touch sense, file system, audio and signal processing
- Work in a familiar environment with a broad third party ecosystem of IDEs, RTOS and debuggers
- Hardware trace for less than \$80
- Development kits starting at \$34.95 with free C compiler

## More Design Options

*Simplify your system design through integration.*

- Extensive analog and digital peripherals including 10/100 Ethernet I<sup>2</sup>S, ADCs, serial comms and USB
- Up to 16 DMA channels
- 8/16-bit parallel master port supporting graphic interface and additional memory
- CTMU for improved human interfaces with capacitive buttons or slider control

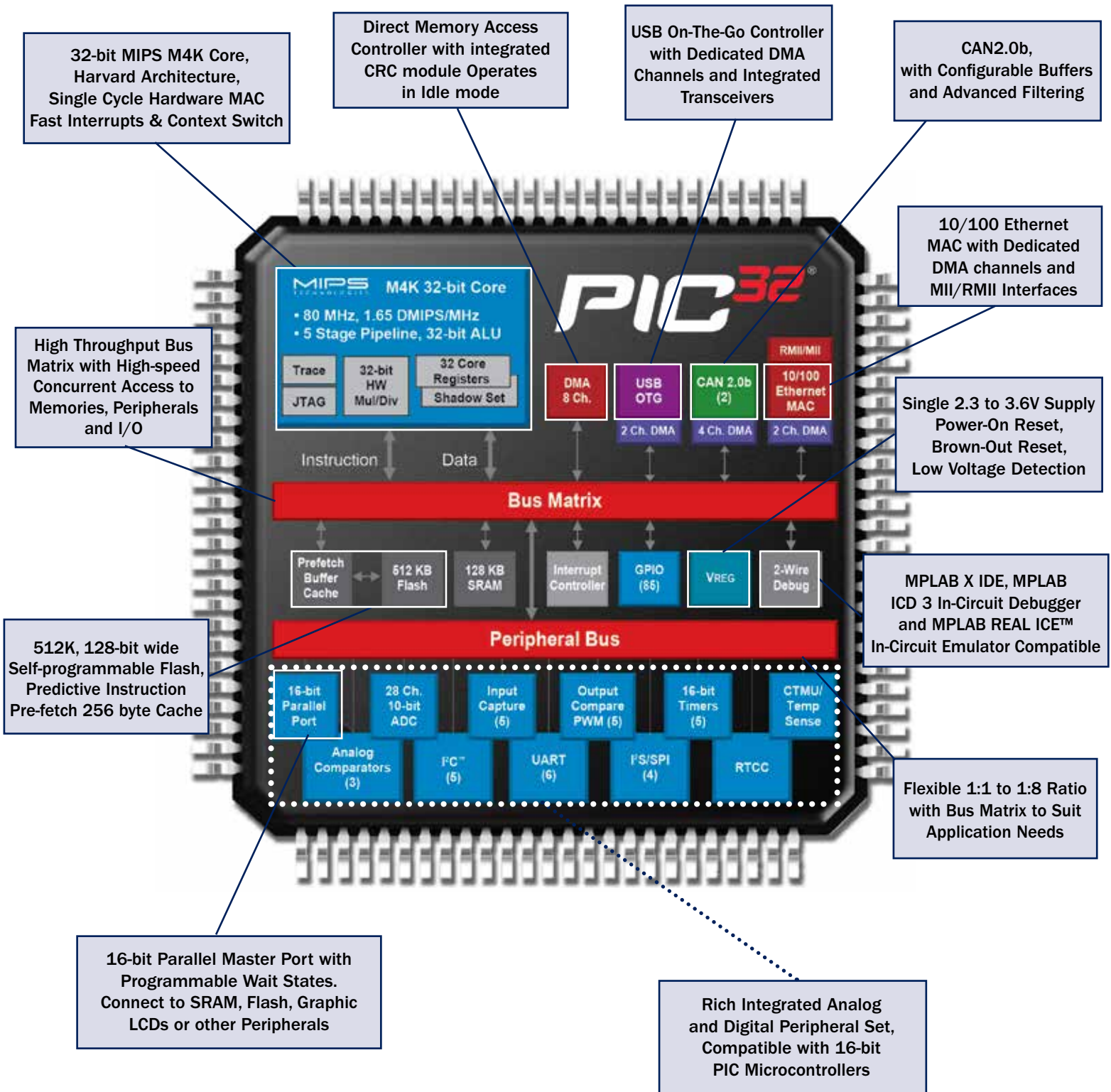
## FREE Microchip Software Libraries

[www.microchip.com/libraries](http://www.microchip.com/libraries)

<b>USB</b>	USB Host, Device, On-the-Go with Class Drivers
<b>HMI</b>	Microchip Graphics Library Capacitive Touch Software
<b>CAN</b>	CAN API Library for PIC32 with Integrated CAN Controller (in compiler) Standalone CAN Library: includes support for MCP2515
<b>Connectivity</b>	Microchip TCP/IP with SSL and BSD IrDA® Stack ZigBee Smart Energy Profile Suite MiWi™ Protocol Stack for 802.15.4 Networks
<b>Audio and Speech</b>	Audio Library for PIC32MX: Speex, ADPCM and WAV; MP3 Decode; Digital Audio for Apple® devices
<b>Encryption</b>	AES 128-, 196- and 256-bit Encryption and Decryption Library Public Key Cryptography Library (RSA)
<b>Basic Libraries</b>	16- and 32-bit File System Libraries FAT File System Library – FatFs DSP Library (located in MPLAB® XC Compiler for PIC32) Math Library (located in MPLAB XC Compiler for PIC32) Peripheral Library (located in MPLAB XC Compiler for PIC32) EEPROM Emulation IEC 60730 Class B Software
<b>Boot Loader</b>	Serial Port Boot Loader USB Host Boot Loader

Get the latest updates at [www.microchip.com/libraries](http://www.microchip.com/libraries).

# Inside the PIC32 Microcontroller



**Note:** Not all features are available on all PIC32 devices. Please see product family table for more information.

# Developing with the PIC32 Microcontroller

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



## PIC32 Starter Kits

Getting started is easy with any of the fully integrated PIC32 Starter Kits featuring simple installation, getting started tutorial and PIC32 starter board with easy USB connection to your PC. The Starter Kits include:


- MPLAB X IDE and MPLAB XC 32 C Compiler†
- PIC32 Starter Board with Integrated Programmer and Debugger
- Code Examples, Documentation, Tutorials and Sample Projects, Optional I/O Expansion board allows signal breakouts and connections for PICtail™ Plus Daughter Cards

†Lite version has **no code size limit** and full optimizations. After 60 days some optimizations are disabled.


## PIC32 Development Tools: Choose a Platform

**Starter Kit Platform**


Microstick II  
(DM330013-2)




PIC32 USB  
Starter Kit II  
(DM320003-2)




PIC32 Starter Kit  
(DM320001)




Wi-Fi® Comm  
Demo Board  
(DV102411)



PIC32 Ethernet  
Starter Kit  
(DM320004)




MPLAB Starter Kit for  
PIC32MX1XX/2XX  
(DM320013)




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**OPTIONAL**


PIC32 I/O  
Expansion Board  
(DM320002)




PIC32 USB Digital  
Audio Mixer Board  
(DM320014)



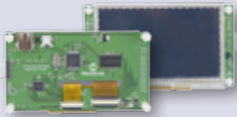
Multimedia  
Expansion Board  
(DM320005)



PIC32MX Audio  
Development Board  
(DM320011)

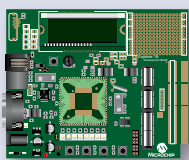


PIC32 GUI Development  
Board with Projected  
Capacitive Touch  
(DM320015)\*



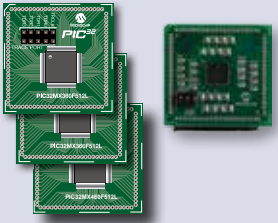
**OR** **Explorer 16 Platform**

Explorer 16  
Development Board  
(DM240001)



+


PIC32  
Plug-in Modules  
(MA320001/2/3)  
(MA320011)



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**AND**

MPLAB ICD 3  
In-Circuit Debugger  
(DV164035)



OR

MPLAB REAL ICE  
In-Circuit Emulation  
System (DV244005)



\*Please contact your Microchip representative for availability

# Developing with the PIC32 Microcontroller

## PICtail Boards Common to Both Development Platforms

Graphics Daughter Board  
with 3.2" Display Kit  
(AC164127-3)



CAN/LIN PICtail Plus  
Daughter Board  
(AC164130-2)



Low-Cost Controllerless (LCC)  
Graphics PICtail Plus Board  
(AC164144)



M2M PICtail  
Daughter Board  
(AC320011)



PIC32 VGA Camera Sensor  
(VCS) PICtail Plus Board  
(AC164150)



MRF24WB0MA Wi-Fi  
Daughter Board  
(AC164136-4)



MRF24J40MA PICtail Plus  
2.4 GHz RF Card  
(AC164134)



PIC32MX CTMU  
Evaluation Board  
(AC323027)



Graphics Controller PICtail  
Plus Epson S1D13517 Board  
(AC164127-7)



Graphics Display Truly 7"  
800 × 480 (WVGA) PICtail  
Plus Board (AC164127-9)



... and many more!

## Third-party Application Software and Hardware Support

- Ashling Microsystems
- AVIX-RT
- CMS Systems
- Digilent Inc.
- easyGUI
- eflightworks
- expresslogic
- Free RTOS
- Green Hills Software Inc.
- Lauterbach
- Macraigor Systems
- Micrium
- Micro/sys Inc.
- OLIMEX Ltd.
- Pumpkin
- RAMTEX International
- RoweBots Research Inc.
- SEGGER
- SparkFun Electronics
- TechToys Company

For up-to-date information about our 32-bit portfolio, related development tools and technical support, visit: [www.microchip.com/PIC32](http://www.microchip.com/PIC32).

# PIC32 Microcontroller Product Families

## PIC32 Product Family

Device	Flash KB + Boot Flash	SRAM KB	Pin Count	MHz	I <sup>2</sup> S/SPI	I <sup>2</sup> C™	UARTs	DMA Channels General/Dedicated	CTMU/PPS	USB	10/100 Ethernet	CAN 2.0b	IC/OC/PWM	10-bit ADC 1 Msps	Analog Comparator	Timers 16b/32b	RTCC	Parallel Master Port	JTAG Program, Debug, Boundary Scan	Temp. Range
PIC32MX110F016B	16 + 3	4	28	40	2/2	2	2	4/2	Y	N	N	N	5/5/5	10	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX110F016C	16 + 3	4	36											12						
PIC32MX110F016D	16 + 3	4	44											13						
PIC32MX120F032B	32 + 3	8	28	40/50	2/2	2	2	4/2	Y	N	N	N	5/5/5	10	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX120F032C	32 + 3	8	36											12						
PIC32MX120F032D	32 + 3	8	44											13						
PIC32MX130F064B	64 + 3	16	28	40	2/2	2	2	4/2	Y	N	N	N	5/5/5	10	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX130F064C	64 + 3	16	36											12						
PIC32MX130F064D	64 + 3	16	44											13						
PIC32MX150F128B	128 + 3	32	28	40/50	2/2	2	2	4/2	Y	N	N	N	5/5/5	10	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX150F128C	128 + 3	32	36											12						
PIC32MX150F128D	128 + 3	32	44											13						
PIC32MX210F016B	16 + 3	4	28	40	2/2	2	2	4/2	Y	Y	N	N	5/5/5	9	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX210F016C	16 + 3	4	36											12						
PIC32MX210F016D	16 + 3	4	44											13						
PIC32MX220F032B	32 + 3	8	28	40/50	2/2	2	2	4/2	Y	Y	N	N	5/5/5	9	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX220F032C	32 + 3	8	36											12						
PIC32MX220F032D	32 + 3	8	44											13						
PIC32MX230F064B	64 + 3	16	28	40	2/2	2	2	4/2	Y	Y	N	N	5/5/5	9	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX230F064C	64 + 3	16	36											12						
PIC32MX230F064D	64 + 3	16	44											13						
PIC32MX250F128B	128 + 3	32	28	40/50	2/2	2	2	4/2	Y	Y	N	N	5/5/5	9	3	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX250F128C	128 + 3	32	36											12						
PIC32MX250F128D	128 + 3	32	44											13						
PIC32MX320F032H	32 + 12	8	64	40	2/2	2	2	0/0	N	N	N	N	5/5/5	16 ch	2	5/2	Y	Y	Y	-40°C to +105°C
PIC32MX320F064H	64 + 12	16	64	80																
PIC32MX320F064H	64 + 12	16	64	80																
PIC32MX320F128H	128 + 12	16	64	80																
PIC32MX320F128L	128 + 12	16	100	80																
PIC32MX330F064H*	64 + 12	16	64	80																
PIC32MX330F064L*	64 + 12	16	100	80																
PIC32MX340F128H	128 + 12	32	64	80																
PIC32MX340F128L	128 + 12	32	100	80																
PIC32MX340F256H	256 + 12	32	64	80																
PIC32MX360F256L	256 + 12	32	100	80																
PIC32MX340F512H	512 + 12	32	64	80																
PIC32MX360F512L	512 + 12	32	100	80																
PIC32MX420F032H	32 + 12	8	64	40																
PIC32MX430F064H*	64 + 12	16	64	80	2/2	4	4/2	Y	28 ch											
PIC32MX430F064L*	64 + 12	16	100	80	2/2	5	4/2	Y	28 ch											
PIC32MX440F128H	128 + 12	32	64	80	0/1	2	4/2	N	16 ch											
PIC32MX440F128L	128 + 12	32	100	80	0/2															
PIC32MX440F256H	256 + 12	32	64	80	0/1															
PIC32MX460F256L	256 + 12	32	100	80	0/2															
PIC32MX440F512H	512 + 12	32	64	80	0/1															
PIC32MX460F512L	512 + 12	32	100	80	0/2															

AEC-Q100 qualified for grade 2 and 3. Check individual product pages for details.

\*Please contact your Microchip representative for availability

# PIC32 Microcontroller Product Families

## PIC32 Product Family (Cont.)

Device	Flash KB + Boot Flash	SRAM KB	Pin Count	MHz	I <sup>2</sup> S/SPI	I <sup>2</sup> C™	UARTs	DMA Channels General/Dedicated	CTMU/PPS	USB	10/100 Ethernet	CAN 2.0b	IC/OC/PWM	10-bit ADC 1 Msps	Analog Comparator	Timers 16b/32b	RTCC	Parallel Master Port	JTAG Program, Debug, Boundary Scan	Temp. Range		
PIC32MX534F064H	64 + 12	16	64	80	0/3	4	6	4/4	N	Y	N	1	5/5/5	16 ch	2	5/2	Y	Y	Y	-40°C to +105°C		
PIC32MX534F064L			100		0/4	5																
PIC32MX564F064H		32	64	0/3	4																	
PIC32MX564F064L			100	0/4	5																	
PIC32MX564F128H	128 + 12	32	64	80	0/3	4																
PIC32MX564F128L			100	0/4	5																	
PIC32MX575F256H	256 + 12	64	64	80	0/3	4		8/4														
PIC32MX575F256L			100	0/4	5																	
PIC32MX575F512H	512 + 12	64	64	80	0/3	4																
PIC32MX575F512L			100	0/4	5																	
PIC32MX664F064H	64 + 12	32	64	80	0/3	4	6	4/4	N	Y	Y	N	5/5/5	16 ch	2	5/2	Y	Y	Y		-40°C to +105°C	
PIC32MX664F064L			100	0/4	5																	
PIC32MX664F128H	128 + 12	32	64	80	0/3	4																
PIC32MX664F128L			100	0/4	5																	
PIC32MX675F256H	256 + 12	64	64	80	0/3	4		8/4														
PIC32MX675F256L			100	0/4	5																	
PIC32MX675F512H	512 + 12	64	64	80	0/3	4																
PIC32MX675F512L			100	0/4	5																	
PIC32MX695F512H	512 + 12	128	64	80	0/3	4																
PIC32MX695F512L			100	0/4	5																	
PIC32MX764F128H	128 + 12	32	64	80	0/3	4	6	4/6	N	Y	Y	1	5/5/5	16 ch	2	5/2	Y	Y	Y	-40°C to +105°C		
PIC32MX764F128L			100	0/4	5																	
PIC32MX775F256H	256 + 12	64	64	80	0/3	4																8/8
PIC32MX775F256L			100	0/4	5																	
PIC32MX775F512H	512 + 12	64	64	80	0/3	4		2														
PIC32MX775F512L			100	0/4	5																	
PIC32MX795F512H	512 + 12	128	64	80	0/3	4																
PIC32MX795F512L			100	0/4	5																	

AEC-Q100 qualified for grade 2 and 3. Check individual product pages for details.

## Package Options



28-pin QFN  
6 × 6 mm (ML)



28-pin SSOP  
10.2 × 7.8 mm (SS)



28-pin SOIC  
17.9 × 10.3 mm (SO)



28-pin SPDIP  
36 × 7.5 mm (SP)



36-pin VTLA  
5 × 5 mm (TL)



44-pin VTLA  
6 × 6 mm (TL)



44-pin TQFP  
10 × 10 mm (PT)



44-pin QFN  
8 × 8 mm (ML)



64-lead TQFP  
10 × 10 mm (PT)



64-lead QFN  
9 × 9 mm (MR)



124-lead VTLA (TL)  
9 × 9 mm



100-lead TQFP  
12 × 12 mm (PT)



100-lead TQFP  
14 × 14 mm (PF)



121-ball BGA  
10 × 10 mm (BG)

## 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):

- **Support** link provides a way to get questions answered fast: <http://support.microchip.com>
- **Sample** link offers evaluation samples of any Microchip device: <http://sample.microchip.com>
- **Forum** link provides access to knowledge base and peer help: <http://forum.microchip.com>
- **Buy** link provides locations of Microchip Sales Channel Partners: [www.microchip.com/sales](http://www.microchip.com/sales)

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#### UK - Wokingham

Tel: 44-118-921-5869

## 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.

- Technical Training Centers: [www.microchip.com/training](http://www.microchip.com/training)
- MASTERS Conferences: [www.microchip.com/masters](http://www.microchip.com/masters)
- Worldwide Seminars: [www.microchip.com/seminars](http://www.microchip.com/seminars)
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- Resources from our Distribution and Third Party Partners [www.microchip.com/training](http://www.microchip.com/training)

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Tel: 86-27-5980-5300

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