



**PIC32 Microcontroller Families**

**With USB, CAN and Ethernet**

The PIC32 logo features the word 'PIC' in a large, silver, 3D metallic font, followed by '32' in a red, 3D metallic font. A small 'TM' trademark symbol is positioned to the upper right of the '32'. The background is a red, glossy, wavy surface.

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

# Performance Leading **PIC<sup>32</sup>** Microcontroller

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

## High Performance & Memory

### *Power your RTOS, Touch Screens and Complex Applications*

- 80 MHz, 1.56 DMIPS/MHz MIPS M4K Core
- 512K Flash with pre-fetch cache
- 128K RAM for data and program execution
- Fast interrupts and context switch

## Fast, Easy Development

### *Shorten Your Projects and Reuse Hardware, Software and Tools*

- Free USB, TCP/IP, graphics and file system source code
- Broad Third Party ecosystem
- \$49.99 starter kit with free C compiler
- Hardware trace for less than \$80

## Industry Leading Compatibility

### *Create Scalable Products in a Consistent Environment*

- Common MPLAB<sup>®</sup> development tools
- Pin & peripheral compatible with 16-bit PIC MCUs
- Common software stacks across MCUs
- Common tools environment ~600 PIC MCUs

## More Design Options

### *Simplify Your System Design Through Integration*

- Extensive analog and digital peripherals
- USB Host/Device/OTG, Dual CAN, 10/100 Ethernet
- Up to 16 DMA channels
- 16-bit parallel master port

## FREE Microchip Software Libraries

[www.microchip.com/pic32libraries](http://www.microchip.com/pic32libraries)

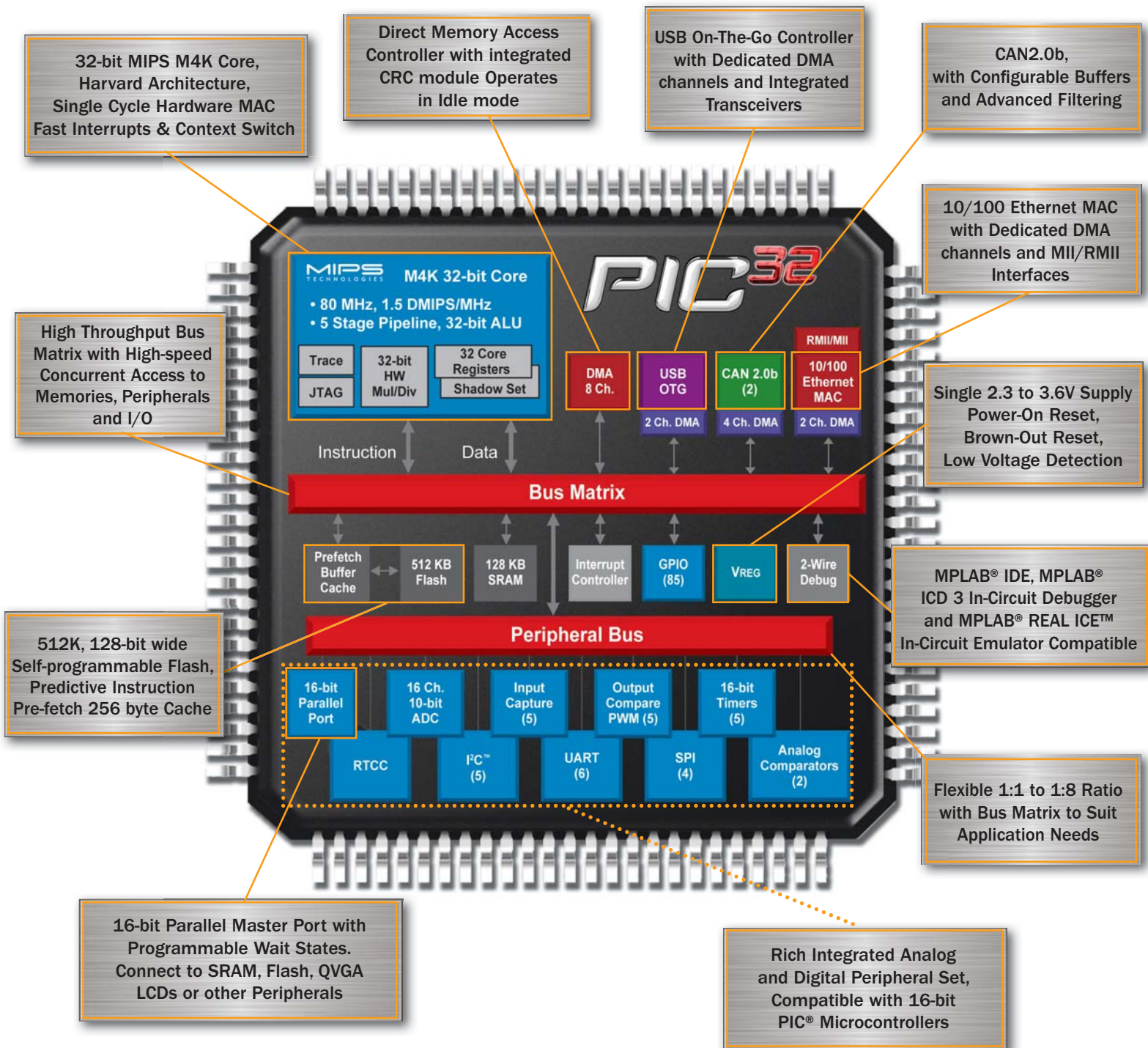
|                         |                                                                                                                                                                                                                                                                                 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

\* Contact Microchip for availability.

\*\* Software planned for future - get the latest updates at [www.microchip.com/pic32libraries](http://www.microchip.com/pic32libraries).

[www.microchip.com/PIC32](http://www.microchip.com/PIC32)

# Inside the **PIC<sup>32</sup>** Microcontroller



## Package Options

### 64-pin



64-lead TQFP  
10 x 10 (PT)



64-lead QFN  
9 x 9 (MR)



100-lead TQFP  
12 x 12 (PT)



100-lead TQFP  
14 x 14 (PF)



100-ball BGA  
10 x 10 (BG)

# Developing with the **PIC32<sup>™</sup>** 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<sup>®</sup> 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 IDE and MPLAB C32 C Compiler<sup>†</sup>
- 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<sup>™</sup> Plus Daughter Cards

<sup>†</sup>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

**PIC32 Starter Kit (DM320001)**



**USB II Starter Kit (DM320003-2)**



**PIC32 Ethernet Starter Kit (DM320004)**



OPTIONAL

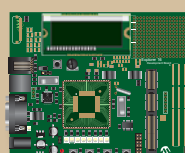
**PIC32 I/O Expansion Board (DM320002)**



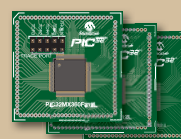
OR

### Explorer 16 Platform

**Explorer 16 Development Board (DM240001)**



**PIC32 Plug-in Modules (MA320001) (MA320002) (MA320003)**



+

AND

**MPLAB<sup>®</sup> ICD 3 In-Circuit Debugger (DV164035)**



**MPLAB<sup>®</sup> REAL ICE<sup>™</sup> In-Circuit Emulation System (DV244005)**



OR

### PICtail<sup>™</sup> Boards Common to Both Development Platforms

**Graphics PICtail<sup>™</sup> Board (AC164127-3)**



**ECAN/LIN PICtail<sup>™</sup> Plus Daughter Board (AC164130)**



**802.11 ZeroG PICtail<sup>™</sup> (AC164136-2)**



**MRF24J40MA 2.4 GHz RF Card (AC164134)**



... and many more!

| PIC32 Product Family |                          |          |           |     |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
|----------------------|--------------------------|----------|-----------|-----|-----|-------------------|-------|---------------------------------------|-----|--------------------|----------|-----------|----------------------|----------------------|-------------------|------|-------------------------|------------------------------------------|---|---|-----|---|---|---|-------|-------|---|-----|---|---|
| Device               | Flash KB<br>+ Boot Flash | SRAM KB  | Pin Count | MHz | SPI | I <sup>2</sup> C™ | UARTs | DMA Channels<br>General/<br>Dedicated | USB | 10/100<br>Ethernet | CAN 2.0b | IC/OC/PWM | 10-bit ADC<br>1 Msps | Analog<br>Comparator | Timers<br>16b/32b | RTCC | Parallel<br>Master Port | JTAG Program,<br>Debug,<br>Boundary Scan |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX320F032H      | 32 + 12                  | 8        | 64        | 40  | 2   | 2                 | 2     | 0/0                                   | N   | N                  | N        | 5/5/5     | 16 ch                | 2                    | 5/1               | 1    | Y                       | Y                                        |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX320F064H      | 64 + 12                  | 16       | 64        | 40  |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX320F064H      |                          |          | 80        |     |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX320F128H      | 128 + 12                 | 16       | 64        | 80  |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX320F128L      |                          |          | 100       |     |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX340F128H      |                          | 32       | 64        |     |     |                   |       | 4/0                                   |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX340F128L      |                          |          | 100       |     |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX340F256H      | 256 + 12                 | 32       | 64        | 80  |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX360F256L      |                          |          | 100       |     |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX340F512H      | 512 + 12                 | 32       | 64        | 80  |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX360F512L      |                          |          | 100       |     |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX420F032H      | 32 + 12                  | 8        | 64        | 40  | 1   | 2                 | 2     | 0/2                                   | Y   | N                  | N        | 5/5/5     | 16 ch                | 2                    | 5/1               | 1    | Y                       | Y                                        |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX440F128H      | 128 + 12                 | 32       | 64        | 80  | 1   |                   |       | 4/2                                   |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX440F128L      |                          |          | 100       | 2   |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX440F256H      | 256 + 12                 | 32       | 64        | 80  | 1   |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX460F256L      |                          |          | 100       | 2   |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX440F512H      | 512 + 12                 | 32       | 64        | 80  | 1   |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX460F512L      |                          |          | 100       | 2   |     |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX575F256H      | 256 + 12                 | 64       | 64        | 80  | 3   |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          | 4 | 6 | 8/4 | Y | N | 1 | 5/5/5 | 16 ch | 2 | 5/1 | 1 | Y |
| PIC32MX575F256L      |                          |          | 100       | 4   | 5   |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX575F512H      | 512 + 12                 | 64       | 64        | 80  | 3   | 4                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX575F512L      |                          |          | 100       | 4   | 5   |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX675F256H      | 256 + 12                 | 64       | 64        | 80  | 3   | 4                 | 6     | 8/4                                   | Y   | Y                  | N        | 5/5/5     | 16 ch                | 2                    | 5/1               | 1    | Y                       | Y                                        |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX675F256L      |                          |          | 100       | 4   | 5   |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX675F512H      |                          | 512 + 12 | 64        | 64  | 80  | 3                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          | 4 |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX675F512L      |                          |          |           | 100 | 4   | 5                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX695F512H      |                          |          | 128       | 64  | 80  | 3                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          | 4 |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX695F512L      |                          |          |           | 100 | 4   | 5                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX775F256H      | 256 + 12                 | 64       | 64        | 80  | 3   | 4                 | 6     | 8/8                                   | Y   | Y                  | 2        | 5/5/5     | 16 ch                | 2                    | 5/1               | 1    | Y                       | Y                                        |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX775F256L      |                          |          | 100       | 4   | 5   |                   |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX775F512H      |                          | 512 + 12 | 64        | 64  | 80  | 3                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          | 4 |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX775F512L      |                          |          |           | 100 | 4   | 5                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX795F512H      |                          |          | 128       | 64  | 80  | 3                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          | 4 |   |     |   |   |   |       |       |   |     |   |   |
| PIC32MX795F512L      |                          |          |           | 100 | 4   | 5                 |       |                                       |     |                    |          |           |                      |                      |                   |      |                         |                                          |   |   |     |   |   |   |       |       |   |     |   |   |

## Third-party Application Software and Hardware Support



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)

## Support

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

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7/21/09

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Microchip Technology Inc.  
2355 W. Chandler Blvd.  
Chandler, AZ 85224-6199

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QQ          800077892  
  
Skype        ameyasales1 ameyasales2

➤ Customer Service :

Email        service@ameya360.com

➤ Partnership :

Tel          +86 (21) 64016692-8333  
  
Email        mkt@ameya360.com