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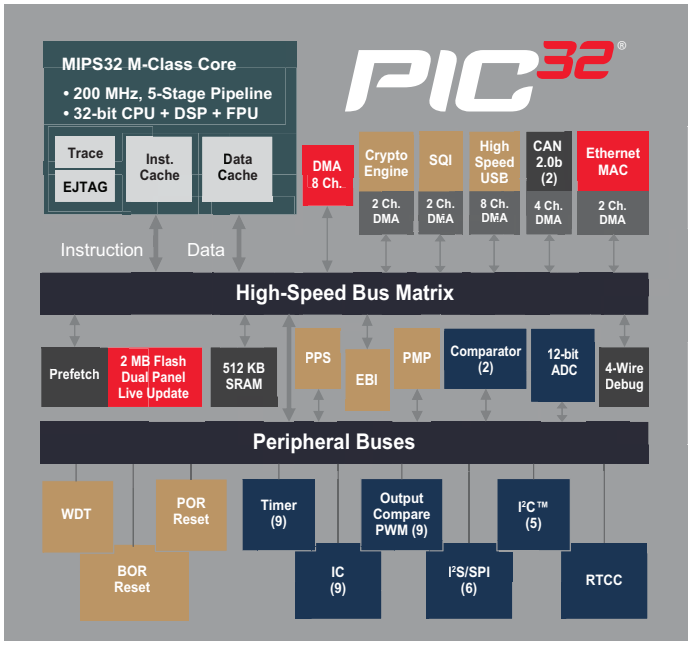
High-Performance PIC32MZ with Floating Point Unit (FPU) Embedded Connectivity Family

32-bit MCUs (up to 2 MB Live-Update Flash and 512 KB SRAM) with Audio and Graphics Interfaces, Hi-Speed USB, Ethernet and Advanced Analog

Summary

The PIC32MZ with Floating Point Unit (FPU) Embedded Connectivity family offers a high-performance MCU with MIPS32 M-Class core running at 200 MHz/330 DMIPS. The core features a Floating Point Unit for fast, single- and double-precision math and enhanced DSP functionality with four 64-bit accumulators, single-cycle MAC and a 5-stage pipeline. It is coupled with up to 2 MB Flash and 512 KB SRAM and several on-board advanced peripherals including I²S™/SPI for audio; 8-/16-bit Parallel Master Port (PMP) and External Bus Interface (EBI) for graphics or external memory; 48-channel, 12-bit Analog-to-Digital Converter (ADC); Hi-Speed USB 2.0-compliant Device/Host/OTG; 10/100 Mbps Ethernet MAC; Serial Quad Interface (SQI) for serial devices and Crypto Engine for reduced software overhead and easy execution of encryption/decryption.



Key Features

- 200 MHz/330 DMIPS MIPS32 M-Class core
- Up to 2 MB dual-panel Flash for live update support
- Floating Point Unit for fast single- and double-precision math
- DSP enhanced core:
  - Four 64-bit accumulators
  - Single-cycle MAC
- 12-bit, 12 Msps, 48-channel ADC
- Memory management unit for optimum embedded OS execution
- microMIPS™ mode for up to 35% code compression
- CAN, UART, I²C™, PMP, EBI, SQI and analog comparators
- SPI/I²S interfaces for audio processing and playback
- Hi-Speed USB Device/Host/OTG
- 10/100 Mbps Ethernet MAC with MII and RMII interface
- Temperature range: –40 to 85°C; –40 to 125°C (planned)

MPLAB® Harmony for PIC32

MPLAB Harmony is a flexible, abstracted, fully integrated firmware development environment for PIC32 microcontrollers. It enables robust framework development of interoperable RTOS-friendly libraries with quick and extensive Microchip support for third-party software integration. MPLAB Harmony includes a set of peripheral libraries, drivers and system services that are readily accessible for application development. The code development format allows for maximum re-use and reduces time to market. It features the MPLAB Harmony Configurator (MHC) plug-in that provides a graphical way to select and configure all MPLAB Harmony components inlcuding middleware, system services and peripherals with ease.

Applications	Operating System Abstract Layer (OSAL)	Middleware/ Software Libraries	Device Drivers	Development Software	Third-Party Software
■ Bluetooth® audio and SPP ■ CAN applications ■ Graphics applications ■ TCP/IP applications and utilities ■ USB applications ■ Crypto	■ OSAL interface with “basic” and “none” implementation ■ ThreadX ■ embOS ■ FreeRTOS ■ OpenRTOS ■ Micrium µC/OS-II ■ Micrium µC/OS-III	■ Graphics ■ TCP/IP ■ USB ■ Cryptographic libraries ■ File systems ■ System services ■ Bluetooth ■ DSP/Math ■ Bootloader ■ Peripheral Libraries (PLIBs)	■ ADC ■ Audio codecs ■ Ethernet media access controller ■ Ethernet PHY interface ■ Controllerless graphics ■ Epson LCD controller ■ Non-volatile memory ■ SPI, UART, CAN2.0B, high-speed USB ■ Timer, parallel master port	■ MPLAB® X IDE ■ MPLAB XC32++ ■ MPLAB Harmony Configurator (MHC) Plug-In ■ MPLAB Harmony Graphics Composer (MHGC) ■ Board Support Packages (BSP)	■ Networking ■ Security ■ Cloud services

Additional software components planned

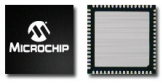
MICROCHIP

Featured PIC32MZ Devices with Floating Point Unit*

Device	Flash + Boot Flash (KB)	SRAM (KB)	Pin Count	Speed (MHz)	SPI/I²S™	I²C™	UART	DMA Channels General/Dedicated	PPS	USB (Full/Hi-Speed)	10/100 Ethernet	CAN2.0B	IC/OC/PWM	12-bit ADC (Ch)	ADC S/H	Analog Comparator	Timer 16-bit/32-bit	RTCC	SQI	EBI	PMP	JTAG Program, Debug, Boundary Scan	Encryption	Temp. Range (°C)
PIC32MZ2048EFG144	2048 + 160	512	144	200	6	5	6	8/12	✓	HS	✓	–	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ2048EFH144	2048 + 160	512	144	200	6	5	6	8/16	✓	HS	✓	2	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ2048EFG124	2048 + 160	512	124	200	6	5	6	8/12	✓	HS	✓	–	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ2048EFH124	2048 + 160	512	124	200	6	5	6	8/16	✓	HS	✓	2	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ1024EFG100	1024 + 160	512	100	200	6	5	6	8/12	✓	HS	✓	–	9/9/9	40	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ1024EFH100	1024 + 160	512	100	200	6	5	6	8/16	✓	HS	✓	2	9/9/9	40	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ1024EFG064	1024 + 160	512	64	200	4	4	6	8/12	✓	HS	✓	–	9/9/9	24	6	2	9/4	✓	✓	–	✓	✓	–	–40 to 85
PIC32MZ2048EFM144	2048 + 160	512	144	200	6	5	6	8/18	✓	HS	✓	2	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	✓	–40 to 85
PIC32MZ1024EFM124	1024 + 160	512	124	200	6	5	6	8/18	✓	HS	✓	2	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	✓	–40 to 85
PIC32MZ1024EFE144	1024 + 160	256	144	200	6	5	6	8/12	✓	HS	✓	–	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ1024EFF100	1024 + 160	256	100	200	6	5	6	8/16	✓	HS	✓	2	9/9/9	40	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ1024EFK064	1024 + 160	256	64	200	4	4	6	8/18	✓	HS	✓	2	9/9/9	24	6	2	9/4	✓	✓	–	✓	✓	✓	–40 to 85
PIC32MZ0512EFF124	512 + 160	128	124	200	6	5	6	8/16	✓	HS	✓	2	9/9/9	48	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ0512EFE100	512 + 160	128	100	200	6	5	6	8/12	✓	HS	✓	–	9/9/9	40	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ0512EFF100	512 + 160	128	100	200	6	5	6	8/16	✓	HS	✓	2	9/9/9	40	6	2	9/4	✓	✓	✓	✓	✓	–	–40 to 85
PIC32MZ0512EFK064	512 + 160	128	64	200	4	4	6	8/18	✓	HS	✓	2	9/9/9	24	6	2	9/4	✓	✓	–	✓	✓	✓	–40 to 85

**For a complete list of PIC32MZ devices with FPU, please visit www.microchip.com/pic32.*

Package Options

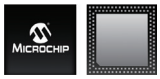


64-lead QFN (MR)
9 × 9 × 0.9 mm

64-lead TQFP (PT)
10 × 10 × 1 mm

100-lead TQFP (PT)
12 × 12 × 1 mm

100-lead TQFP (PF)
14 × 14 × 1 mm



124-lead VTLA (TL)
9 × 9 × 0.9 mm

144-lead TQFP (PH)
16 × 16 × 1 mm

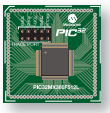
144-lead LQFP (PL)
20 × 20 × 1.4 mm

Development Tools

PIC32MZ with FPU Embedded Connectivity Starter Kits (DM320007/DM320007-C)

This kit boasts an on-board 200 MHz, 2 MB Flash PIC32MZ with FPU, 12-bit ADC, Hi-Speed USB, CAN, Ethernet, External Bus Interface (EBI), Serial Quad Interface (SQI) and more. The kit also features a plug-in interface that can accommodate various 10/100 Ethernet PHY transceiver daughter boards for prototyping and development in addition to a 40-pin expansion connector. Two versions of the starter kit are available: one with an on-chip crypto engine (DM320007-C) and one without (DM320007).

PIC32MZ2048 EF Plug-In Module (PIM) (MA320019)



This PIM enables USB, Ethernet, CAN and general purpose embedded control development using the Explorer 16 Development Board.

Note: This PIM is not compatible with the PIC32 Bluetooth Audio Development Kit

PIC32MZ2048 EF Audio PIM (MA320018)

This PIM enables Bluetooth® and digital audio development using the PIC32 Bluetooth Audio Development Kit.

Note: This PIM is not compatible with the Explorer 16 Development Board.

Multimedia Expansion Board II (DM320005-2)

The Multimedia Expansion Board II is a highly integrated, compact and flexible development platform which works with the PIC32MZ starter kits. It features a 4.3" WQVGA projected capacitive touch display daughter board. It also has an on-board 24-bit stereo audio codec, VGA camera, 802.11b/g wireless module, Bluetooth HCI transceiver, temperature sensor, microSD™ slot and analog accelerometer.

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www.microchip.com/pic32

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