PIC32MK High-Performance 32-bit MCU for Precision Control

State-of-the-Art Analog Peripherals, DSP and Floating Point in Small Package Size

Summary

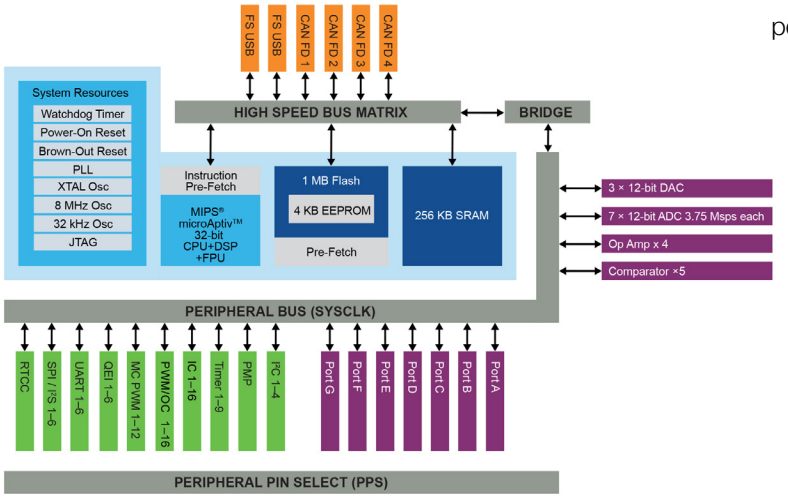
A perfect fit for your industrial, automotive and motor control applications, the PIC32MK family of 32-bit microcontrollers (MCUs) is packed with powerful features and best in class analog performance enabling higher precision and efficiency and lower system cost.

Product Description

PIC32MK, 32-bit Microcontroller (MCU) family offers high computational performance CPU running at 120 MHz (198 DMIPS), hardware double precision Floating Point Unit (FPU) and DSP, industry-leading analog integration, variety of communication interfaces like USB, CAN-FD, SPI, I²C and UART, in wide range of package sizes.

Key Applications

- 3-Phase AC induction motor: pumps, fans and industrial motor drives
- Sensored BLDC and PMSM Motor: e-bikes, power tools, 3D printers
- Cost-sensitive sensorless motor: ceiling fans, drones, pumps, compressors, washing machines
- High-speed and high-precision motor: CNC, sewing machine, robotics
- Industrial control units and sensors which need high performance CPU core and analog measurement



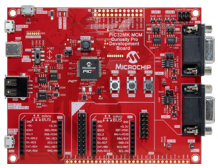
Key Highlights

Key Features	Benefits	
Superior Analog 7x ADC, 3x DAC, 5x AC, 4x OpAmp	• 7x 3.75 Msps 12-bit ADC modules offering up to 42 inputs and supporting a combined performance of 25.45 Msps, enables higher analog precision • High-speed Analog Comparator (AC) and Operational Amplifier (OpAmp) enable higher system efficiency and reduce design complexity and the no. of external discrete device needed	Precision Efficiency Save Cost
Advanced Motor Interfaces Up to 12x Motor PWM Pairs, 6x QEI	• Motor control optimized PWM modules increase the system efficiency and decrease the number of external discrete devices • Multiple Quadrature Encoders enables higher resolution on motor position and direction	Efficiency Save Cost Precision
Smart Peripheral Mix 2x USB, 4x CAN-FD, LIN, I²S	• One single MCU that communicates to multiple bus protocols • Reduced design complexity and reduced cost	Efficiency Save Cost

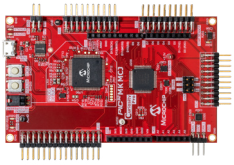
MICROCHIP

Tools and Demo Examples

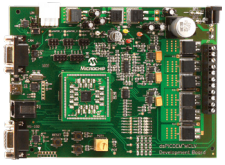
Development Kits



PIC32MK MCM Curiosity Pro Development Board (EV31E34A): a low-cost, modular development system with an on-board programmer/debugger and can be expanded with various MikroElectronika Click™ boards.



PIC32MK MCJ Curiosity Pro Development Board (DT100113): a low-cost, modular development system with an integrated programmer/debugger and can be expanded with Arduino Uno R3 or Xplained Pro compatible boards.



PIC32MK MCM 100-pin Motor Control Plug-In Module (PIM) (MA320211): using on-chip op amps with the following hardware:

- dsPICDEM™ MCLV-2 development board (DM330021-2)
- dsPICDEM MCHV-2 development board (DM330023-2)
- dsPICDEM MCHV-3 development board (DM330023-3)

MPLAB® Harmony v3: Motor Control Apps Repo

Algorithm	Description	Supported Plug In Module	dsPICDEM™ MCLV-2 Support
pmsm_foc_pll_estimator_pic32_mk	Sensorless Field Oriented Control of PMSM using PLL Estimator	PIC32MK Motor Control Plugin Module	Yes
pmsm_foc_encoder_pic32_mk	Sensored Field Oriented Control of PMSM using Quadrature Encoder	PIC32MK Motor Control Plugin Module	Yes
mc_foc_zsmt_fip_pic32mk_mclv2tc1*	Sensorless Field Oriented Control of PMSM w/ Zero Speed Maximum Torque Capability	PIC32MK Motor Control Plugin Module	Yes

*Contact Microchip sales

Available Resources

- MPLAB X Integrated Development Environment (IDE)
- MPLAB Harmony v3 Software Framework
- Harmony v3 Motor Control Library
- MPLAB Mindi™ Analog Simulator
- 32-bit MCUs Motor Control Design Center

Services and Third Party

- MATLAB® and Simulink® for Motor Control Development
- Open-Source Tools for Motor Control Development including Scilab, Xcos and X2C

Devices for Microchip TSS Solution

- Wireless Connectivity: Wi-Fi®, Bluetooth®, Bluetooth Low Energy, LoRa, IEEE 802.15.4, Sub-G
- Wired Connectivity and Interface: CAN Transceivers, Ethernt PHY
- Industrial Networking: EtherCAT®
- CryptoAuthentication™ Device: ATECC608A, ATSHA204A
- Clock and Timing: MEMs Oscillator
- Analog: Op Amp, Motor Driver
- Power Management: Linear and Switching Regulators

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