

PICmicro® MCU Power Managed Family

Microchip's industry leading, flexible, power managed microcontrollers with Nanowatt Technology

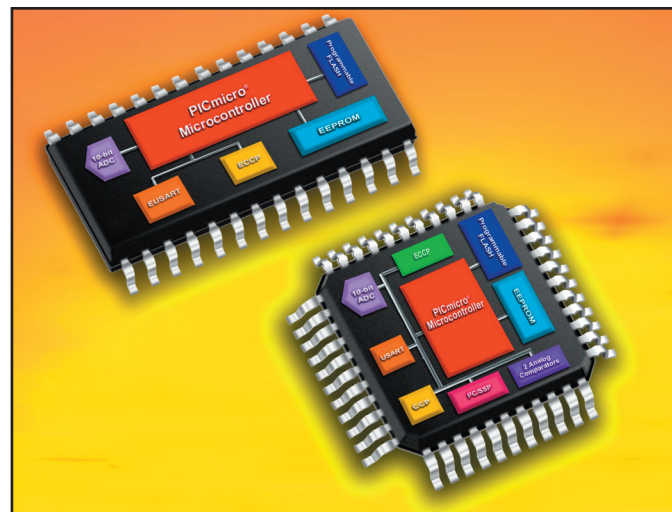
merge the powerful FLASH-based PIC18F architecture that gives 10 MIPS performance, with several new power managed features that are ideal for power consumption critical applications. Some of the new features include new oscillator sources, a new low power Watchdog Timer, a 2-speed start-up, a fail-safe clock monitor and six new Power Managed modes. These devices provide a low cost system-on-a-chip solution for intelligent small systems, or complex systems that require extended battery life and energy efficient operation. This PICmicro MCU family features a 'C' compiler friendly environment, data EEPROM, self-programming, a 10-bit ADC with up to 13 analog input channels, three 16-bit Timers and one 8-bit Timer, and ICD capability, all packed into 18-, 20-, 28-, and 40-pin packages. The new power managed features allow designers to command complete control of their power consumption, making them ideal for instrumentation and monitoring, data acquisition, power conditioning, environmental monitoring and sensor applications.

High Performance RISC CPU:

- C compiler optimized architecture/instruction set
- Linear program memory addressing up to 8 Kbytes
- Linear data memory addressing up to 512 bytes
- 256 bytes of EEPROM data memory
- Up to 10 MIPS operation:
 - DC - 40 MHz clock input
 - 4 MHz - 10 MHz osc./clock input with 4X PLL
- 16-bit wide instructions, 8-bit wide data path
- Priority levels for interrupts
- 8 x 8 Single Cycle Hardware Multiplier

Peripheral Features:

- High current sink/source 25 mA/25 mA
- Three external interrupt pins
- Timer0 module: 8-bit/16-bit timer/counter
- Timer1 module: 16-bit timer/counter
- Timer2 module: 8-bit timer/counter
- Timer3 module: 16-bit timer/counter
- Secondary low power oscillator clock option – Timer1/Timer3
- Up to two Capture/Compare/PWM (CCP) modules
- Enhanced Capture/Compare/PWM (ECCP) module (40/44-pin devices only)
 - Single, Half-bridge and Full-bridge Output modes
 - Programmable Deadband Delay
 - Auto Shutdown/Restart
- Master Synchronous Serial Port (MSSP) module with two modes of operation (28/40/44-pin devices only):
 - 3-wire SPI™ (supports all 4 SPI modes)
 - I²C™ Master and Slave modes
- Addressable USART module:
 - Supports RS-485 and RS-232



Peripheral Features (continued):

- Enhanced USART module (18/20-pin devices only)
 - Auto wake-up on START bit
 - Auto baud detection
 - Supports RS-485, RS-232 and LIN 1.2
- Parallel Slave Port (PSP) module (40/44-pin devices only)

Advanced Analog Features:

- Compatible 10-bit, up to 13-channel Analog-to-Digital Converter module (A/D) with:
 - Fast sampling rate
 - Programmable acquisition time
 - Conversion available during SLEEP mode
- Analog Comparator module with 2 Comparators (28/40/44-pin devices only)
- Programmable 16-level Low Voltage Detection (PLVD)
 - Supports interrupt-on-low voltage detection
- Programmable Brown-out Reset (BOR)

Special Microcontroller Features:

- 100,000 erase/write cycle Enhanced FLASH program memory
- 1,000,000 erase/write cycle Data EEPROM memory
- Self-reprogrammable under software control
- Multiple Power Managed modes including SLEEP:
 - CPU IDLE option
 - Three clock sources: Primary, Timer1 and Internal RC
- Two-speed Start-up
- Power-on Reset (POR), Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
- Extended Watchdog Timer (WDT) for reliable operation
- Programmable code protection
- Selectable oscillator options including:
 - 4X Phase Lock Loop
 - Secondary oscillator (32 kHz clock input)
 - Internal RC oscillator, calibrate to $\pm 1\%$. Frequency range 31 kHz to 8 MHz.



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PICmicro® Microcontrollers

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Special Microcontroller Features (continued):

- In-Circuit Serial Programming™ (ICSP™) via two pins
- Low Voltage Programming
- MPLAB® In-Circuit Debug (ICD) via two pins

CMOS Technology:

- Low power, high speed FLASH technology
- Fully static design
- Wide operating voltage range (2.0V to 5.5V)
- Industrial temperature range

Additional Information:

- Microchip's web site: www.microchip.com
- Microchip's *Technical Library CD-ROM*, [Order No. DS00161](#)
- Application Notes are available in:
 - *Embedded Control Handbook*, [Order No. DS00092](#)
 - *Embedded Control Handbook Update 2000*, [Order No. DS00711](#)
- Microchip's *Overview, Quality Systems and Customer Interface System*, [Order No. DS00169](#)

PICmicro MCU Low Power Family

Device	FLASH Program Memory Bytes	Data RAM Bytes	Program Memory Type	EEPROM Data	I/O Pins	ADC Channels (10-Bits)	Serial I/O	CCP/ECCP (PWM)	Timers	ICSP	Pins
PIC18F1220	4096	256	FLASH	256	16	7	EUSART	1 / 0	3-16 bit, 1-8 bit, 1-WDT	Yes	18L PDIP 18L SOIC, 20L SSOP 28L QFN
PIC18F1320	8192	256	FLASH	256	16	7	EUSART	1 / 0	3-16 bit, 1-8 bit, 1-WDT	Yes	18L PDIP 18L SOIC, 20L SSOP 28L QFN
PIC18F2220	4096	512	FLASH	256	23	10	AUSART/MI ² C/SPI	2 / 0	3-16 bit, 1-8 bit, 1-WDT	Yes	28L SDIP, 28L SOIC
PIC18F2320	8192	512	FLASH	256	23	10	AUSART/MI ² C/SPI	2 / 0	3-16 bit, 1-8 bit, 1-WDT	Yes	28L SDIP, 28L SOIC
PIC18F4220	4096	512	FLASH	256	34	13	AUSART/MI ² C/SPI	1 / 1	3-16 bit, 1-8 bit, 1-WDT	Yes	40L PDIP 44L QFN, 44L TQFP
PIC18F4320	8192	512	FLASH	256	34	13	AUSART/MI ² C/SPI	1 / 1	3-16 bit, 1-8 bit, 1-WDT	Yes	40L PDIP 44L QFN, 44L TQFP
Abbreviations:	ADC = Analog-to-Digital Converter EUSART = Enhanced Universal Synchronous/Asynchronous Receiver/Transmitter PWM = Pulse Width Modulator QFN = Quad Flat No Leads					AUSART = Addressable Universal Synchronous/Asynchronous Receiver/Transmitter MI ² C/SPI = Master I ² C/SPI WDT = Watchdog Timer SPI = Serial Peripheral Interface					

Development Tools from Microchip

MPLAB® IDE	Integrated Development Environment (Hardware/Software Project Manager)
MPASM™ Assembler	Universal PICmicro® Macro-Assembler Software
MPLINK™ Object Linker/ MPLIB™ Object Librarian	Linker/Librarian Software
MPLAB® SIM	Simulator Software
MPLAB® C18	Code Development Systems
C Compilers	Sold by Third Party Vendors (Hi-Tech, IAR, CCS)
MPLAB® ICD 2	In-Circuit Debugger
MPLAB® ICE 2000	Full featured, modular In-Circuit Emulator
PRO MATE® II	Full featured, modular Device Programmer

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