

PICmicro® MCU Power Managed PIC16F Family Featuring nanoWatt Technology

The Power Managed PIC16F818/819 and PIC16F87/88 MCU family merges the FLASH-based PIC16F architecture that is easy-to-program, with only 35 single word instructions, with new low power features that are ideal for battery management applications. New power managed features can include new oscillator sources, a new low current Watchdog Timer, Two-Speed Start-up, Fail-Safe Clock Monitor and up to three new Power Managed modes. These devices provide low cost solutions for intelligent small systems that require extended battery life and energy efficient operation. This PICmicro MCU family features data EEPROM, Self-programming, a 10-bit ADC with up to 7 analog input channels, one 16-bit Timer and two 8-bit Timers, and ICD capability, all packed into an 18-pin package. The low power features make the devices ideal for battery powered and power consumption critical applications, including instrumentation and monitoring, data acquisition, power conditioning, environmental monitoring and sensor applications.

High Performance RISC CPU:

- 35 single word instructions
- FLASH program memory up to 4K x 14 words
- 256 bytes of backup EEPROM data memory
- Up to 5 MIPs operation:
 - DC - 20 MHz clock input

Power Managed Features:

- Power Managed modes:
 - Primary RUN XT, RC oscillator, 87 μ A, 1 MHz, 2V (PIC16F87/88 only)
 - RC_RUN 7 μ A, 31.25 kHz, 2V (PIC16F87/88 only)
 - SEC_RUN 14 μ A, 32 kHz, 2V (PIC16F87/88 only)
 - SLEEP 0.2 μ A, 2V
- Timer1 Oscillator 1.3 μ A, 32 kHz, 2V
- Watchdog Timer 0.7 μ A, 2V
- Two-Speed Oscillator Start-up (PIC16F87/88 only)
- Fail-Safe Clock Monitor

Peripheral Features:

- High current sink/source: 25 mA
- Timer0 module: 8-bit timer/counter
- Timer1 module: 16-bit timer/counter
- Timer2 module: 8-bit timer/counter
- One Capture/Compare/PWM (CCP) module
- Synchronous Serial Port (SSP) module with two modes of operation:
 - 3-wire SPI™ (supports all 4 SPI modes)
 - I²C™ Slave modes
- Addressable USART module supports interrupt-on-address bit (PIC16F87/88 only)



Advanced Analog Features:

- 10-bit, up to 7-channel Analog-to-Digital Converter A/D (not available on PIC16F87)
- Analog Comparator module (PIC16F87/88 only) with:
 - Two analog comparators
 - Programmable on-chip voltage reference
 - Programmable input multiplexing from device inputs and internal voltage reference
 - Comparator outputs are externally accessible

Special Microcontroller Features:

- 100,000 erase/write cycle Enhanced FLASH program memory
- 1,000,000 erase/write cycle Data EEPROM memory
- Data EEPROM retention > 40 years
- Self-reprogrammable under software control
- Selectable oscillator options including:
 - Internal oscillator block:
 - Frequency range of 125 kHz to 8 MHz
 - Internal RC oscillator of 31.25
- Multiple Low Power modes:
 - CPU in various operational states
- Clock failure recovery mechanism ensures robust operation
- Enhanced low current Watchdog Timer (WDT)
- Programmable code protection
- Power saving SLEEP mode
- In-Circuit Serial Programming™ (ICSP™) via two pins
- 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

PIC16F81X/8X Microcontroller Family

Device	FLASH Program Memory Bytes	Data RAM Bytes	Program Memory Type	EEPROM Data	I/O Pins	ADC Channels (10-Bits)	Serial I/O	Comp.	CCP	Timers	ICSP	Pins
PIC16F818	1792	128	FLASH	128	16	5	I ² C/SPI	N/A	1	2-8 bit, 1-16 bit, 1-WDT	Yes	18L PDIP, 18L SOIC, 20L SSOP, 28L QFN
PIC16F819	3584	256	FLASH	256	16	5	I ² C/SPI	N/A	1	2-8 bit, 1-16 bit, 1-WDT	Yes	18L PDIP, 18L SOIC, 20L SSOP, 28L QFN
PIC16F87	7168	368	FLASH	256	16	N/A	AUSART/I ² C/SPI	2	1	2-8 bit, 1-16 bit, 1-WDT	Yes	18L PDIP, 18L SOIC, 20L SSOP, 28L QFN
PIC16F88	7168	368	FLASH	256	16	7	AUSART/I ² C/SPI	2	1	2-8 bit, 1-16 bit, 1-WDT	Yes	18L PDIP, 18L SOIC, 20L SSOP, 28L QFN

Abbreviations: ADC = Analog-to-Digital Converter
 PWM = Pulse Width Modulator
 SPI = Serial Peripheral Interface
 AUSART = Addressable Universal Synchronous/Asynchronous Receiver/Transmitter
 QFN = Quad Flat No Leads
 WDT = Watchdog Timer

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 [®] ICD 2	In-Circuit Debugger
MPLAB [®] ICE 2000	Full featured, modular In-Circuit Emulator
PRO MATE [®] II	Full featured, modular Device Programmer

Americas

Atlanta (770) 640-0034
 Boston (978) 692-3848
 Chicago (630) 285-0071
 Dallas (972) 818-7423
 Detroit (248) 538-2250
 Kokomo (765) 864-8360
 Los Angeles (949) 263-1888
 San Jose (408) 436-7950
 Toronto (905) 673-0699

Asia/Pacific

Australia 61-2-9868-6733
 China - Beijing 86-10-85282100
 China - Chengdu 86-28-86766200
 China - Fuzhou 86-591-7503506
 China - Hong Kong SAR 852-2401-1200
 China - Shanghai 86-21-6275-5700
 China - Shenzhen 86-755-82901380
 China - Qingdao 86-532-5027355
 India 91-80-2290061
 Japan 81-45-471-6166
 Korea 82-2-554-7200
 Singapore 65-6334-8870
 Taiwan 886-2-2717-7175

Europe

Austria 43-7242-2244-399
 Denmark 45-4420-9895
 France 33-1-69-53-63-20
 Germany 49-89-627-144-0
 Italy 39-039-65791-1
 United Kingdom 44-118-921-5869

As of 12/05/02

Microchip Technology Inc. • 2355 W. Chandler Blvd. • Chandler, AZ 85224-6199 • (480) 792-7200 • Fax (480) 792-9210

Information subject to change. The Microchip name and logo, the Microchip logo, KEELOQ, MPLAB, PIC, PICmicro, PICSTART, PRO MATE and PowerSmart are registered trademarks of Microchip Technology Inc. in the U.S.A. and other countries. FilterLab, microID, MXDEV, MXLAB, PICMASTER, SEEVAL and The Embedded Control Solutions Company are registered trademarks of Microchip Technology Inc. in the U.S.A. Accuron, dsPIC, dsPICDEM.net, ECONOMONITOR, FanSense, FlexROM, fuzzyLAB, In-Circuit Serial Programming, ICSP, ICEPIC, microPort, Migratable Memory, MPASM, MPLIB, MPLINK, MPSIM, PICC, PICkit, PICDEM, PICDEM.net, PowerCal, PowerInfo, PowerTool, rPIC, Select Mode, SmartSensor, SmartShunt, SmartTel and Total Endurance are trademarks of Microchip Technology Inc. in the U.S.A. and other countries. Serialized Quick Turn Programming (SQTP) is a service mark of Microchip Technology Inc. in the U.S.A. All other trademarks mentioned herein are property of their respective companies. © 2003 Microchip Technology Inc. All rights reserved. Printed in the U.S.A. 2/03 DS30620A



This datasheet has been download from:

www.datasheetcatalog.com

Datasheets for electronics components.