PIC18 Microcontroller Family

The PIC18 microcontroller family provides PICmicro® devices in 18- to 80-pin packages, that are both socket and software upwardly compatible to the PIC16 family. The PIC18 family includes all the popular peripherals, such as MSSP, ESCI, CCP, flexible 8- and 16-bit timers, PSP, 10-bit ADC, WDT, POR and CAN 2.0B Active for the maximum flexible solution. Most PIC18 devices will provide FLASH program memory in sizes from 8 to 128 Kbytes and data RAM from 256 to 4 Kbytes; operating from 2.0 to 5.5 volts, at speeds from DC to 40 MHz. Optimized for high-level languages like ANSI C, the PIC18 family offers a highly flexible solution for complex embedded applications.

High Performance RISC CPU:

- 77 instructions
- C-Language friendly architecture
- PIC16 source code compatible
- Linear program memory addressing to 2 Mbyte
- Linear data memory addressing up to 4 Kbytes
- Up to 10 MIPs operation:
  – DC - 40 MHz osc/clock input
  – 4 MHz - 10 MHz clock with PLL active
- 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
- Up to four external interrupt pins
- Up to three 16-bit timer/counters
- Up to two 8-bit timer/counters with 8-bit period register (time-base for PWM)
- Secondary LP oscillator clock option - Timer1
- Up to five Capture/Compare/PWM (CCP) modules
  CCP pins can be configured as:
  – Capture input: 16-bit, resolution 6.25 ns (T_{CY}/16)
  – Compare: 16-bit, max. resolution 100 ns (T_{CY})
  – PWM output: PWM resolution is 1- to 10-bit
  Max. PWM frequency @: 8-bit resolution = 156 kHz
  10-bit resolution = 39 kHz
- Master Synchronous Serial Port (MSSP) module
  Two modes of operation:
  – 3-wire SPI™ (supports all 4 SPI modes)
  – I^2C™ Master and Slave mode
- Up to 2 Addressable USART modules (ESCI)
  – Supports interrupt on Address bit
- Parallel Slave Port (PSP) module

Analog Features:

- 10-bit Analog-to-Digital Converter module (A/D) with:
  – Fast sampling rate
  – Up to 16 channels input multiplexor
  – Conversion available during SLEEP
  – DNL = ±1 LSb, INL = ±1 LSb

Analog Features (Continued):

- Programmable Low Voltage Detection (LVD) module
  – Supports interrupt-on-low voltage detection
- Programmable Brown-out Reset (BOR)
- Comparators

Special Microcontroller Features:

- Power-on Reset (POR), Power-up Timer (PWRT) and Oscillator Start-up Timer (OST)
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
- Programmable code protection
- In-Circuit Serial Programming™ (ICSP™) via two pins

CMOS Technology:

- Fully static design
- Wide operating voltage range (2.0V to 5.5V)
- Industrial and Extended temperature ranges

Power Managed Features:

- Dynamically switch to secondary LP oscillator
- Internal RC oscillator for ADC operation during SLEEP
- SLEEP mode (I_{PD} < 1 µA typ.)
  – up to 23 individually selectable wake-up events
  – 3 edge selectable wake-up inputs
  – 4 state change wake-up inputs
- Internal RC oscillator for WDT (period wake-up)
- RAM retention mode (V_{DD} as low as 1.5V)
- Up to 6 more Power Managed modes available on selected models (PIC18F1320/2320/4320 and PIC18F1220/2220/4220)

MICROCHIP
PICmicro® Microcontrollers

Additional Information:

- Microchip's web site: **www.microchip.com**
- Microchip's *PICmicro 18C MCU Reference Manual*, Order No. DS39500
- Microchip's CD-ROMs available:
  – *Technical Library*, Order No. DS00161
- Microchip's Data Sheets available:
  – *PIC18CXX2*, Order No. DS39026
  – *PIC18CXX8*, Order No. DS30475
  – *PIC18C601/801*, Order No. DS39541
- Application Notes are available in:
  – *Embedded Control Handbook*, Order No. DS00092
  – *Embedded Control Handbook, Volume 2, Math Library*, Order No. DS00167
  – *Embedded Control Handbook Update 2000,* Order No. DS00711
- Microchip's *Quality Systems and Customer Interface System*, Order No. DS00169
- Demo Boards Available:
  – PICDEM™ 2 Demonstration Board
  – ROMless
  – CAN/LIN bus
- Third Party Tools Available:
  – C Compilers
  HI-TECH - PICC™, www.htsoft.com
  IAR - EWB-PIC, www.iar.com
  CCS PIC18 C Compiler, www.ccsinfo.com

PIC18 Microcontroller Family

	Program Memory		Data Memory RAM	Data Memory EEPROM	I/O	ADC				CCP/	Timers		
Product	Type	Bytes	Bytes	Bytes	Ports	10-bit	MSSP	USART	Other	PWM	8/16-bit	Packages	Pins
PIC18F1220	FLASH	4K	256	256	16	7	—	1	6x PMM	1	1/3	DIP, SOIC, SSOP, QFN	18
PIC18F1320	FLASH	8K	256	256	16	7	—	1	6x PMM	1	1/3	DIP, SOIC, SSOP, QFN	18
PIC18F2220	FLASH	4K	512	256	23	10	I²C/SPI	1	6x PMM	2	1/3	DIP, SOIC	28
PIC18F2320	FLASH	8K	512	256	23	10	I²C/SPI	1	6x PMM	2	1/3	DIP, SOIC	28
PIC18C242	OTP	16K	512	—	23	5	I²C/SPI	1	—	2	1/3	DIP, SOIC	28
PIC18C252	OTP	32K	1536	—	23	5	I²C/SPI	1	—	2	1/3	DIP, SOIC	28
PIC18F242	FLASH	16K	512	256	23	5	I²C/SPI	1	—	2	1/3	DIP, SOIC, SSOP	28
PIC18F252	FLASH	32K	1536	256	23	5	I²C/SPI	1	—	2	1/3	DIP, SOIC, SSOP	28
PIC18F258	FLASH	32K	1536	256	22	5	I²C/SPI	1	CAN 2.0B	1	1/3	DIP, SOIC	28
PIC18F4220	FLASH	4K	512	256	34	13	I²C/SPI	1	6x PMM	2	1/3	DIP, TQFP, QFN	40/44
PIC18F4320	FLASH	8K	512	256	34	13	I²C/SPI	1	6x PMM	2	1/3	DIP, TQFP, QFN	40/44
PIC18C442	OTP	16K	512	—	34	8	I²C/SPI	1	—	2	1/3	DIP, PLCC, TQFP	40/44
PIC18C452	OTP	32K	1536	—	34	8	I²C/SPI	1	—	2	1/3	DIP, PLCC, TQFP	40/44
PIC18F442	FLASH	16K	512	256	34	8	I²C/SPI	1	—	2	1/3	DIP, PLCC, TQFP	40/44
PIC18F452	FLASH	32K	1536	256	34	8	I²C/SPI	1	—	2	1/3	DIP, PLCC, TQFP	40/44
PIC18F458	FLASH	32K	1536	256	33	5	I²C/SPI	1	CAN 2.0B	1	1/3	DIP, PLCC, TQFP	40/44
PIC18C601	—	ROMless	1536	—	31	8	I²C/SPI	1	—	2	1/3	PLCC, TQFP	64/68
PIC18C658	OTP	32K	1536	—	52	12	I²C/SPI	1	CAN 2.0B	2	1/3	PLCC, TQFP	64/68
PIC18F6520	FLASH	32K	2048	1024	52	12	I²C/SPI	2	—	5	2/3	TQFP	64
PIC18F6620	FLASH	64K	3840	1024	52	12	I²C/SPI	2	—	5	2/3	TQFP	64
PIC18F6720	FLASH	128K	3840	1024	52	12	I²C/SPI	2	—	5	2/3	TQFP	64
PIC18C801	—	ROMless	1536	—	42	12	I²C/SPI	1	—	2	1/3	PLCC, TQFP	80/84
PIC18C858	OTP	32K	1536	—	68	16	I²C/SPI	1	CAN 2.0B	2	1/3	PLCC, TQFP	80/84
PIC18F8520	FLASH	32K	2048	1024	68	16	I²C/SPI	2	EMA	5	2/3	TQFP	80
PIC18F8620	FLASH	64K	3840	1024	68	16	I²C/SPI	2	EMA	5	2/3	TQFP	80
PIC18F8720	FLASH	128K	3840	1024	68	16	I²C/SPI	2	EMA	5	2/3	TQFP	80

Abbreviation: ADC = Analog-to-Digital Converter; CCP = Capture/Compare/PWM; I²C = Inter-Integrated Circuit Bus; PMM = Power Managed Mode; PWM = Pulse Width Modulation; SPI = Serial Peripheral Interface; USART = Universal Synchronous/Asynchronous Receiver/Transmitter

Development Tools from Microchip		Resale Price*
MPLAB® IDE	Integrated Development Environment (IDE)	FREE
MPASM™ Assembler	Universal PICmicro Macro-Assembler	FREE
MPLINK™ Linker/MPLIB™ Librarian	Linker/Librarian	FREE
MPLAB® SIM	Software Simulator	FREE
MPLAB® ICE 2000/4000	Full Featured Modular In-Circuit Emulator	Starting at $2,045
MPLAB® ICD 2	In-Circuit Debugger	Starting at $159
C compiler	Microchip MPLAB® C18 or supported by third-party vendors (HI-TECH, IAR, CCS)	Contact Vendor
PRO MATE® II Device Programmer	Full Featured Modular Device Programmer	Starting at $854
PICSTART® Plus Programmer	Entry Level Development Kit with Programmer	$199

*All prices are manufacturer's suggested resale for North America.

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