MICROCHIP

8-bit PIC® Microcontrollers

www.microchip.com/8bit

Overview

Get ready to see a new world of 8-bit PIC® MCUs

PIC microcontrollers are finding their way into new applications like smart phones, audio accessories, video gaming peripherals and advanced medical devices. Microchip provides solutions for the entire performance range of 8-bit microcontrollers, with easy-to-use development tools, complete technical documentation and post design-in support through a global sales and distribution network.

Have you looked at PIC MCUs recently?

— more than 140 new products introduced since 2009
— Industry leading Sleep power MCUs with nanoWatt XLP
— MCUs with Integrated USB starting under $1
— Free C-compiler
— Free TCP/IP stack and USB drivers
— Segmented Display Drivers up to 192 pixels for under $1

What else do you need??
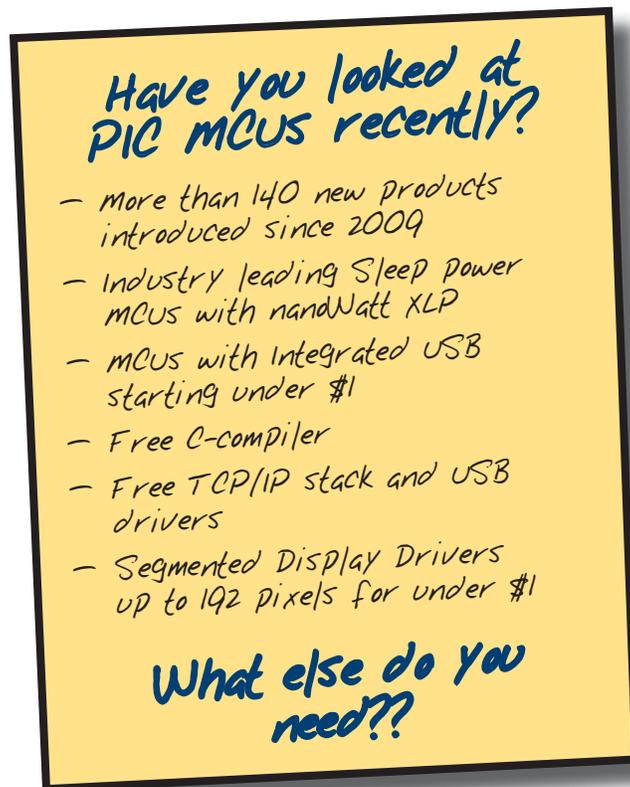
There are hundreds of 8-bit PIC microcontrollers to choose from ranging from 6 to 100 pins and up to 128 KB Flash that are pin and code compatible across the portfolio. PIC microcontrollers with XLP technology feature the world's lowest active and sleep power consumption with flexible power modes and wake-up sources. MPLAB® Integrated Development Environment supports all PIC microcontrollers with C Compiler support and common development boards.

Peripheral integration is key with communication and control peripherals like SPI, I2C™, UART, PWM, ADC and comparators as well as specialized peripherals for USB, mTouch™ Sensing, LCD, CAN and Ethernet. Customers have made PIC MCUs a worldwide standard, with over one million development systems shipped. PIC microcontrollers are quick and easy to design into a wide variety of applications with a long history of dependable product delivery.

KEY HIGHLIGHTS

EXTREME LOW POWER
- Active currents down to 50 µA/MHz
- Sleep current as low as 9 nA
- Battery lifetime > 20 years

INTEGRATED PERIPHERALS
- Only supplier to integrate USB, LCD, Ethernet, Touch Sensing and CAN in 8-bit MCUs

LOW COST
- Over 200 parts less than $1.00 at high volume

SMALL FORM FACTORS
- As small as 8-pin 2x3 DFN and 28-pin 4x4 UQFN
- Chip scale packages available

DESIGN SUPPORT
- Free MPLAB® Integrated Development Environment
- Free C Compilers
- Comprehensive technical documentation
- World-class, 24/7 technical support and training

FASTER TIME-TO-MARKET
- Free software
- Pin and code compatibility – Easy migration
- Pre-programmed parts via Quick Turn Programming (QTP)

Global Support

Microchip provides 24/7 global technical support with on-line and phone support, hundreds of dedicated field application engineers, more than 50 sales offices and our authorized distributor network. Microchip also offers standard code libraries, reference designs, application notes and seminars on-line and at Microchip Regional Training Centers.

Scalability & Migration

To offer customers a low-risk development environment, PIC microcontrollers offer seamless migration within the complete range of products. The 8-bit PIC microcontroller family is pin-compatible within a given pin count as well as code compatible between the architectures. Being able to migrate easily between various PIC MCUs allows flexibility to react to changing design requirements and feature enhancements. Maximize re-use for future developments and preserve the investment in hardware, software and tools by choosing Microchip.

8-bit PIC MCU Architectures
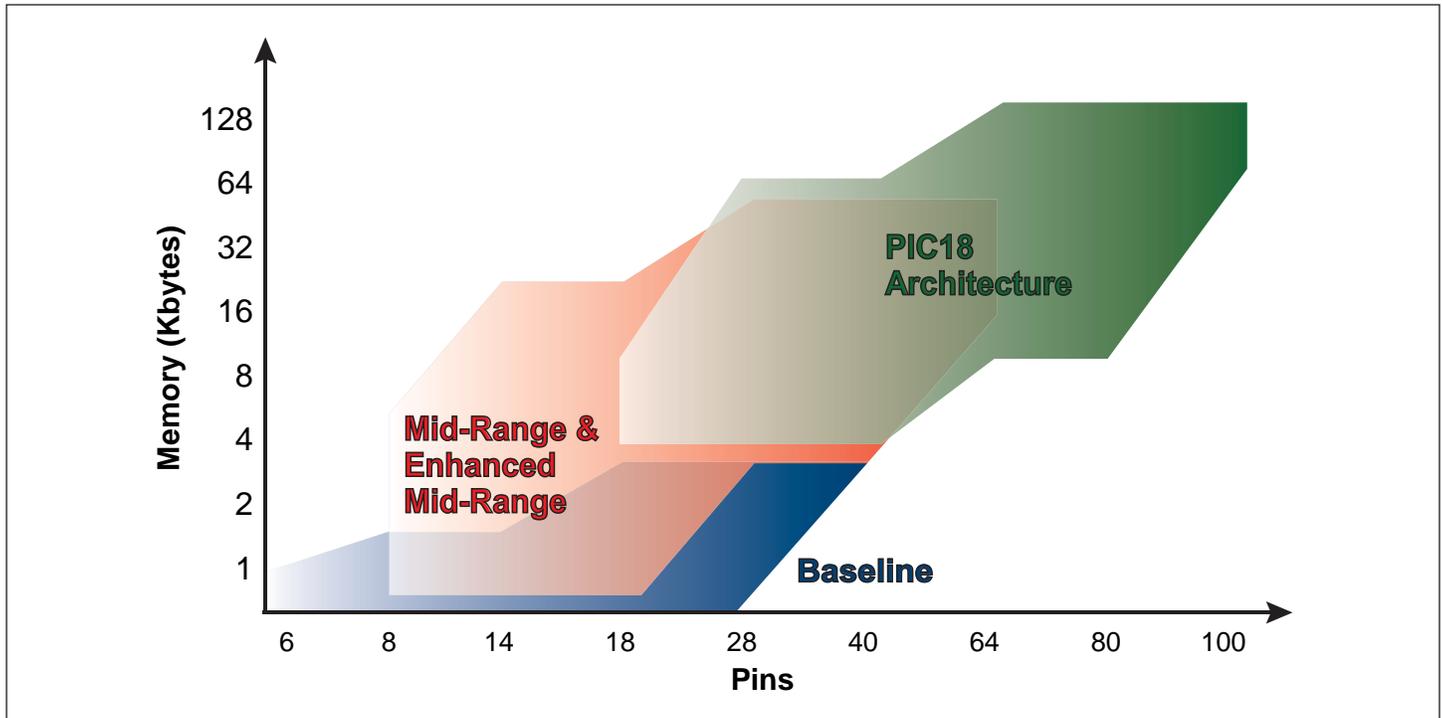
	Baseline Architecture	Mid-Range Architecture	Enhanced Mid-Range Architecture	PIC18 Architecture
Pin Count	6-40	8-64	8-64	18-100
Interrupts	No	Single interrupt capability	Single interrupt capability with hardware context save	Multiple interrupt capability with hardware context save
Performance	5 MIPS	5 MIPS	8 MIPS	Up to 16 MIPS
Instructions	33, 12-bit	35, 14-bit	49, 14-bit	83, 16-bit
Program Memory	Up to 3 KB	Up to 14 KB	Up to 28 KB	Up to 128 KB
Data Memory	Up to 134B	Up to 368B	Up to 1.5 KB	Up to 4 KB
Hardware Stack	2 level	8 level	16 level	32 level
Features	• Comparator • 8-bit ADC • Data Memory • Internal Oscillator	In addition to Baseline: • SPI/I²C™ • UART • PWMs • LCD • 10-bit ADC • Op Amp	In addition to Mid-Range: • Multiple Communication Peripherals • Linear Programming Space • PWMs with Independent Time Base	In addition to Enhanced Mid-Range: • 8x8 Hardware Multiplier • CAN • CTMU • USB • Ethernet • 12-bit ADC
Highlights	Lowest cost in the smallest form factor	Optimal cost to performance ratio	Cost effective with more performance and memory	High performance, optimized for C programming, advanced peripherals
Total Number of Devices	16	58	29	193
Families	PIC10, PIC12, PIC16	PIC12, PIC16	PIC12F1XXX, PIC16F1XXX	PIC18

Baseline Architecture

Baseline devices utilize a 12-bit program word architecture and enable the most cost-effective product solutions. These MCUs allow engineers to use microcontrollers in applications where they have never been used before. Baseline PIC MCUs provide a pricing structure that makes them nearly disposable, with form factors as small as 2x3 mm they can easily be implemented into the most space constrained designs.

This microcontroller family includes an internal oscillator, a comparator, ADC and Data Memory for data-logging, giving engineers the ability to add smarts in various entry level applications.

Its low cost and easy implementation can also help designers to replace multiple discrete components with an integrated MCU solution, resulting in additional savings in board space.

Application Examples

- **"Electronic Glue"** – Design in a baseline MCU from the start to accommodate bug fixes and last-minute changes. Avoid costly, time-consuming silicon revisions or board changes.
- **Logic Control** – Substitute passive discrete logic functions such as delays, smart gates, signal conditioning, simple state machines, encoders/decoders, etc.
- **Intelligent Disposable Electronics** – Highly suitable for "disposable" applications such as drug or pregnancy testers, dialysis monitoring (blood sugar) and more.
- **Waveform Generation** – Replace traditional 555 timers, PWMs, remote control encoders, pulse generation, programmable frequency source, resistor programmable oscillators and more.
- **Mechatronics** – Traditional mechanical functions like smart switches, remote I/Os, LED flashers and other forms of mechanical timers and switches can be replaced easily with baseline MCUs.

www.microchip.com/baseline

Mid-Range Architecture

Mid-Range devices feature a 14-bit program word architecture and are available in 8 to 64-pin packages. These microcontrollers provide 1.8-5.5V operation, speeds up to 20 MHz, interrupt handling and an 8-level deep stack. These devices are available in various peripheral and memory configurations and feature serial analog and digital peripherals, such as: SPI, I2C, USART, LCD and A/D converters.

These Mid-Range MCUs are capable of achieving up to 5 MIPS of performance and some of the newer Mid-Range products also feature nanoWatt XLP, Microchip's industry

leading low power technology. With low sleep and dynamic current consumption, these MCUs are highly suited for energy efficient and battery powered applications.

Increased Functionality

Microchip continues to increase functionality and performance of its products with each successive generation, providing features that help simplify the design of embedded control systems. The Mid-Range families share several features that make designing control architectures for multi-dimensional, interconnected systems easier.

- Enhanced Hardware Serial Communications – It is often necessary to interface the main MCU with external memories, digital sensor ICs, display devices or other controllers in a system. The EUSART and Master SPI/ I2C peripherals allow flexibility in configuration to many communication protocols.
- Advanced Analog Peripherals – Our precision 10-bit ADCs and dual comparators with S/R Latch mode can replace costly external ADCs, 555 timers, simple op amps and other analog function ICs.
- Small Form Factors – The 8-pin 3x3 mm DFN, 28-pin 4x4 mm UQFN, 40-pin 5x5 mm UQFN allow designers to squeeze high levels of performance into space-constrained applications.

www.microchip.com/midrange

Enhanced Mid-Range Architecture

Industry-Leading MCU Integration

The Enhanced Mid-Range core builds upon the best elements of the Mid-Range core and provides additional performance, while maintaining compatibility with Mid-Range PIC microcontrollers for true product migration.

Enhanced Mid-Range Core Key Features

- Performance increase up to 50%
- Code-size reductions up to 40%
- Up to 56 KB of Flash Program Memory
- Up to 4 KB of Data Memory
- Up to 32 MHz internal oscillator
- Optimized for 'C' Programming
- Enhanced 16 Level Hardware Stack with Optional RESET Capabilities
- Automatic Interrupt Context Save of Core Registers
- Enhanced Indirect Linear Addressing
- Simplified Register Map
- 1.8V-5.5V operation
  – Full analog operation throughout
- Increased Peripheral Support Including:
  – Analog-to-Digital Converters
  – Multiple Comparators
  – Multiple SPI/I2C, USART
  – Multiple Capture/Compare/PWM
  – mTouch Sensing Solutions
  – Operational Amplifiers
  – LCD Drive Capability
- PIC microcontrollers with the Enhanced Mid-Range core are denoted as PIC12F1XXX and PIC16F1XXX

The Enhanced Mid-Range core provides the ability to migrate with minimal effort among existing Mid-Range PIC MCUs; as well as up or down with PIC12, PIC16 and PIC18 MCUs. All of these result in application longevity, scalability, ease of design and versatility.

8-bit PIC microcontrollers have always provided a general purpose approach to bringing a higher level of intelligence and reliability into cost sensitive applications. PIC microcontrollers with the Enhanced Mid-Range core will empower embedded designers to create applications that enrich the user experience.

Featured Microcontrollers

PIC16F193X/PIC16F194X

This MCU family ranges from 28- to 64-pins and features low power nanoWatt XLP Technology, segmented LCD driver peripheral, capacitive touch module, EUSART, SPI, I2C, multiple PWMs, multiple timers and analog peripherals like ADC and comparators.

PIC1XF182X

This small pin-count family ranges from 8 to 20-pin, and boasts multiple communications peripherals in tiny package options. These parts also feature industry leading low dynamic currents down to 50 µA/MHz and nanoWatt XLP technology with 20 nA current consumption in sleep.
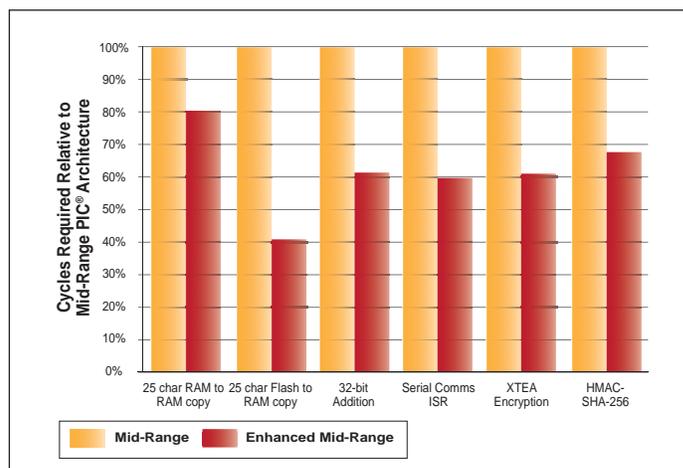
Development Tool

F1 Evaluation Platform (DM164130-1)

- Demonstration/development tool for Enhanced Mid-Range PIC MCUs
- Populated with a PIC16LF1937 featuring XLP technology
- On-board 3V LCD glass and prototyping space
- Includes demonstrations focusing on low power, LCD and motor control
- Support for the Motor Control add-on (DM164130-2)
- Support for PICkit™ 3 Programmer and PICkit Serial Analyzer

www.microchip.com/enhanced

PIC18 Architecture

The PIC18 family utilizes a 16-bit program word architecture and incorporates an advanced RISC architecture with 32 level-deep stack, 8x8 hardware multiplier, and multiple internal and external interrupts. With the highest performance in Microchip's 8-bit portfolio, the PIC18 family provides up to 16 MIPS and linear memory.

PIC18 is the most popular architecture for new 8-bit designs where customers want to program in C. Preserve your code investment by migrating between more than 175 PIC18 products, supporting both 3V and 5V applications with packages ranging from 18 to 100 pins. The PIC18 family features the J- and K-series in addition to the traditional PIC18 product line.

Integration is key on the PIC18 devices, with peripherals supporting connectivity and human interface applications such as:

- Segmented LCDs – capable of driving up to 192 segments
- mTouch Touch Sensing – for keys, buttons and sliders
- Charge Time Measurement Unit (CTMU) – precise time measurement and capacitive touch sensing
- Full-speed USB v2.0 – up to 12 Mbps
- Ethernet MAC and PHY (10/100Base-T) – with free TCP/IP stack
- CAN Module – conforms to CAN 2.0B Active specification
- LIN interface – EUSART compatible with LIN 2.1 specification
- Peripheral Pin Select – flexible pin mapping saves board space

The feature set of the PIC18F MCUs allows this family to be used in a wide variety of applications including: industrial (e.g. metering, electronic door locks, cargo tracking, lighting, alarm systems); appliance (e.g. smart energy, dishwashers, refrigerators, HVAC controls); medical (e.g. diagnostic devices, portable medical meters); and automotive (e.g. lighting, dashboard instrument clusters, keyless entry, interior controls, garage-door openers) markets.

PIC18 J-Series

The PIC18 J-series balances high performance and complex peripherals with cost-effectiveness. Offering 12 MIPS performance and peripherals for USB, touch sensing, Ethernet and LCD, the J-series products also feature low power performance and advanced analog functionality with a 12-bit A/D converter. The J-series also offers a nice migration path to Microchip's PIC24F 16-bit family since they share the same manufacturing process. For application notes, webinars and more information on the J-series products, visit: **www.microchip.com/PIC18J.**

PIC18 K-Series

The PIC18 K-series offers eXtreme Low Power technology, on-board EEPROM and high endurance Flash program and data memory. The K-series offers the highest performance in the PIC18 architecture with 16 MIPS, operating voltages from 1.8V to 5.5V, and a 12-bit A/D converter. For more information on the K-series products, visit: **www.microchip.com/PIC18K.**

Development Tools

PIC18 Explorer Board (DM183032)

- Features PIC18F8722 and PIC18F87J11 MCUs
- Plug-In Modules (PIMs) available for other MCUs, including K22 PIMs
- PICtail™ daughter board connector for expansion boards

PIC18 Starter Kit (DM180021)

- Features PIC18F46J50
- Functions as a USB mouse, joystick or mass storage device.
- Includes Cap touch sense pads, MicroSD™ memory card, potentiometer, accelerometer and OLED display

PIC18 Development Kit (DV164136)

- Includes the PIC18 Explorer Board, PICkit 3 programmer/ debugger, USB cable and the 9V universal power supply all in one bundle

www.microchip.com/pic18

PIC Microcontrollers with nanoWatt XLP Technology

As more electronic applications require low power or battery power, energy conservation becomes paramount. Today's applications must consume little power, and in extreme cases, last for 20 years, while running from a battery. Products featuring Microchip's nanoWatt XLP technology extend battery life and reduce standby currents to support green initiatives worldwide.

PIC® MCUs Offer eXtreme Low Power

- Sleep currents down to 9 nA
- Active Mode currents down to 50 µA/MHz
- Execution Efficiency with more than 80% PIC MCU single cycle instructions
- Execute code smarter, sleep longer, maximize battery life
- Wake-up sources including RTC, WDT, BOR, Interrupts, Reset or POR

Low Power Peripheral Integration

Many of today's low power products need advanced peripherals. Microchip offers low power devices with peripherals like USB, LCD and mTouch capacitive sensing. This eliminates the need for additional parts in the application, which saves cost, current and complexity.

Low Power Reliability

In addition to peripherals, products with nanoWatt XLP have system supervisory circuits specially designed for battery powered products.

- Watchdog Timer down to 200 nA, provides protection against system failure
- Real-time Clock/Calendar down to 450 nA, provides precise timekeeping
- Brown-out Reset down to 45 nA, protects as batteries are depleted or changed

Battery Life Estimator

The XLP Battery Life Estimator is a free software utility to aid you in developing eXtreme Low Power applications with Microchip's PIC MCUs featuring XLP technology.

- Profile your application Run and Sleep time (duty cycle)
- Select operating temperature and operating voltage
- Pre-loaded with most common battery specifications

Run from a Single Battery

The MCP1623/4 and MCP1640 Synchronous Boost Regulators enable single cell battery applications, ideal for small, portable and lightweight applications.

- Power any PIC MCU down to 0.35V
- Provides 2-5.5V fixed/stable output voltage

Development Tools

PIC18 Starter Kit – PIC18F46J50 Family (DM180021)

- Includes an on-board debugger and programming capability
- USB communication
- Board can function as a USB mouse or mass storage device
- Includes MicroSD™ memory card slot

F1 Evaluation Platform – PIC16F1937 Family (DM164130-1)

- Demonstration/development tool for Enhanced Mid-Range PIC microcontrollers
- Platform consists of a 44-pin development board with prototyping space
- Demonstrations focusing on low power, LCD and motor control
- Provides a platform for general purpose development

Featured XLP Product Families

Device Family	Pins	Flash (KB)	Sleep (nA)	Active (uA/MHz)	Special Features
PIC16F727	20-44	3.5-14	20	55	–
PIC16F1829	8-20	3.5-14	20	50	–
PIC16F1947	28-64	7-28	60	55	LCD
PIC18F47J13	28-44	16-128	9	197	–
PIC18F47J53	28-44	16-128	9	197	USB
PIC18F87K22	20-80	8-128	20	50	–
PIC18F87K90	64-80	32-128	20	180	LCD

All numbers are typical values, sleep numbers refer to the lowest power Sleep mode available on each family.

www.microchip.com/xlp

PIC Microcontrollers with mTouch™ Sensing

Touch sensing has become an alternative to traditional push-buttons and switches providing:

- Lower cost of manufacturing and assembly
- Elegant and stylish designs
- Increased reliability; with fewer moving parts
- Proximity-sensitive human interfaces

Microchip's mTouch Sensing Solutions allow designers to integrate touch sensing with application code in a single microcontroller, reducing total system cost. Microchip offers a broad portfolio of low power, low cost and flexible solutions for keys/sliders and touch screen controllers. Get to market faster using our easy GUI-based tools, free source code and low-cost development tools.

Touch Sensing for Keys and Sliders

- mTouch Capacitive Sensing technology enables:
  - Longer battery life with eXtreme low power MCUs; Capacitive sensing in less than 5 µA
  - High noise immunity and low emissions
  - Low cost implementation with no external components
- With mTouch inductive sensing technology you can:
  - Use polished or brushed metal surfaces including stainless steel and aluminum
  - Sense through gloves
  - Create water-proof designs
  - Deploy Braille-friendly interfaces
- Broad portfolio of MCUs enable lowest system cost:
  - 8, 16 and 32-bit PIC MCUs for Capacitive and Inductive Touch
  - Integrated USB, Graphics, LCD, IrDA, CAN

Touch Screen Controllers

Microchip offers both resistive and projected capacitive touch screen controllers. Advanced touch screen solutions use sophisticated proprietary touch screen decoding algorithms to send fully processed and reliable touch coordinates to the application.

- Fully processed touch coordinates
- Projected Capacitive technology
  - Multi-touch enabling gestures
  - Low cost MCU implementation
  - Wide operating voltage: 1.8-5.5V
  - Low operating current 1.5 mA at 5V typical
- Analog Resistive technology
  - Lowest system cost, easy integration
  - Universal 4, 5 & 8-wire solution with on-chip calibration
  - I^2C™, SPI, UART or USB interfaces
  - Low power "touch to wake-up" feature

Development Tools

Enhanced mTouch Capacitive Evaluation Kit (DM183026-2)

- Features PIC16F1937 and PIC18F46J50 boards
- Includes 8-button, matrix and slider daughter cards
- Includes PICkit Serial Analyzer

AR1000 Development Kit (DV102011)

- Analog resistive 7", four-wire touch screen
- Includes PICkit Serial Analyzer
- GUI available for design and configuration

Projected Capacitive Development Kit (DM160211)

- PIC16F707 controller board with fully functional firmware
- Sensor board with 3.5" projected capacitive 12 x 9 touch screen
- Royalty-free source code supports sensors with up to 32 channels

PICDEM Inductive Touch Development Kit (DM183027)

- Populated with a PIC16F1936
- Embossed aluminum front panel with four buttons
- Buzzer and LEDs for feedback

www.microchip.com/mtouch

PIC Microcontrollers with LCD

Segmented displays are used in a wide variety of applications, ranging from meters to portable medical devices to thermostats to exercise equipment.
PIC microcontrollers with integrated LCD drivers can directly drive segmented displays with letters, numbers, characters and icons. The main features of Microchip's LCD portfolio include:

- Flexible LCD segments
  - 28 pins - up to 60 segments
  - 44 pins - up to 96 segments
  - 64 pins - up to 184 segments
  - 80 pins - up to 192 segments
- Variable clock inputs
- Integrated voltage bias generation
- Direct drive for both 3V and 5V powered displays
- Software contrast control for boosting or dimming for different temperature or lighting conditions
- Drive LCD while conserving power in Sleep mode
- Integrated real time clock and calendar for displaying time and date information
- mTouch capacitive touch sensing capability

Direct Drive for Segmented Displays

The LCD PIC microcontrollers support direct LCD panel drive capability with no external components needed, lowering total system cost. They have integrated voltage bias generation which allows the MCU to generate the different voltage levels that are required to drive the LCD segment pins and provide good contrast for the display. The LCD MCUs support a range of fixed and variable bias options as well as variable clock inputs that enable the flexibility to work with many different glass vendors.

Contrast Control

Software contrast control is a key feature using firmware to either boost or dim the contrast of the display. Boost the contrast up to VDD or beyond if you are using one of the MCUs with an integrated charge pump. Software contrast control allows the designer to vary the contrast on the LCD to account for different operating conditions such as temperature, lighting, and humidity. Also, software contrast control can be invaluable for portable applications. As the battery level starts to drop, the firmware can apply a boost to the contrast helping extend the battery life while still seeing a crisp image on the display.

Development Tools

PICDEM™ LCD 2 Demo Board (DM163030)

- Illustrates and supports the main features of Microchip's 28-, 40-, 64- and 80-pin LCD PIC microcontrollers
- Separate Processor Plug-in Modules (PIMs) are available to evaluate all of the LCD products
- LCD glass with icons, numbers, alphanumeric and starburst display
- Demonstrates booster capability for contrast control and dimming

Free Segment Display Designer GUI (DM183026-2)
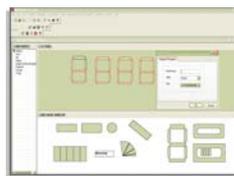
- Drag and drop to design display and automatically generate code
- Allows components of various shapes and sizes
- Users can create, edit, delete or save components
- Download with MPLAB at **www.microchip.com/mplab**

Featured LCD Product Families

Device Family	Pins	Flash (KB)	Max Segments	Voltage (V)	Additional Features
PIC16F1947	28-64	7-28	184	1.8-5.5	mTouch Capacitive Touch Sensing Peripherals
PIC18F87J93	64-80	16-128	192	2.0-3.6	mTouch Capacitive Touch Sensing Peripherals, Real Time Clock and Calendar, 12-bit ADC
PIC18F87K90	64-80	32-128	192	1.8-5.5	

www.microchip.com/lcd

PIC Microcontrollers with Integrated USB

USB communication is growing in popularity for remote upgrades, downloading data and other portable serial communication applications. Microchip's USB PIC MCUs bring the benefits of full-speed USB to a broad range of embedded designs that can operate in various environments and locations, enabling easy access to other USB devices such as printers, handheld devices or PCs.

Full-Speed USB 2.0

Microchip offers USB solutions capable of full-speed USB operation (up to 12 Mbits/s) with the PIC18 family of devices including:

- Performance: 12 MIPS
- 8-128 KB Program Flash
- Up to 4 KB Data RAM
- Analog features: 12-bit ADC, 2 comparators
- Up to 2 SPI/I²C, 2 UARTs, 5 PWMs

The 16- and 32-bit PIC MCUs include integrated USB On-The-Go and embedded host support.

Free USB Software

Microchip has USB software to support USB on 8, 16 and 32-bit MCUs. This software is royalty-free source code and also includes sample projects. The 8-bit family supports USB device mode with full speed operation. Additional software support includes full C and RTOS development environments.

Also available are: TCP/IP stacks, graphics libraries and ZigBee® software stacks, which allow USB functionality to be combined with other capabilities to support a variety of designs.

Add USB to any PIC MCU with UART

The MCP2200 is a stand-alone USB to UART serial converter that enables full-speed USB connectivity in applications containing a UART interface. The MCP2200 has 256 bytes of EEPROM and 8 general purpose I/O. It offers a simple "plug-and-play" solution, allowing USB connectivity with very little design effort.

Microchip USB Framework Configuration Tool

- Generates config files with just a few clicks
- Royalty-free source code
- Firmware projects and USB drivers for the PC

Development Tools

Low Pin Count USB Development Kit (DV164126/DM164127)

- For evaluation of PIC18F14K50/ 13K50 20-pin USB MCUs
- Contains hardware, software and code examples
- Self-directed course and lab materials

PIC18F46J50 FS USB Demo Board (MA180024)

- Features the PIC18F46J50 XLP family with USB
- Can be used with the PIC18 Explorer Board (DM183032)

PICDEM™ Full-Speed USB Demo Kit (DM163025)

- Features the PIC18F4550 family of Flash MCUs
- Full-speed USB 2.0 interface

Featured USB Product Families

Device Family	Pins	Flash (KB)	Other Key Features
PIC18F14K50	20	8-16	XLP, 1.8-.5V
PIC18F46J50	28-44	16-64	XLP
PIC18F47J53	28-44	64-128	XLP, 12-bit ADC
PIC18F87J50	64-80	32-128	–

www.microchip.com/usb

PIC Microcontrollers with Ethernet

and fully compatible with 10/100/1000 Base-T networks. Microchip's Ethernet solution also includes: Free and robust TCP/IP stack optimized for PIC microcontroller and dsPIC® digital signal controller families (www.microchip.com/tcpip).

Development Tools

PICDEM.net™ 2 Development Board (DM163024)

- Supports ENC28J60 and PIC18F97J60 devices
- Can be developed as web server

PICtail™ Ethernet Daughter Board (AC164121)

- Can be plugged to any of the PIC18 demonstration boards
- Populated with ENC28J60
- Interfaces to RJ-45 female connector

Embedded Ethernet

Microchip addresses the growing demand for embedded Ethernet products with the ENC624J600, ENC424J600 and ENC28J60 as standalone Ethernet controllers, and the PIC18F97J60 family, which are IEEE 802.3 compliant

Featured Ethernet Product Families

Device Family	Pins	PIC + Ethernet	Integrated MAC + PHY	Interface	Hardware Security	Pre-Programmed MAC	Additional Features
PIC18F97J60	64-100	Yes	Yes (10 Base-T)	–	No	No	IEEE 802.3™ Compliant, Auto-Negotiation, Configurable Buffer
ENC28J60	28	No	Yes (10 Base-T)	SPI	No	No	
ENC624J600	44-64	No	Yes (10/100 Base-T)	SPI/Parallel	Yes	Yes	

www.microchip.com/ethernet

PIC Microcontrollers with CAN

Controller Area Network (CAN)

Microchip offers a complete line of 8-, 16- and 32-bit microcontrollers to meet the needs of high-performance, embedded applications using the CAN bus. On-chip peripherals include A/D converters, comparators, motor control PWMs, USART (RS485, RS232, LIN) and Master I2C/SPI.

Microchip's Enhanced CAN Module

- Supports CAN 1.2, CAN 2.0A and CAN 2.0B protocols
- DeviceNet data bytes filter support
- Standard and extended data frames
- 0-8 bytes data length

- Three modes of operation:
  - Mode 0 – Legacy mode
  - Mode 1 – Enhanced Legacy mode with DeviceNet support
  - Mode 2 – FIFO mode with DeviceNet support
- Six buffers programmable as RX/TX buffers

Development Tools

PICDEM™ CAN-LIN 2 Demonstration Board (DM163011)

- Demonstrates CAN module features
- Includes both firmware and PC software for simulating a CAN network
- The firmware comes pre-programmed on the sample device

Featured CAN Product Families

Device Family	Pins	Flash (KB)	CAN Transmit Buffers	CAN Receive Buffers	Voltage (V)	Additional Features
PIC18F4685	28-44	16-96	3	2	2.0-5.5	LIN USART
PIC18F66K80	28-64	32-64	3	2	1.8-5.5	LIN USART

www.microchip.com/can

Support

Microchip is committed to supporting its customers in developing products faster and more efficiently. We maintain a worldwide network of field applications engineers and technical support ready to provide product and system assistance. In addition, the following service areas are available at www.microchip.com:

- **Support** link provides a way to get questions answered fast: http://support.microchip.com
- **Sample** link offers evaluation samples of any Microchip device: http://sample.microchip.com
- **Forum** link provides access to knowledge base and peer help: http://forum.microchip.com
- **Buy** link provides locations of Microchip Sales Channel Partners: www.microchip.com/sales

Training

If additional training interests you, then Microchip can help. We continue to expand our technical training options, offering a growing list of courses and in-depth curriculum locally, as well as significant online resources – whenever you want to use them.

- Regional Training Centers: www.microchip.com/rtc
- MASTERs Conferences: www.microchip.com/masters
- Worldwide Seminars: www.microchip.com/seminars
- eLearning: www.microchip.com/webseminars
- Resources from our Distribution and Third Party Partners www.microchip.com/training

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