

Introduction	1
Introduction	1
Microchip Internet Connections	2
Emulator Systems	3
MPLAB [®] In-Circuit Emulator (ICE) Ordering Instructions	4
MPLAB-ICE 2000 Description and Features	8
MPLAB-ICE 2000 Full-Featured Modular In-Circuit Emulator Pod	9
MPLAB-ICE 2000 Processor Module	10
MPLAB-ICE Device Adapters	11
MPLAB-ICE Transition Socket	12
MPLAB-ICE Replacement Accessories	13
ICEPIC Emulator Description and Features	15
ICEPIC Low-Cost In-Circuit Emulator	16
ICEPIC Daughter Boards	17
Software Tools	19
Software Tool Descriptions and Features	23
MPLAB Integrated Development Environment (IDE)	25
MPLAB-C17 C Compiler	26
MPLAB-C18 C Compiler	27
Total Endurance [™] Software Model	28
FilterLab [™] Active Software Design Tool	29
Programmer Systems	31
Programmer Systems Descriptions and Features	35
PICSTART Plus Low-Cost Development Kit	37
PRO MATE II Device Programmer	38
In-Circuit Serial Programming [™] (ICSP [™])	
Socket for PRO MATE II	39
PICSTART [®] Plus Adapter Kits and Accessories	40
In-Circuit Debugger	41
MPLAB In-Circuit Debugger (ICD)	42
MPLAB In-Circuit Debugger (ICD)	43

**FIRST EDITION
2000**

CONTENTS

Microchip Development Systems Ordering Guide

Demo Boards and Evaluation Kits	45
Demo Boards and Evaluation Kits Descriptions and Features	49
PICDEM Demonstration Boards	51
KEELOQ® Evaluation Kit	52
KEELOQ Transponder Evaluation Kit	53
Serial EEPROM Designer's Kit	54
MCP2510 CAN Developer's Kit	55
microID™ Programmer Kit	56
125 kHz microID Developer's Kit	57
125 kHz Anticollision microID Developer's Kit	58
13.56 MHz Anticollision microID Developer's Kit	59
MXDEV™ 1 Analog Evaluation System Driver Board	60
MXDEV 1 MCP3201/02 Evaluation System Daughter Board Kit	61
MXDEV 1 MCP3204/08 Evaluation System Daughter Board Kit	62
Worldwide Sales and Service	66

Information contained in this publication regarding device applications and the like is intended by way of suggestion only. No representation or warranty is given and no liability is assumed by Microchip Technology Incorporated with respect to the accuracy or use of such information. Use of Microchip's products as critical components in life support systems is not authorized except with express written approval by Microchip.

© 2000 Microchip Technology Incorporated. All rights reserved.

The Microchip name and logo, PIC, PICmicro, PICSTART, PICMASTER, PRO MATE, KEELOQ, MPLAB, and SEEVAL are registered trademarks of Microchip Technology Incorporated in the U.S.A. and other countries. microID, In-Circuit Serial Programming, ICSP, MXDEV, and Total Endurance are trademarks of Microchip Technology in the U.S.A. and other countries.

IBM and PC/AT are registered trademarks of International Business Machines Corporation.

Performa is a trademark of Checkpoint Systems, Inc.

Windows and MS-DOS are registered trademarks of Microsoft Corporation.

All other trademarks mentioned herein are property of their respective companies.

All other product/company trademarks mentioned herein are the property of their respective companies.



Introduction

Whether you're new to Microchip Technology Incorporated development system products or quite familiar with them, you'll find the ***Microchip Development Systems Ordering Guide*** to be very helpful. The table of contents provides you with an overview of the system products covered in the guide. There are a number of new development tools and kits in this edition to support Microchip's expanding device families. For current information on support products, please check Microchip's web site (www.microchip.com).

At the beginning of each section, there is a comprehensive table designed to assist you in identifying all of the available development tool products supporting each specific Microchip silicon part number.

Microchip Technology Service and Support

Quality

Design and manufacturing continuous improvement processes are put in place to ensure high quality in Microchip Development Systems product offerings.

Warranty

FIRST EDITION
2000

INTRODUCTION

Microchip Internet Connections

On-line Support

Microchip provides on-line support on the Microchip World Wide Web (WWW) site.

The web site is used by Microchip as a means to make files and information easily available to customers. To

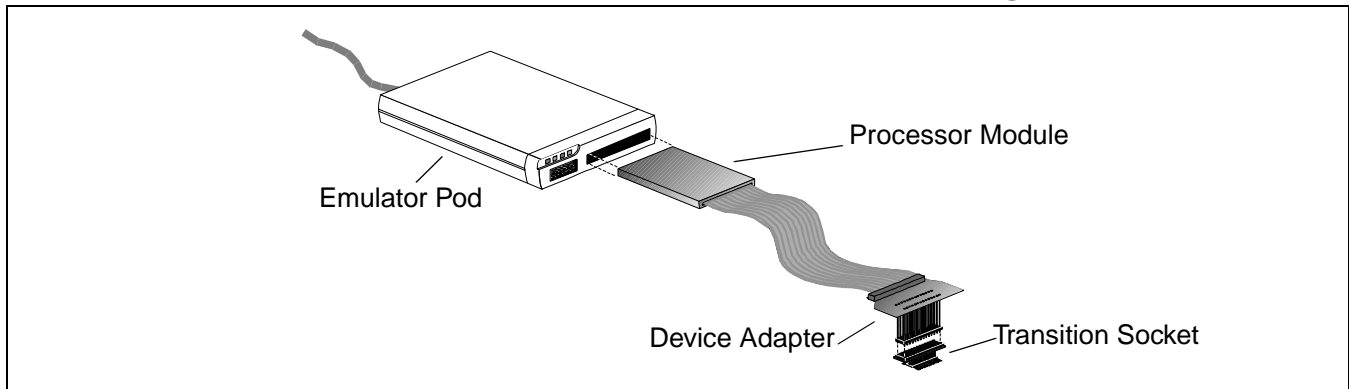


MICROCHIP

FIRST EDITION
2000

EMULATOR SYSTEMS

MPLAB[®] In-Circuit Emulator (ICE) Ordering Instructions



How Do I Order MPLAB-ICE?

Ordering MPLAB-ICE as easy as 1, 2, and 3!

1. Pick your PICmicro[®] MCU device.
2. Pick your PICmicro MCU package.
3. Find the right line on the next few pages for MPLAB-ICE part numbers. You're ready to order.

A Complete MPLAB-ICE System

MPLAB-ICE is a modular emulator system with interchangeable components allowing the system to be easily configured to emulate different PICmicro microcontrollers (MCU). Since this emulator supports package-specific emulation, customers need to know which device and package they intend to emulate. Then, the customer can use the *MPLAB-ICE Cross Reference Parts List* starting on page 5 to identify the part numbers required to complete an MPLAB-ICE system. A complete system consists of:

1. An emulator pod (including among other things the host-to-pod parallel cable and power supply).
2. A processor module (including the flex cable circuit).
3. A device adapter.
4. An optional transition socket.

An MPLAB-ICE system is ordered as separate components. Knowing the terms will make it easy to order and use the MPLAB-ICE system. Read more about each component.

1. Emulator Pod

MPLAB-ICE 2000 is the full-featured emulator pod containing a main board and an additional board for expanded trace memory and complex control logic.

MPLAB-ICE 2000 comes with a standard parallel interface cable that connects the pod to the parallel port of the PC.

2. Processor Module

The processor module is a PICmicro MCU, device-specific module that is inserted into the emulator pod. The processor module contains the emulator chip, logic, and low-voltage circuitry. A flex cable extends from the processor module and is connected to the device adapter at the target application.

3. Device Adapter

The device adapter provides a common interface for the PICmicro MCU being emulated. The device adapter provides emulation support for standard DIP and PLCC styles. For emulation support of other packages, a transition socket is needed along with the device adapter. This adapter contains a special device that provides an oscillator clock allowing the user to accurately emulate the RC characteristics of the PICmicro MCU.

4. Transition Socket

The transition sockets are available in various styles to allow the common device adapter to be translated to support surface-mount packages, such as SOIC, SSOP, PQFP, and TQFP.

MPLAB-ICE Cross Reference Parts List

Model Name/ Part Number	Lead Count/ Package Type	MPLAB-ICE Emulator Hardware Tools			
		Emulator Pod	Processor Module	Device Adapters	Transition Sockets
PIC12C508	8P 8JW 8SM	ICE2000 ICE2000	PCM16XA0 PCM16XA0	DVA12XP080 DVA12XP080	- XLT08SO
PIC12C508A	8P 8JW 8SM 8SN	ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0	DVA12XP080 DVA12XP080 DVA12XP080	- XLT08SO XLT08SO
PIC12C509	8P 8JW 8SM	ICE2000 ICE2000	PCM16XA0 PCM16XA0	DVA12XP080 DVA12XP080	- XLT08SO
PIC12C509A	8P 8JW 8SM 8SN	ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0	DVA12XP080 DVA12XP080 DVA12XP080	- XLT08SO XLT08SO
PIC12CE518	8P 8JW 8SM 8SN	ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0	DVA12XP080 DVA12XP080 DVA12XP080	- XLT08SO XLT08SO
PIC12CE519	8P 8JW 8SM 8SN	ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0	DVA12XP080 DVA12XP080 DVA12XP080	- XLT08SO XLT08SO
PIC12C671	8P 8JW 8SM	ICE2000 ICE2000	PCM12XA0 PCM12XA0	DVA12XP081 DVA12XP081	- XLT08SO
PIC12C672	8P 8JW 8SM	ICE2000 ICE2000	PCM12XA0 PCM12XA0	DVA12XP081 DVA12XP081	- XLT08SO
PIC12CE673	8P 8JW	ICE2000	PCM12XA0	DVA12XP081	-
PIC12CE674	8P 8JW	ICE2000	PCM12XA0	DVA12XP081	-
PIC14000	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM14XA0 PCM14XA0 PCM14XA0	DVA14XP280 DVA14XP280 DVA14XP280	- XLT28SO XLT28SS
PIC16C505	14P 14JW 14SL	ICE2000 ICE2000	PCM16XA0 PCM16XA0	DVA16XP140 DVA16XP140	- XLT14SO
PIC16C52	18P 18SO	ICE2000 ICE2000	PCM16XA0 PCM16XA0	DVA16XP180 DVA16XP180	- XLT18SO
PIC16C54/PIC16C54A/ PIC16C54C	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16HV540*	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XM0 PCM16XM0 PCM16XM0	DVA16XP181 DVA16XP181 DVA16XP181	- XLT18SO XLT20SS
PIC16C55/PIC16C55A	28P 28JW 28SP 28SO 28SS	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0 PCM16XA0	DVA16XP280 DVA16XP280 DVA16XP280 DVA16XP280	XLT28XP - XLT28SO XLT28SS2
PIC16C554	18P 18JW 18SO 18SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C558	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C56/PIC16C56A	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C57/PIC16C57C	28P 28JW 28SP 28SO 28SS	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0 PCM16XA0	DVA16XP280 DVA16XP280 DVA16XP280 DVA16XP280	XLT28XP - XLT28SO XLT28SS2
PIC16C58A/PIC16C58B	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XA0 PCM16XA0 PCM16XA0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C62A	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XB1 PCM16XB1 PCM16XB1	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16C62B	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16C620/PIC16C620A	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C621/PIC16C621A	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C622/PIC16C622A	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16CE623	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS

*Contact Microchip Technology Inc. for availability.

Microchip Development Systems Ordering Guide

MPLAB-ICE Cross Reference Parts List (Continued)

Model Name/ Part Number	Lead Count/ Package Type	MPLAB-ICE Emulator Hardware Tools			
		Emulator Pod	Processor Module	Device Adapters	Transition Sockets
PIC16CE624	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16CE625	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XC0 PCM16XC0 PCM16XC0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C63	28SP 28JW 28SO	ICE2000 ICE2000	PCM16XB1 PCM16XB1	DVA16XP281 DVA16XP281	- XLT28SO
PIC16C63A	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16C64A	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XB1 PCM16XB1 PCM16XB1 PCM16XB1	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C642	28SP 28JW 28SO	ICE2000 ICE2000	PCM16XD0 PCM16XD0	DVA16XP281 DVA16XP281	- XLT28SO
PIC16C65A	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XB1 PCM16XB1 PCM16XB1 PCM16XB1	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C65B	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C66	28SP 28JW 28SO	ICE2000 ICE2000	PCM16XE1 PCM16XE1	DVA16XP281 DVA16XP281	- XLT28SO
PIC16C662	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XD0 PCM16XD0 PCM16XD0 PCM16XD0	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C67	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C71	18P 18JW 18SO	ICE2000 ICE2000	PCM16XF0 PCM16XF0	DVA16XP180 DVA16XP180	- XLT18SO
PIC16C710	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XF0 PCM16XF0 PCM16XF0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C711	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XF0 PCM16XF0 PCM16XF0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C712	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP182 DVA16XP182 DVA16XP182	- XLT18SO XLT20SS
PIC16C715	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XG0 PCM16XG0 PCM16XG0	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PIC16C716	18P 18JW 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP182 DVA16XP182 DVA16XP182	- XLT18SO XLT20SS
PIC16C72	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XB1 PCM16XB1 PCM16XB1	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16C72A	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16C73A	28SP 28JW 28SO	ICE2000 ICE2000	PCM16XB1 PCM16XB1	DVA16XP281 DVA16XP281	- XLT28SO
PIC16C73B	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16C74A	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XB1 PCM16XB1 PCM16XB1 PCM16XB1	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C74B	40P 40JW 44L 44PO 4PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C76	28SP 28JW 28SO	ICE2000 ICE2000	PCM16XE1 PCM16XE1	DVA16XP281 DVA16XP281	- XLT28SO

*Contact Microchip Technology Inc. for availability.

Emulator Systems

PIC16C77	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XE1 PCM16XE1 PCM16XE1 PCM16XE1	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C773	28SP 28JW 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XLO PCM16XLO PCM16XLO	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16C774	40P 40JW 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XLO PCM16XLO PCM16XLO PCM16XLO	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16F83	18P 18SO	ICE2000 ICE2000	PCM16XH1 PCM16XH1	DVA16XP180 DVA16XP180	- XLT18SO
PIC16F84	18P 18SO	ICE2000 ICE2000	PCM16XH1 PCM16XH1	DVA16XP180 DVA16XP180	- XLT18SO
PIC16F84A	18P 18SO 20SS	ICE2000 ICE2000 ICE2000	PCM16XH1 PCM16XH1 PCM16XH1	DVA16XP180 DVA16XP180 DVA16XP180	- XLT18SO XLT20SS
PI16FC870*	28SP 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XR0 PCM16XR0 PCM16XR0	DVA16XP282 DVA16XP282 DVA16XP282	- XLT28SO XLT28SS
PIC16F871*	40P 44L 44PT	ICE2000 ICE2000 ICE2000	PCM16XR0 PCM16XR0 PCM16XR0	DVA16XP401 DVA16XL441 DVA16PQ441	- - XLT44PT
PIC16F872	28SP 28SO 28SS	ICE2000 ICE2000 ICE2000	PCM16XKO PCM16XKO PCM16XKO	DVA16XP281 DVA16XP281 DVA16XP281	- XLT28SO XLT28SS
PIC16F873	28SP 28SO	ICE2000 ICE2000	PCM16XKO PCM16XKO	DVA16XP281 DVA16XP281	- XLT28SO
PIC16F874	40P 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XKO PCM16XKO PCM16XKO PCM16XKO	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16F876	28SP 28SO	ICE2000 ICE2000	PCM16XKO PCM16XKO	DVA16XP281 DVA16XP281	- XLT28SO
PIC16F877	40P 44L 44PO 44PT	ICE2000 ICE2000 ICE2000 ICE2000	PCM16XKO PCM16XKO PCM16XKO PCM16XKO	DVA16XP400 DVA16XL440 DVA16PQ440 DVA16PQ440	- - XLT44PT XLT44PT
PIC16C923	64SP 64PT	ICE2000 ICE2000	PCM16XJO PCM16XJO	DVA16XP640 DVA16PQ640	- XLT64PT1
PIC16C924	64SP				

MPLAB-ICE 2000 Description and Features

MPLAB-ICE 2000 is a high-performance, real-time in-circuit emulator.

Microchip's universal MPLAB-ICE for PICmicro MCUs has been designed with the user's requirements in mind. The system is small, portable, lightweight, and offers improved performance and value. For quick hook-up to portable or desktop PCs, MPLAB-ICE easily connects to the parallel (printer) port.

Interchangeable processor modules allow the system to be easily configured to emulate different processors. This modular system consists of an emulator pod, a processor module, a device adapter, and a transition socket. Also included is Microchip's MPLAB Integrated Development Environment (IDE) featuring MPASM macro assembler, MPLAB programmer's editor, symbolic debugger, and project manager with built-in support for high-level languages that support the Common Object Description format (i.e., MPASM, MPLAB-C17, and MPLAB-C18).

MPLAB-ICE 2000 is a premium quality emulator system providing full-speed emulation, low-voltage operation, 32K x 128-bit trace, and unlimited breakpoints. Complex triggering of the MPLAB-ICE 2000 provides sophisticated trace analysis and precision breakpoints. The trace analyzer captures real-time execution addresses, opcodes, and read/writes of external data. It also traces all file register RAM usage showing internal addresses and data values, as well as all accesses to special function registers, including I/O, timers, and peripherals. Triggers and breakpoints can be set on single events, multiple events, and sequences of events. The MPLAB-ICE 2000 analyzer is fully transparent and does not require halting the processor to view the trace. In addition, MPLAB-ICE 2000 supports code coverage profiling.

System Description

Features	MPLAB-ICE 2000
Real-Time Emulation	Full Speed
Low-Voltage Emulation	2.0 to 5.5 volts
Trace Memory	32K x 128 bit
Break/Trigger on Internal Registers	Yes
Software Breakpoints	Program Address
Complex Break/Trigger on Logic	Program Address and Data; Internal Register Address and Data; Access Type; and Eight External Inputs
Logic Analyzer Trigger	One External Input and Output
Multi-level Trigger	Yes (4 levels)
Pass Counter	Yes
Delay Counter	Yes
Time Stamp	Yes
Programmable Clock	32 kHz to 40 MHz
Logic Probes	Yes
Communications	Parallel (printer) Port
Code Coverage Profiling	Yes



MPLAB-ICE 2000 Full-Featured Modular In-Circuit Emulator Pod

MPLAB-ICE 2000 In-Circuit Emulator Pod provides full-speed, real-time emulation, low-voltage operation, 32k x 128-bit trace, and unlimited breakpoints. The sophisticated emulator pod connects to the parallel (printer) port for quick hook-up to portable or desktop PCs.

MPLAB-ICE 2000 In-Circuit Emulator Pod includes:

1. MPLAB-ICE 2000 Pod
2. Power Supply
3. Tripod
4. Logic Probes
5. Parallel Cable
6. MPLAB-ICE and MPLAB Software, Complete Documentation including CD-ROM with full data book and application notes

Ordering Part Number:

ICE 2000

MPLAB-ICE 2000 Emulator Pod

Microchip Development Systems Ordering Guide



MPLAB-ICE 2000 Processor Module

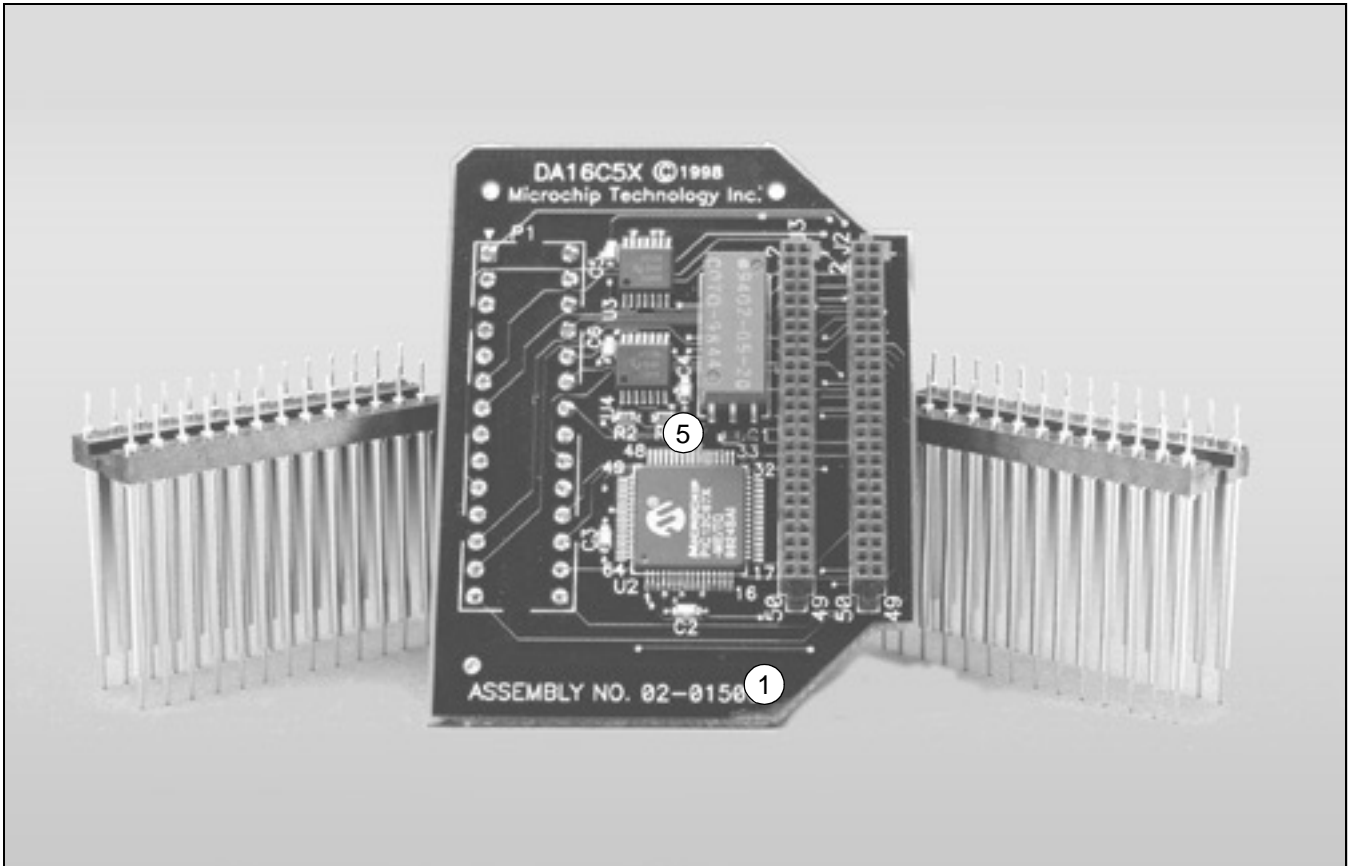
The Processor Module is the second required component for an MPLAB-ICE system. The processor module is a PICmicro MCU, device-specific module that is inserted into the emulator pod. The processor module contains a PCMCIA-like hardware module and an attached flex cable. The flex cable extends from the processor module and is connected to the device adapter at the target application.

MPLAB-ICE Processor Module includes:

1. Processor Module Header with attached Flex Cable
2. MPLAB-IDE Software, Complete Documentation including CD-ROM

Ordering Part Number:

See *MPLAB-ICE Cross Reference Parts List*, page 5.



MPLAB-ICE Device Adapters

The Device Adapter is the third required component in an MPLAB-ICE system. The device adapter provides a common interface for the PICmicro MCU being emulated. The device adapter provides emulation support for standard DIP and PLCC styles. For emulation support for other package types, a transition socket is required along with a device adapter.

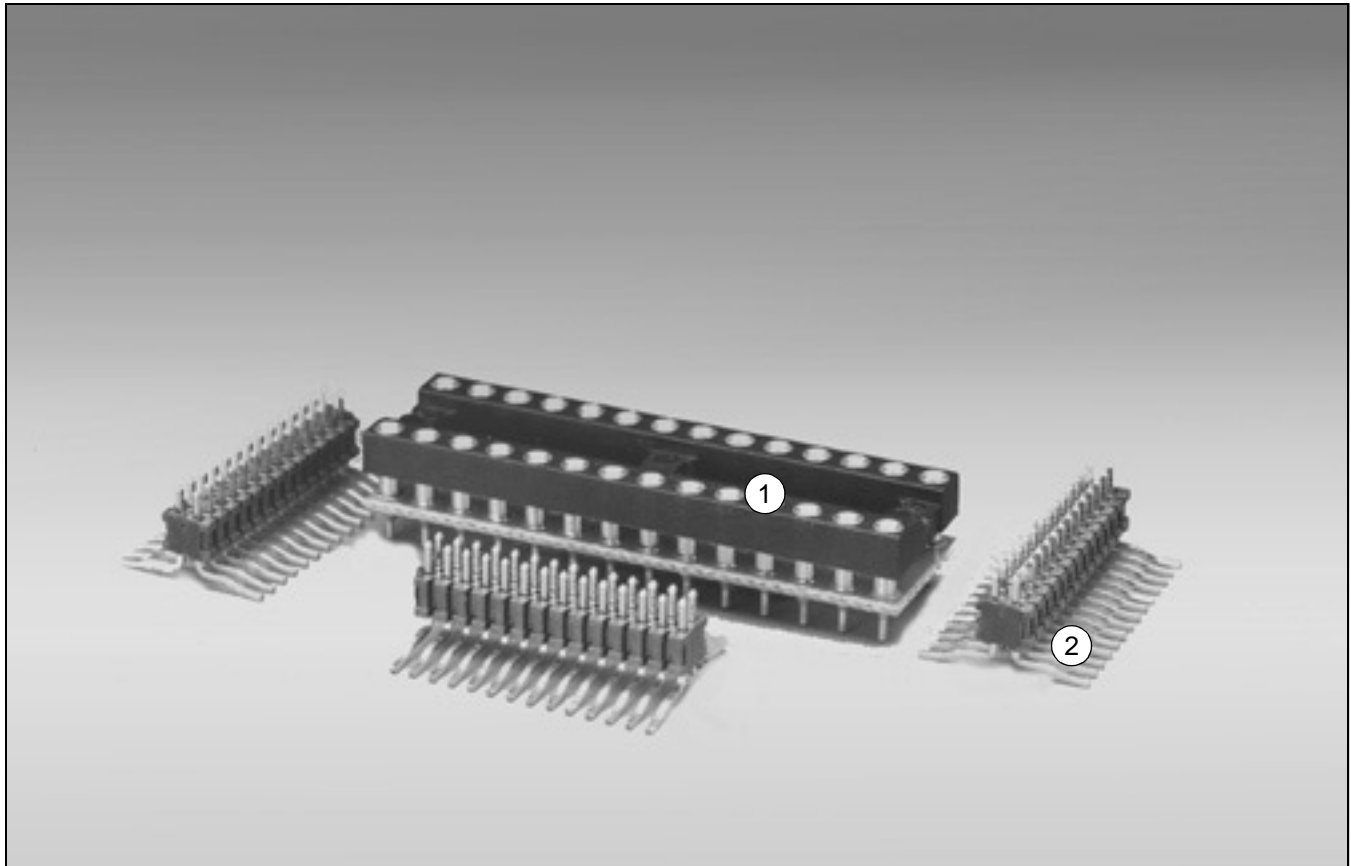
MPLAB-ICE Device Adapters include (PDIP Device Adapter shown):

1. Device Adapter Printed Circuit Board
2. Two Adapter Plugs

Note: Hardware for PLCC and PQFP/TQFP device adapters is different.

Ordering Part Number:

See *MPLAB-ICE Cross Reference Parts List*, page 5.



MPLAB-ICE Transition Socket

Transition Sockets are available in various styles to allow the common device adapter to be translated to support surface-mount packages, such as SOIC, SSOP, PQFP, and TQFP.

Transition sockets are typically composed of two parts: the DIP adapter socket and the SOIC/SSOP header. The DIP adapter socket is designed to plug into the emulator system's DIP device adapter on one side and the SOIC/SSOP header on the other. The header is then soldered down to the target application.

Refer to the *Transition Socket Specification* data sheet (DS51194) for more information.

MPLAB-ICE Transition Socket includes (SOIC Socket shown):

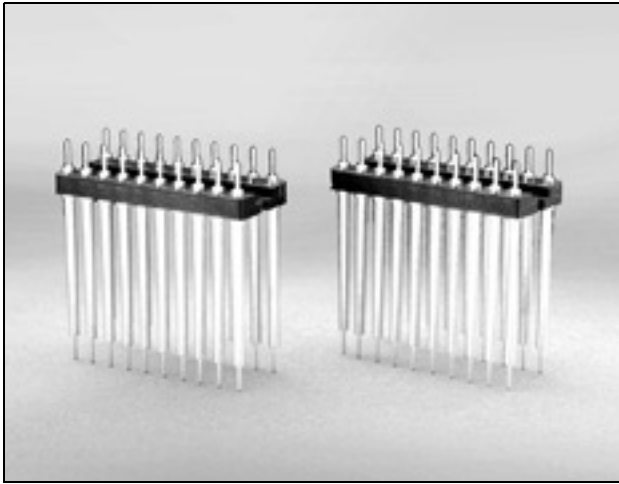
1. Adapter Socket
2. Three Headers (only included with SOIC and SSOP transition sockets)

Note: Hardware for 28-lead (600 mil) PDIP, PQFP, and TQFP transition sockets is different.

Ordering Part Number:

See *MPLAB-ICE Cross Reference Parts List*, page 5.

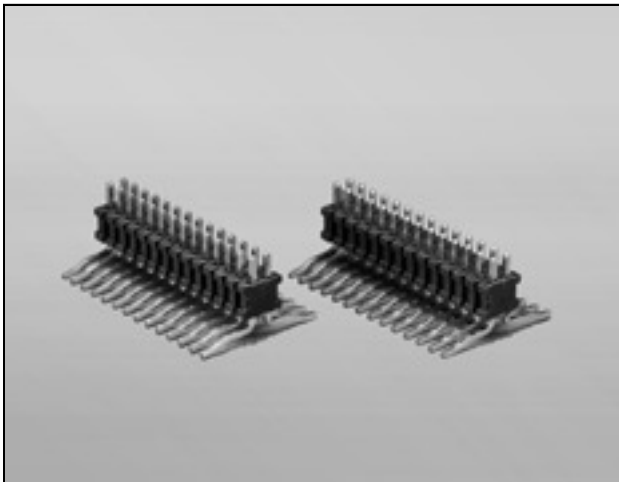
MPLAB-ICE Replacement Accessories



Device Adapter Plugs

Device adapter plugs are available as replacement accessories. The table below lists the replacement part number.

Model Part Number	Description
ACICE0201	MPLAB-ICE 8P 300 mil adapter plug
ACICE0202	MPLAB-ICE 18P 300 mil adapter plug
ACICE0203	MPLAB-ICE 20P 300 mil adapter plug
ACICE0204	MPLAB-ICE 28P 300 mil adapter plug
ACICE0205	MPLAB-ICE 28P 600 mil adapter plug
ACICE0206	MPLAB-ICE 40P 600 mil adapter plug
ACICE0207	MPLAB-ICE 14P 300 mil adapter plug



Transition Headers

Transition socket headers can be purchased separately in the event that a customer needs additional headers. The table below lists the headers available.

Model Part Number	Description
ACICE0301	8P SOIC Header
ACICE0302	14P SOIC Header
ACICE0303	18P SOIC Header
ACICE0305	20P SOIC Header
ACICE0306	28P SOIC Header
ACICE0307	28P SSOP Header

Other Replacement Accessories

Model Part Number	Description
ACICE0103	MPLAB-ICE Power Supply
ACICE0104	MPLAB-ICE Logic Probes
ACICE0105	MPLAB-ICE Parallel Cable
ACICE0106	MPLAB-ICE Tripod
ACICE0107	MPLAB-ICE Flex Cable

Extra logic probe hooks can be purchased from:

E-Z-Hook: 1 (800) 995-HOOK

Part Number: XM25

Description: Micro Hook Adaptor with 0.025 square pin

Microchip Development Systems Ordering Guide

ICEPIC Cross Reference Ordering Information

Model Name/ Part Number	ICEPIC Pod	ICEPIC Daughter Board
PIC12C508 ^(*)	EM167200	AC165201
PIC12C509 ^(*)	EM167200	AC165201
PIC16C52	EM167200	AC165201
PIC16C54	EM167200	AC165201
PIC16C54A	EM167200	AC165201
PIC16C55	EM167200	AC165201
PIC16C554	EM167200	AC165208
PIC16C558	EM167200	AC165208
PIC16C56	EM167200	AC165201
PIC16C57	EM167200	AC165201
PIC16C58A	EM167200	AC165201
PIC16C61	EM167200	AC165211
PIC16C620	EM167200	AC165202
PIC16C621	EM167200	AC165202
PIC16C622	EM167200	AC165202
PIC16C62A	EM167200	AC165207
PIC16C63	EM167200	AC165207
PIC16C642	EM167200	EM167213
PIC16C64A	EM167200	AC165207
PIC16C65A	EM167200	AC165207
PIC16C66	EM167200	AC165214
PIC16C662	EM167200	EM165213
PIC16C67	EM167200	AC165214
PIC16C71	EM167200	AC167211
PIC16C710	EM167200	AC167211
PIC16C711	EM167200	AC167211
PIC16C715	EM167200	AC167215
PIC16C72	EM167200	AC165207
PIC16C73A	EM167200	AC165207
PIC16C74A	EM167200	AC165207
PIC16C76	EM167200	AC165214
PIC16C77	EM167200	AC165214
PIC16C773	EM167200	AC165217
PIC16C774	EM167200	AC165217
PIC16C923	EM167200	AC165210
PIC16C924	EM167200	AC165210
PIC16F83	EM167200	AC165212
PIC16F84	EM167200	AC165212
PIC16F872	EM167200	AC165216
PIC16F873	EM167200	AC165216
PIC16F874	EM167200	AC165216
PIC16F876	EM167200	AC165216
PIC16F877	EM167200	AC165216

* PIC12CXXX emulation support also requires the use of a kit daughter board adapter AC122002.

ICEPIC Emulator Description and Features

Affordable PICmicro MCU In-Circuit Emulation Solution.

ICEPIC is a low-cost, in-circuit emulation solution for the PIC16C5X, PIC16CXX, PIC16C77X, and PIC16F87X MCU families. The modular system can support different subsets of PIC16C5X or PIC16CXX products through the use of interchangeable personality modules or daughter boards. The emulator is capable of emulating without target application circuitry being present.

ICEPIC is designed to operate on PC-compatible machines ranging from 286-AT[®] and greater. The development software runs under Microsoft Windows[®] 3.X environment, allowing the operator access to a wide range of supporting software accessories.

The ICEPIC development software provides a user-friendly operating environment with an easy-to-use toolbar; unlimited number of breakpoints; single, multiple and procedure step; ability to display and modify any register; user-selectable processor speeds via an oscillator module; full context-sensitive help and an RS-232 serial port.

ICEPIC is fully compatible with Microchip's MPASM Universal Assembler and MPLAB IDE. ICEPIC is CE compliant.

ICEPIC Daughter Boards

The ICEPIC emulator system can be reconfigured for emulation of different PICmicro MCUs by using the corresponding interchangeable Daughter Board for a particular device. See *ICEPIC Cross Reference Ordering Information*, page 14, for device compatibility and ordering part numbers.

Microchip Development Systems Ordering Guide



ICEPIC Low-Cost In-Circuit Emulator

The low-cost, PC-based ICEPIC In-Circuit Emulator system comes with an emulator unit (motherboard), power supply, RS-232 cable, software and documentation. ICEPIC is CE compliant.

ICEPIC was designed by NEOSOFT Inc. and is manufactured under license by RF Solutions Ltd.

See *ICEPIC Cross Reference Ordering Information*, page 14, for device support and ordering information.

Device-specific daughter boards are sold separately. Refer to *ICEPIC Cross Reference Ordering Information*, page 14 for more information.

The ICEPIC Emulator System includes:

1. ICEPIC Base Unit
2. RS-232 Cable
3. Power Supply
4. Complete Software and Documentation

ICEPIC device-specific daughter boards are sold separately.

Ordering Part Number:

See *ICEPIC Cross Reference Ordering Information*, page 14.



ICEPIC Daughter Boards

The ICEPIC interchangeable personality modules or daughter boards are combined with the motherboard within one housing, connecting to the target application via a connector cable that extends from the housing. The motherboard incorporates the common emulation logic while the daughter board is for device-specific emulator logic. This economical system allows the user to purchase a new daughter board for a new processor group as needed, at approximately 30 percent of the full system cost.

See *ICEPIC Cross Reference Ordering Information*, page 14, for device support and ordering information.

The ICEPIC Daughter Board Kits include:

1. Device-Specific Daughter Board
2. Extender Cable
3. Complete Software and Documentation

Ordering Part Number:

See *ICEPIC Cross Reference Ordering Information*, page 14.

Microchip Development Systems Ordering Guide

NOTES:



MICROCHIP

**FIRST EDITION
2000**

SOFTWARE TOOLS

Microchip Development Systems Ordering Guide

Software Tools Cross Reference and Ordering Information

Model Name/Part Number	MPLAB®	MPLAB-C17	MPLAB-C18	Total Endurance™ Software Model	KEELOQ® License Disk
24CXX/24LCXX	—	—	—	SW242001	DS40149
93CXX/93LCXX	—	—	—	SW242001	DS40149
HCS200	—	—	—	—	DS40149
HCS201	—	—	—	—	DS40149
HCS300	—	—	—	—	DS40149
HCS301	—	—	—	—	DS40149
HCS320	—	—	—	—	DS40149
HCS360	—	—	—	—	DS40149
HCS361	—	—	—	—	DS40149
HCS410	—	—	—	—	DS40149
HCS412	—	—	—	—	DS40149
HCS500	—	—	—	—	DS40149
HCS512	—	—	—	—	DS40149
HCS515	—	—	—	—	DS40149
PIC12C508	SW007002	—	—	—	—
PIC12C508A	SW007002	—	—	—	—
PIC12C509	SW007002	—	—	—	—
PIC12C509A	SW007002	—	—	—	—
PIC12CE18	SW007002	—	—	—	—
PIC12CE19	SW007002	—	—	—	—
PIC12C671	SW007002	—	—	—	—
PIC12C672	SW007002	—	—	—	—
PIC12CE673	SW007002	—	—	—	—
PIC12CE674	SW007002	—	—	—	—
PIC14000	SW007002	—	—	—	—
PIC16C505	SW007002	—	—	—	—
PIC16C52	SW007002	—	—	—	—
PIC16C54	SW007002	—	—	—	—
PIC16C54A	SW007002	—	—	—	—
PIC16C54C	SW007002	—	—	—	—
PIC16HV540	SW007002	—	—	—	—
PIC16C55	SW007002	—	—	—	—
PIC16C55A	SW007002	—	—	—	—
PIC16C554	SW007002	—	—	—	—
PIC16C558	SW007002	—	—	—	—
PIC16C56	SW007002	—	—	—	—
PIC16C56A	SW007002	—	—	—	—
PIC16C57	SW007002	—	—	—	—
PIC16C57C	SW007002	—	—	—	—
PIC16C58A	SW007002	—	—	—	—
PIC16C58B	SW007002	—	—	—	—
PIC16C62A	SW007002	—	—	—	—
PIC16C62B	SW007002	—	—	—	—
PIC16C620	SW007002	—	—	—	—
PIC16C620A	SW007002	—	—	—	—
PIC16C621	SW007002	—	—	—	—
PIC16C621A	SW007002	—	—	—	—

■ Shaded area indicates not applicable.

* Contact Microchip for availability.

Software Tools Cross Reference and Ordering Information (Continued)

Model Name/Part Number	MPLAB®	MPLAB-C17	MPLAB-C18	Total Endurance™ Software Model	KEELOQ® License Disk
PIC16C622	SW007002	—	—	—	—
PIC16C622A	SW007002	—	—	—	—
PIC16CE623	SW007002	—	—	—	—
PIC16CE624	SW007002	—	—	—	—
PIC16CE625	SW007002	—	—	—	—
PIC16F627 ^(*)	SW007002	—	—	—	—
PIC16F628 ^(*)	SW007002	—	—	—	—
PIC16C63	SW007002	—	—	—	—
PIC16C63A	SW007002	—	—	—	—
PIC16C64A	SW007002	—	—	—	—
PIC16C642	SW007002	—	—	—	—
PIC16C65A	SW007002	—	—	—	—
PIC16C65B	SW007002	—	—	—	—
PIC16C66	SW007002	—	—	—	—
PIC16C662	SW007002	—	—	—	—
PIC16C67	SW007002	—	—	—	—
PIC16C71	SW007002	—	—	—	—
PIC16C710	SW007002	—	—	—	—
PIC16C711	SW007002	—	—	—	—
PIC16C712	SW007002	—	—	—	—
PIC16C715	SW007002	—	—	—	—
PIC16C716	SW007002	—	—	—	—
PIC16C717	SW007002	—	—	—	—
PIC16C72	SW007002	—	—	—	—
PIC16C72A	SW007002	—	—	—	—
PIC16C73B	SW007002	—	—	—	—
PIC16C73C ^(*)	SW007002	—	—	—	—
PIC16C74A	SW007002	—	—	—	—
PIC16C74B	SW007002	—	—	—	—
PIC16C76	SW007002	—	—	—	—
PIC16C77	SW007002	—	—	—	—
PIC16C770 ^(*)	SW007002	—	—	—	—
PIC16C771 ^(*)	SW007002	—	—	—	—
PIC16C773	SW007002	—	—	—	—
PIC16C774	SW007002	—	—	—	—
PIC16F83	SW007002	—	—	—	—
PIC16F84	SW007002	—	—	—	—
PIC16F84A	SW007002	—	—	—	—
PIC16F870	SW007002	—	—	—	—
PIC16F871	SW007002	—	—	—	—
PIC16F872	SW007002	—	—	—	—
PIC16F873	SW007002	—	—	—	—
PIC16F874	SW007002	—	—	—	—
PIC16F876	SW007002	—	—	—	—
PIC16F877	SW007002	—	—	—	—
PIC16C923	SW007002	—	—	—	—
PIC16C924	SW007002	—	—	—	—
PIC17C42A	SW007002	SW006010	—	—	—

■ Shaded area indicates not applicable.

* Contact Microchip for availability.

Microchip Development Systems Ordering Guide

Software Tools Cross Reference and Ordering Information (Continued)

Model Name/Part Number	MPLAB®	MPLAB-C17	MPLAB-C18	Total Endurance™ Software Model	KEELOQ® License Disk
PIC17C43	SW007002	SW006010	—	—	—
PIC17C44	SW007002	SW006010	—	—	—
PIC17C752	SW007002	SW006010	—	—	—
PIC17C756	SW007002	SW006010	—	—	—
PIC17C756A	SW007002	SW006010	—	—	—
PIC17C762	SW007002	SW006010	—	—	—
PIC17C766	SW007002	SW006010	—	—	—
PIC18C242	SW007002	—	SW006011	—	—
PIC18C252	SW007002	—	SW006011	—	—
PIC18C442	SW007002	—	SW006011	—	—
PIC18C452	SW007002	—	SW006011	—	—

■ Shaded area indicates not applicable.

* Contact Microchip for availability.

Software Tool Descriptions and Features

MPLAB Integrated Development Environment (IDE)

MPLAB gives PICmicro MCU users the flexibility to edit, compile, and debug from a single user interface.

MPLAB is a Windows[®]-based development platform for the PICmicro MCU families. MPLAB IDE offers a project manager and program text editor, a user-configurable toolbar containing four pre-defined sets and a status bar which communicates editing and debugging information.

MPLAB is the common user interface for Microchip development systems tools including MPLAB Editor, MPASM Assembler, MPLAB-SIM Software Simulator, MPLIB, MPLINK, MPLAB-C17 C Compiler, MPLAB-C18 C Compiler, MPLAB-ICE, PICMASTER In-Circuit Emulator, PICSTART Plus Development Programmer, PRO MATE II Programmer, and MPLAB-ICD. Additional products may become available as add-on tools in the future.

The MPLAB desktop provides the development environment and tools for developing and debugging your application as a project, allowing you to quickly move between different development and debugging modes. With the MPLAB environment, you can write and debug your source code, automatically locate errors in source files for editing, debug with breakpoints based on internal register values, watch the program flow with MPLAB-SIM (software simulator) or MPLAB-ICE, make timing measurements with a “stop watch,” view variables in watch windows, program firmware with PICSTART Plus or PRO MATE II programmers, and find quick answers to questions from the MPLAB on-line help.

MPLAB IDE runs under Microsoft[®] Windows[®] operating systems.

MPLAB-C17

MPLAB-C17 provides powerful integration capabilities and ease of use!

The MPLAB-C17 is a full-featured ANSI-compliant C compiler for the PIC17CXXX MCU family. MPLAB-C17 is fully compatible with Microchip's MPLAB IDE, allowing source level debugging with both MPLAB-ICE and MPLAB-SIM. MPLAB provides a convenient, project oriented development environment that reduces development time.

MPLAB-C17 allows code for the PIC17CXXX family to be written in the C high-level language using powerful PICmicro MCU libraries, enabling the developer to devote more time to the application and less time to the details of the processor.

MPLAB-C17 was designed explicitly for the PIC17CXXX family and allows the use of a software stack for maximum RAM reusability or can be run without a stack for optimal code space efficiency.

MPLAB-C17 provides user configurable interrupt support macros for saving and restoring context during interrupt handling. Libraries and interrupt handlers are provided for multiple memory models. Libraries, precompiled objects and linker scripts can be included in MPLAB projects along with C and Assembly source files for use with MPLAB's make and build functions.

MPLAB-C17 will run on any 486 or better PC, on MS-DOS[®] 5.0+ or as a native 32-bit Windows 95 or Windows NT[®] executable.

Microchip Development Systems Ordering Guide

MPLAB-C18

The MPLAB-C18 is a full-featured ANSI-compliant C compiler for the Microchip Technology PIC18CXXX family of PICmicro MCUs. MPLAB-C18 is fully compatible with Microchip's MPLAB IDE, allowing source level debugging with both the MPLAB-ICE and the MPLAB-SIM simulator. MPLAB provides a convenient, project oriented development environment that reduces development time.

MPLAB-C18 allows code for the PIC18CXXX family to be written in the C high-level language using powerful PICmicro MCU libraries, enabling the developer to devote more time to the application and less time to the details of the processor.

MPLAB-C18 was designed explicitly for the PIC18CXXX family and allows the use of a software stack for maximum RAM reusability.

MPLAB-C18 provides user configurable interrupt support for saving and restoring context during interrupt handling. Libraries are provided for multiple memory models. Libraries, precompiled objects, and linker scripts can be included in MPLAB projects along with C and Assembly source files for use with MPLAB's make and build functions.

MPLAB-C18 will run on any 486 or better PC as a native 32-bit Windows 95 or Windows NT executable.

Total Endurance Software Model

Microchip's revolutionary Total Endurance Software Model provides electronic system designers with unprecedented visibility into Serial EEPROM-based applications. This advanced software model (with a very friendly user interface) eliminates time and guesswork from Serial EEPROM-based designs by accurately predicting the device's performance and reliability within a user-defined application environment. Design trade-off analysis which formerly consumed days or weeks can now be performed in minutes...with a level of accuracy that delivers a truly robust design.

KEELOQ License Disk

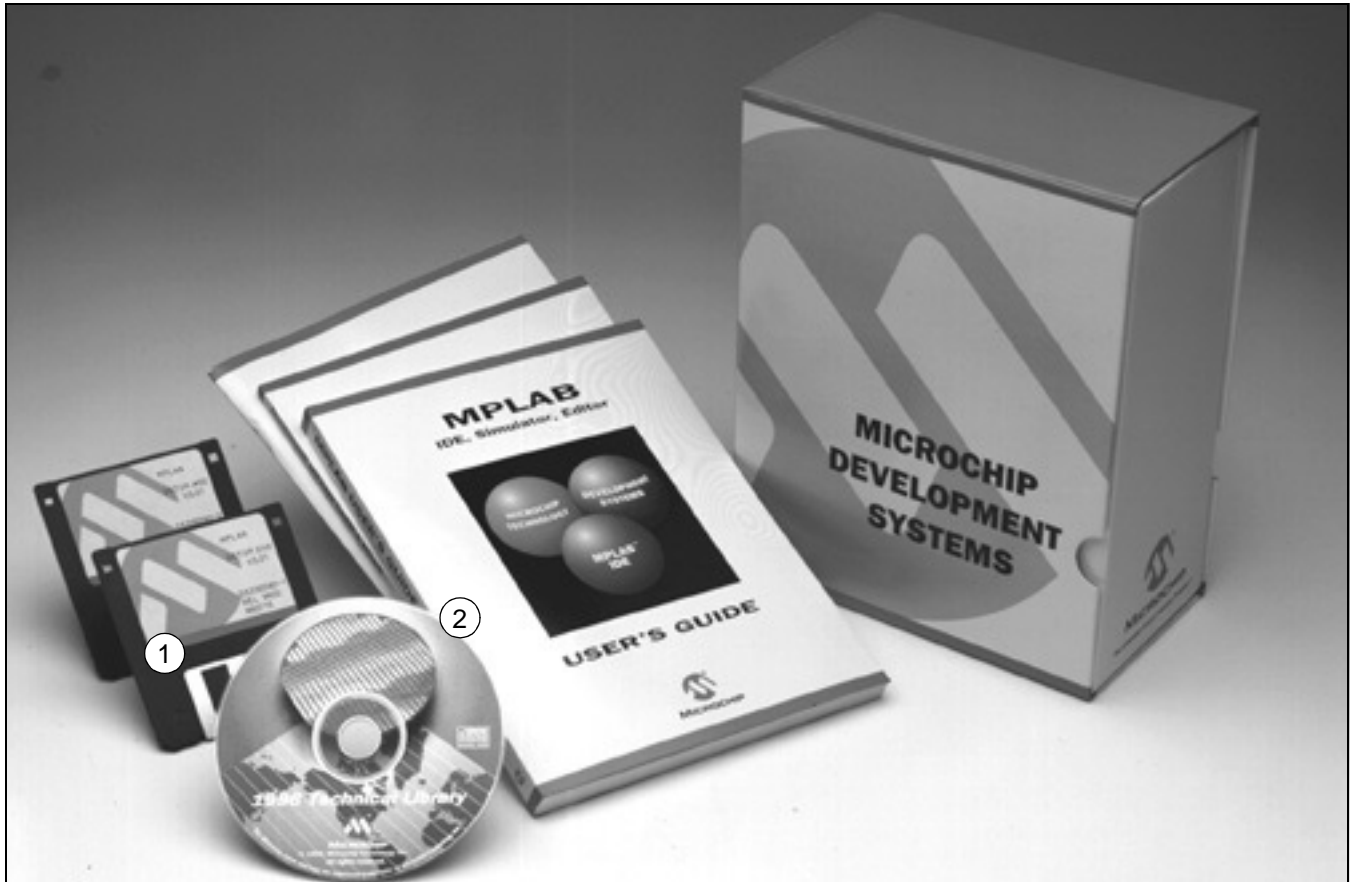
The KEELOQ License Disk contains KEELOQ application notes, decoder software, and the KEELOQ Software Toolkit.

The KEELOQ Software Toolkit is a tool that is designed to be used by a KEELOQ system developer to debug code. The toolkit allows the user to receive KEELOQ transmissions from the KEELOQ Evaluation Kit (DM303002) and the KEELOQ Transponder Evaluation Kit (DM303005).

The KEELOQ Decoder software is typically used as the starting point of a decoder design. The software is fully described in the application notes accompanying the software.

FilterLab™

FilterLab is an innovative software tool that simplifies active filter design. Available at no cost from Microchip's web site (www.microchip.com), the FilterLab active filter software design tool provides full schematic diagrams of the filter circuit with component values and displays the frequency response.



MPLAB Integrated Development Environment (IDE)

MPLAB IDE allows you to write, debug, and optimize the PICmicro MCU applications for firmware product designs.

MPLAB IDE software package includes the following:

- MPLAB Project Manager
- MPLAB-SIM Software Simulator
- MPLAB Editor
- MPASM Universal Macro Assembler for PICmicro MCUs
- MPLINK and MPLIB (Linker and Librarian)

MPLAB currently supports: MPLAB-ICE, PICMASTER In-Circuit Emulator, PICSTART Plus Development Programmer, PRO MATE II Universal Programmer, MPLAB-ICD, MPLAB-C17, and MPLAB-C18.

Host System Requirements: PC with 486 or higher processor. Pentium® recommended; 8 MB Memory, 32 MB recommended; 16 MB hard disk space, 32 MB recommended; Microsoft Windows operating system, and CD-ROM Drive.

The MPLAB IDE Development Kit includes:

1. MPLAB Software
2. Complete documentation including Microchip's Technical Library CD-ROM

Ordering Part Number:

SW007002

MPLAB IDE

Microchip Development Systems Ordering Guide



MPLAB-C17 C Compiler

The MPLAB-C17 ANSI-compliant C compiler comes complete with the MPLAB IDE. The IDE allows you to quickly move between different development and debugging modes. For example, you can quickly advance from software debugging with MPLAB-SIM to hardware debugging with MPLAB-ICE.

MPLAB-C17 has implemented extensions to the C language to provide specific support for Microchip's PICmicro MCU environment.

These C library extensions include:

A/D converter	Input Capture
SPI™	Timers
I ² C™	I/O Port
Reset	External LCD
Software I ² C	Software USART
Relay	Memory/String Manipulation
32-bit Math Library	Interrupt Support Macros
USART	Character Classification
Pulse Width Modulation	Number/Text Conversion
Software SPI	

A 30-day free demo is available from the Microchip web site.

The MPLAB-C17 Development Kit includes:

1. MPLAB-C17 C compiler software
2. MPLAB Software
3. Complete Documentation including Microchip's Technical Library CD-ROM
4. *MPLAB-CXX User's Guide and MPLAB-CXX Library Reference Guide*

Ordering Part Number:

SW006010

MPLAB-C17 C Compiler



MPLAB-C18 C Compiler

The MPLAB-C18 ANSI-compliant C compiler comes complete with the MPLAB IDE. The IDE allows you to quickly move between different development and debugging modes. For example, you can quickly advance from software debugging with MPLAB-SIM to hardware debugging with MPLAB-ICE.

MPLAB-C18 has implemented extensions to the C language to provide specific support for Microchip's PICmicro MCU environment.

A 30-day free demo is available from the Microchip web site.

The MPLAB-C18 Development Kit includes:

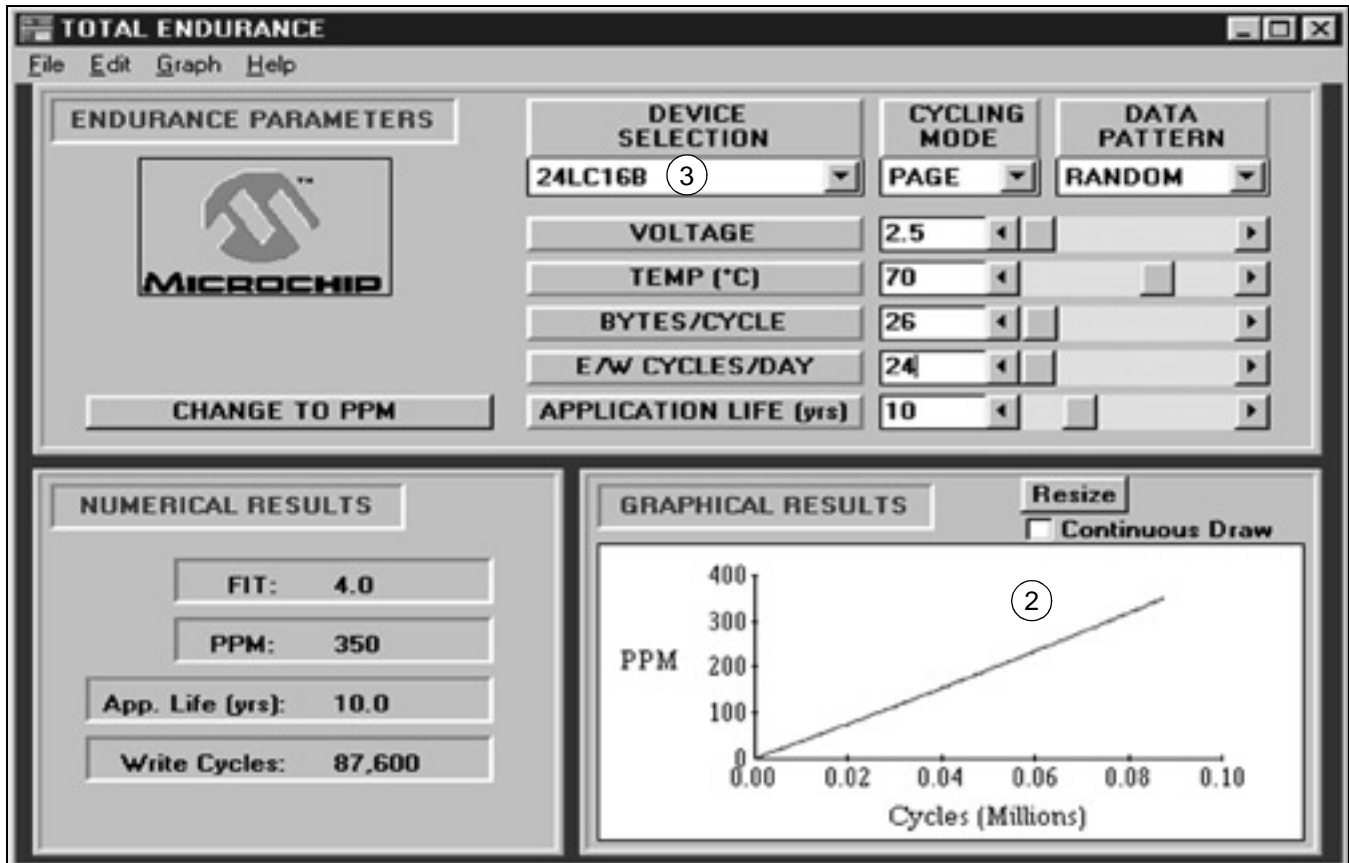
1. MPLAB-C18 C compiler software
2. MPLAB Software
3. Complete documentation including Microchip's Technical Library CD-ROM
4. *MPLAB-CXX User's Guide and MPLAB-CXX Library Reference Guide*

Ordering Part Number:

SW006011

MPLAB-C18 Compiler

Microchip Development Systems Ordering Guide



Total Endurance™ Software Model

With Microchip's Total Endurance Software Model, users may input the following application parameters:

- Serial EEPROM device type
- Bytes to be written per cycle
- Cycling mode – byte or page
- Data pattern type – random or worst-cast
- Temperature in °C
- Erase/Write cycles per day
- Application lifetime or target PPM level

The model will respond with FIT rate, PPM level, application life and, plot of the PPM level versus number of cycles. The model is available in both MS-DOS and Windows versions.

The Windows 3.1 or MS-DOS 3.1-compatible model features:

- Automatic or manual recalculation
- Real-time update of data
- Full-screen or windowed graphical view
- Hypertext on-screen help
- Key or slide-bar entry of parameters
- On-screen editing of parameters
- Single-click copy of plot to clipboard
- Numeric export to delimited text file
- On-disk Endurance Tutorial

Ordering Part Number:

Available from the Microchip web site.



FilterLab Active Software Design Tool

Features:

- Multiple Filter Order and Responses with Gain Option
 - Ability to select Bessel, Butterworth or Chebyshev filter response
 - Up to 8th-order filters can be simulated
 - Circuit diagram and component values given
- Bode Plot with Phase Margin
 - Resultant Bode plot generated
- Circuit Implementation
 - Standard 1 percent resistors
 - Standard capacitor values generate and user adjustable
 - Circuit configuration: Sallen-Key (noninverting) or multiple feedback (inverting)
- Spice Model Generated
 - Spice Model of entire filter generated
 - Allows for streamline of simulations
- Anti-Aliasing Wizard
 - Filter optimization for Analog-to-Digital Converter base on bit resolution and sample rate

Ordering Part Number:

Available from the Microchip web site.

Microchip Development Systems Ordering Guide

NOTES:



MICROCHIP

FIRST EDITION
2000

PROGRAMMER SYSTEMS

Microchip Development Systems Ordering Guide

Programmers Cross Reference and Ordering Information

Model Name/ Part Number	PICSTART Plus	PRO MATE II	PRO MATE II						
			DIP	SOIC	SSOP	PLCC	MQFP	TQFP	ICSP Module
24CXX/24LCXX	—	DV007003	AC004001	AC004002	—	—	—	—	—
93CXX/93LCXX	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS200	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS201	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS300	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS301	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS320	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS360	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS361	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS410	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS412	—	DV007003	AC004001	AC004002	—	—	—	—	—
HCS500 ^(†)	—	DV007003	—	—	—	—	—	—	—
HCS512	—	DV007003	AC164001	AC164002	—	—	—	—	—
HCS515 ^(†)	—	DV007003	—	—	—	—	—	—	—
PIC12C508	DV003001	DV007003	AC124001	AC124001	—	—	—	—	AC004004
PIC12C508A	DV003001	DV007003	AC124001	AC124001 ^(†) AC164026 ^(†)	—	—	—	—	AC004004
PIC12C509	DV003001	DV007003	AC124001	AC124001	—	—	—	—	AC004004
PIC12C509A	DV003001	DV007003	AC124001	AC124001 ^(†) AC164026 ^(†)	—	—	—	—	AC004004
PIC12CE518	DV003001	DV007003	AC124001	AC124001 ^(†) AC164026 ^(†)	—	—	—	—	AC004004
PIC12CE519	DV003001	DV007003	AC124001	AC124001 ^(†) AC164026 ^(†)	—	—	—	—	AC004004
PIC12C671	DV003001	DV007003	AC124001	AC124001	—	—	—	—	AC004004
PIC12C672	DV003001	DV007003	AC124001	AC124001	—	—	—	—	AC004004
PIC12CE673	DV003001	DV007003	AC124001	—	—	—	—	—	AC004004
PIC12CE674	DV003001	DV007003	AC124001	—	—	—	—	—	AC004004
PIC14000	DV003001	DV007003	AC144001	AC144002	AC144002	—	—	—	AC004004
PIC16C505	DV003001	DV007003	AC124001	AC164026	—	—	—	—	AC004004
PIC16C52	DV003001	DV007003	AC164001	AC164002	—	—	—	—	—
PIC16C54	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C54A	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C54C	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16HV540	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C55	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C55A	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C554	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C558	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C56	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C56A	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C57	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C57C	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C58A	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C58B	DV003001	DV007003	AC164001	AC164002	AC164015	—	—	—	—
PIC16C62A	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16C62B	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16C620	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C620A	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C621	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C621A	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004

■ Shaded area indicates not applicable.

* Contact Microchip Technology Inc. for availability.

‡ Adapter required.

† AC124001 (208 mil); AC164026 (150 mil).

Programmer Systems

Programmiers Cross Reference and Ordering Information (Continued)

Model Name/ Part Number	PICSTART Plus	PRO MATE II	PRO MATE II						
			DIP	SOIC	SSOP	PLCC	MQFP	TQFP	ICSP Module
PIC16C622	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C622A	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16CE623	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16CE624	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16CE625	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16F627 ^(†)	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16F628 ^(†)	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C63	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC16C63A	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16C64A	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C642	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC16C65A	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C65B	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C66	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC16C662	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C67	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C71	DV003001	DV007003	AC164010	AC164010	—	—	—	—	AC004004
PIC16C710	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C711	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C712	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C715	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C716	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C717	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16C72	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16C72A	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16C73A	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC16C73B	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16C74A	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C74B	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C76	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC16C77	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C770	DV003001	DV007003	AC164028	AC164028	AC164018	—	—	—	AC004004
PIC16C771	DV003001	DV007003	AC164028	AC164028	AC164018	—	—	—	AC004004
PIC16C773	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16C774	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16F83	DV003001	DV007003	AC164010	AC164010	—	—	—	—	AC004004
PIC16F84	DV003001	DV007003	AC164010	AC164010	—	—	—	—	AC004004
PIC16F84A	DV003001	DV007003	AC164010	AC164010	AC164018	—	—	—	AC004004
PIC16F870*	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16F871*	DV003001	DV007003	AC164012	—	—	AC164013	—	AC164020	AC004004
PIC16F872*	DV003001	DV007003	AC164012	AC164017	AC164021	—	—	—	AC004004
PIC16F873	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC16F874	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16F876	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC16F877	DV003001	DV007003	AC164012	—	—	AC164013	AC164014	AC164020	AC004004
PIC16C923	DV003001 [‡]	DV007003	AC164025	—	—	AC164023	—	AC164023	AC004004
PIC16C924	DV003001 [‡]	DV007003	AC164025	—	—	AC164022	—	AC164023	AC004004
PIC17C42A	DV003001	DV007003	AC174001	—	—	AC174002	AC174004	AC174005	—
PIC17C43	DV003001	DV007003	AC174001	—	—	AC174002	AC174004	AC174005	—
PIC17C44	DV003001	DV007003	AC174001	—	—	AC174002	AC174004	AC174005	—

■ Shaded area indicates not applicable.
 * Contact Microchip Technology Inc. for availability.
 ‡ Adapter required.
 † AC124001 (208 mil); AC164026 (150 mil).

Microchip Development Systems Ordering Guide

Programmers Cross Reference and Ordering Information (Continued)

Model Name/ Part Number	PICSTART Plus	PRO MATE II	PRO MATE II						
			DIP	SOIC	SSOP	PLCC	MQFP	TQFP	ICSP Module
PIC17C752	DV003001†	DV007003	—	—	—	AC174007	—	AC174008	AC004004
PIC17C756	DV003001†	DV007003	—	—	—	AC174007	—	AC174008	AC004004
PIC17C756A	DV003001†	DV007003	—	—	—	AC174007	—	AC174008	AC004004
PIC17C762	DV003001†	DV007003	—	—	—	AC174012	—	AC174011	AC004004
PIC17C766	DV003001†	DV007003	—	—	—	AC174012	—	AC174011	AC004004
PIC18C242	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC18C252	DV003001	DV007003	AC164012	AC164017	—	—	—	—	AC004004
PIC18C442	DV003001	DV007003	AC164012	—	—	AC164013	—	AC164020	AC004004
PIC18C452	DV003001	DV007003	AC164012	—	—	AC164013	—	AC164020	AC004004

■ Shaded area indicates not applicable.

* Contact Microchip Technology Inc. for availability.

‡ Adapter required.

† AC124001 (208 mil); AC164026 (150 mil).

Programmer Systems Descriptions and Features

PICSTART Plus

PICSTART Plus makes designing with Microchip MCUs simple and affordable.

The PICSTART Plus development system from Microchip Technology provides the product development engineer with a highly-flexible, low-cost design tool set for all PICmicro MCUs (DIP packages up to 40 pins). PLCC Adapters are available for the PIC16C92X, PIC17C75X, and PIC17C76X.

The PICSTART Plus development system runs on any PC-compatible machine running under the Windows 3.1 or greater operating system. In addition, drivers are available for customers running Windows NT. PICSTART Plus is easy-to-use and features Microchip's highly acclaimed MPLAB IDE, with its built-in editor, assembler, and Windows-based MPLAB-SIM simulator. The PICSTART Plus development system includes full documentation, software, development programmer, and a device sample.

The CE-compliant PICSTART Plus development programmer features a molded plastic enclosure and special circuit design techniques to enhance ESD protection. PICSTART Plus is a development programmer and is not recommended for use in a production environment.

Sample software programs are provided to help the developer quickly become familiar with the PICSTART Plus development system and with Microchip's PICmicro MCU families. The PICSTART Plus system also includes Microchip's Technical Library CD-ROM containing complete documentation necessary to get started with your design.

PRO MATE II

CE Compliant PRO MATE II makes programming easy.

The PRO MATE II device programmer tool allows development engineers to program user software into Microchip's entire line of PICmicro MCUs, HCSXXX Security Products, and 2- and 3-wire Serial EEPROM products.

The PRO MATE II device programmer is easy-to-use and operates either as a stand-alone unit or in conjunction with a PC-compatible host system. When connected to a host system, PRO MATE II provides an exceptionally user-friendly interface to give the developer complete control over the programming session. This time-saving tool comes complete with all the accessories needed to connect to a host system including interface cables and a universal input power supply.

In addition to the programmer unit, the PRO MATE II system contains Microchip's highly-acclaimed MPLAB IDE, with its built-in editor, assembler, and Windows-based MPLAB-SIM simulator. The PRO MATE II programmer includes full documentation and software.

PRO MATE II is CE-compliant, meaning it meets or exceeds all the directives for safety, emissions, ESD and susceptibility (to radiated emission) requirements set forth by the European Union (EU) countries.

The PRO MATE II device programmer is designed to be robust and reliable with:

- Enhanced socket module alignment with four auto alignment pins
- Three levels of over-current protection and superior ESD immunity for rugged environments
- A small and compact universal IEC power supply
- Improved LCD display and buttons.

In-Circuit Serial Programming™ (ICSP™) Socket Module

Microchip offers an ICSP kit that can be used with PRO MATE II, Microchip's universal device programmer. Together, these two tools allow you to implement ICSP with minimal effort and use the ICSP capability of Microchip's PICmicro MCUs.

In-System Programming (ISP) is a technique where a programmable device is programmed after the device is placed in a circuit board. ICSP is an enhanced ISP technique implemented in Microchip's PICmicro OTP and FLASH MCUs. Using only two I/O pins to serially input and output data makes ICSP easy-to-use and less intrusive on the normal operation of the MCU.



PICSTART Plus Low-Cost Development Kit

The PICSTART Plus development system includes the PICSTART Plus development programmer and the MPLAB IDE.

The PICSTART Plus programmer gives the product developer the ability to program user software into any of the supported microcontrollers. The PICSTART Plus software running under MPLAB provides for full interactive control over the programmer.

The MPASM macro assembler provides programmable memory data files, listing files, and special files required for symbolic debug. The MPLAB-SIM software simulator allows the user to isolate code problems and debug firmware designs on PICmicro MCUs. It simulates the core functions as well as most of the peripherals of the PICmicro MCU families. It is particularly suitable for optimizing algorithms where real-time emulation is not required.

See *Programmiers Cross Reference and Ordering Information*, page 32, for specific device support.

The PICSTART Plus Development Kit includes:

1. PICSTART Plus Device Programmer
2. RS-232 Interface Cable
3. Complete Documentation including Microchip's Technical Library CD-ROM
4. MPLAB IDE Software
5. Power Supply
6. Product Sample

Ordering Part Number:

DV003001 PICSTART Plus

Adapter Kits for PICSTART Plus sold separately:

AC164024 68-pin PLCC Adapter Kit
for PIC16C92X and
PIC17C75X

AC164027 84-pin PLCC Adapter Kit for
PIC17C76X

Microchip Development Systems Ordering Guide



PRO MATE II Device Programmer

Microchip's PRO MATE II makes it easy to program the company's entire line of PICmicro MCUs, HCSXXX Security Products, and Serial EEPROMs operating either as a stand-alone unit or in conjunction with a PC-compatible host system. When connected to a host system, PRO MATE II provides an exceptionally user-friendly interface to give the developer complete control over the programming session.

The PRO MATE II software provides many user interface features. These include a "safe mode," where accidental corruption of master code is prevented, and the ability to save and restore "environment" settings. The PRO MATE II system runs with Microchip's popular MPLAB IDE software.

Socket Modules are sold separately. See *Programmers Cross Reference and Ordering Information*, page 32, for socket module ordering information.

The PRO MATE II Device Programmer includes:

1. PRO MATE II Universal Device Programmer Unit
2. RS-232 Interface Cable
3. Complete Documentation including Microchip's Technical Library CD-ROM-
4. PRO MATE and MPLAB IDE Software
5. Power Supply

Ordering Part Number:

DV007003

PROMATE II

See *Programmers Cross Reference and Ordering Information*, page 32 for more information.



In-Circuit Serial Programming™ (ICSP™) Socket for PRO MATE II

The In-Circuit Serial Programming (ICSP) Socket module is a complete kit including connectors, cables, and required interface boards to allow a development engineer to implement ICSP with PRO MATE II.

PRO MATE II is sold separately. See *Programmers Cross Reference and Ordering Information*, page 32 for ordering information.

The ICSP Socket for PRO MATE II includes:

1. ICSP socket
2. Power supply
3. Cable
4. Complete Documentation

Ordering Part Number:

AC004004

ICSP Socket Module

See *Programmers Cross Reference and Ordering Information*, page 32 for ordering information.

Microchip Development Systems Ordering Guide

PICSTART Plus Adapter Kits and Accessories

Ordering #	Model Name	Description
AC164024	68-Pin PLCC Adapter Kit	PIC16C92X/PIC17C75X 68-Pin PLCC Adapter for PICSTART Plus. Currently this header supports PIC16C92X and PIC17C75X.
AC164027	84-Pin PLCC Adapter Kit	PIC17C6X 84-Pin PLCC Adapter for PICSTART Plus.



MICROCHIP

FIRST EDITION
2000

IN-CIRCUIT DEBUGGER

Microchip Development Systems Ordering Guide

MPLAB In-Circuit Debugger (ICD)

Microchip's In-Circuit Debugger, MPLAB-ICD, is a powerful, low-cost development and evaluation kit for the FLASH PIC16F87X MCU family. MPLAB-ICD utilizes the in-circuit debugging capability of the PIC16F87X. This feature, along with Microchip's ICSP protocol, offers cost-effective in-circuit FLASH programming and debugging from the graphical user interface of the MPLAB IDE. A designer can develop and debug source code by watching variables, setting breakpoints, and single-stepping. Running at full speed enables testing hardware in real-time.

The modular design of MPLAB-ICD consists of three basic components: ICD module, ICD header, and ICD demo board. The ICD module connects to a serial (COM) port of a PC. When instructed by the MPLAB IDE, the ICD module programs and issues debug commands to the target PIC16F87X using ICSP protocol. A 9-inch, 6-pin conductor cable connects the ICD module to the ICD header. The header contains a target PIC16F877, a modular jack, and 28-pin and 40-pin male DIP headers. The 28-pin and 40-pin DIP headers can be plugged into a target circuit board or into the ICD demo board. A modular jack can be designed into at a target circuit board to support direct connection to the ICD module or, alternatively, a DIP socket on a target application can support direct connection to the ICD header. If a target application is not available, immediate prototype development using the MPLAB-ICD is feasible with the included ICD demo board. This board offers LEDs, DIP switches, an analog potentiometer, and prototyping area.

The complete MPLAB-ICD hardware development system along with the free MPLAB software provides a powerful, affordable run-time development tool.

Model Name/Part Number	MPLAB-ICD(*)
PIC16F870	DV164001
PIC16F871	DV164001
PIC16F872	DV164001
PIC16F873	DV164001
PIC16F874	DV164001
PIC16F876	DV164001
PIC16F877	DV164001

* Contact Microchip Technology's web site at www.microchip.com for information on how to use the MPLAB ICD (DV164001) with PIC16C62/63/64/65/66/67/72/73/74/76/77.



MPLAB In-Circuit Debugger (ICD)

The low-cost PC-based MPLAB-ICD comes with the ICD module; ICD header; ICD demo board; RS-232 cable; 40-pin DIP and 28-pin SDIP connection sockets; one 9-inch, 6-pin conductor modular cable; MPLAB IDE software; and complete documentation. MPLAB-ICD requires the user to provide a power supply for operation. (A PICSTART Plus or equivalent 9V, 0.75A power supply is required.)

The ICD module connects to the serial port of the host PC via the RS-232 cable. The 9-inch modular cable connects the ICD module to the ICD header. The ICD header plugs into the connection socket located on the demo board or a target application. A user provided power supply from the demo board or target application powers the MPLAB-ICD module.

The MPLAB-ICD Debugger Kit includes:

1. ICD Module
2. ICD Header
3. ICD Demo Board
4. RS-232 Cable
5. 6-pin Conductor Cable
6. PIC16F877 sample
7. Complete Documentation including Microchip's Technical Library CD-ROM, MPLAB-ICD and MPLAB IDE software

Microchip Development Systems Ordering Guide

NOTES:



MICROCHIP

FIRST EDITION
2000

**DEMO BOARDS AND
EVALUATION KITS**

Microchip Development Systems Ordering Guide

PICmicro MCU Demo Boards and Evaluation Kits Cross Reference and Ordering Information

Model Name/Part Number	PICDEM-1	PICDEM-2	PICDEM-3	PICDEM-14A	PICDEM-17
PIC12C508	DM163001	—	—	—	—
PIC12C508A	DM163001	—	—	—	—
PIC12C509	DM163001	—	—	—	—
PIC12C509A	DM163001	—	—	—	—
PIC12CE518	—	—	—	—	—
PIC12CE519	—	—	—	—	—
PIC12C671	—	—	—	—	—
PIC12C672	—	—	—	—	—
PIC12CE673	—	—	—	—	—
PIC12CE674	—	—	—	—	—
PIC14000	—	—	—	—	—

Demo Boards and Evaluation Kits

PICmicro MCU Demo Boards and Evaluation Kits Cross Reference and Ordering Information (Continued)

Model Name/Part Number	PICDEM-1	PICDEM-2	PICDEM-3	PICDEM-14A	PICDEM-17
PIC16C715	DM163001	—	—	—	—
PIC16C716	—	—	—	—	—
PIC16C717	—	—	—	—	—
PIC16C72	—	DM163002	—	—	—
PIC16C72A	—	DM163002	—	—	—
PIC16C73A	—	DM163002	—	—	—
PIC16C73B	—	DM163002	—	—	—
PIC16C74A	—	DM163002	—	—	—
PIC16C74B	—	DM163002	—	—	—
PIC16C76	—	DM163002	—	—	—
PIC16C77	—	DM163002	—	—	—
PIC16C770	DM163001	—	—	—	—
PIC16C771	DM163001	—	—	—	—
PIC16C773	—	—	—	—	—
PIC16C774	—	DM163002	—	—	—
PIC16F83	DM163001	—	—	—	—
PIC16F84	DM163001	—	—	—	—
PIC16F84A	DM163001	—	—	—	—
PIC16F873	—	DM163002	—	—	—
PIC16F874	—	DM163002	—	—	—
PIC16F876	—	DM163002	—	—	—
PIC16F877	—	DM163002	—	—	—
PIC16C923	—	—	DM163003	—	—
PIC16C924	—	—	DM163003	—	—
PIC17C42A	DM163001	—	—	—	—
PIC17C43	DM163001	—	—	—	—
PIC17C44	DM163001	—	—	—	—
PIC17C752	—	—	—	—	DM173001
PIC17C756	—	—	—	—	DM173001
PIC17C756A	—	—	—	—	DM173001
PIC17C762	—	—	—	—	DM173001
PIC17C766	—	—	—	—	DM173001
PIC18C242	—	DM163002	—	—	—
PIC18C252	—	DM163002	—	—	—
PIC18C442	—	DM163002	—	—	—
PIC18C452	—	DM163002	—	—	—

■ Shaded area indicates not applicable.

Microchip Development Systems Ordering Guide

KEELOQ, microID™, and Serial EEPROM Evaluation Kits

Model Name/ Part No.	KEELOQ® Evaluation Kit	KEELOQ Transponder Evaluation Kit	Serial EEPROM Design Kit	MCP2510 CAN Development Kit	microID Programmer Kit	125 kHz microID Developer's Kit	125 kHz Anticollision microID Developer's Kit	13.56 MHz Anticollision microID Developer's Kit
24CXX/ 24LCXX	—	—	DV243001	—	—	—	—	—
93CXX/ 93LCXX	—	—	DV243001	—	—	—	—	—
HCS200	DM303002	—	—	—	—	—	—	—
HCS201	DM303002	—	—	—	—	—	—	—
HCS300	DM303002	—	—	—	—	—	—	—
HCS301	DM303002	—	—	—	—	—	—	—
HCS320	DM303002	—	—	—	—	—	—	—
HCS360	DM303002	—	—	—	—	—	—	—
HCS361	DM303002	—	—	—	—	—	—	—
HCS410	—	DM303005	—	—	—	—	—	—
HCS412	—	DM303005	—	—	—	—	—	—
HCS500	DM303002	—	—	—	—	—	—	—
HCS512	DM303002	—	—	—	—	—	—	—
HCS515	DM303002	—	—	—	—	—	—	—
MCRF200	—	—	—	—	PG103001	DV103001	—	—
MCRF250	—	—	—	—	PG103001	—	DV103002	—
MCRF355	—	—	—	—	—	—	—	DV103003
MCP2510	—	—	—	DV251001	—	—	—	—

■ Shaded area indicates not applicable.

Demo Boards and Evaluation Kits Descriptions and Features

PICDEM Demonstration Boards

PICDEM-1, PICDEM-2, PICDEM-3, PICDEM-14A, and PICDEM-17 are simple boards which demonstrate the capabilities of Microchip PICmicro MCU families. See *PICmicro MCU Demo Boards and Evaluation Kits Cross Reference and Ordering Information*, page 46, for specific device support for each board.

All necessary hardware is included to run basic demonstration programs, which are supplied on a 3.5-inch disk. The users can program the samples provided with the PICDEM on a PRO MATE II or PICSTART Plus programmer and easily debug/test the sample code, or the user can connect the PICDEM to the MPLAB-ICE and download the sample code to the emulator and debug/test the code. Additionally, a generous prototype area is available for user hardware.

KEELOQ Evaluation Kit

The KEELOQ Evaluation Kit demonstrates the capabilities of Microchip's code hopping technology. The HCSXXX Code Hopping Encoder devices are designed to be the transmitter portion. The HCSXXX Decoder devices are used in the receiver portion of secure authentication and Remote Keyless Entry (RKE) systems. The devices use the KEELOQ code hopping algorithm which combines high security, a small package outline, and a very low cost to make this an ideal solution for unidirectional RKE systems.

Primary applications for the KEELOQ devices include automobile keyless entry and security systems, garage door openers, accessory clone protection, home security systems, central locking systems, gate openers, vehicle immobilizers, identity tokens, and a growing list of other applications.

The KEELOQ Evaluation Kit includes all the necessary hardware to evaluate a code hopping system, as well as a basic demonstration software program, which is supplied on a PC-compatible 3.5-inch diskette.

KEELOQ Transponder Evaluation Kit

The KEELOQ Transponder Evaluation Kit allows the user to fully evaluate KEELOQ Code Hopping Transmitter/Transponders. The transponder uses the KEELOQ code hopping technology which combines high security transmitter and transponder operation in a small, low-cost package.

Primary applications for the KEELOQ devices include automobile keyless entry, security systems, garage door openers, accessory clone protection, home security systems, central locking systems, gate openers, vehicle immobilizers, identity tokens, electronic tagging, passive (batteryless) transponders, and a growing list of other applications.

The KEELOQ Transponder Evaluation Kit is supplied with software to let the user easily reprogram or modify the transponder's settings. The hardware includes a base station which functions as a transponder programmer/code hopping decoder, and transponder reader unit.

Serial EEPROM Designer's Kit

Microchip's Serial EEPROM Designer's Kit includes everything necessary to quickly develop a robust and reliable Serial EEPROM-based design and greatly reduce the time required for system integration and hardware/software debugging.

The Serial EEPROM Designer's Kit includes Microchip's Total Endurance Software Model as well as the SEEVAL[®] evaluation and programming board.

Microchip Development Systems Ordering Guide

microID Development Kits

The microID family of RFID tags is available in a variety of configurations. The 125 kHz MCRF200 can be configured to match existing tags and directly installed – upgrading to contactless programmability at no added cost.

The MCRF250 and MCRF355 enable new and advanced RFID tag applications. These devices feature anticollision capability (simultaneous reading) for more than 10 tags (125 kHz) and more than 40 tags (13.56 MHz) in the same reader field. The MCRF250 and MCRF355 are low-cost solutions for emerging RFID tag applications like airline baggage, parcel shipments, laundry, industrial and automotive assembly tracking, library books, and retail tagging.

MCP2510 CAN Development Kit

The MCP2510 CAN Developer's Kit provides the ability to read, display and modify all registers of the MCP2510 on a bit-by-bit or a byte-by-byte basis. Implementation of the MCP2510 into a user's application is made easy by offering a variety of features to configure and control the functionality of the MCP2510. Included on the target board are PICmicro MCU sockets, a header to access the required MCP2510 pins, and prototype area for the user to quickly build and test his own CAN node. Also included are on-board transceivers that have jumper-configurable options to allow different bus setups. In addition, this tool provides the user with an expansion connector for connecting to an external CAN network. By using the expansion connector in this manner, the PC interface can be used as a simple bus monitor for CAN message traffic.

For CAN beginners, the MCP2510 CAN Developer's Kit can be used as a low-cost method of demonstrating basic input and output functionality by transmitting and receiving CAN messages. Transmitted messages are set up via an easy-to-use Windows interface. LEDs connected to the MCP2510 transmit and receive pins toggle to show message traffic. Both analog and digital signals can be generated on the target board. These signals are then received by the host PC and displayed in a de-stuffed format for easy identification of message contents. In this manner, basic CAN communication can be demonstrated and understood.

Analog Evaluation Tool

The Analog Evaluation Tool from Microchip Technology is a versatile and easy-to-use system for evaluation and development work with the MCP line of analog products. The system consists of two parts: the DVMCPA Driver Board, which provides data acquisition, analysis and display; and a Daughter Board, which contains the device to be evaluated. Device-specific software is included.

In addition to the ability of the Driver Board to work with device-specific Daughter Boards, users can create their own Daughter Boards based on their own design requirements. Also, there is a prototype area on the Driver Board for user-designed circuits that could be used in place of the Daughter Boards.

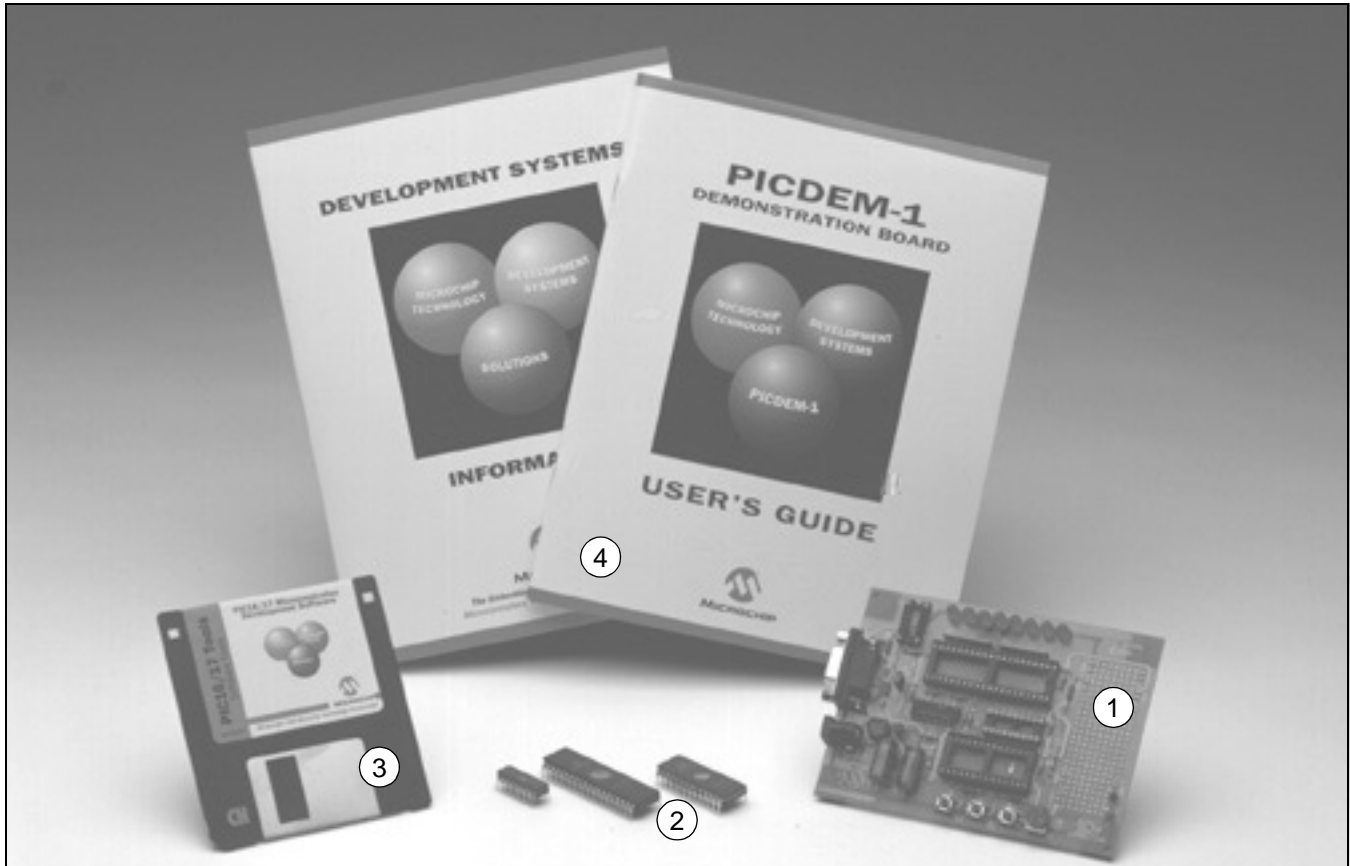
The Daughter Boards include the device under evaluation and associated interface circuitry. The Daughter Board can be used as a stand-alone board by adding additional circuitry either on the provided prototype area or on another board.

The software is contained on the included CD-ROM and runs on any PC-compatible machine running under Microsoft Windows 95/98.

Daughter Boards are currently available for the following products:

- MCP3001/02
- MCP3004/08
- MCP3201/02
- MCP3204/08

Demo Boards and Evaluation Kits



PICDEM Demonstration Boards

The PICDEM Demonstration boards, PICDEM-1, PICDEM-2, PICDEM-3, PICDEM-14A, and PICDEM-17 include all the necessary hardware and software to run basic demo programs.

See *PICmicro MCU Demo Boards and Evaluation Kits Cross Reference and Ordering Information*, page 46, for specific device support and ordering information.

Each PICDEM Kit includes:

1. PICDEM Demonstration Board (1, 2, 3, 14A, or 17 as applicable)
2. Product Samples
3. Demo/Tutorial Software (PICDEM-3 is written in C using the MPLAB-C/demonstration version)
4. Complete Documentation

Ordering Part Number:

DM163001	PICDEM-1
DM163002	PICDEM-2
DM163003	PICDEM-3
DM143001	PICDEM-14A
DM173001	PICDEM-17

Microchip Development Systems Ordering Guide



KEELOQ Evaluation Kit

The KEELOQ Evaluation Kit includes all the necessary hardware to evaluate a code hopping system, as well as a basic demonstration software program, which is supplied on a PC-compatible 3.5-inch diskette.

The KEELOQ Evaluation Kit hardware includes an HCS512 and PIC16C56/93C46 EEPROM-based decoder and RF Receiver module. It also features an on-board +5V regulator and filtered rectifier for direct input from 9V AC/DC wall adapter. The multiple radio frequency transmitters use HCS300 Hopping Code Encoders.

An RS-232 socket and associated hardware for direct connection to RS-232 interface are also included.

The KEELOQ Evaluation Kit includes:

1. RF Receiver/Decoder Board
2. RS-232 Interface Cable
3. Interconnection Cable
4. HCSXXX Product Samples
5. HCSXXX Programmer
6. RF Transmitters
7. PC Software (Windows-based)
8. Complete Documentation
9. Power Supply
10. KEELOQ License Disk

Ordering Part Number:

DM303002

KEELOQ Evaluation Kit

Demo Boards and Evaluation Kits



KEELOQ Transponder Evaluation Kit

The KEELOQ Transponder Evaluation Kit hardware consists of a base station, a transmitter/transponder, a batteryless transponder, and various transponder samples. The base station doubles as a programmer and decoder. The base station includes a coil used for generating a magnetic field used to communicate with a transponder inductively. The base station has an RF receiver for receiving KEELOQ code hopping transmissions.

The accompanying Windows software is supplied on a 3.5-inch diskette and includes all the necessary software for programming and testing the transponder in all its modes.

The KEELOQ Transponder Evaluation Kit includes:

1. RF Receiver/Decoder Board
2. RS-232 Interface Cable
3. Power Supply
4. Complete Documentation
5. HCSXXX Product Samples
6. HCS410 Transmitter/Transponder
7. Interconnection Cable
8. HCS412 Passive Entry Transmitter/Transponder (2)
9. HCS410 Batteryless Transponder
10. KEELOQ License Disk (not shown)

Ordering Part Number:

DM303005 KEELOQ Transponder
Evaluation Kit

Microchip Development Systems Ordering Guide



Serial EEPROM Designer's Kit

Microchip's Serial EEPROM evaluation and programming system (SEEVAL) will accept any Microchip Serial EEPROM in DIP package and enable the designer or system integrator to read, write, or erase any byte or the entire array. SEEVAL also provides the following advanced features to aid in system integration and debug.

The Serial EEPROM Designer's Kit includes:

1. Total Endurance Software Model
 2. SEEVAL Evaluation and Programming System
 3. SEEVAL Software
 4. Serial EEPROM Sample Pack
 5. RS-232 Interface Cable
 6. Documentation including Microchip's Technical Library CD-ROM
- Power Supply (not shown)
- 7.

Ordering Part Number:

DV243001

Serial EEPROM Designer Kit

Demo Boards and Evaluation Kits



MCP2510 CAN Developer's Kit

The MCP2510 CAN Developer's Kit is a multifunction tool that speeds implementation of the MCP2510 stand-alone CAN controller by offering functions for controlling its feature-set.

In addition, this tool can be used to demonstrate basic CAN input/output functionality and monitor bus activity on the user's CAN bus. It is ideal for new CAN user's that want to understand how CAN may be used for network communication.

The MCP2510 CAN Developer's Kit includes:

1. MCP2510 Target Board
2. Power Supply
3. PC Parallel Port Interface Cable
4. Complete Documentation including Microchip's Technical Library CD-ROM and *MCP2510 CAN Developer's Kit User's Guide*
5. User Interface Software (runs under Windows 95/98)

Ordering Part Number:

DV251001 MCP2510 CAN Development Kit

Microchip Development Systems Ordering Guide



microID Programmer Kit

The microID Programmer Kit is used to contactlessly program MCRF200 or MCRF250 microID devices. The programmer is calibrated for ISO-card tags but can be adjusted to be used for virtually any 125 kHz microID tag configuration, including button tags and keyfobs.

The microID Programmer's Kit includes:

1. RF-LAB 125 Software Interface (runs under Windows 95/98)
2. Contactless Programmer
3. Power Supply (110/220V)
4. RS-232 Serial Cable
5. Documentation including Microchip's Technical Library CD-ROM and a complete *125 kHz System Design Guide* (application notes, designs, and tutorials)

Ordering Part Number:

PG103001

microID Programmer's Kit

Demo Boards and Evaluation Kits



125 kHz microID Developer's Kit

The 125 kHz microID Developer's Kit is an easy-to-use tool for design engineers at all skill levels. This kit includes all the hardware, software, reference designs, and samples required to get started in RFID designs.

The developer's kit also includes a contactless programmer and readers for three different configurations of MCRF200: 123h (ASK), 08Dh (PSK), and 00Ah (FSK).

The programmer is used to contactlessly program MCRF200 or MCRF250 microID devices. The programmer is calibrated for ISO-card tags but can be adjusted to be used for virtually any 125 kHz microID tag configuration, including button tags and keyfobs.

The 125 kHz microID Developer's Kit includes:

1. PSK Reader
2. FSK Reader
3. ASK Reader
4. Contactless Programmer
5. Two Power Supplies
6. Two RS-232 Cables
7. RF-LAB 125 Software Interface (runs under Windows 95/98)
8. Samples in Card-Tag Form (123h, 08Dh, 00Ah)
9. Samples in DIP Form (123h, 08Dh, 00Ah)
10. Documentation including Microchip's Technical Library CD-ROM and a complete *13.56 MHz System Design Guide* (application notes, reference designs, and tutorials)

Ordering Part Number:

DV103001 125 kHz microID Developer's Kit

Microchip Development Systems Ordering Guide



125 kHz Anticollision microID Developer's Kit

The 125 kHz Anticollision microID Developer's Kit is an easy-to-use tool for design engineers at all skill levels. This kit includes all the hardware, software, reference designs, and samples required to get started in 125 kHz anticollision (multiread) RFID designs.

The developer's kit also includes a contactless programmer and anticollision reader for FSK configuration of MCRF250 (40Ah).

The Programmer is used to contactlessly program MCRF200 or MCRF250 microID devices. The programmer is calibrated for ISO-card tags but can be adjusted to be used for virtually any 125 kHz microID tag configuration, including button tags and keyfobs.

The 125 kHz Anticollision microID Developer's Kit includes:

1. FSK Anticollision Reader
2. Contactless Programmer
3. Power Supply
4. RS-232 Cables
5. RF-LAB 125 Software Interface (runs under Windows 95/98)
6. Samples in Card and DIP Form
7. Documentation including Microchip's Technical Library CD-ROM and a complete *125 kHz System Design Guide* (application notes, designs, and tutorials)

Ordering Part Number:

DV103002 125 kHz Anticollision microID
Developer's Kit

Demo Boards and Evaluation Kits



13.56 MHz Anticollision microID Developer's Kit

The 13.56 MHz microID Developer's Kit is an easy-to-use tool for design engineers at all skill levels. This kit includes all the hardware, software, reference designs, and samples required to get started in 13.56 MHz RFID designs.

This kit is intended to show basic operation of the high-performance MCRF355 tagging chip.

The 13.56 MHz Anticollision microID Developer's Kit includes:

1. 13.56 MHz Anticollision Reader
2. Contact Programmer
3. Two Power Supplies
4. Two RS-232 Cables
5. RF-LAB 13.56 Software Interface (runs under Windows 95/98)
6. Socketed Tags
7. Flexible, Preprogrammed Performa™ tags by Checkpoint Systems Inc.
8. Samples in DIP Form
9. Documentation including Microchip's Technical Library CD-ROM and a complete *13.56 MHz System Design Guide*

Ordering Part Number:

DV103003 13.56 MHz Anticollision microID
Developer's Kit

Microchip Development Systems Ordering Guide



MXDEV™ 1 Analog Evaluation System Driver Board

The MXDEV 1 Analog Evaluation System Driver Board contains three different PICmicro microcontroller sockets (PIC16C63, PIC16C54 and PIC12C5XX) so that users can choose the PICmicro MCU most suited to their application. It also includes an LCD display, an LED display socket, SRAM for data storage, and an RS-232 interface. The LCD display can display information such as configuration data and acquisition data from the daughter board.

The Daughter Board kits contains the device to be evaluated. The Daughter boards are supplied with a PIC16C63 that contains the device-specific code and plugs into one of the sockets on the DVMCPA. Code is also provided that shows how to interface the PIC16C54 and the PIC12C509 with the ADC.

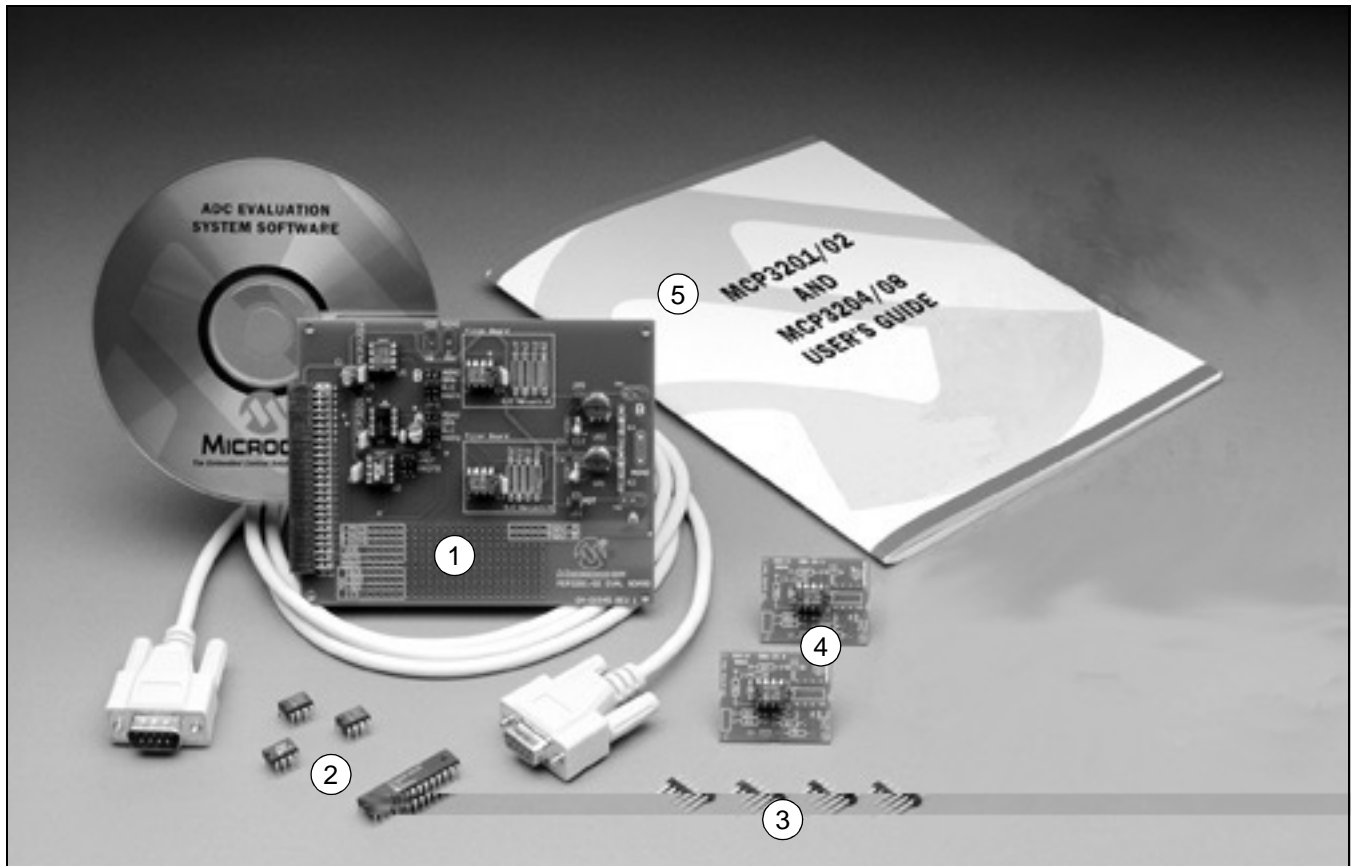
The MXDEV 1 Analog Evaluation System Driver Board kit includes:

1. Driver Board
2. Two Power Supplies
3. RS-232 Cable
4. Documentation included MXLAB ADC Software and *Analog Driver Board User's Guide*

Ordering Part Number:

DVMCPA MXDEV 1 Analog Evaluation
System Driver Board

Demo Boards and Evaluation Kits



MXDEV 1 MCP3201/02 Evaluation System Daughter Board Kit

The MXDEV 1 MCP3201/3202 Evaluation System Daughter Board Kit includes jumper-selectable options for maximum flexibility. Choices include:

- Selection of the signal source between the onboard potentiometer and an external source
- Selection of the ADC reference voltage between the onboard VREF and an external source
- Selection between single-ended and pseudo-differential inputs (depending on the device being evaluated).

There is a prototype area on the board for additional circuitry as needed.

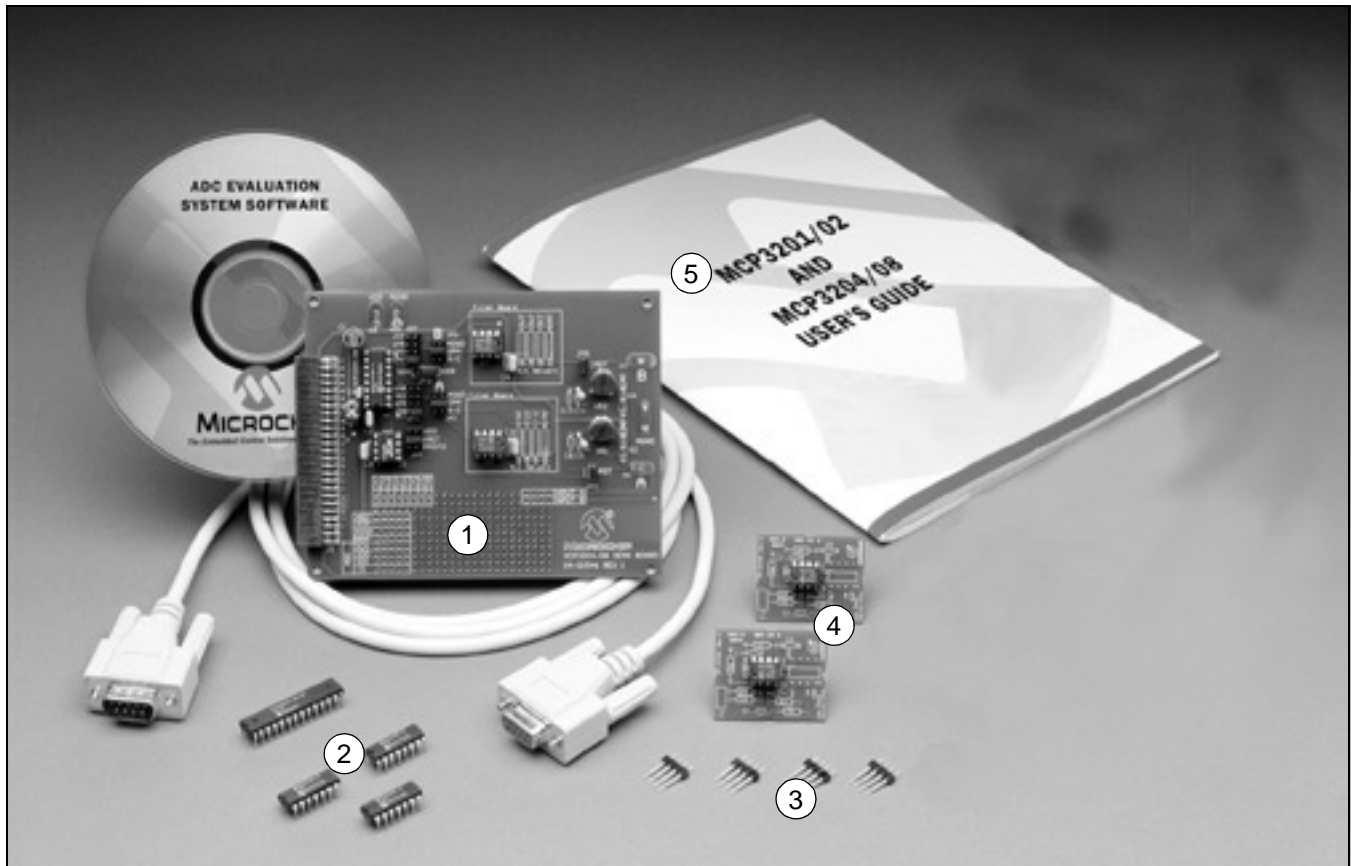
The MCP3201/3202 Daughter Board kit includes:

1. MXDEV 1 MCP3102/02 Daughter Board
2. MCP3201/02 Samples and preprogrammed PIC16C63 for use in the Driver Board
3. Adapter Plugs
4. Filter Boards
5. Documentation included MXLAB ADC Software and *MCP3201/02 and MCP3204/08 Daughter Board User's Guide*

Ordering Part Number:

DV3201A MXDEV 1 MCP3201/02 Evaluation
System Daughter Board

Microchip Development Systems Ordering Guide



MXDEV 1 MCP3204/08 Evaluation System Daughter Board Kit

The MXDEV 1 MCP3204/3208 Evaluation System Daughter Board Kit includes jumper-selectable options for maximum flexibility. Choices include:

- Selection of the signal source between the onboard potentiometer and an external source
- Selection of the ADC reference voltage between the onboard VREF and an external source
- Selection between single-ended and pseudo-differential inputs (depending on the device being evaluated).

There is a prototype area on the board for additional circuitry as needed.

The MCP3204/08 Evaluation System includes:

1. MCP3204/08 Daughter Board
2. MCP3204/08 Samples and preprogrammed PIC16C63 for use in the Driver Board
3. Adapter Plugs
4. Filter Boards
5. Documentation included MXLAB ADC Software and *MCP3201/02 and MCP3204/08 Daughter Board User's Guide*

Ordering Part Number:

DV3204A MXDEV 1 MCP3204/08 Evaluation
System Daughter Board

Demo Boards and Evaluation Kits

NOTES:

Microchip Development Systems Ordering Guide

NOTES:

Demo Boards and Evaluation Kits

NOTES:



WORLDWIDE SALES AND SERVICE

AMERICAS

Corporate Office

Microchip Technology Inc.
2355 West Chandler Blvd.
Chandler, AZ 85224-6199
Tel: 480-786-7200 Fax: 480-786-7277
Technical Support: 480-786-7627
Web Address: <http://www.microchip.com>

Atlanta

Microchip Technology Inc.
500 Sugar Mill Road, Suite 200B
Atlanta, GA 30350
Tel: 770-640-0034 Fax: 770-640-0307

Boston

Microchip Technology Inc.
5 Mount Royal Avenue
Marlborough, MA 01752
Tel: 508-480-9990 Fax: 508-480-8575

Chicago

Microchip Technology Inc.
333 Pierce Road, Suite 180
Itasca, IL 60143
Tel: 630-285-0071 Fax: 630-285-0075

Dallas

Microchip Technology Inc.
4570 Westgrove Drive, Suite 160
Addison, TX 75248
Tel: 972-818-7423 Fax: 972-818-2924

Dayton

Microchip Technology Inc.
Two Prestige Place, Suite 150
Miamisburg, OH 45342
Tel: 937-291-1654 Fax: 937-291-9175

Detroit

Microchip Technology Inc.
Tri-Atria Office Building
32255 Northwestern Highway, Suite 190
Farmington Hills, MI 48334
Tel: 248-538-2250 Fax: 248-538-2260

Los Angeles

Microchip Technology Inc.
18201 Von Karman, Suite 1090
Irvine, CA 92612
Tel: 949-263-1888 Fax: 949-263-1338

New York

Microchip Technology Inc.
150 Motor Parkway, Suite 202
Hauppauge, NY 11788
Tel: 631-273-5305 Fax: 631-273-5335

San Jose

Microchip Technology Inc.
2107 North First Street, Suite 590
San Jose, CA 95131
Tel: 408-436-7950 Fax: 408-436-7955

AMERICAS (continued)

Toronto

Microchip Technology Inc.
5925 Airport Road, Suite 200
Mississauga, Ontario L4V 1W1, Canada
Tel: 905-405-6279 Fax: 905-405-6253

ASIA/PACIFIC

China - Beijing

Microchip Technology, Beijing
Unit 915, 6 Chaoyangmen Bei Dajie
Dong Erhuan Road, Dongcheng District
New China Hong Kong Manhattan Building
Beijing, 100027, P.R.C.
Tel: 86-10-85282100 Fax: 86-10-85282104

China - Shanghai

Microchip Technology
Unit B701, Far East International Plaza,
No. 317, Xianxia Road
Shanghai, 200051, P.R.C.
Tel: 86-21-6275-5700 Fax: 86-21-6275-5060

Hong Kong

Microchip Asia Pacific
Unit 2101, Tower 2
Metroplaza
223 Hing Fong Road
Kwai Fong, N.T., Hong Kong
Tel: 852-2-401-1200 Fax: 852-2-401-3431

India

Microchip Technology Inc.
India Liaison Office
No. 6, Legacy, Convent Road
Bangalore, 560 025, India
Tel: 91-80-229-0061 Fax: 91-80-229-0062

Japan

Microchip Technology Intl. Inc.
Benex S-1 6F
3-18-20, Shinyokohama
Kohoku-Ku, Yokohama-shi
Kanagawa, 222-0033, Japan
Tel: 81-45-471-6166 Fax: 81-45-471-6122

Korea

Microchip Technology Korea
168-1, Youngbo Bldg. 3 Floor
Samsung-Dong, Kangnam-Ku
Seoul, Korea
Tel: 82-2-554-7200 Fax: 82-2-558-5934

ASIA/PACIFIC (continued)

Singapore

Microchip Technology Singapore Pte Ltd.
200 Middle Road
#07-02 Prime Centre
Singapore, 188980
Tel: 65-334-8870 Fax: 65-334-8850

Taiwan

Microchip Technology Taiwan
10F-1C 207
Tung Hua North Road
Taipei, Taiwan
Tel: 886-2-2717-7175 Fax: 886-2-2545-0139

EUROPE

Denmark

Microchip Technology Denmark ApS
Regus Business Centre
Lautrup hofj 1-3
Ballerup DK-2750 Denmark
Tel: 45 4420 9895 Fax: 45 4420 9910

France

Arizona Microchip Technology SARL
Parc d'Activite du Moulin de Massy
43 Rue du Saule Trapu
Batiment A - 1er Etage
91300 Massy, France
Tel: 33-1-69-53-63-20 Fax: 33-1-69-30-90-79

Germany

Arizona Microchip Technology GmbH
Gustav-Heinemann-Ring 125
D-81739 München, Germany
Tel: 49-89-627-144 0 Fax: 49-89-627-144-44

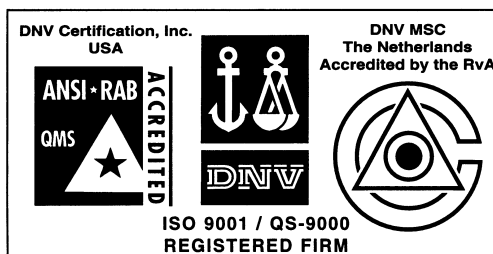
Italy

Arizona Microchip Technology SRL
Centro Direzionale Colleoni
Palazzo Taurus 1 V. Le Colleoni 1
20041 Agrate Brianza
Milan, Italy
Tel: 39-039-65791-1 Fax: 39-039-6899883

United Kingdom

Arizona Microchip Technology Ltd.
505 Eskdale Road
Winnersh Triangle
Wokingham
Berkshire, England RG41 5TU
Tel: 44 118 921 5858 Fax: 44-118 921-5835

03/23/00



Microchip received QS-9000 quality system certification for its worldwide headquarters, design and wafer fabrication facilities in Chandler and Tempe, Arizona in July 1999. The Company's quality system processes and procedures are QS-9000 compliant for its PICmicro® 8-bit MCUs, KEELoc® code hopping devices, Serial EEPROMs and microperipheral products. In addition, Microchip's quality system for the design and manufacture of development systems is ISO 9001 certified.

All rights reserved. © 2000 Microchip Technology Incorporated. Printed in the USA. 5/00 Printed on recycled paper.

Information contained in this publication regarding device applications and the like is intended through suggestion only and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications. No representation or warranty is given and no liability is assumed by Microchip Technology Incorporated with respect to the accuracy or use of such information, or infringement of patents or other intellectual property rights arising from such use or otherwise. Use of Microchip's products as critical components in life support systems is not authorized except with express written approval by Microchip. No licenses are conveyed, implicitly or otherwise, except as maybe explicitly expressed herein, under any intellectual property rights. The Microchip logo and name are registered trademarks of Microchip Technology Inc. in the U.S.A. and other countries. All rights reserved. All other trademarks mentioned herein are the property of their respective companies.