



PROGRAMMING AND CUSTOMIZING THE 8051 MICROCONTROLLER



Includes 12
complete projects

Tips and
Techniques
for interfacing
the 8051 to a
wide range
external devices

CD contains all
software tools
necessary for
creating custom
applications

MYKE PREDKO

Library of Congress Cataloging-in-Publication Data

Predko, Myke.

Programming & customizing the 8051 microcontroller / Myke Predko.

p. cm.

Includes index.

ISBN 0-07-134195-1—ISBN 0-07-134192-7 (soft)

1. Intel 8051 (Computer) 2. Digital control systems. I. Title.

II. Title: Programming and customizing the 8051 microcontroller.

TJ223.M53P74 1999

629.8'95—dc21

98-48076

CIP

McGraw-Hill



A Division of The McGraw-Hill Companies

Copyright © 1999 by The McGraw-Hill Companies, Inc. All rights reserved. Printed in the United States of America. Except as permitted under the United States Copyright Act of 1976, no part of this publication may be reproduced or distributed in any form or by any means, or stored in a data base or retrieval system, without the prior written permission of the publisher.

5 6 7 8 9 0 DOC/DOC 0 3

P/N 134196-X (HC)

P/N 134193-5 (PBK)

PART OF ISBN 0-07-134195-1

PART OF ISBN 0-07-134192-7

The sponsoring editor for this book was Scott Grillo, the editing supervisor was John Baker, and the production supervisor was Pamela Pelton. It was set in Times New Roman by Lisa M. Mellott through the services of Barry E. Brown (Broker—Editing, Design and Production).

Printed and bound by R. R. Donnelley & Sons Company.

McGraw-Hill books are available at special quantity discounts to use as premiums and sales promotions, or for use in corporate training programs. For more information, please write to the Director of Special Sales, McGraw-Hill, Professional Publishing, Two Penn Plaza, New York, NY 10121-2298. Or contact your local bookstore.



This book is printed on recycled, acid-free paper containing a minimum of 50% recycled, de-inked fiber.

Information contained in this work has been obtained by The McGraw-Hill Companies, Inc. ("McGraw-Hill") from sources believed to be reliable. However, neither McGraw-Hill nor its authors guarantees the accuracy or completeness of any information published herein and neither McGraw-Hill nor its authors shall be responsible for any errors, omissions, or damages arising out of use of this information. This work is published with the understanding that McGraw-Hill and its authors are supplying information but are not attempting to render engineering or other professional services. If such services are required, the assistance of an appropriate professional should be sought.

INTRODUCTION

In my day job, working for Test Engineering at Celestica, I am amazed at the reluctance of many new engineers to design applications (both products and test interfaces) with an embedded microcontroller. This is disappointing for me because I think that the projects could be developed significantly faster and much more easily using a microcontroller.

The purpose of this book is to introduce the engineer or technician to the Intel developed 8051 embedded microcontroller and provide enough information and tools (with the CD-ROM that comes with this book) for someone who has never worked with the 8051 before to develop and debug their own applications. Along with the information, I have provided a number of experiments and example applications to show how the 8051 can be interfaced to a number of different common electronic devices.

An embedded microcontroller (as I define it) is a chip which has a computer processor with all it's support functions (clocking and reset), memory (both Program Storage and RAM), and I/O (including bus interfaces) built into the device. These built in functions minimize the need for external circuits and devices to be designed in the final application. See Fig. I-1.

Often, interface and control circuits are attempted with discrete logic or PLDs because of the assumptions that microcontrollers:

- are more expensive than discrete logic
- require a long learning curve

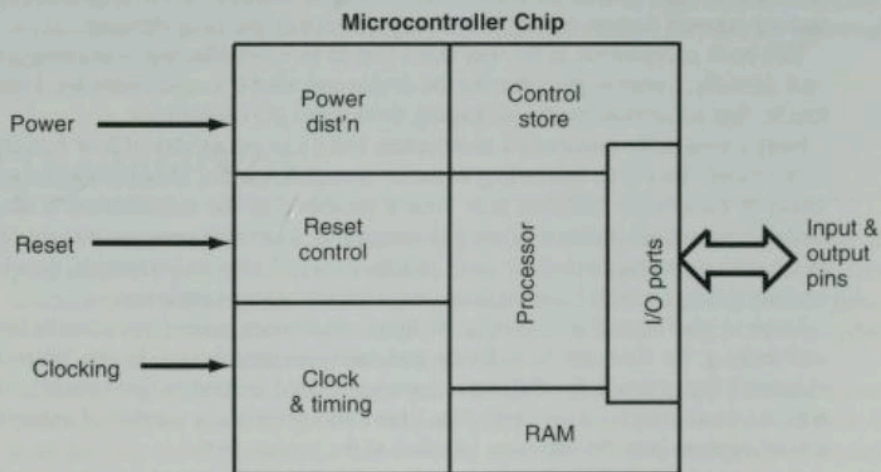


FIGURE I-1 Microcontroller block diagram.