Transducers for Microprocessor Systems

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Transducers for Microprocessor Systems

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MACMILLAN

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Softcover reprint of the hardcover 1st edition 1985 978-0-333-38565-4

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First published 1985

Published by
Higher and Further Education Division
MACMILLAN PUBLISHERS LTD
Houndmills, Basingstoke, Hampshire RG21 2XS
and London
Companies and representatives
throughout the world

Printed in Hong Kong

British Library Cataloguing in Publication Data
Cluley, J. C.

Transducers for microprocessor systems.

1. Transducers 2. Microprocessors

I. Title

001.64'4 TK7895.T7

ISBN 978-0-333-38566-1 ISBN 978-1-349-86023-4 (eBook)

DOI 10.1007/978-1-349-86023-4

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Preface

Many of the millions of microprocessors that are produced every year are used as the controlling elements in industrial plant, test equipment, domestic appliances, chemical plant, material handling equipment etc. To fulfil their allotted role the microprocessor systems need to collect data on external conditions and states such as temperature, pressure, force, velocity, torque and flow rate. These are not electrical quantities and thus transducers are required to transform these variables into electrical signals which the microprocessor system can deal with.

Also the microprocessor may be designed to modify some of these quantities in order to perform its control function; again transducers must be attached to the output circuits of the microprocessor.

The selection of suitable transducers is often a critical factor in the design of microprocessor systems, and a knowledge of the types available, their performance and relative cost is essential for engineers involved in design and development.

Unfortunately, since most transducers are not essentially electronic in nature, few courses in electronic engineering devote much time to a study of transducers and their applications. I have tried in this book to give an overall picture of the range and variety of transducers that may be needed in microprocessor systems, an outline of their main characteristics, and the way in which they can be interfaced to typical microprocessors.

For completeness I have included a chapter that gives a brief description of the more important interface packages used to connect transducers to the microprocessor. Readers requiring further details of interfacing or the way in which microprocessors handle information may find it helpful to consult companion Macmillan books: my own *Interfacing to Microprocessors*, and *Understanding Microprocessors* by B. S. Walker.

I hope that students of electronic engineering and practising engineers involved in the design of microprocessor systems and instrumentation will find in this book a useful introduction to the selection and application of transducers.

J. C. CLULEY

List of Abbreviations

ACIA	Asynchronous Communications Interface Adapter
ADC	Analogue-to-Digital Converter
BCD	Binary Coded Decimal
CMOS	Complementary Metal Oxide Silicon
CPU	Central Processor Unit
CR	Control Register
DAC	Digital-to-Analogue Converter
DDR	Data Direction Register
DMA	Direct Memory Access
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LS	Least Significant
MS	Most Significant
PIA	Peripheral Interface Adapter
PIO	Parallel Input/Output Controller
PPI	Programmable Peripheral Interface
RAM	Random Access Memory (Writable Storage)
ROM	Read-Only Memory
VDU	Visual Display Unit