

Contents:

PREFACE	3
1. COMPUTERS - AN INTRODUCTION	5
1.1 Brief historical review	5
1.2 Computer generations	8
1.3 Classification of computers	10
2. A PERSONAL COMPUTER AND ITS ARCHITECTURE	14
2.1 Fundamentals of computer architecture	14
2.2 Basic system of a PC	15
2.3 Internal memory	18
2.4 Microcomputer bus structure	20
2.5 A Keyboard and a mouse	22
2.6 A monitor	23
2.7 Secondary storage units	26
2.8 A printer	30
2.9 Other peripheral devices	32
3. MICROPROCESSORS AND MICROPROCESSOR SYSTEMS	35
3.1 Microprocessor architecture	35
3.2 Instruction execution cycle	38
3.3 Word length and operation speed	39
3.4 Microprocessor instruction set	40
3.5 Microprocessor systems	42
3.6 Data transfers within a microprocessor system	42
3.6.1 Data transfer between memory and CPU	42
3.6.2 Data transfer between CPU and I/O devices.	43
3.6.3 Data transfer between memory and I/O devices	46
3.6.4 Data transfer between computers	47
3.7 Microprocessor supporting chips	48
3.8. Single-chip microprocessors	48
3.9 Special types of microprocessors	49
4. INTEL MICROPROCESSORS	52
4.1 Intel processor family-tree	52
4.2 The Intel 8080 8-bit processor	56
4.3 The Intel 8086 16-bit processor	57
4.4 The Intel 80386 32-bit processor	58
4.5 The 8051 microcontroller family	60
5. INPUT/OUTPUT INTERFACE CIRCUITS	63
5.1 Units used in supporting hardware	63

COMPUTERS AND COMPUTER SYSTEMS (Contents)

5.2	The Intel 8255 programmable parallel interface	66
5.3	The Intel 8251 programmable serial interface	69
5.4	The Intel 8254 programmable timer/counter	70
5.5	The Intel 8259 programmable interrupt controller	73
6.	DIGITAL INTERFACING	75
6.1	Basic output devices	75
6.2	Basic input devices	82
6.3	D.c. motors and stepper motors	87
7.	A/D AND D/A CONVERSION	96
7.1	Principles of A/D and D/A conversion	96
7.2	D/A converters	98
7.3	A/D converters	99
7.4	Some ADC and DAC application examples	103
8.	INTRODUCTION TO C LANGUAGE	110
8.1	Assembly language versus C language	110
8.2	An introductory example	111
8.3	How to use TURBO C environment	114
8.4	Introduction to C language	116
8.5	An example of a control task solved in C	124
8.6	Combining C and assembly language	125
9.	COMPUTER SYSTEMS	131
9.1	Main areas of computer applications in manufacturing	131
9.2	Applications in measuring and instrumentation	133
9.3	Computer based process control systems	136
9.4	Computer applications in robotics	139