



ELECTRONIC SYSTEMS & TECHNIQUES

2ND EDITION

K.F. IBRAHIM



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Electronic systems & techniques

Second edition

K.F. Ibrahim

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Preface

The book may be divided into four parts. Chapters 1–4 provide an introduction to the basic principles of electricity. Chapters 5–18 cover the variety of electronic systems in block diagram (or building block) format starting with the single stage amplifier right across to computer systems. Here the essential knowledge of the relationship between the various blocks or units is established.

Chapters 20–36 look inside the 'building blocks' that make up a system enquiring into their constituent parts and operation. The characteristics of components and the variety of circuitry used in electronics are explained with special attention to modern digital techniques.

Chapters 37 and 38 deal with instruments, testing, and fault finding. Analogue as well as digital and microprocessor test devices are included. In fault diagnosis, I have employed the functional approach where the state (cut-off or saturation; OFF or ON) of the unit-under-test is examined as the first step to identifying the faulty component.

In this second edition I have included two sets of eighty multiple choice questions. The first set (Chapter 19, Useful exercises I) covers the topics in Chapters 1 to 18. The second set (Chapter 39, Useful exercises II) covers topics in Chapters 20 to 38. I have also included new topics that have become necessary knowledge for basic electronic servicing such as analogue and digital converters, digital television receivers, timers and microprocessor test instruments.

Although the treatment I have adopted is non-mathematical, the systems and circuits are explained in depth to give the reader a sound understanding in electronics. Wherever possible I have indicated typical values of components that may be found in practice.

The book deals, to one extent or another, with the various aspects of modern electronics. It adequately covers the syllabus of Part I and Part II (core subjects and analogue electronics) of the City and Guilds 224 Course (Electronic Servicing). It is suitable for BTEC students at levels I, II and III taking electronic engineering. It is also useful to practising engineers who would like to back their practical background with theoretical knowledge.

The emphasis on digital electronics is intentional for it is in this field that recent advances have occurred and future developments lie. It has been my intention throughout the book to meet the challenge of conveying complex electronic concepts and systems in a manner that may be understood by those who have not had the opportunity of a mathematical background, but who may nonetheless wish to acquire the necessary skills to service modern electronic equipment. To this end I hope I have succeeded.

K.F. Ibrahim

12 Microcomputers and other systems

Computer system

Figure 12.1 shows a basic computer system. The 'brain' of the computer is the microprocessor which carries out the arithmetic and logical operations as well as controlling the whole system. The microprocessor may carry out mathematical operations such as addition and multiplication, logical operations such as AND, OR, NOR etc., or data transfer as instructed by a program. The program is a series of instructions which sets out the operations to be carried out step-by-step. The program is stored in the memory unit. Apart from the program which the memory feeds into the microprocessor, the microprocessor may store some data in memory for later use, e.g. temperature readings at regular intervals for later analysis, or sales figures of a certain item for later comparison with other items. Communication between the microprocessor and the memory, therefore, may take place in both directions, as shown. Such communication is known as *bidirectional*.

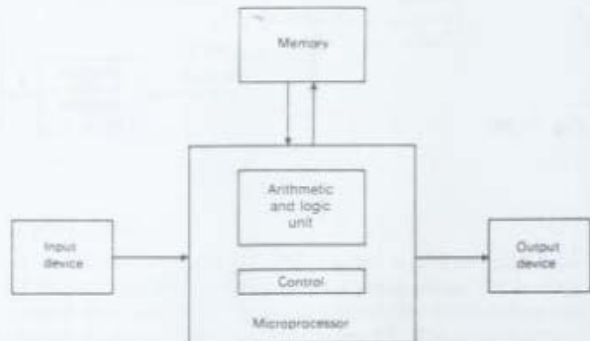


Fig. 12.1