



## COMPUTERS AND THE PROFESSIONAL

*(Publications intended to help the computer professional, and others involved in computing, in dealing with problems associated with the various tasks for which they are responsible.)*

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### Introduction to On-line Systems

Computer systems which give an immediate response to input are becoming increasingly common. They present many problems for the systems designer and programmer familiar only with batch-processing systems. This book gives an overview of on-line systems practice and introduces the reader to the concept of on-line working and should help to identify suitable application areas.

Typical situations dealt with in the book include the use of small- to medium-sized digital computers for applications in stock control, order entry and processing, and the maintenance and interrogation of files. Other issues considered are data transmission, system design, data management, terminal devices, software, security and integrity.

The book – which is the first in a series – is not only suitable for all who are responsible for deciding whether an organisation should be on-line but is also of interest to professionals and students desiring an ‘overview’ of on-line systems.

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# Introduction to On-line Systems

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# Preface

This book arises from a recommendation by the NCC Midlands Region Working Party on Teleprocessing. Set up in 1972 at the request of NCC members, this Working Party aims to:

- meet regularly to discuss aspects of on-line systems;
- promote the improvement of services and facilities in on-line systems;
- produce a series of books to guide companies designing on-line systems.

This On-line Systems guide, the first in a series, gives an introduction to the subject based on current UK practice. Members of the Working Party have provided information about their own applications and system design issues, and have acted in an editorial and advisory capacity.



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# Foreword

This book is concerned with on-line computing systems, with particular reference to commercial applications. It is assumed that the reader is familiar with the practices, procedures and terminology of conventional computing, which is commonly called – if not strictly accurately – ‘batch processing’.

The objectives of this book are:

- to introduce the concept of on-line working;
- to help the reader to decide whether he has any applications suitable for on-line working;
- to reassure the reader that on-line working, although different to batch processing, is not too difficult.

The book deliberately does not treat the subject at a detailed level. It is expected to appeal to persons who are responsible for deciding whether an organisation should bring any of its applications or systems ‘on-line’. Such persons may be heads of departments involved in production, marketing, sales, distribution, office administration, research and development and so on; alternatively they may be working in support groups concerned with corporate planning, management services or operational research. All these persons should benefit from reading this book if they are, or have been, users – directly or indirectly – of the computer, or have attended computer appreciation courses. The book is also written for computer professionals who have experience of batch processing and desire an ‘overview’ of on-line systems; i.e. data processing managers, systems analysts and programmers. In particular, the book seeks to penetrate the vast number of small to medium sized companies in the United Kingdom who have not already introduced on-line systems.

Earlier books about the subject have tended to go into a great deal of detail, to reflect practice in the USA, to depend upon the telecommunications services and facilities provided by USA companies, or to describe large, complicated on-line systems. During the preparation of this book, co-operation has been sought and received from the Post Office, computer manufacturers, suppliers of services appropriate to on-line working, and existing users of on-line systems.

It has been decided in the compilation of the material gathered to give greater emphasis to aspects and topics which are believed to have the widest applicability. Typical situations include the use of small to medium sized digital computers for applications in stock control, order entry and

processing, and the maintenance and interrogation of files of all manner of records and statistics. Specialised applications, in airline seat reservation systems and in banking, for example, have been surveyed also; these involve larger computers, complicated networks, and sophisticated software and the computer is dedicated to the support of the system, at least during a considerable part of the day. In general, though, a computer will not necessarily be so dedicated; it may simultaneously carry out batch processing.

Scientific applications, graphics, process control, air traffic control, automated warehouses and other specialised systems were not surveyed. It is felt that these systems are not of such widespread interest, and because they have particular characteristics are best considered separately.

The need for this book is underlined by the following figures supplied by the PO.

Numbers of terminals using PO DATEL services (excluding those using private modems)	
December 1966	1,035
December 1968	3,149
December 1970	13,927
December 1972	22,982

Additionally, there is an unknown number of terminals either using private modems or installed 'locally' without any modems. Following the first transmission of data over the telephone network in the UK in 1961, the use of PO DATEL services has expanded rapidly since the introduction of DATEL 100 (for data transmission over the Telex system or over leased telegraph circuits, but not over telephone lines) in 1963. The current rate of growth in the use of terminals in the UK is expected to be maintained over the next ten years. During this period, many people are going to become directly involved one way or another with on-line systems, and few people will not benefit indirectly through increased levels of service as consumers, ratepayers or taxpayers.

It is the ability of the user to be in direct contact with the computer and with the files held on direct access storage devices that is the distinguishing characteristic of on-line computing. All the components function together to support a specific application. These components include: the main computer, the miscellaneous hardware devices for line control, the terminal devices, the storage devices and the files on them, the transmission links,

the operating system, the data communications software, the application programs, the documentation of the system, the forms, the fallback and recovery procedures, the maintenance contracts with the suppliers and so on. But it is the people who use the system who are of paramount importance. Great attention must be paid to the interaction between the system, the terminal user, and other people concerned. During design, development and implementation, people must be consulted.

It should be noted that:

- an application may rely partly on on-line working and partly on batch processing;
- an application may be on-line for a few hours per day only;
- a computer may (or may not) be dedicated to an on-line application;
- a computing system may simultaneously be supporting several on-line applications and batch processing applications.

Chapter 1 discusses the advantages of on-line working and describes some systems. Chapter 2 considers terminals, the devices through which people communicate with the system. Chapter 3 discusses the transmission of data, with particular reference to PO services. Chapter 4 considers factors affecting the design of an on-line system. Chapter 5 considers the storage and retrieval of data. Chapter 6 discusses input/output issues, with particular reference to data entry and conversational dialogue. Chapter 7 discusses the role of software, and Chapter 8 the very important issues of reliability, security and integrity. Finally Chapter 9 summarises the book.



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