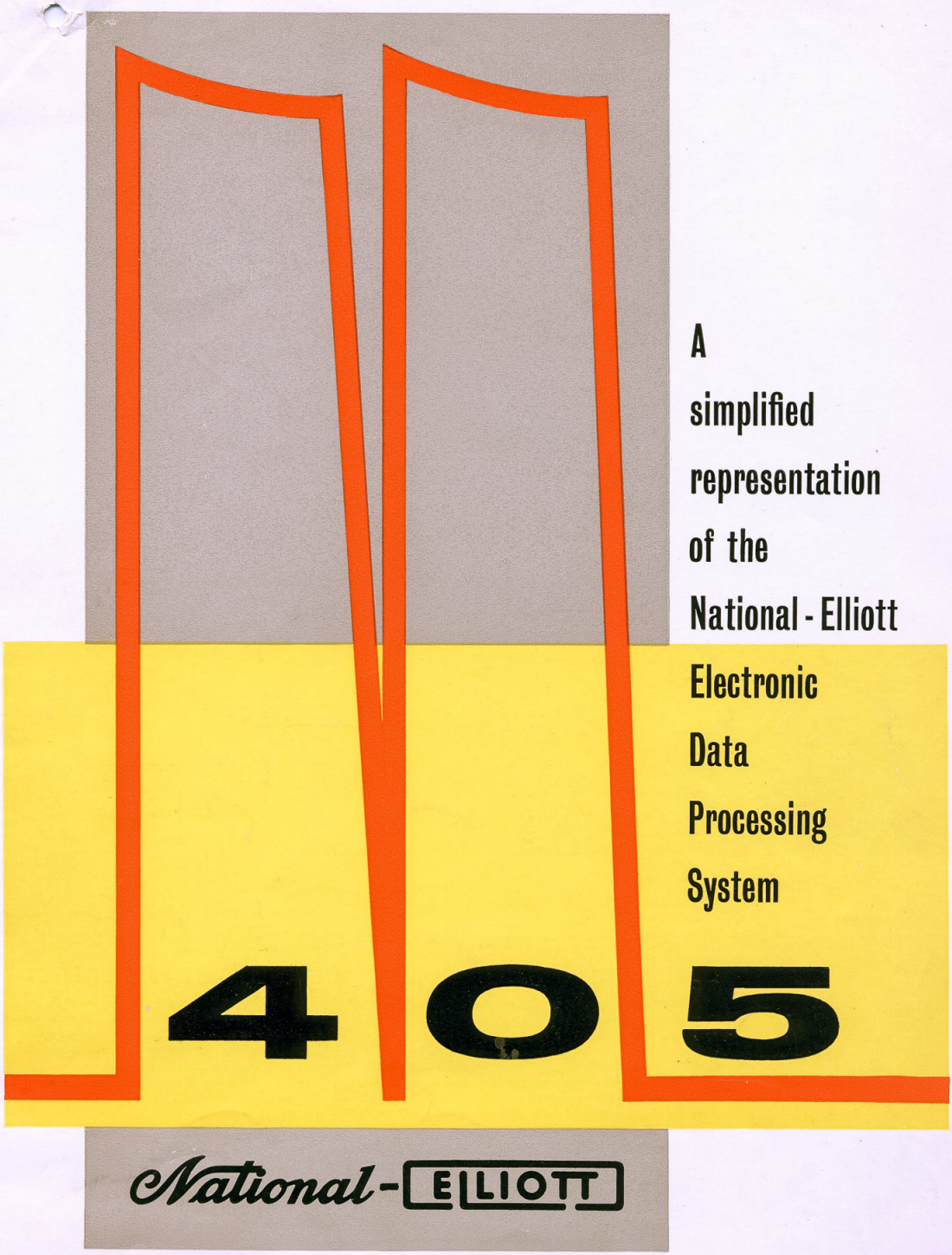
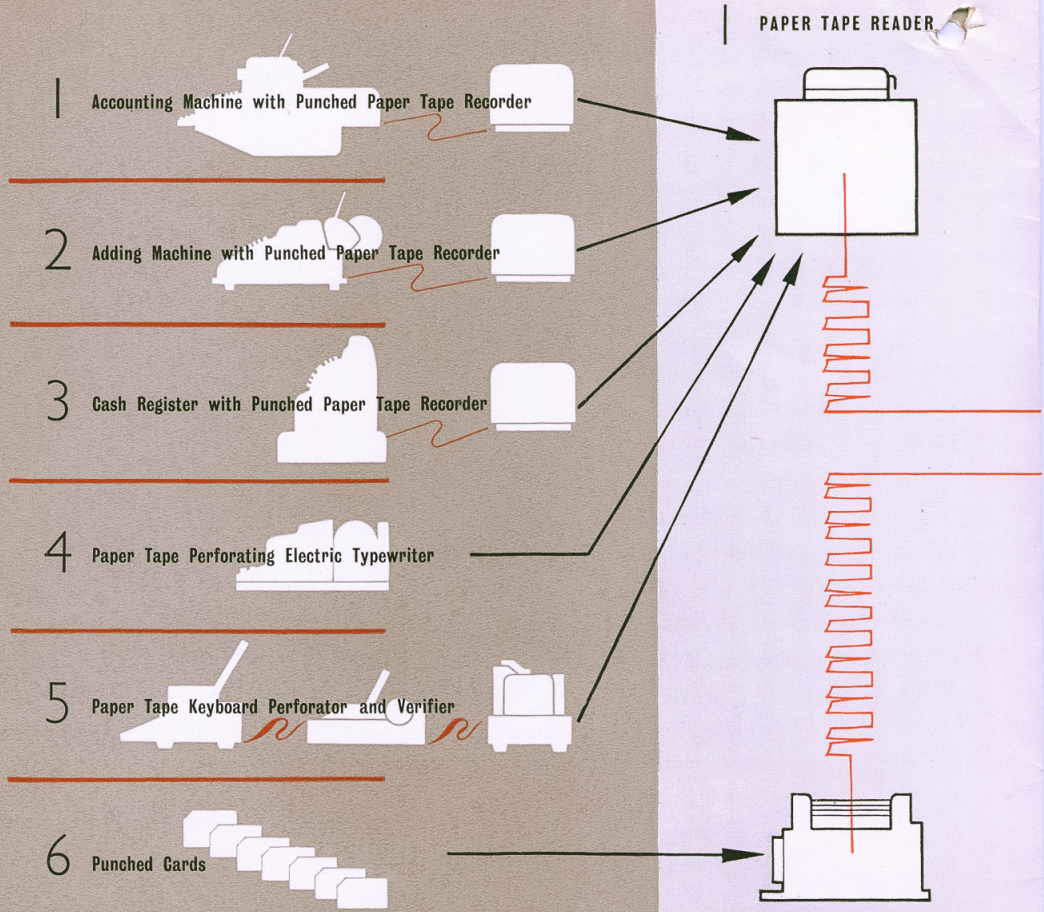
Lecture Notes



A simplified representation of the National-Elliott Electronic Data Processing System

405

National-ELLIOTT



Input

SIX METHODS OF INPUT PREPARATION

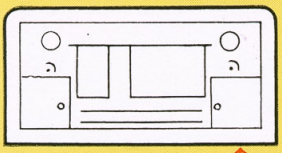
The method used to prepare input will vary according to the purchaser's requirements. Basic data recorded on essential visible accounting records is punched into paper tape automatically as a by-product of the accounting machine operation. Adding machine listing is a very fast way of punching abbreviated numeric data, such as Account Number and amount. Original documents, such as Sales Orders, may be prepared by means of a perforating electric typewriter, which creates the input media (paper tape) automatically. Programmes, amendments to computer stored data and other input data not falling into the categories listed above, will be punched into paper tape by means of a Keyboard Perforator and a second (verified) tape, produced by means of a Verifier.

Existing installations of punched cards can be used in conjunction with the National-Elliott 405 System.

Note : In addition to the data-originating devices shown above, the computer will accept, via suitable conversion equipment, data originated by other instruments designed for the purpose of recording alpha/numeric data in encoded form, e.g. Tag Readers, etc.

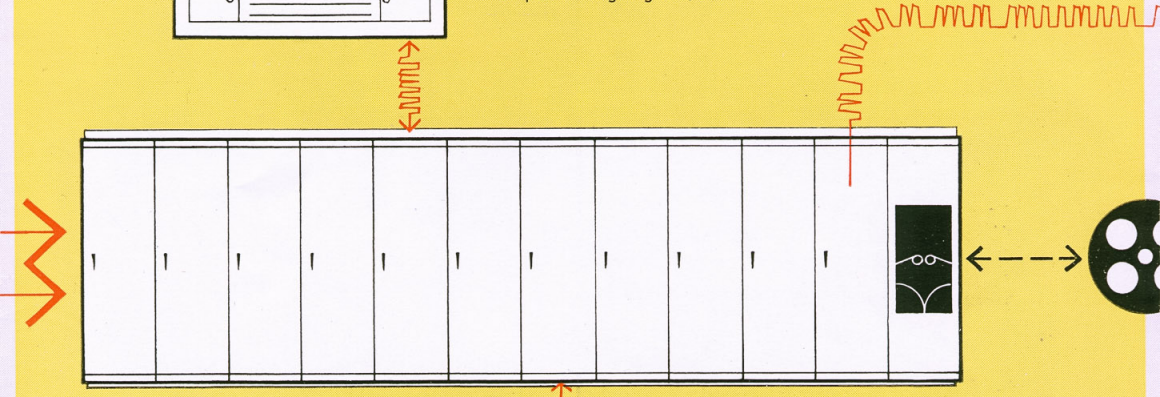
TWO METHODS OF INPUT

The punched paper tapes are fed into the Paper Tape Reader, which reads the tapes photoelectrically, translating the information into a series of electrical impulses. In a similar manner, punched cards are read by the Card Reader.

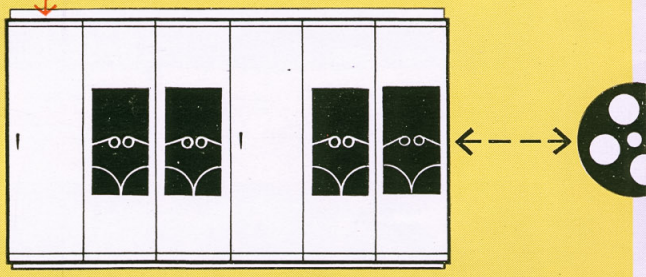


CONTROL CONSOLE

For exercising control over the computer's operation; programme checking, monitoring, examining contents of specific storage registers, etc.



Addition, Subtraction, Multiplication and Division; Sorting and Analysis; Selection, Comparison and inclusion of relevant data (Balances, Prices, Rates, Limits, Names, Addresses,etc., etc.).

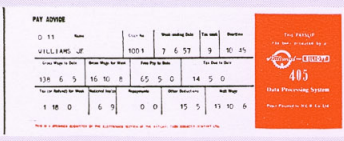


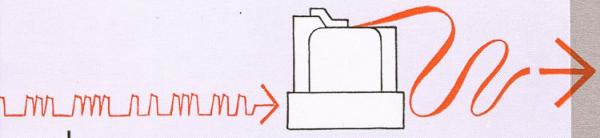
MAGNETIC FILM STANDING DATA STORE

Each reel of film has a capacity of 2½ million decimal digits or over 1½ million alphabetical characters.

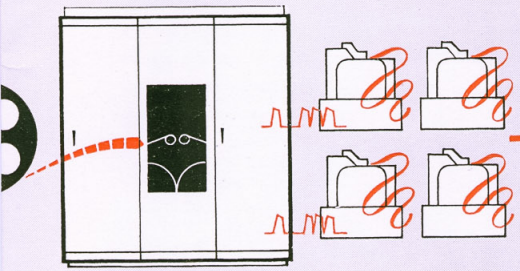
Processing

The pattern of electrical impulses produced by either the Tape Reader or Card Reader is fed straight into the computer where all the data is processed in such a way as to produce whatever end records and information are required. The computer not only adds, subtracts, multiplies and divides, but also sorts out the information received, and decides, according to programmed instructions, how it shall be treated or taken into account. In the processing of data it is necessary to take into account a vast quantity of standing and historic information (Old Balances, Prices, Commission, Discount Rates, Tax Code Number, etc.). All this information—even including the addresses of customers and suppliers—is "remembered" in the Magnetic Film Store from which the computer will extract whatever information it requires.

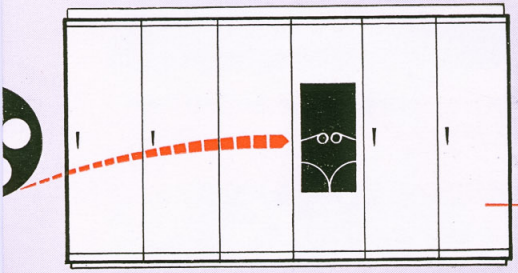




PAPER TAPE OUTPUT PUNCH

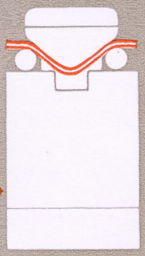


2 MAGNETIC FILM for Conversion to Paper Tape



3 MAGNETIC FILM for Line Printer Operation (off-line)

CHARACTER PRINTERS



2 LINE PRINTER

Film to Paper Tape Conversion

Magnetic Film is used in order that the computer can output information at a speed compatible with its processing speed. However, in many cases it is more advantageous to use a battery of automatic character printers for printing rather than a line printer. Since these printers are operated by means of punched paper tape, it is necessary first to convert the data recorded on magnetic film by the computer into punched paper tape. This method, therefore, combines the advantages of fast computer output and the flexibility of small unit printers.

Output

THREE FORMS OF OUTPUT

The method or methods of output employed will depend on the volume of information required and the type of printing equipment to be used. The simplest type of output is punched paper tape, in which processed data in the form of electrical impulses from the computer pass to a Paper Tape Output Punch. Where there is a large volume of output, magnetic film is used, since the speed of recording on magnetic film is many times faster than the operating speed of a Paper Tape Output Punch,

Two types of magnetic film output are available, depending upon whether the film is to be used to actuate a Line Printer or is to be converted to paper tape for operating automatic character printers.

In addition to the three forms of output indicated, another method commonly employed is a directly connected electric typewriter, for printing out "exception" reports, operator instructions, etc.

TWO METHODS OF PRINTING

The punched paper tape produced by the Paper Tape Output Punch (or by the Film to Tape Converter) is fed, in sections, to a number of automatic character printers which reproduce the processed data in conventional figures and letters, in the format required.

Magnetic Film, containing the processed data recorded by the computer, is fed into a Line Printer, which prints the data one line at a time at very high speeds.

Thus, either on-line (direct) or off-line (independent) methods of printing may be employed, according to circumstances.

National - ELLIOTT

General Introductory Notes

Whether an Electronic Data Processing System is installed principally for the purpose of mass-producing Documents of Commerce and essential internal records, or whether it is installed according to a more sophisticated programme to incorporate the provision of accurate "stop-press" information for the purposes of scientific management and policy determination, the system installed will only afford its greatest benefits if it is designed expressly for the purposes of processing business data. That is to say, a fully successful Electronic Business Data Processing System must be designed and constructed so that, in addition to working accurately at very high speeds, it is capable of assembling, storing and handling data of great variety and in very large volumes.

In the overall scheme and design details of the National-Elliott System, these considerations are expressed in certain of its characteristics.

The three levels of "storage" permit, on the one hand, storage of large volumes of data, and on the other high-speed access to data required for processing.

Storage Level ONE (Computing)

At the first level of storage, up to 512 "words" of high-speed access store may be provided, the capacity of each "word" being about 9 decimal digits with sign.

Storage Level TWO (Intermediate)

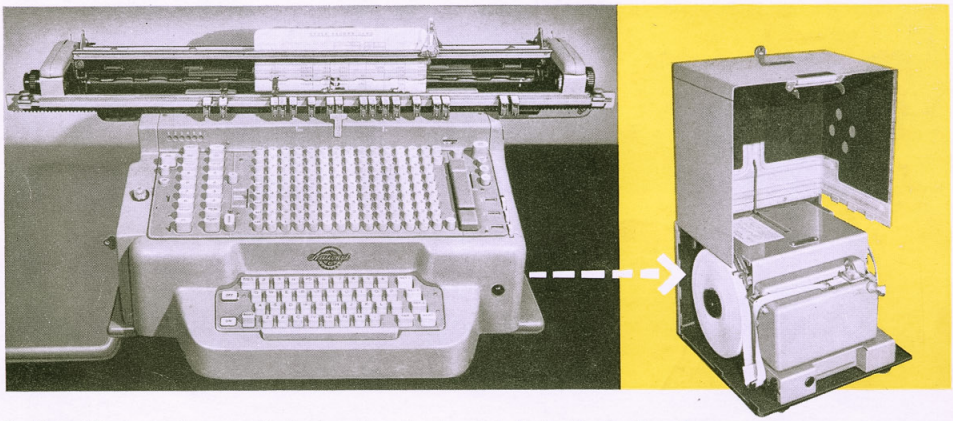
At the second level of storage, that is at the point in the system where data to be worked upon is retained in a temporary reservoir (the equivalent of a desk file), the system may be constructed with a magnetic disc to provide a memory of 16,384 "words" capacity.

Storage Level THREE (External)

The magnetic film system of storage provides a standing data file of unlimited capacity in the most convenient possible form. (One 10" reel of film is equivalent in capacity to some 30,000 80-column punched cards, i.e. $2\frac{1}{2}$ million decimal digits). Moreover, there is no limit to the number of reels which may be held available, and in those cases where it is necessary to obtain direct or semi-simultaneous access to more than one reel at a time, the system may be equipped with several servo-controlled search units each with its own set of read/write heads for extracting and/or amending the data held on file.

The capacities of the National-Elliott System are capable of wide variation. Indeed, the expansibility of the system —within such liberal limits—is, from a business point of view, a very noteworthy National-Elliott feature. For expansibility—at will, as need demands—means that an initial or pilot system can be installed to handle the financial and statistical accounting in a selected geographical area or a selected section of the accounting plan, and then enlarged to embrace further areas as experience suggests and necessity demands.

The National-Elliott Data Processing installation at the Head Office of The National Cash Register Company Ltd., Marylebone Road, London.
This installation may be viewed by appointment with the Manager of the Electronics Group



The National Direct-entry Accounting Machine is used in conjunction with the National Punched Paper Tape Recorder to provide self-proved, conventional records in legible characters at the point at which data originates; and, as a by-product of the posting operation, encoded data in the form of punched tape for computer input.

THE NATIONAL CASH REGISTER COMPANY LTD (Electronics Group) 206-216 Marylebone Road, London NW1