

INTERNATIONAL COMPUTERS AND TABULATORS LTD.

INTERNATIONAL COMPUTERS AND TABULATORS LTD. UNITED STATES SALES & SERVICES 839 STEWERT AVENUE, GARDEN CITY, NEW YORK, 11533 TELEPHONE 516, CH 8-5656 I·C·T

COLUMN

THE

RANGE OF Punched Card Accounting Machines

To streamline the smaller business (I·C·T) offers

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21-Column Punched-Card Equipment

Low in initial cost, low in upkeep cost

I N every kind and size of organization, at every management level, efficient direction depends upon the instant availability of up-to-theminute facts and figures. Sometimes, however, managements 'make do' with inadequate information because of the cost and time involved in its extraction and preparation.

Progressive organizations all over the world have found the complete answer to the problem in I.C.T punched card methods which provide the means of marshalling and presenting management information speedily, economically and as a matter of routine.

The 21-column range of equipment has been specifically developed to bring the advantages of punched card methods within the reach of managements having a limited budget at their disposal. It employs the same well-tried principles and, within its size limits, offers the same advantages as the larger ranges of equipment but is unequalled for low initial and upkeep cost.

The basis of the Punched-Gard system

The basis of the system is the card in which information is recorded by means of holes punched in pre-determined positions. Each card so punched is a 'unit of information' that can be handled or filed like any other indexcard. Unlike the latter, however, it is not a static record. Punched cards are flexible records that activate high-speed machines, by means of which any number of such units of information can be merged and arranged in any desired order, as often as required, and tabulated in normal characters on loose-leaf sheets or continuous stationery. Simultaneously with this printing of the information contained in the cards the automatic addition or subtraction of quantities and amounts is effected.

With hand methods such basic information is normally copied over and over again in the process of producing various accounting and statistical statements, with consequent innumerable opportunities for error. With the punched card method the information is recorded and verified *once*; there-

after machines do the work of classifying, dissecting, adding and subtracting; the 'human element' is reduced to the minimum.



Each card is made to register the relevant facts relating to one transaction by the grouping of the columns into 'fields', the headings of which denote the nature of the facts they contain. The cards are of uniform shape and size and are designed to meet the precise accounting or statistical purpose for which they are required. The illustrations on this page show typical examples of 21-column card forms in common use.



Preparing the Records

The I.C.T Automatic Key Punch, a simple machine operated by juniors, mechanically feeds, perforates and ejects the cards. The punching of the cards is the only manual operation in the system.



Simple as A B C



Arranging the Records

The I.C.T Sorter mechanically senses the perforations in the cards and automatically groups them in the required order at a speed of 40,000 card passages an hour.

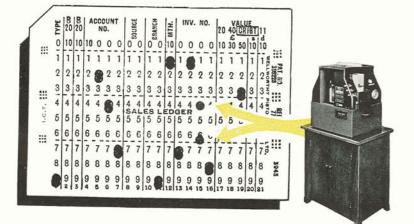
Printing the Results

The I.C.T Tabulator automatically prints the information punched in the cards and simultaneously adds or subtracts quantities and amounts.



Automatic Verification

Using an Automatic Key Punch set for 'verifying', a different operator re-punches the cards. Where the two punchings agree oval holes are produced: where they differ round holes remain. The Automatic Verifier then mechanically senses the cards (at a speed of 200 cards a minute) and indicates the errors by inserting a distinctively coloured card in the pack wherever there is a card with a round hole. The Verifier punches a special hole in each card to indicate that it has been verified.



The I.C.T Tape-to-Card Translator



The I.C.T Tape-to-Card Translator, which is available in the 21-column range of equipment, is a most important link in integrated data processing.

Information contained in most perforated tapes of varying capacities, particularly the five channel variety which is suitable for recording Co-operative Society members' purchases, can be automatically converted into punched cards.

Thus, from the output of all types of tape-producing machines, such as typewriters, cash registers, teleprinters and computers, the Tape-to-Card Translator will rapidly produce the punched card media for use in any of the various types of mechanical, electromechanical and electronic punched card equipment.

I·C·T) AUXILIARY MACHINES

The I.C.T Reproducing Punch

The I.C.T Reproducing Punch automatically reproduces a new set of punched cards from an existing set at a speed of 130 cards a minute. The machine can also be used for repeat reproduction, i.e. reproducing any desired number of cards from one original card.

The punching may be an exact reproduction or it may be modified as required by the elimination or transposition of the punching in selected card columns or fields. The machine is fully automatic in every respect feeding, punching and ejecting.





The I.C.T Collator automatically compares two separate but related packs of punched cards and groups, interleaves or segregates them according to the agreement or disagreement of the factors represented by particular perforations. These operations are performed in a single passage of the cards through the machine, provided the two packs of cards have previously been sorted into sequential order of the designations being compared. The I.C.T Collator

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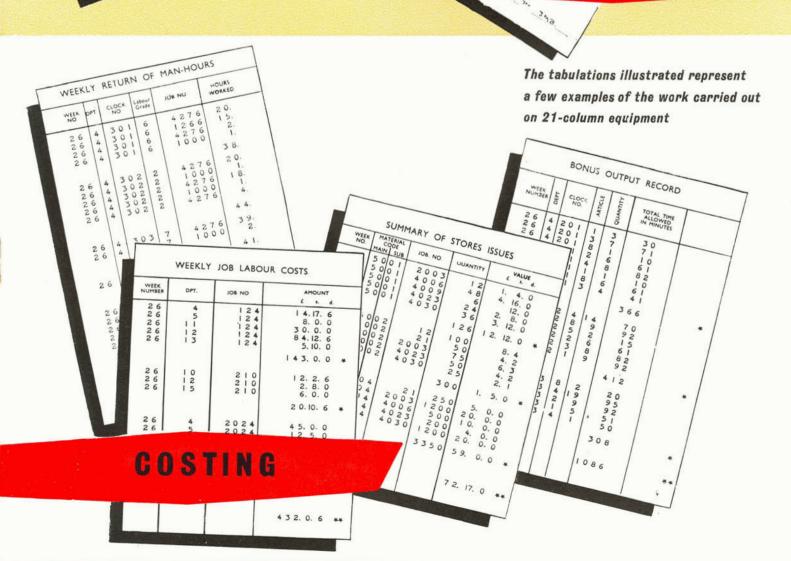
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-COLUMN EQUIPMENT

IS USED BY

every kind and size of organization for all classes of accounting and statistical work

H.M. Government Departments for

National Gas & Electricity Authorities for

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National Transport Undertakings for Municipal Authorities for

Electrical and Mechanical Engineering Firms for

> Radio Manufacturers for Brewers for Dyers and Cleaners for Publishers for Perfume Manufacturers for Piston Ring Manufacturers for

> > Multiple Shops for Food Manufacturers for

Bankers for Group Industrial Authorities for Tax Statistics and Analyses; Agricultural Census; National Insurance Accounting; Dental Statistics

Revenue Collection and Analysis; Plant Register; Labour and Material Costs; Job Costing

Bulk Travel Statistics; Wages Deductions Analysis

Expenditure Allocation and Analysis; Teachers' Salaries; Meal Records, etc.

Sales Accounting and Analysis; Labour and Material Costs; Transport Statistics; Labour Analysis; Stock Control; Purchase Ledger; Remittance Advices; Job Costing; Wages Abstracting

Costing

Cask Control

Wages Incentive Schemes

Newspaper Statistics

Stores Control; Sales and Production Statistics

Sales Accounting; Credit Control Material Analysis; Sales and Purchase Analyses

Sales Analysis and Stock Control

Costing; Stock Control; Control Statistics; Sales Analysis

Standing Order Payments

Production and Distribution Statistics

and by large and small firms embracing Textiles, Chemicals, Foodstuffs; Building and Contracting; Rubber and Plastics; Metals; Oils and Paints; Paper and Stationery; Furniture; Leather; Tobacco; Transport; Departmental Stores; Chain Stores; etc., etc. I·C·T



INTERNATIONAL COMPUTERS AND TABULATORS LIMITED

HEAD OFFICE: Gloucester House, 149 Park Lane, London, W.1. Telephone: Hyde Park 8080

SALES OFFICES

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Aberdeen, Birmingham, Corby, Glasgow, Leeds, Liverpool, London, Manchester, Molesey (Surrey), Newcastle-upon-Tyne, Nottingham, Southampton and Watford

DIVIDEND SERVICE BUREAU

City Gate House, Lackington Street, Finsbury Square, London, E.C.2. (Monarch 1596)

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Data Processing Schools at: Bradenham Manor, near High Wycombe, Bucks. (Naphill 2191/2/3) Moor Hall, Cookham, Berks. (Bourne End 1840) 88 High Holborn, London, W.C.1. (Chancery 3311) 102 Queen's Road, Brighton (29621) Engineering Training Schools at: Castlereagh (Northern Ireland), Croydon, Dartford, Letchworth, Stevenage and Southport.

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Oxen Road, Luton, Bedfordshire. (6530/1)

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Putney Bridge House, Putney Bridge Approach, London, S.W.6. (Renown 3322)

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Hamilton House, 138 Piccadilly, London, W.1.

(Hyde Park 8080)

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149 Park Lane, London, W.1: (Hyde Park 8080)

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I.C.T SPECIAL PROJECTS

Powder Mill Lane, Dartford, Kent. (21261)

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; Stevenage,

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NIGERIA : BELGIUM

BURMA : CANADA

CEYLON : CYPRUS : DENMARK : EASTERN EUROPE

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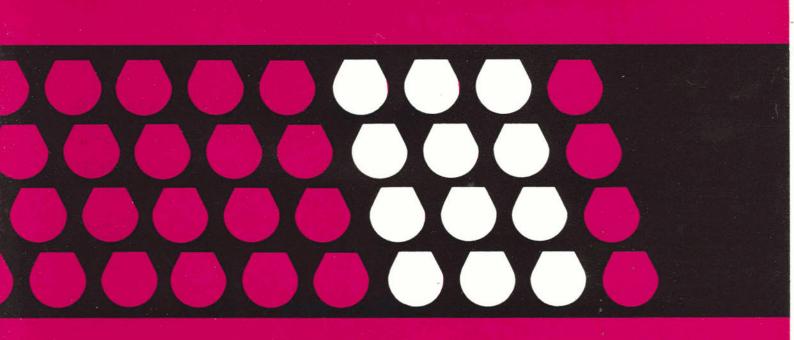
SWEDEN : SWITZERLAND : UNITED ARAB REPUBLIC

UNITED STATES OF AMERICA : WEST INDIES



TYPE 36 AUTOMATIC KEY PUNCH

80-column punched card data processing



INTERNATIONAL COMPUTERS AND TABULATORS LIMITED 149 Old Park Lane London W1



TYPE 36 AUTOMATIC KEY PUNCH 80-column punched card data processing

Sustained and accurate output of punched cards

The I.C.T *36 Automatic Key Punch* incorporates features which enable the operator to maintain a sustained and accurate output of punched cards.

- automatic card feed
- direct card ejection into stacker
- choice of keyboards
- automatic and optional gang punching
- error correction facilities
- high speed duplication

Keyboards

Keyboards are interchangeable by the operator and a choice can be made between: a typewriter keyboard combined with a numerical section

or a numerical keyboard which can be used for both alphabetic and numeric recording. For the convenience of the operator, the keyboard can be placed anywhere on the working surface. The keyboards have a particularly light yet positive touch.

Control

The I.C.T *36* has a small pluggable control panel. Functions can be programmed to operate automatically or under keyboard control. Features include:

- automatic or key-controlled skipping
- spacing over remaining columns of an alphabetic field
- programmed punching of constant information
- key selected gang-punching
- operator choice of punch, gang-punch or skip selected fields
- duplicate part of all of previous card
- duplicate correct columns for error rectification



Cards to be duplicated can be inserted by hand

Reproducing feature

The I.C.T *36 Automatic Key Punch* offers considerable flexibility for gang-punching and duplication.

While each card is being punched, the previous card passes through a pin-sensing station. Numeric and alphabetic data are transferred back to the punch position, subject to the over-riding control of keyboard operation and the plugged program.

Visibility

A considerable portion of the card is visible for dual purpose card punching.

Optional facilities

The standard punch can be specified with a range of optional facilities. These include a counter to record the number of cards processed, an interchangeable control panel and links for utilizing the punch in association with keyboard accounting machines.



I.C.T 36 Punch with combined typewriter numeric keyboard

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ABERDEEN	14 Bon Accord Crescent, Aberdeen. (51371/2)
BECKENHAM	205/213 High Street, Beckenham. (7231)
BELFAST	Alanbrooke Road, Castlereagh, Belfast, 6. (51391/2/3)
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BRIGHTON	Norwich Union House, Church Street, Brighton, 1. (67198)
BRISTOL	Bridge House, Baldwin Street, Bristol, 1. (23401)
CARDIFF	St. David's House, Wood Street, Cardiff. (28215)
COVENTRY	Copthall House, Station Square, Coventry. (21455/6)
DUNDEE	2 Union Street, Dundee. (26687/8)
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HARROW	I.C.T House, 2 Gayton Road, Harrow. (8888)
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LECTURES AND FILMS

85-91 Upper Richmond Road, London, S.W.15. (Putney 9695)

WORKS

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Powder Mill Lane, Dartford, Kent. (21261)

I.C.T (ENGINEERING) LIMITED

Letchworth Garden City, Hertfordshire; Stevenage Hertfordshire; Whyteleafe, Surrey.



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Printed in England.

P.195/9.63/7M/E.J.



This machine mechanically arranges punched cards in the sequences and groupings necessary to present the information they contain in the required order.

The sorting proceeds column by column. The cards are placed in batches in the magazine and a pointer is set against the particular column to be dealt with at each run through the machine. In operation, the cards pass through the machine at high speed and are deposited in numbered receiving boxes corresponding with the positions punched in the cards.

Optional Additional Features

Sub and grand counting attachment.—Provides a count of each batch of cards sorted, and a grand total of all cards passing through the machine.

Full counting attachment.—Counts the cards falling into each receiving box, in addition to the functions of the sub and grand counting attachment.

Reject box counter.—Records the number of cards falling into the 'Reject' box. Can be cleared independently.

Shutter delay device.--Provides for the extraction of all master cards which are unaccompanied by detail cards, from a pack of master and

detail cards previously sorted into numerical sequence. This takes place in one passage of the cards through the machine without disturbing the sequence of the cards.

Repetition sorting device.—Permits the sorting of groups of cards (each group consisting of a master card followed by any number of trailer cards) into the numerical sequence determined by, and punched only in, the master card.

Card Capacity	40 columns.
Speed	40,000 card passages an hour.
Motor	¹ /₂ hp, AC or DC.
Weight	2 cwts. 1 qtr. 9 lbs.
Dimensions	Height, 42 ins.; Width, 15¾ ins.; Length, 44 ins.



40-COLUMN PUNCHED CARD DATA PROCESSING

sorter type **327**

APR 2 7 1964



The 40-column Summary Card Punch automatically punches summary, or balance cards, simultaneously with the tabulating operation.

Operation

After connection to the tabulator a supply of unpunched cards is placed in the *Summary Card Punch* magazine and tabulating proceeds. A summary card is then automatically punched on each sub and/or grand total stroke of the tabulator. The accumulated numerical totals, together with required designatory information, are transmitted to the *Summary Card Punch*, and punched into the summary or balance cards automatically, without any interruption of the tabulating process.

Performance

Summary cards can be obtained at:

- (a) Both sub and grand total strokes of the tabulator;
- (b) Sub-total strokes only;
- (c) Grand-total strokes only.

Variations

All the information totalled by the tabulator can be automatically punched into any field of the summary card regardless of the design of the detail card or of the columnar arrangement of the tabulation. Information appearing in the printed tabulation can be excluded from the summary card as necessary.

Summary cards representing balances are automatically punched with a debit or credit control hole, as appropriate. The summary cards can also be 'gang-punched' with non-variable information which does not appear either in the detail cards or the printed tabulation.



Summary Card Punch shown connected to Tabulator

40-COLUMN PUNCHED CARD DATA PROCESSING

SUMMARY CARD PUNCH TYPE 262



TYPE 262 SUMMARY CARD PUNCH

Automatic Stop

A signal light gives visual warning that the supply of cards in the magazine is running low, or that the card receiver is full, and both tabulator and Summary Card Punch are automatically stopped.

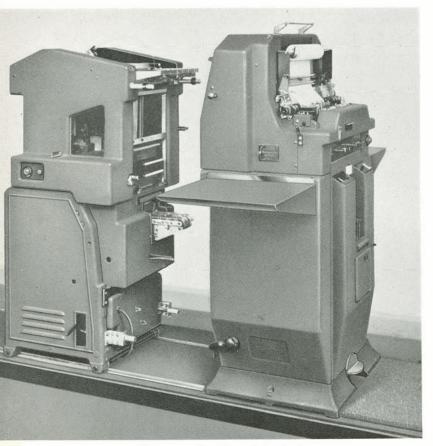
Optional Additional Features

Automatic Noughts - for eliminating the punching of preceding noughts.

Card Operated Designation Selective feature - which enables alphanumeric data from a card other than the first of a group to be punched into to the summary card.

Independent Delatching - for use when summary cards are taken for sub and grand totals, to permit selected alphanumeric data to be retained from the first card after a grand total for punching in all following sub total cards and the grand total card.

Card Capacity	40 columns.
Motor	¹ / ₃ hp, AC or DC.
Weight	5 cwts. 1 qtr. 26 lbs.
Dimensions	Height, 60 $\frac{1}{4}$ ins. (including baseboard).
Floor Area	Of baseboard not including tabulator: 108 ins. by 29 ins.



Summary Card Punch (on left) with Tabulator

INTERNATIONAL COMPUTERS AND TABULATORS (CANADA) LIMITED 1000 YONGE STREET TORONTO 5, ONTARIO



This Tabulator translates the information punched in 40-column cards into printed tabulations, on continuous stationery or individual sheets, with or without carbon copies.

Flexibility of Application

Its unique design enables this single, basic machine to be made available in a number of varying standard units within the capacity of its 38 sectors. It can, for example, combine alphabetical printing with the printing, addition and direct subtraction of amounts in sterling, with the controlled provision of sub and grand totals over any of the 40 columns on the card, accumulative totals may be provided as an optional feature. Alternatively, it is available for dealing with decimal currencies (either with or without alphabetical printing). The machine can be made to list all cards or just print one total line by means of a Listing/Totals only Control.

The connection between the card sensing mechanism and the adding and printing units is by means of the connection box which can be inserted or removed from the Tabulator in a few seconds. One connection box will often serve for several types of tabulation and when it is necessary to use different boxes the change from one job to the other can be made immediately.

Features Available

The following are some of the important features which can be supplied:

- 1 The machine has one 25-sector and one 13-sector: the 25-sector will print words and figures according to the punching of the cards and will also provide, if required, the automatic printing of noughts succeeding any significant figures appearing in the tabulation.
- 2 All types of numerical units: sterling, decimal, etc., to suit varying needs.
- 3 True positive and negative totals with subtraction unit.



40-COLUMN PUNCHED CARD DATA PROCESSING

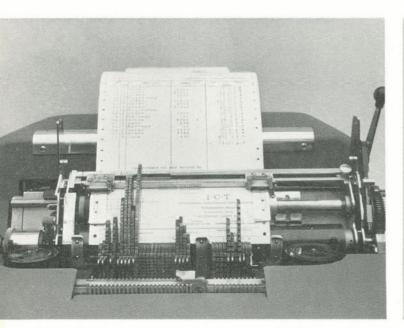
TABULATOR TYPE 816



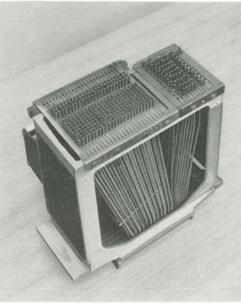
TYPE 816 TABULATOR

- 4 Automatic totalling control for sub and grand totals over all columns of the card.
- 5 Simple pinwheel feed with infinitely adjustable pinwheels taking marginally-punched stationery of any width from 4¹/₂ ins. to 11 ins. or unpunched paper (roll or interfold) up to 11 ins. wide.
- 6 Cross feed carbon paper ribbon device for the economical production of carbon copies using the minimum of carbon paper.

Card Capacity	40 columns.
Speed	80 or 100 cards a minute.
Motor	¹ / ₃ hp, AC or DC.
Weight	5 cwts. 3 qtrs. 24 lbs.
Dimensions	Height, 56 ins.; Width, 27 ins.; Length, $28\frac{1}{4}$ ins.



The paper feed and part of the printing mechanism of the tabulator



A connection box—interchangeable in a matter of seconds



This machine extracts the information contained in a punched card and automatically prints this information on the face of the card in normal characters and figures.

Printing Variations

The position in which the printing appears on the card can be varied as follows:

- (a) Along the top edge of the card in which the information is punched (also in ten other horizontal positions, when the posting feature is fitted);
- (b) The columnar position of the printed information need not necessarily correspond with the punching in the card;
- (c) The machine can be set to print only the information contained in any selected column or group of columns.

Posting Feature

0

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This optional, extra device allows the machine to print the interpretation of a punched card on to an immediately preceding card which may or may not itself be punched.

The posting device can be made inoperable at will and the machine then functions as an ordinary interpreter.

23 lbs.

Operation

The Interpreter is simple to operate and has a working speed of 3,840 cards an hour. With the posting feature in operation, speed is half that quoted. It has 40 type wheels and prints the information from the card in a single stroke.

Card Capacity	40 columns.			
Motor	¹ / ₂ hp, AC or DC.			
Weight	3 cwts. 2 qtrs. 23			
Dimensions	Height, 46½ ins.; Width, 25¼ ins.; Length, 28½ ins.			



40-COLUMN PUNCHED CARD DATA PROCESSING

INTERPRETER TYPE 442



This machine is designed for the rapid grouping and/or separating of packs of cards; its primary function being to compare automatically two packs and to group, interleave or divide them according to the agreement or disagreement of the designations punched in the cards. These operations are performed at one passage of the cards through the machine and without the need for any special perforations or any special arrangement of the designations being compared. The Collator is thus able to perform various and diverse grouping operations, some of the more important of which are described below.

Performance

The Collator will sense any ten adjacent columns in each of the two packs of cards and as the sensing units are movable across the full face of the card it is not necessary for the information being compared to be in the same field of the two packs. Within certain limitations, alphabetical as well as numerical punching can be compared.

Operation

The two packs of cards are placed in the two feeding magazines located one at each end of the machine, and the sensing units are moved over the columns to be compared. The control levers for the receiving boxes having been set according to the required operation, the starting lever is depressed, and the cards are automatically fed, sensed and passed into their appropriate receiving boxes.

Speeds

The speed of the machine varies according to the type of work being performed. On most classes of work, 200 cards a minute are dealt with

but on certain simple comparing work, as many as 400 cards a minute can be delivered to the receiving boxes.

40-COLUMN PUNCHED CARD DATA PROCESSING

collator type 372



(I.C.T

TYPE 372 COLLATOR

Functions

The more important operations of the Collator, including some involving optional features, include:

Inserting the cards of one pack in their correct position in another pack in order to make one complete pack (*e.g.* inserting current job cards in work-in-progress file);

Comparing two packs of cards and amalgamating (or alternatively placing into separate boxes) those which agree, simultaneously rejecting those which do not agree (*e.g.* inserting balance cards with corresponding movement cards and rejecting unmoved balance cards and *vice versa*); inserting name and address cards with appropriate item cards and the simultaneous removal of the cards they replace;

Replacing some of the cards in a pack by the insertion of a number of new cards and the simultaneous removal of the cards they replace; Combining two packs of cards into one by feeding the cards alternately from each pack irrespective of their punching;

Selecting from one pack or two packs, cards in any one of many different sequence combinations, *e.g.* alternate cards, every third card, etc.;

Selecting all cards punched with a given number, with the concurrent insertion of marker cards if required;

Selecting cards punched with numbers in a given range.

Selecting from a pack of cards, all those punched with a predetermined control hole;

Dividing a pack of cards into two, one containing cards punched with numbers lower than a given number; the other containing cards with numbers equal to or higher than the given number;

Dividing a pack of cards into three packs: (i) containing cards punched with numbers lower than (ii) with numbers equal to, and (iii) with numbers higher than the given number.

Card Capacity

Weight

Motor

1/2 hp, AC or DC.

4 cwts. 3 gtrs. 22 lbs.

40 columns.

Dimensions

Height, 45 ins.; Width, 23¹/₂ ins.; Length, 37³/₄ ins.



The tabulating machine processes data contained in punched cards, presenting the results in the form of printed lists and summaries.

Main Units

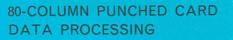
Punched cards are read and data entered into the machine through the input mechanism. The standard machine has two consecutive sensing stations, but a third can be specified, if required.

Calculations are carried out in a maximum of 120 counter wheels. These are arranged in up to twenty-eight groups of three, four or six wheels. Groups can be interconnected to give any desired size of calculation in a variety of notations, sterling, decimals, weights and fractions. All counter groups can add, subtract, cross-add and crosssubtract.

The print unit consists of 120 individually controlled printing members, each of forty-nine characters—twenty-six alphabetic, twelve numeric, plus eleven special symbols. Information can be printed directly from punched cards, from the counters and from a magnetic core store. Horizontal spacing is eight characters to the inch.

Automatic control provides facilities for printing totals and balances when a break in card sequence is detected. Minor, intermediate and major totals are automatically printed; final totals are under the control of the operator. Six calculating/printing cycles are available at each level of control. If specified, cycles can be recalled.

Data is processed and presentations controlled according to instructions drawn from control panels which are quickly interchangeable. The program of processing is determined by plugwires inserted into these panels by the operator.



TABULATOR TYPE 915





TYPE 915 TABULATOR

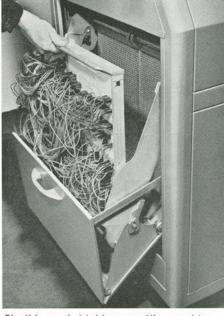
Additional Features

As an optional feature up to 100 positions of magnetic core storage can be fitted, each position capable of storing a figure or alphabetical character. The storage unit accepts information from punched cards and has transfer facilities to and from the counter wheels. Stored data can be printed and summary punched. Information recorded in one punched card can be printed selectively in successive lines.

Automatic feeding devices control the movement of continuous stationery, cut forms and ledger sheets, with automatic printing of sub-totals.

A summary punch can be linked to the tabulator for the automatic production of cards representing group totals and balances.

Card Capacity	80 columns.
Speed	9,000 cards an hour.
Motor	∄hp AC.
Weight	22 cwts.
Dimensions	Height, 46 ins.; Width, 30 ins.; Length, 83 ins.



Flexible and highly versatile machine operation is secured by a detachable control panel.



A sensing mechanism, associated with a punched paper band, controls the paper positioning during printing, both with single sheets and continuous stationery.



The Tabulator extracts from the sorted cards their punched information, processes it and presents the results, in figures, in the required form. It selects those facts recorded on the cards which are relevant to the desired results; feeds the figures into adding mechanisms; calculates quantities and amounts for which totals are required; subtracts or compares results at pre-determined stages; prints the indicative and additive details, totals, balances and grand totals, in any desired form. An almost endless variety of information can be extracted, calculated and printed. Where necessary, the content of each card can be transcribed, in the form of a printed list, during the adding function of the machine.

Flexibility of Design

Although tabulators are 'tailor made' to customer requirements, the three main integral units forming their basic design allow extreme flexibility of functioning. This flexibility is of major value when existing applications are revised, new routines mechanised on established equipment, or *ad hoc* demands by management need to be satisfied with minimum delay.

Three Main Units

- The card feed assembly, which reads and transfers indicative and additive data from the cards;
- 2 A series of adding mechanisms or counter groups of various capacities, which can be combined in operation to provide increased individual capacity;
- 3 A print unit, composed of a maximum of 100 individually controlled adjacent print wheels, or positions, which can be grouped according to requirements.

Control Panels

Flexible machine operation is controlled by detachable control panels the nerve centre of the machine. Plug wires, inserted initially into the



80-COLUMN PUNCHED CARD DATA PROCESSING

TABULATOR TYPE 906

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TABULATOR

control panels by the operator, are the means whereby data can be read from the punched cards, transferred and controlled, as between the three main units and within the units themselves.

The control panel provides electrical paths for direct or selective acceptance of data from the cards and for its distribution to counters and print wheels according to needs.

When required, it allows continuous feeding of unlimited numbers of cards of a group, on completion of which the feed is stopped temporarily to enable functions such as cross addition and subtraction, total printing and 'rolling' for accumulative totals, to take place.

It provides paths for the transfer or 'rolling' of data either directly or selectively as between any group of counters and print wheels.

It also controls the sequence of the transfers of data.

The independence of the three main units and of both the variable counter groups and variable print wheel groups, gives the maximum possible internal flexibility of operation. Printed statements and analyses may be entirely designed to suit their real purposes, as numeric data can be printed on any position of the print unit, irrespective of counter groups used or the sequence in which information is recorded in punched cards.

Direct Subtraction

The basic machine includes a number of counter groups fitted with direct subtraction.

Direct subtraction enables a net balance, either debit or credit, to be obtained in the counter group into which both debit and credit data have been transferred from punched cards.

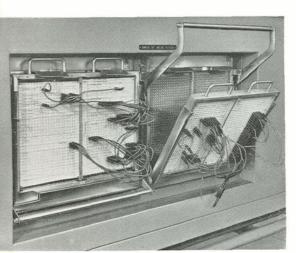
Stationery Feeds

Automatic feeding devices permit the production of correctly and accurately spaced forms on perforated continuous stationery, ledger sheets or bill forms. Both ledger sheets or bill forms, placed singly by the operator on a tray attached to the rear of the print unit, are fed through the platen to the correct printing position and (after printing has taken place) are ejected entirely automatically.

Summary Punching

When linked with a tabulator, the Summary Punch produces automatically, during tabulator operation, punched summary cards or new balance cards. These are separate punched card recordings of the quantities of values standing in the tabulator counter groups at predetermined steps in the tabulator operations.

Card Capacity	80 columns.
Speed	Adds and prints at rate of 200 cards a minute.
Counter Capacity	 Maximum of 100 adding mechanisms arranged in groups of two, four or eight positions, as follows: Four counter groups, each of two positions; Thirteen counter groups, each of four positions; Five counter groups, each of eight positions. The maximum number of positions available for direct subtraction is sixty.
Print Unit	Maximum of 100 print positions, each printing numerals only.
Control	Three types—minor, intermediate and major; sixteen positions of the card, or more if specified.
Voltage	200-250 AC, single phase.
Weight	18 cwts. (maximum standard machine).
Dimensions	Height, 50 ins.; Width, 32 ins.; Length, 80 ins.



Control panels are rapidly interchangeable



The Type 550/2 Electronic Calculator is a major item in the range of 80-column Data Processing Equipment. It can be programmed to carry out a wide range of calculations incorporating addition, subtraction, multiplication and division.

The Two Units

The electronic calculator is composed of two units, the gang punch (Type 239/2) and the calculating unit.

- (a) The gang punch provides the input and output facilities for the equipment. Information to be processed is read from punched cards and transferred to the calculator. The results of processing are punched either into the same cards or into specially designated cards at the punching station of the Type 239/2 Gang Punch.
- (b) The calculating unit converts, stores and processes the information read by the input and passes the results back for recording in punched card form. Data is processed according to instructions drawn from control

panels which are quickly interchangeable. The program of processing is determined by plug wires inserted into these panels by the operator.

Operations are carried out, within the program capacity of the machine, at a speed of 6,000 card passages an hour, regardless of the complexity of the calculations. 50 program steps (200 primary cycles) are available for each card.

Operating Cycle

The cycle of machine operations consists of;

- (a) Sensing the input data;
 (b) Calculating in accordance with programs;
- (c) Punching results together with any indicative data;
- (d) Checking results.



ELECTRONIC DATA PROCESSING

ELECTRONIC CALCULATOR TYPE 550/2



TYPE 550/2 ELECTRONIC CALCULATOR

Capacity

The total capacity is 100 decimal or sterling digits, distributed as follows:

- Input —up to eighty digits comprising sixty digits to storage and twenty digits to the arithmetical unit (first and second registers);
- Output—up to twenty digits as product/s punched into one card together with non-processed indicative data. (If, however, one of the input registers is not in use, output can be increased to thirty digits).

Calculating

The arithmetic unit embodies an adding device (the 'adder'), a subtraction device (the 'complementer') and four working stores or registers wherein data is actually processed.

Calculating capacity in the four registers is up to ten decimal digits for addition and subtraction. For multiplication, working maxima are nine digits for multiplier, 10 digits each for multiplicand and product. Sterling multiplications do not require conversion and decimals of pence can be included. For division, the maxima (for dividend, divisor and quotient) vary according to conditions between eight and ten digits.

Optional simultaneous automatic checking is a feature of this equipment. For example, for multiplication the operation is performed in two different ways:

a x b=c and 10a x
$$\frac{b}{10}$$

and the resultant products 'c' are compared.

For division, complete checking is achieved by retaining the remainder and adding this to the product of the divisor and quotient for comparison with the original dividend.

An 'error' signal is provided to give warning if a discrepancy should be detected.

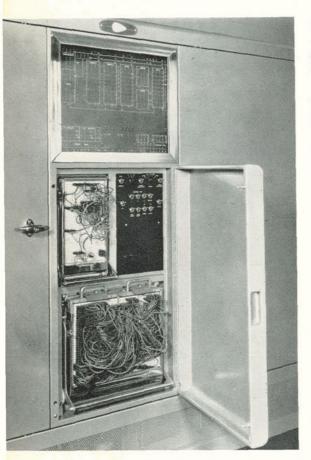
Other Facilities

These include group multiplication and division; negative values, punched true and designated; automatic zeroising; punch emitters for automatic designation punching; and electronic emitters for supplying constants.

Checking

Apart from the automatic check on calculations there are checks of conditions, e.g. 'RUN-OUT' control to prevent splitting groups of cards; a switch that operates when the card receiver is full, and a feature to ensure that card columns used for input or output information have not been double-punched or left blank in error.

Card Capacity	80 columns.			
Speed	6,000 card passages an hour.			
Voltage	200–260 volts, single phase, 50 cycles; or 350–450 volts three-phase, 50 cycles.			
Weights	Gang Punch: 9 cwts. 1 qr. Calculating Unit: 18 cwts.			
Dimensions	Gang Punch: Height, 46 ins.; Width, 31 ins.; Length, 48 ins. Calculating Unit: Height, 62 ins.; Width, 35 ins.; Length, 55 ins.			



The Calculator control panel



This machine extracts the information contained in an 80-column punched card and automatically prints it on the top edge of the face of the card, in letters and figures. The cards are sensed by brushes. There are 35 wires in the print head, arranged in a matrix of 7×5 , and each character is formed of dots made by the appropriate wires within the matrix. These impinge on to an inked ribbon and print one character at a time.

The machine is designed to operate in accordance with the standard I.C.T punching code, but it is also possible to interpret cards punched with any of seven other codes; the actual code required is selected by switches built into the machine. In particular, the interpreter can interpret and print out 5th Zone symbols (%, $\frac{1}{4}$, -, /, $\frac{1}{2}$, \cdot , @, and $\frac{3}{4}$) from double-punched cards, and the £ and * symbols by plugging. The standard alternative punching for months 10, 11, and 12 in a single column, can also be interpreted by programming on the control panel.

Card Capacity	80 columns.
Speed	40 columns a second interpreting; 140 columns a second skipping.
Voltage	230/250 A.C., 50 cycles only.
Weight	3 cwts. 2 qtrs. 8 lbs.
Dimensions	Height, 48 $\frac{1}{6}$ ins.; Width, 20 $\frac{1}{2}$ ins.; Length, 47 ins.

80-COLUMN PUNCHED CARD DATA PROCESSING

INTERPRETER TYPE 424

APR 2 7 1964





This machine will automatically:

- Merge or match in sequence two files of punched cards, selecting unmatched cards from both files;
- 2 Separate a file of merged cards into either two or three packs;
- 3 Check the sequence of a file of cards;
- 4 Select cards containing a pre-determined number or between a range of numbers irrespective of the sorted order.

Performance

The Collator has two separate feeds which may be replenished during machine operation. Cards pass into one or more of four pockets as requirements dictate. As a typical example the machine will associate name and address cards with their relevant transaction cards for subsequent invoice, statement production etc. It processes the cards selectively and alternatively from either feed into the desired association, rejecting unmatched cards. Its ability to distinguish recorded data extends to sixteen digits or eight letters in each card when merging or matching with selection of unwanted cards. This can be extended to thirty-two digits or sixteen letters on the more simple applications.

80-COLUMN PUNCHED CARD DATA PROCESSING

COLLATOR TYPES 365 & 368

APR 2 7 1964





TYPES 365 & 368 COLLATOR

Functions

As customarily employed, the Collator performs (automatically, economically and at high speeds) the routine operations of:

Filing	<u>-e.g</u> .	current transactions with previous transactions and balances;
Pulling	—e.g.	debit cards by reference to credit cards;
Merging	—e.g.	master, or name and address cards with detail cards;
Re-filing	—e.g.	master, or name and address cards for further use;
Selecting	—e.g.	debits in arrears;
Segregating	g—e.g.	last cards of groups or other single cards;
C1		and the second and a second and the

Checking -e.g. sequences of a/c numbers, clock numbers, etc.

Card Counting Feature

This can be supplied to:

- 1 Control the merging in sequence of a pre-determined or variable number of cards from one card feed either in front of or after single cards trom the second feed;
- 2 Insert master or descriptive cards at set intervals into a separate file of cards;
- 3 Check consecutive sequence in a file of cards.

Control Panel

Machine operations are governed by control panel plugging; and the versatility of the machine is such that many other interesting and useful operations can be undertaken by it.

Speeds

The maximum speed of each feed is 14,400 card passages an hour. Thus, when both feeds are operating simultaneously, the maximum speed is 28,800 card passages an hour. The speed of operation varies between these two limits according to the specific nature of the job.

Models	Type 365. Type 368, 4-Zone Alpha.				
Card Capacity	80 columns.				
Voltage	230 volts AC; 110 volts DC; 220 volts DC.				
Weight	7 cwts. 0 qtrs. 26 lbs.				
Dimensions	Height, 51 ins.; Width, 20 ins.; Length. 42 ins.				



This machine automatically classifies, groups and re-groups punched cards in any desired order at extremely high speeds. Its operation is usually preliminary to the work of the tabulator or computer, and is an important part of the processes which enable punched card methods to provide rapid day-to-day accounting and statistical information.

Thirteen pockets are available to receive processed cards. Twelve of these correspond to the maximum variety of recording possible in one column, i.e., '0–9', '10', and '11'. The remaining pocket is for cards not punched in the column being sorted. Each pocket has a capacity of 500 cards and a device that stops the machine when a pocket is full.

Method of Operation

0

The sorter is simple to use; the operator sets the single sorting brush—the punched hole sensing medium—on the column to be sorted, inserts a batch of cards in the feed hopper and depresses the start key. The card feed hopper can be replenished during the progress of the sorting operation without stopping the machine. On completion of the first run, the cards are removed and placed again in the feed hopper, the sorting brush set to the next column and the sorting process repeated. The number of runs needed is determined by the size of the fields being classified.

80-COLUMN PUNCHED CARD DATA PROCESSING

high speed sorter type 313





TYPE 313 HIGH SPEED SORTER

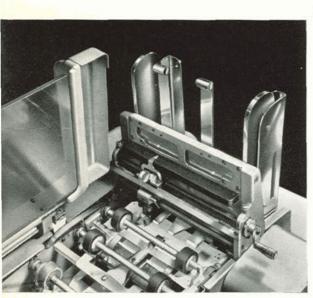
Automatic Selection

A standard feature is the selection of cards punched with significant designations, without disturbing the sequence of the remainder.

Card Counter

This attachment counts the cards being sorted. A second counter can also be fitted providing sub and grand totals.

Card Capacity	80 columns.
Speed	45,000 card-passages an hour.
Voltage	230/250 volts AC only. Starting load is 11 amps. and running load 3 amps.
Weight	5 cwts.
Dimensions	Height, 46 ins.; Width, 18 ins.; Length, 68 ins.



Column selecting and sensing mechanism



The basic machine is a high-speed automatic punch for reproducing punched alphabetical and numerical data from one set of cards into another.

Three Functions

It will perform three separate and distinct functions:

- 1 Reproduce part or whole of data recorded in one set of cards;
- 2 Gang-punch, or punch, repetitive data from a single master card, or interspersed master cards, into any desired quantity of detail cards;
- 3 Compare data recorded in punched hole form,
 - (a) as between two sets of cards and
 - (b) in succeeding cards.

These functions, reproduction, gang-punching and comparison, may be done simultaneously.

The machine may also be linked with an 80-column tabulator to act as a summary and balance card punch.

80-COLUMN PUNCHED CARD DATA PROCESSING

REPRODUCING PUNCHES TYPES 203 & 208





Flexibility

The machine is equipped with a control panel, similar in principle to a telephone switchboard, by means of which any desired arrangement of data may be transferred from a single card or cards into others.

End-printing Reproducer-Type 208

This machine is a development of the basic type 203 and will perform the same functions. In addition, it enables numerals recorded in a punched card to be printed in large characters along the right hand edge of the same card.

Optional Extra Features

Emitter.-This enables gang punching of a numerical constant (e.g., a date) to be plugged on the control panel.

Selector .- This device enables alternative fields to be selected for sensing or punching, or gang punching to be directed to different fields in the detail cards from those in the master cards. One or two selectors, each of 10 point capacity, may be specified.

Card Counting Device.-This records the number of cards passing through the feed or entering the stacker to which it is fitted.

Mark Sensing.-Is a further development of the Reproducing Punch (Type 203). Through mark sensing, pencil marks on a card, which can be made at any required location, are translated into punched holes in the same card.

Manual transcription of data into punched hole form is therefore eliminated and cards are punched automatically at a speed of 6,000 per hour in readiness for all subsequent machine processing which may be required. The mark sensing process is widely employed in many applications, the most common of which are stock control, payroll accounting, production control, cost accounting, plant records, surveys and market research, local government accountancy.

In a card designed for mark sensing, each mark has a width of three punching columns, and a maximum of twenty-seven columns of information can, therefore, be marked. The mark sensing capacity may be doubled by using both the face and the back of the card.

Card Capacity	80 columns.
Speed	6,000 card passages an hour.
Voltage	240 volts AC single phase; 110 volts DC; 220 volts DC.
Weight	6 cwts. 1 qtr. 24 lbs.
Dimensions	Height, 45‡ ins.; Width, 24 ins.; Length, 49 ins.



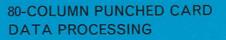
This machine is designed for positive verification of the accuracy of numeric, alphabetic or multi-hole punching in 80-column cards.

Equipped with automatically controlled card feed and eject, this is an advanced model in the range of automatic verifiers and provides a high output of card verifying, with manual operations and operator fatigue reduced to a minimum.

Positive Verification

The theory of verification is identical with that of any checking procedure; that repetition of the work by a different person reveals errors made by the one who originally performed the task. Punched cards are placed in the machine; the verifying operator, reading data from the same original source as the punch operator, then proceeds as though actually punching. Verification is positive. Sections of the card can be spaced over at high speed, with or without a check on the blank columns. Incorrect punching is instantly and automatically signalled by the machine. Errors arising from punching extra digital positions or from the omission of punching in a single column are also signalled automatically. Immediately an error is detected, the Verifier stops and a check light glows red. The operator may then depress the 'cancel' key and repeat verification; if the check light again glows, the punching error is confirmed and the card is automatically released to the end of the card bed, but is not ejected onto the stack of correctly verified cards.

Cards verified correct are indicated by a small 'v' which is notched in any one of four alternative positions along the top of each card, and then ejected into the stacker. This identification feature does not operate when an error has been detected.



automatic verifier type 129





TYPE 129 AUTOMATIC VERIFIER

Keyboard

In addition to having keys to perform the operations mentioned the keyboard unit is movable to any position convenient to the individual operator on the spacious table provided. The keyboard is interchangeable with other automatic Verifier keyboards of similar design. The machine can be specified for use with a numeric keyboard and/or an alpha-numeric keyboard, or with an alphabetic (typewriter style) keyboard.

Control Panel

This can be plugged to:

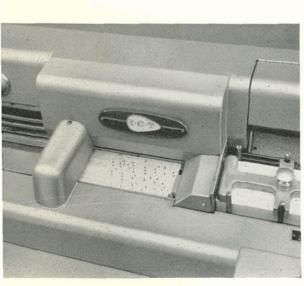
- (a) Provide automatic card feed to, or ejection from, any column of the card;
- (b) Space automatically over any pre-determined number of card columns, with machine verification ensuring, where necessary, that columns spaced over are unpunched;
- (c) Provide selectively controlled spacing, again with blank-column checking, which becomes operative by depression of the 'skip' key.

The standard machine has a non-detachable control panel, but can be specified for interchangeable panels.

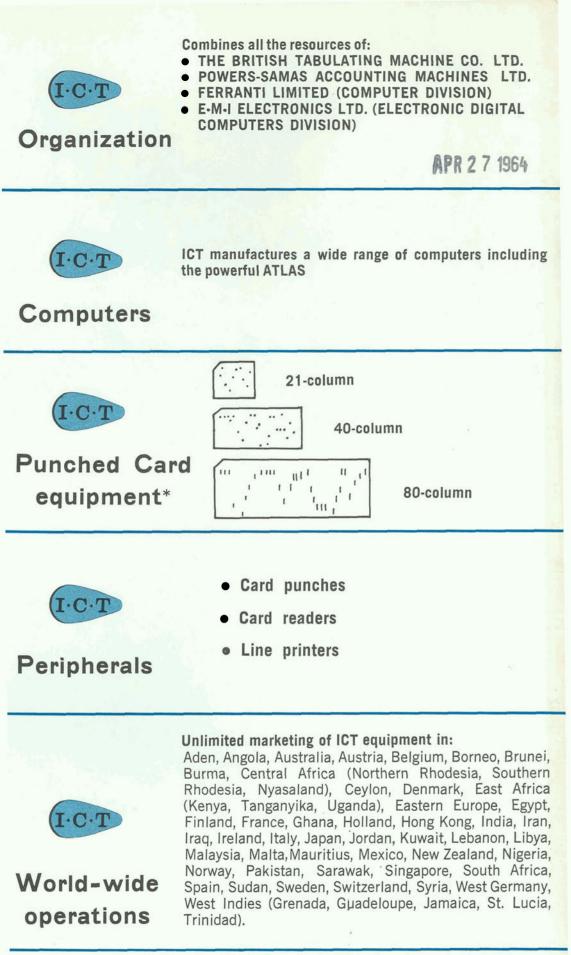
Card Visibility

Cards are almost wholly visible during verifying, a useful asset where cards are used in the dual capacity of original document and punched card record.

Card Capacity	80 columns.
Voltage	230 volts AC; 110 volts DC; 220 volts DC.
Weight	2 cwts. 3 qtrs. 24 lbs.
Dimensions	Height, 35 ins.; Width, 27 ins.; Length, 41 ins.



The card feed, showing almost complete visibility of the card to be verified.



*Manufactures the widest range of punched card equipment in the world.

O.E.M.

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