



General Information Manual

Order Writing, Billing and Sales Analysis

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* Trademark

Order Writing, Billing and Sales Analysis

Introduction

Order writing, billing and sales analysis constitute one of the most receptive areas for efficient mechanization in today's industry. IBM equipment offers countless advantages to aggressive management, such as greater profit opportunities and increased productivity. Rising clerical and warehouse personnel costs, coupled with lower output, are also forces which make the relatively "static" cost of mechanized methods increasingly attractive.

IBM systems for billing and order writing have been installed in companies throughout the United States. The methods vary with individual requirements, but the unvarying objectives and results are increased efficiency, correct pricing, and easily read customer invoices. Reports and analyses often not feasible because of the time and expense necessary for their preparation become natural by-products in an IBM system and offer management invaluable aids for timely decision making.

The flexibility of methods and the many types and capacities of IBM equipment available permit the use of the order writing and billing technique best suited for a particular size or type of industry. Within any basic method, infinite variations can be made to fit individual needs.

Orders

The source document for billing is the order. This order may take one of several forms. It may be telephoned or telegraphed to the vendor by the customer or salesman; it may be sent through the mail from the salesman or the customer.

If customers are numerous, varied or scattered, order blanks and catalogs may not be feasible. Customer purchase orders or letters describing items ordered in customer terms are then used. These must be screened and translated into language familiar to all vendor employees to prevent different interpretations of the same order by different persons on the vendor's staff.

The type of order form received at the point of shipment will vary with the industry.

Figure 1 shows a sample order form for a company where the number of products is large and the order form is filled in from a vendor's catalog. Orders of this type are prepared by the customer or salesman.

They outline the essentials necessary for proper shipment of the product.

Preprinted order forms are used by some businesses. These forms include the commodity number, commodity description (in vendor's terminology) and a blank space for customer to enter quantity (Figure 2). For example, a wholesale grocery (typically handling 3,000 to 5,000 different items) might use preprinted orders with the following advantages:

- Ease in customer's ordering.

- Increase in the number of items ordered, since the customer reviews the entire line.

- Simplified order and billing procedures, due to correct code numbers, descriptions, prices, etc.

- Order form sequence for ease in selecting merchandise.

Order Writing

If the order received from the customer or salesman does not provide the necessary information, it must be properly restated for the factory or warehouse and shipping department.

If the commodity is to be manufactured for the specific order, or if the commodity is not available for immediate shipment even though it is a standard item, restatement of the order is required. If the commodity is of such a nature that the weight or count of the shipment is not exactly as ordered, an entry of the quantity must be made after shipment and before billing. This condition would also require a restatement of the order.

A complete customer order should include ship-to and invoice-to name and address, date, order number, quantity, description of the item (in vendor's terminology if possible), and such special information as shipping, packing and marking instructions.

The objective of restating or rewriting the order is to provide for:

- Easier selection of the items ordered.

- A packing list.

- Package labels.

- An analysis of the orders, informing the plant what to produce (product requirements).

- Control of back orders.

- Acknowledgment of the order to the customer (or to the salesman, where this is the practice).

- Standardized nomenclature.

ORDER		NATIONAL PRODUCTS INC. GREENVILLE, MASS.		OFFICE USE ONLY	
SOLD TO <u>Seaside Home Supply Co.</u> <u>14 Seaside Ave.</u> <u>Richards Reef</u> <u>New Hampshire</u>				CREDIT DEPT. OK	
SHIP TO <u>Same</u>		DATE TO BE SHIPPED <u>4-15</u>		VIA <u>Freight</u>	
DATE <u>3-1</u> CUST. ORDER NO. <u>311</u> SALESMAN <u>J. Henry</u> NO. <u>86</u> INV. NO. _____		PLEASE SHOW COMMODITY NUMBER			
QUANTITY	DESCRIPTION	COMMODITY NUMBER	PRICE	CUSTOMER'S AUTHORIZATION	
3 doz.	Koldflo Elec Fan 12 in.	19941			
6 doz.	Koldflo Elec Fan 8 in.	19939			
3	Korn King Corn Poppers	42641			
3 doz.	Vacu-Lok Vacuum Bottles 1 Pt.	66488			
1 doz.	Luxury Heat Pads	12996			
ALL PRICES SUBJECT TO CHANGE WITHOUT NOTICE			DZ - DOZEN		
DELIVERIES WILL BE MADE FROM NEAREST BRANCH			GR - GROSS		
			C - HUNDRED		
			M - THOUSAND		
			CS - CASE		
			CT - CARTON		
			SALES OFFICES ARE LOCATED IN ALL PRINCIPAL CITIES		

Figure 1.

COMMODITY CODE NO.	DESCRIPTION - PK. & SIZE	COST-CASE	SUGGESTED RETAIL	ORDER RECORD	VOLUME	POLIO	VOLUME POLIO	
							1	2
1 55109	72 REG PA						1	29
2 55111	50 LG LA							
3 55113	50 LA							
4 55117	50 PA							
5 55119	72 PA							
6 55122	18 4 RGSW	CH K CH CHW MEIN 303	12	1268	45		6	1268
7 55123	48 BATH SW	CHU KNG CANT CHKN	12	1269	99		4	1269
8 55124	012 4 SW	CHU KN SOY SAUCE 50	12	1270	17			1270
9 55125	72 REG SW	CHU KNG CANT MUSH	12	1271	89			1271
10 55126	012 4 SW	CHU KNG NOODLES 2 1/2	12	1272	27		4	1272
11 55128	012 4 SW	ST BEAN SPROUTS 303	24	1279	29		3	1279
12 55129	50 CA	ST CHKN CHP SUEY 303	24	1281	29			1281
13 55130	024 3 BTH CA	ST NOODLES 303	24	1284	16		7	1284
14 55131	72 CA	ST SAUCE 50	24	1288	19		3	1288
15 55133	50 LU	LA CHOY SAUCE 30	24	1293	10			1293
16 55136	012 4 BTH LU							
17 55145	50 BATH LU							
18 55147	72 LU							
19 55149	72 REG LU							
20 55165	100 BATH ZE							
21 55166	024 4 BTH ZE							
22 55167	144 REG ZE							
23 55171	50 BATH DI							
24 55173	50 DI							
25 55175	50 DI							
26 55179	72 REG DI							
27 55180	024 3 RGD I							
28 55181	72 REG DA							
29 55182	024 3 RGD I							
30 55183	72 REG DI							
31 55184	024 3 RGD I							
32 55187	50 BTH I I							
33 55189	50 BATH I I							
34 55193	72 REG L I							
35 55195	72 REG L I							
36 55201	50 BATH PR							
37 55203	72 REG PR							
38 55204	024 3 RGP R							
39 55207	50 D O							
40		L&M FLT REG	5	1322	266			1322
41		LUCKY STRIKE REG	5	1323	245		9	1323
42		OLD GOLD REG	5	1324	245			1324
43		PH MORRIS REG	5	1325	245		5	1325
44		CAVALIER KING	5	1332	245			1332
							29	29

Figure 2.

STRAIGHT BILL OF LADING — SHORT FORM — ORIGINAL — Not Negotiable
RECEIVED, subject to the classification and tariffs in effect on the date of the issue of this Bill of Lading.

If charges are to be prepaid, write or stamp here, "To be Prepaid."

FROM NATIONAL PRODUCTS INC.
GREENVILLE, MASS.

INVOICE NUMBER
12345

SOLD TO [REDACTED]

POSTMASTER: CONTS. MUST RETURN POSTAGE GUARANTEED THIS PARCEL MAY BE OPENED FOR POSTAL INSPECTION IF NECESSARY

SHIP TO [SEAVIEW HOME SUPPLY CO
14 OCEANSIDE AVE
RICHARDS REEF N H]

CUST. NO.	SHIP VIA	SALESMAN	CUST. ORDER NO.	INVOICE DATE
10341	FREIGHT	86	311	4151
COMMODITY CODE	DESCRIPTION	QUANTITY	UNIT PRICE	AMOUNT
19941	KOLDFLO ELEC FAN 12 IN	36	219 5	10 612 0
19949	KOLDFLO ELEC FAN 8 IN	72	215 0	18 010 0
42641	KORN KING CORN POPPER	3	416 0	1 318 0
66488	VACU-LOK VACUUM BTS 2PT	36	18 8	3 116 8
12996	LUXURY HEAT PADS	12	315 0	4 210 0
				37 368

PACKING SLIP FROM NATIONAL PRODUCTS INC.

OFFICE COPY

ACCOUNTS RECEIVABLE

SALESMAN COPY

Figure 4.

A third copy may be an office copy, filed in invoice-number sequence as a reference to answer any questions about the invoice or any item billed.

A fourth copy may be an accounts receivable copy, filed in customer sequence as a record of the charge to the customer's account.

A fifth copy may go to the salesman who sold the merchandise.

The legibly printed invoice or order, which shows the warehouse location of each item, increases the speed and accuracy of order picking. It also sharply reduces "scratches" of items simply because they cannot be found without backtracking.

Separate invoice sheets can be printed for each warehouse floor, section, packing room, etc. Large orders may be split for parallel picking. Wholesalers who handle many small orders may prepare consolidated picking sheets for simultaneous picking of several orders by one man.

The printing of total pieces and weight (and also cubic volume equivalent, if desired) on each invoice assists in determining truck requirements and routing, and in assigning picker personnel in advance of order assembly. The same accurate piece count is also an

aid to order checkers and to customer receiving personnel.

Objectives

In addition to providing prompt, accurate invoices, the objectives of a billing procedure are to:

- Establish accounts receivable and sales analysis controls.

- Record merchandise shipped.

- Supply figures for sales or use-tax and royalty reports.

- Supply figures for commission statements.

- Prepare shipping documents (labels, bills of lading, delivery receipts, etc., if these are not included in an order writing procedure).

- Keep salesmen currently informed.

When order writing precedes billing or where pre-billing is practical, there are additional objectives:

- Interpret customer orders for stockroom operations.

- Provide a shipping order to expedite selection of items.

- Provide assurance that all orders are shipped.

- Control back orders.

Prebilling

Under a controlled inventory situation, where it is known in advance whether or not the item ordered is available, independent order writing is usually omitted, and billing is done directly, with a copy of the invoice becoming the order to the warehouse or plant for shipment. This procedure is referred to as pre-billing.

Postbilling

Where stock availability is not known or production is based on the order, order writing is usually accomplished first, and billing deferred until shipment is made. This type of billing is referred to as post-billing.

The use of the prefix "pre" or "post" with the word "billing" indicates whether the invoice is written before or after the merchandise is selected for packing and shipping. For example, a wholesale grocery doing prebilling writes an invoice upon receipt of the customer order, and a copy of the invoice is used for selecting the items ordered. A wholesale drug company, doing postbilling, prepares an order from which

the merchandise is selected, prints the invoice while the order is being packed and after it has been picked, and includes the invoice with the shipment.

Internal and External Billing

Internal bills are invoices directed to some unit within the same organization, such as warehouse, branch, or affiliated company. External bills are invoices directed to an outside organization or individual. In many cases, the procedure for internal billing does not differ from that for external billing. In other cases, however, internal invoices are simpler in form because they need to meet only local requirements.

Credit Memorandum

When a customer returns merchandise to the vendor, a credit memorandum is issued to the customer, in accordance with the terms of sale, together with a check for the credited amount or a statement reducing the net amount of the total indebtedness. The preparation of credit memorandums parallels that of invoices (Figure 5).

J. F. BAKER AND SONS

DAYTON BRANCH OFFICE - 1621 CHESTER AVENUE, DAYTON 16, OHIO

ACCOUNT NO. 12496	CLASSIFICATION 3421-96	TERRITORY 62-1	NARCOTIC NO. 73092
----------------------	---------------------------	-------------------	-----------------------

CREDIT TO: ANDREWS BROTHERS
124 MARKET STREET
DAYTON, OHIO

RETURNED BY: SAME

YOUR CLAIM NO.	DEPT.	TERRITORY	SEQ. NO.	CREDIT NUMBER	MO.	DAY	YEAR
6213	123	62-1	106	219-3421	06	21	

COMMODITY	QUANTITY	SIZE	DESCRIPTION	UNIT PRICE	DISC. %	NET AMOUNT
3184	33	24F	THERMOS FILLER	1 00		\$ 33 00
4689	12	6OZ	IRRIGOL	33		3 96
						\$ 36 96

CREDIT MEMORANDUM

ADDRESS ALL COMMUNICATIONS TO THE ABOVE ADDRESS

Figure 5.

IBM Methods of Order Writing and Billing

The use of the IBM billing technique best suited to a particular size and type of industry is made possible by the many types and capacities of IBM equipment available. In the following discussion of the basic methods and some variations of each, the reader should remember that countless additional variations exist and that portions of these methods can be combined in an almost infinite number of ways. However, before a procedure is established, sufficient thought should be given to all details so that no subsequent variations will be necessary.

Coding*

To take maximum advantage of IBM mechanization and achieve successful order writing and billing operations, codes must be established not only as a means of identification (warehouse location, packaging, etc.) but also as an aid in machine operations that precede and include the preparation of desired reports. In invoice and order writing applications, codes are assigned to customers and customer classifications, products and product classifications, salesmen, sales territories, etc. Codes may be the self-checking type, where a computed digit is added as the suffix to the base code to afford automatic verification during punching. After codes have been assigned they are applied throughout the system.

Code construction should be preceded by a complete appraisal of the job to be done and the required results and by a consideration of all possible methods for its accomplishment.

The construction of an adequate code should include exhaustive consideration of the following characteristics:

Flexibility—the code should provide room for additional entries in sequence.

Scope—the code should be designed to allow expansion to include additional categories.

Operation—the code should be adequate for all required accounting segregations.

Convenience—the code should be easy to assign.

Construction—the code should include the least possible number of digits consistent with the problem, to reduce punching and sorting effort to a minimum.

Identification—the code should, if possible, facilitate visual identification.

Converting Source Data Into Punched Holes

Once codes are established, card forms for commodity and customer name and address should be designed and printed. Into these cards the repetitive information is recorded in the form of punched holes to establish a master file of all commodities and a customer name and address file. In Figure 6 a card with the punched card codes is shown, along with a typical name and address card and a commodity card.

Once information is punched into the card and the accuracy verified, this card becomes a permanent record. Through the use of self-checking codes and the card punch, verification is accomplished simultaneously with the punching.

A card punch is used to create the master name and address cards, and partial or complete detail commodity cards. Depending upon the order writing and billing procedure, gang punches, reproducing punches, mark-sensing reproducing punches or calculators may be used to produce automatically additional cards or to complete detail commodity cards prepared by the card punch. Where information is automatically punched, automatic verification methods are used.

Tub Files

Unit Inventory Control Files

When the inventory of each commodity is known in advance of filling an order, and a commodity card can be created for each item in inventory, an ideal billing situation exists. Cards are added to the file as commodities are received, and removed from the file as orders are filled. The file, therefore, always represents the current inventory balance for each item stocked.

Unit inventory files of this type are used when a prebilling plan is followed. In prebilling, unit inventory cards selected from the file are used to produce a combined invoice and shipping authorization or order. The invoice is produced before the actual merchandise is selected in the warehouse in prepara-

* Refer to "Coding Methods," form number F20-8093, for specific methods of coding and for the way in which various codes may be prepared and applied.

tion for shipment. This has the advantage of not showing out-of-stock items on the shipping order and invoice, because the billing file represents the actual inventory.

In setting up a file for this situation, an accurate inventory must be taken and commodity cards reproduced from the master file for each item in stock and placed in a tub file. The commodities should be separated by high dividers for easy reference (Figure 7).

As orders are received a clerk pulls from the unit inventory file as many cards for each commodity as ordered, and the master name and address card for the customer is placed in front of these cards. The customer number is gang-punched into the commodity cards and the invoice written by one of the accounting machines.

Reordering of an item is controlled through the use of a minimum balance signal card inserted at a predetermined point within a group of commodity cards. When this card is encountered by the card puller, it is set aside for analysis by the buyer. The minimum stock signal A, danger signal B, and out-of-stock signal C are removed successively as the commodity cards are selected and forwarded to the buyer (Figure 8).

It is sometimes impractical to maintain prepunched cards for every unit of each commodity if large numbers of cards are involved. Changes in price, for ex-

ample, would require discarding all the affected prepunched cards. In this instance, a working quantity of prepunched cards would be maintained, and a manual notation would be made on a file record card to indicate the total units on hand for which cards have not been punched, and the total units on hand for which cards have been punched.

Serial numbers can be assigned to the prepunched unit inventory cards, and the file record card can also serve as a record of serial numbers assigned to prepunched unit inventory cards (Figure 8). As the unit cards are automatically gang-punched from the receipt cards, a serial number is end-printed on each unit inventory card. Thus, as cards are withdrawn or inserted in the files in serial-number sequence, the inventory count for each item can be ascertained by simple reference to the serial numbers on the cards.

The control by serial numbers can be the low-to-high (descending sequence) or high-to-low (ascending sequence) plan. In both plans the cards are pulled from the back of the file and new cards are added to the front of the file (Figure 9).

In the low-to-high plan the lowest number is pulled as a shipment is made. With the cards filed (the highest number in front and the lowest number in back), the two numbers can easily be read for determining the quantity on hand. The lowest number subtracted from the highest number, plus 1, equals the number of units on hand.

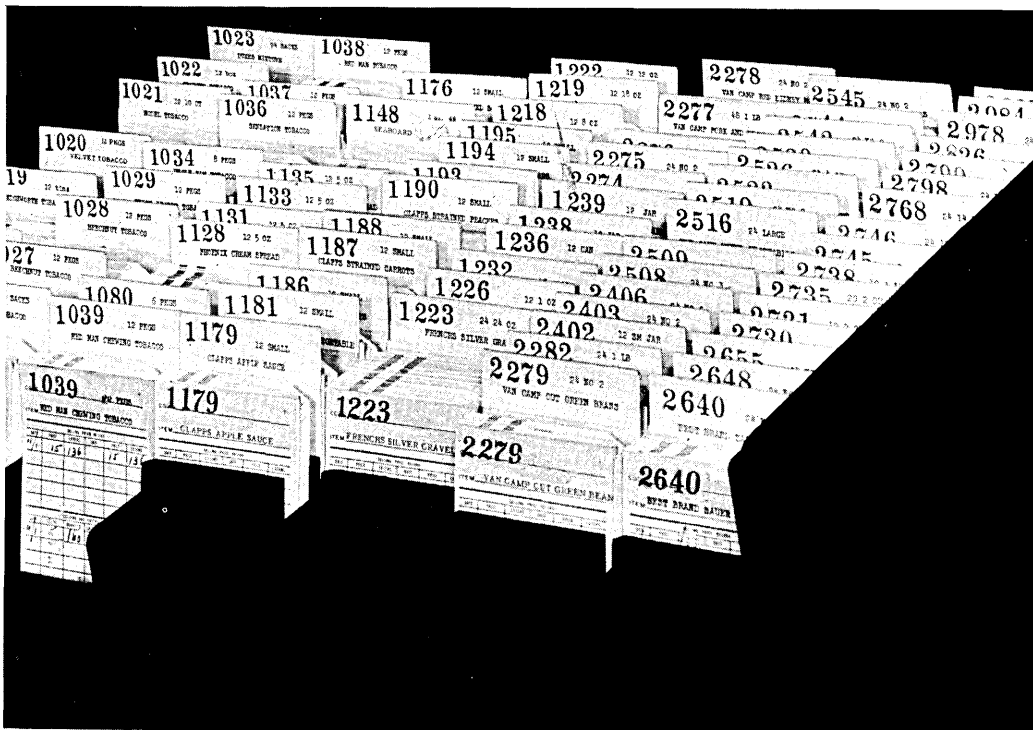


Figure 7.

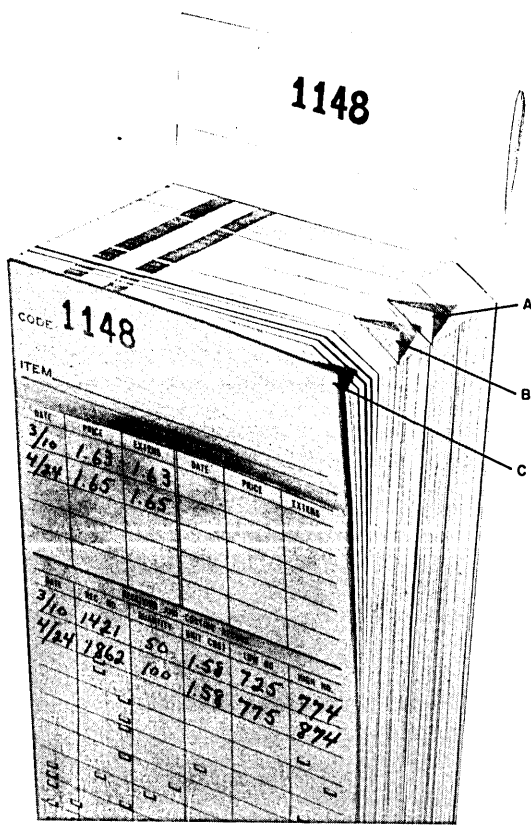


Figure 8.

In the high-to-low plan the highest number is pulled as shipment is made. The basic difference between this plan and the low-to-high plan is the fact that the serial numbers assigned start at 1 each time the supply of unit inventory control cards is replenished. The new cards are placed in front of the cards prepared previously and are separated by high dividers. Cards are pulled from the back to fill orders. The most recent group of inventory control cards (2347-1 to 2347-150) is filed in front of the file and is separated by the high divider card from the cards prepared previously (Figure 9). In this case, when the next card is to be pulled to fill an order, card 2347-4 will be removed.

A majority of items are in single groups and the inventory can be read by referring to the highest-numbered card. The remaining items in the file are either (1) those having two groups of cards, where the inventory on hand is the total of the highest numbers of both groups, or (2) those having one group of cards plus the unpunched balance on the file record card, where the inventory on hand is the total of the highest-numbered card plus the unpunched balance on the file record card.

Unit inventory files may be set up for standard units—that is, case, dozen, gross, etc. Files of this kind should only be used where orders will always be for the standard shipping units.

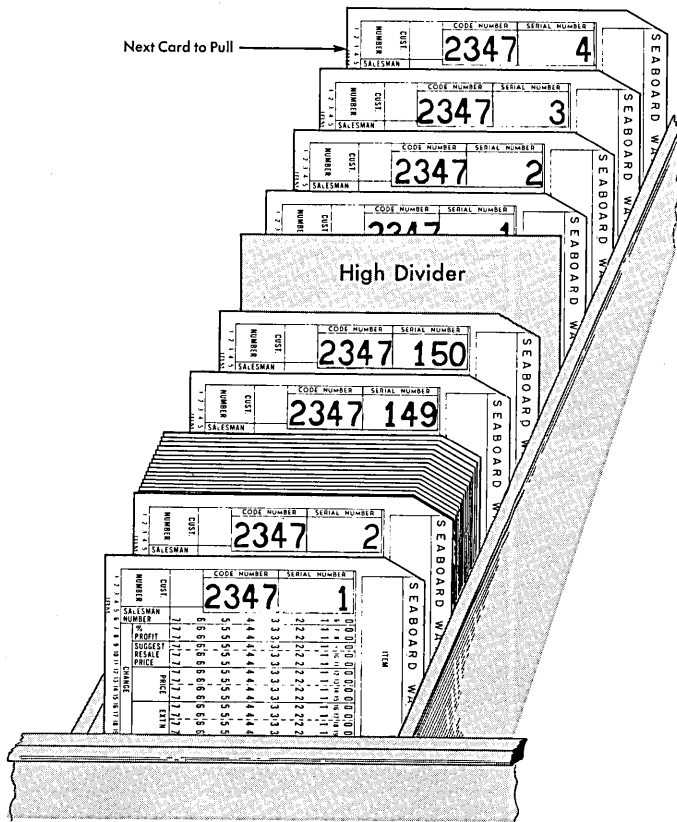


Figure 9.

Partially Punched Billing Files

In some billing and order writing situations a unit inventory control file is not practical. For instance, if quantity on hand for any given commodity, or the number of commodities, ranged from one or two up to hundreds or thousands, or if some other factor, such as unit price, were highly variable, it would be impractical to prepunch as many cards as would be required for all of the possible variations. In these cases, only the data that can be predetermined is included in the commodity master cards and a partially punched billing file is established. For example, the quantity field of the master commodity card is left blank and unit price, unit cost and commodity description prepunched.

Partially punched billing files can be used in either of two ways, depending upon the volume of cards required:

1. If the number of items is too many to have a quantity of cards for each item in one tub file, one card for each commodity is reproduced from the master commodity card file and a file is set up for each card punch operator. When an order is received, the operator selects a commodity card for each item on the order and, through the use of the card punch

equipped with a master card insertion feature, the selected card is duplicated to create an order commodity card. As this card is created, the quantity ordered is punched into it. The tub file card is then returned to the file and the card for the next item on the order is selected.

2. In the case where a tub file can contain a number of cards for each item in stock, a quantity of cards is reproduced from the master commodity card file and placed in the tub file. The commodities should be separated by high dividers for easy reference. As the orders are received, the order clerks select a commodity card for each item on the order. The cards and the order are forwarded to the card punch section, where quantity ordered is punched into each card.

From the original order the customer name and address cards are either selected from the customer master file or punched on the card punch and filed before the order commodity cards. The customer number is then gang-punched into the order commodity cards for each order. If this is an invoice preparation procedure, the cards are then extended (unit price times quantity ordered) on an IBM calculator.

The order or invoice is prepared by either the 403 or 407 Accounting Machine or the 870 Document Writing System.

Denominated Billing Files

When the quantities ordered involve larger numbers than can be handled practically by fully punched unit commodity cards, and partially punched commodity cards are not required, it may be practical to set up denominated billing files. In this case, the master commodity file is punched for various quantities, including all extensions of price and cost. Denominations may be arbitrary quantities or conform to customer ordering habits, where the selection would require a minimum number of cards to be pulled from the file to meet any ordered quantity. Thus, the denominations of a given commodity might be 1, 2, 3, 4, 5, 10, 25, 50 and 100. If an order calls for a quantity of twelve, one 10-denomination and one 2-denomination card would be pulled from the file. In other instances the denomination may conform to the shipping package or container. A given item may be packed two units in a box, six boxes in a carton, and six cartons to a case. The denominated file is then set up for quantities of one each, one box, one carton, and one case. An order for three units, in this case, would require the selection of one 1-each card and one 1-box card; for an order of twelve units, a single 1-carton card would be selected.

Denominated billing files may or may not provide inventory control. For example, inventory billing files can be denominated as to quantities, so that the units involved would be units of five or ten or one dozen instead of only one. In other instances, the actual number of commodity cards in the billing file would have no direct relation to the actual number of units of merchandise in stock. A sufficient number of cards for billing purposes only is then maintained in the file. Signal cards, in this case, do not indicate an actual replenishment point or low-stock position.

Warehouse Bin Plan

In this plan, prepunched commodity cards containing all identifying information are placed in small containers in the corresponding merchandise bins. The cards are removed by the warehouse pickers at the same time that the merchandise is picked for shipment, using the order as the source document for pulling. They are then forwarded to the machine accounting department, where they are combined with customer master cards to prepare the invoice while the merchandise is being packed. Before shipment, the invoice is inserted in the package so that the customer will receive it with the merchandise (Figure 10).



Figure 10.

Order Writing and Invoice Preparation

Where inventory control is not an integral part of the billing file, it is usually necessary to prepare a shipping order as a separate document. At the time the shipping order is printed, it may not be known whether the commodities ordered can be shipped. The final invoice preparation must wait until the shipping order has been returned from the shipping department with an indication of the actual items and quantities shipped. In this case the same cards used to prepare the shipping order, adjusted as necessary,

are used to produce the final invoice.

Orders or invoices from cards selected from any one of the preceding tab file methods are written on (1) the 403 or 407 Accounting Machine or (2) the 870 Document Writing System.

1. On the 403 or 407, as the name and address cards and the order commodity cards are read by the accounting machine, the order or invoice is prepared. If it is a postbilling or an inventory-controlled procedure, the order commodity cards are extended (unit price times quantity) before the writing of the invoice, and a summary punch is connected to the accounting machine so that an accounts receivable

card with invoice total, customer number, invoice number and date may be punched for each invoice.

2. The IBM 870 Document Writing System consists of a control unit with or without paper tape reader or printing; to this an auxiliary keyboard, card punch, one or two non-transmitting typewriters, and a tape punch may be added.

Using this system it is not necessary to record the customer number and quantity ordered for each item in the order commodity card, since this information, as well as order number and date, can be entered through the keyboard on the control unit or the auxiliary keyboard.

LOC.	QTY.	ITEM NO.	DESCRIPTION	UNIT PRICE	EXTENSION	CUST. NO.	RT. NO.	ORDER NO.	ORDER DATE
22	2222	2222	METAL SCREW			11359		24-52	
33	3333	3333	10/30 MOTOR OIL			11167		06-15	

WHOLESALE DISTRIBUTOR CORP. ANYTOWN, U.S.A.									
SOLD TO		INTERNATIONAL PARTS 16 EASTERN PARKWAY NEW YORK, N. Y.			11359 CUSTOMER NO.		24-52 ROUTE NO.		
SHIP TO		SAME			11167 ORDER NO.		06-15 DATE		

QTY.	ITEM NO.	DESCRIPTION	U/M	UNIT PRICE	CHECKER
1	125	26872 METAL SCREW	BX	1.65	
2	30	45268 10/30 MOTOR OIL	CS	7.20	

LOCATION	QTY.	ITEM NO.	DESCRIPTION	U/M
6249	125	26872	METAL SCREW	BX
6253	30	45268	10/30 MOTOR OIL	CS

INTERNATIONAL PARTS 11359 2452 16 EASTERN PARKWAY NEW YORK, N. Y. 2									
SAME									

LOC.	QTY.	ITEM NO.	DESCRIPTION	UNIT PRICE	EXTENSION	CUST. NO.	RT. NO.	ORDER NO.	ORDER DATE
22	2222	2222	METAL SCREW			11359		24-52	
33	3333	3333	10/30 MOTOR OIL			11167		06-15	

Figure 11.

Figure 11 shows a sample card input of the system, the order and order picking tickets, and the card output prepared by the system. In this particular example the tape reader and tape punch are not used. However, the input or output data could be in the form of punched tape received or sent by wire transmission.

Order picking is greatly improved through the use of an IBM-prepared order or invoice. Items can be listed in the same sequence in which the merchandise is arranged in the warehouse, thus eliminating unnecessary steps and backtracking by order pickers. Equally important, for the most efficient warehousing, all items can be physically located according to weight, bulk and demand, resulting in shorter order-picking paths and minimum ton-mileage of picker effort. Typically, the commodity codes are not warehouse sequence codes, since it would then become necessary to change commodity code if warehouse location changed. The chain grocer, for example, usually has a four- or five-digit commodity code and a four-digit warehouse code. In cases where the commodity code is not warehouse sequence code; the order commodity cards should be sorted in warehouse sequence before writing the order (Figure 12).

Batch Billing

Through the use of IBM unit record equipment many invoices can be processed at one time. This method is called batch billing (Figure 13). It is particularly adaptable to the wholesale distribution industry and other organizations where sales are made in standard packaged units and where there are a large number of items and heavy daily activity. It is a prebilling operation and inventory control is an integral part of the system.

To start the system, an accurate inventory must be taken of all commodities in stock and a stock balance card file set up for each commodity. Recorded in these balance cards are the commodity code, commodity name, pack, weight, unit cost, unit price, date, quantity on hand, and extension of unit cost.

As items are received into inventory, receipt cards are punched from the receiving slips with commodity code, quantity and cost.

As an order is received, an order commodity card is punched for each item on the order (commodity code, quantity ordered and customer number).

The receipts and order commodity cards are sorted by commodity code and matched-merged with the balance cards on the IBM collator. A blank card,

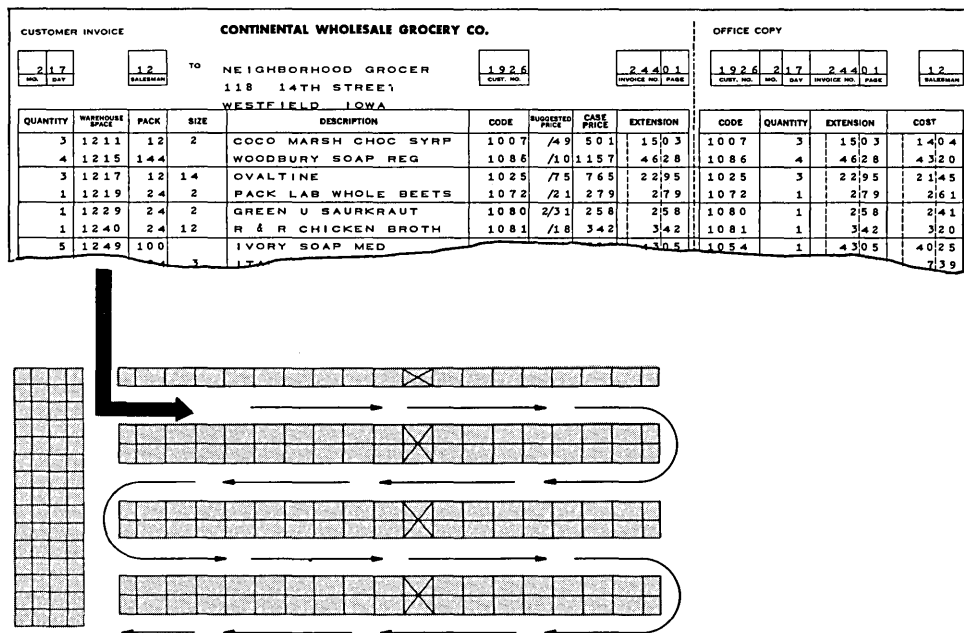


Figure 12.

Figure 14.

which will become the new balance card, is collated after each group of commodity cards (Figure 14).

The cards are then processed through an IBM electronic calculating punch, where the following operations take place in one pass of the cards:

1. The indicative information (commodity number, description, unit price, pack and unit weight) is gang-punched into all the cards. During this operation the calculator detects double-punched or blank columns in the numerical fields.

2. For each commodity:

- a. The old balance and the receipts are added, orders are subtracted, and the resulting new balance is punched into the new balance card.
- b. The retail value (quantity ordered times unit selling price) is computed and punched in each order commodity card.
- c. The weight (quantity ordered times unit weight) is computed and punched in each order commodity card.

Note: During the computing operations, if the on-hand balance reaches zero, all calculations for that item are suspended and order commodity cards for which stock is not available are punched with a significant punch. These cards are either eliminated before invoicing, so that the invoice contains only items for which stock is available, or listed on the invoice as items to be back-ordered.

3. Inasmuch as the cost is included in the balance card and in the receipt card, the new average unit cost can be calculated and punched in the order commodity cards and in the new balance card during the same pass through the machine. When the calculations are completed the cards are separated on the sorter. On a second pass through the machine all calculations are refigured and punched and the results checked through the use of the double-punch and blank column detection feature of the machine.

A customer name and address file (including a ship-to address card and other repetitive information required for invoicing) is also maintained. The order commodity cards are sorted by customer number and collated with the customer name and address cards, and the invoice is prepared on the IBM accounting machine. When a summary punch is connected to the accounting machine, an accounts receivable card can be punched for each invoice.

The new balance cards are filed in the item balance file until a new batch of bills is to be processed. The receipt and old balance cards are filed for possible future use.

This procedure can be modified in many ways regarding both the IBM equipment used and the manner in which the order commodity cards are prepared. The following is a variation to preparation of order commodity cards used by the wholesale grocery:

IBM Card Order Plan

The primary advantages of this method over manual card punching of the order commodity cards lie in the areas of cost-reduction, improved accuracy and increased speed in the batch billing operation.

This plan uses IBM mark-sense cards in combination with a catalog as the transcript order at the ordering point. The catalog is used repetitively for successive orders. A new set of order cards, one for each sheet in the catalog, is used for each order from one customer. Each transcript order card is marked at the ordering point and the automatic conversion process produces a separate detail item card for each item marked on an order card.

The card order catalog provides for 25 order lines on each side of a sheet. The horizontal rulings on the catalog sheet align with the rulings on the order card. The catalog sheet is easily matched with the proper

order card, because the sheet number is preprinted on each catalog sheet and end-printed and prepunched on each order card. Customer number is also punched and preprinted in the order cards (Figure 15).

By using this order card, it is possible to order up to 50 separate items on one card. To originate an order, it is necessary only to match the card order catalog sheet on which the desired item is listed with the order card end-printed with the same sheet number, and then mark the order card, on the line opposite the item listing, with the quantity desired. The marked order card is then sent to the central location for processing. After a mark-sense punching operation which punches quantity ordered, the order card is processed by the IBM card order converter, which produces the order commodity cards (store number, commodity code and quantity) automatically (Figure 16).

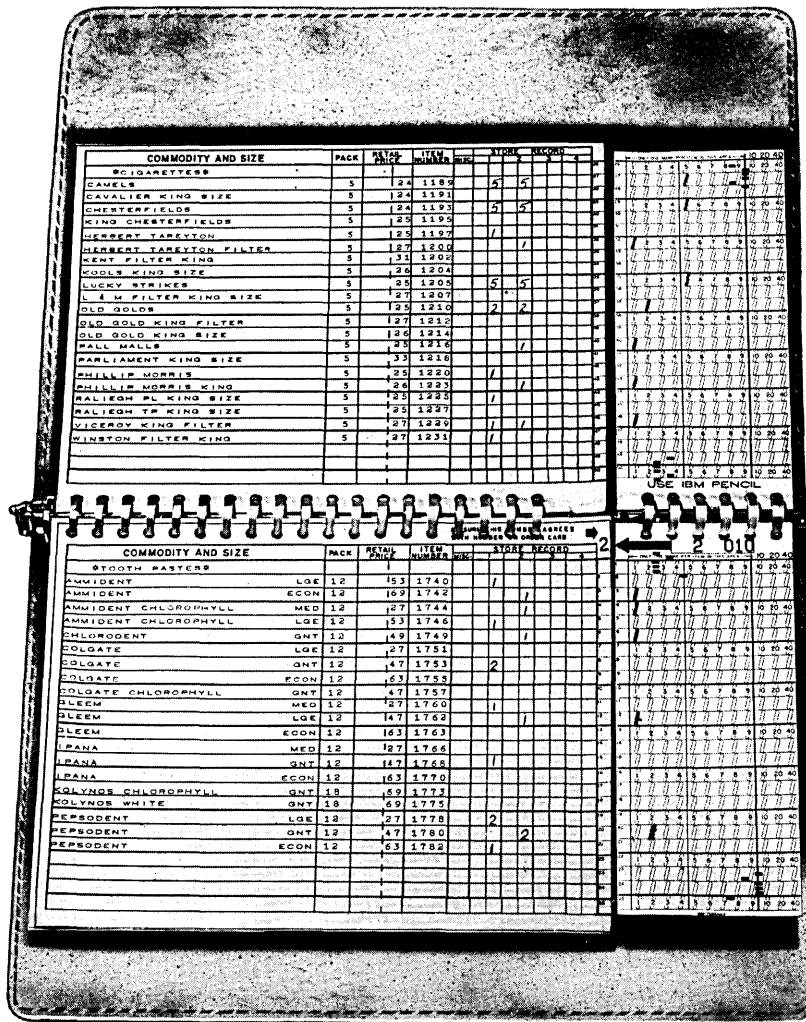


Figure 15.

Stock Allocation Plan

This procedure can be used when there is a need for instant references to stock balances to answer telephone and telegraph inquiries. It is based upon a requirement that orders be pre-edited for stock availability before writing, thus giving the order clerk the chance to split available stock among the customers. The plan is used where there are thousands of items in inventory, with a restricted number active each day, and where items out of stock must be back-ordered or substituted daily.

The item balance card file is maintained in a drawer about two inches wider than the cards. All cards are filed to the right of the drawer.

When an order is received, a customer order master card is punched with the usual reference data, plus the *total* number of different items on the order. This number serves as a control for punching an individual card for each item ordered, and this punching is done either by means of the collator with a counting feature and the reproducer, or by means of a count-controlled gang-punching reproducer. These cards are gang-punched with the order number and with the consecutive line number (representing number of items on the order).

The cards and the order go to a stock editor who has access to the item balance file. Item order card number 1 is selected, and reference is made to the item balance card file by product name. The item order card is sense-marked with transaction code, and quantity to be shipped is marked or back-ordered. The item order card is filed behind the item balance card and both are offset to the left (Figure 17).

In the same manner, coded cards for receipts, on order, and other inventory transactions are inserted

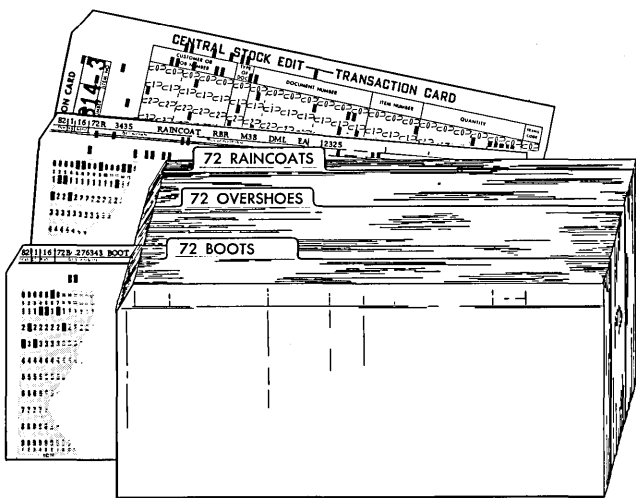


Figure 17.

behind offset item balance cards. Therefore, if more than one inquiry takes place per period, the revised balance may be readily calculated or the available stock allocated to each customer.

Periodically the offset cards are removed from the file (being replaced with OUT signal cards) and sent to the machine accounting unit for processing of the invoice.

CARDATYPE® Plan

The extreme flexibility of the IBM CARDATYPE Accounting Machine makes it possible to tailor an efficient and economic order writing or billing procedure to fit almost any requirement.

The CARDATYPE will type on a document from information punched in IBM cards, from manual operation of the typewriter, or from information keyed into the auxiliary keyboard. When it is equipped with the full complement of optional features, the CARDATYPE Accounting Machine can type on as many as four separate typewriters simultaneously or selectively. The data typed need not be identical. At the same time that information is being typed from the card, the auxiliary keyboard, or the transmitting typewriter, it may be punched into tape or an IBM card.

Automatic typing may be interrupted at any time to allow manual operation of any typewriter keyboard.

Totals can be accumulated in counters from information punched in cards or set up in an auxiliary keyboard. These totals are available at any time for typing on the document and for punching into a tape or into IBM cards.

Extensions, or other multiplications, can be performed automatically.

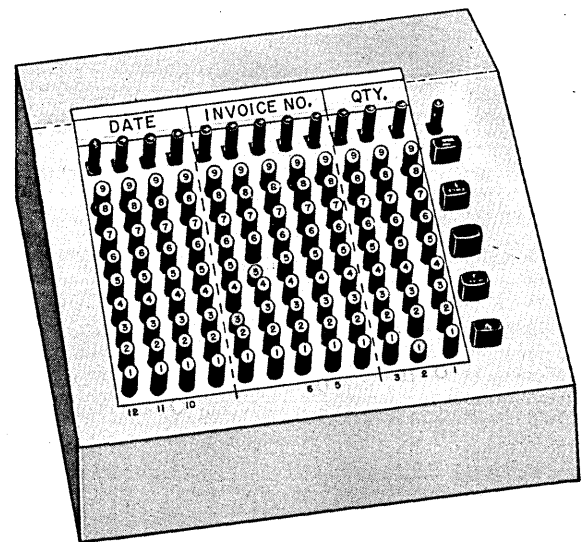


Figure 18.

The following are the steps which can be performed to create any invoice or order from fully punched name and address cards and partially punched order commodity cards. (Before preparation of the invoice, the customer order is audited for delivery date, delivery instructions and customer credit status. It is coded with invoice number, discount rate and tax percentage.)

1. Repetitive data (date, first digits of a block of invoice numbers, etc.) is set up on the auxiliary keyboard (Figure 18).

2. The operator selects the name and address card (and ship-to address card) from the file and places it in the card reader. If the ship-to address is the same as the billing address, the card can be reread and printed by depressing the control key.

3. While the billing and ship-to addresses are being automatically typed, the order number and last digits of invoice number are entered on the auxiliary keyboard by the operator.

4. The specific shipping instructions are typed by the operator on the typewriter which is preparing the invoice.

5. Order commodity cards are inserted in the card reader either one at a time or in batches. The requested quantity for each item is entered on the auxiliary keyboard and, as the indicative information for each item is being automatically typed, the arithmetic unit computes the extensions.

6. As the CARDATYPE is performing its automatic functions, the operator can refile the name and address card and the order commodity cards which have been processed.

7. When the appropriate prepunched miscellaneous information card (which usually contains discount percentage) is inserted in the card reader, it causes the gross invoice amount to be typed, and the discount, sales tax and invoice total to be computed and typed automatically.

At the same time that the invoice is prepared, the secondary typewriter can prepare a picking tag for the selection of the item in the warehouse. The punching unit can create an inventory and sales analysis detail card for each item and an accounts receivable card containing the invoice totals (Figure 19). These cards are separated by sorting on card number and

CONSOLIDATED DISTRIBUTORS, INC.
FORT LEE, NEW YORK

INVOICE TO
608 AUTO SERVICE INC.
123 NORTH BROADWAY
NEW YORK, NEW YORK

TERMS
2/10 NET 30

SHIP TO
608 AUTO SERVICE INC.
123 NORTH BROADWAY
NEW YORK, NEW YORK

TRUCK DELIVER BEFORE 9AM 17323 7|12 35182

STOCK NO.	DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	AMOUNT
212526	BEARING PILOT	EA	12	.55	6.60
			1	34.25	34.25
			12	1.30	15.60
			15	7.45	111.75
			1	89.45	89.45
			3	4.50	13.50
			6	12.60	75.60
			6	11.92	71.52
			1	78.50	78.50
			1	375.00	375.00

GROSS INVOICE AMOUNT 771.20
5 PER CENT DISCOUNT 38.56
3 PER CENT SALES TAX 21.98
INVOICE TOTAL 754.62

CONSOLIDATED DISTRIBUTORS, INC.
PICKING TAG

STOCK NO. LOCATION
212526 152

BEARING PILOT

35182 EA 12
INVOICE NO. UNIT QUANTITY

STOCK NO.	CUSTOMER	ORDER NUMBER	DATE	INVOICE NUMBER	TAX	AMOUNT	MONTH	DAY	YEAR
30803	AUTO SERVICE INC.	17323	7/12	35182		754.62	07	12	34

CONSOLIDATED DISTRIBUTORS, INC.

Figure 19.

held for later accounting and analytical procedures.

Numerous alternatives to this billing procedure can be selected, depending upon the machine configuration and type of files used (Figure 20). For example: (1) if the shipping instructions for a customer were constant, a punched card should be created containing that information and be placed in the name and address file; (2) an invoice register may be typed at the same time as the invoice is prepared; (3) the preparation of a punched card picking tag may be more desirable than a typed picking tag; (4) if distribution is made in standard packaged units, the order commodity card can be prepunched with

quantity and extensions of price and cost. Direct results of prepunching the additional information in the order commodity cards are the elimination of entering quantity in the auxiliary keyboard and the extensions of each item by the arithmetic unit.

It should be noted that the IBM 870 Document Writing System can also be used effectively for order writing. With this flexible system, as many as two typewritten documents, two punched cards and one telegraphic punched paper tape can be created from information manually keyed or automatically sensed by the punched card-reading or telegraphic paper tape-reading mechanism.

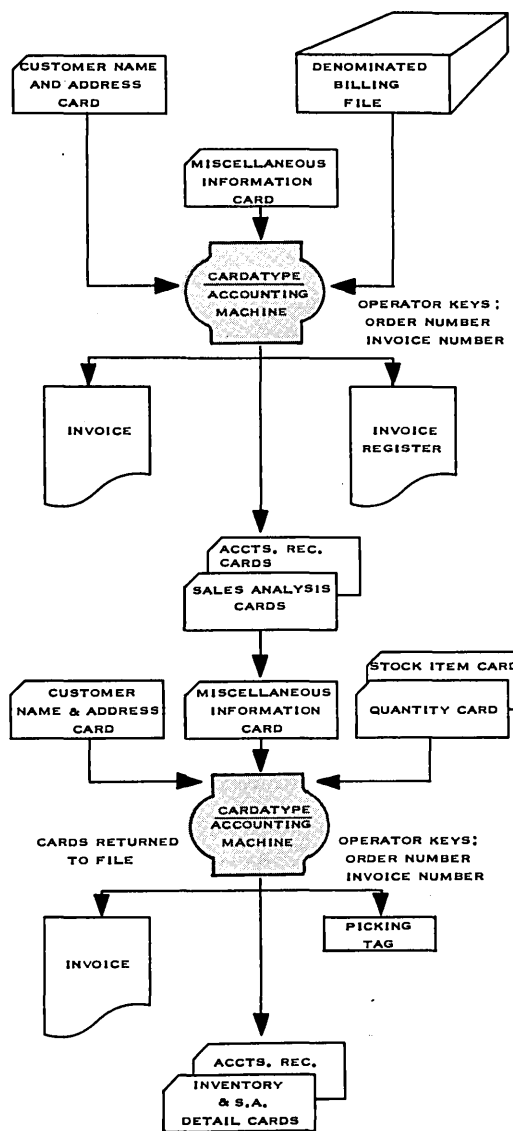
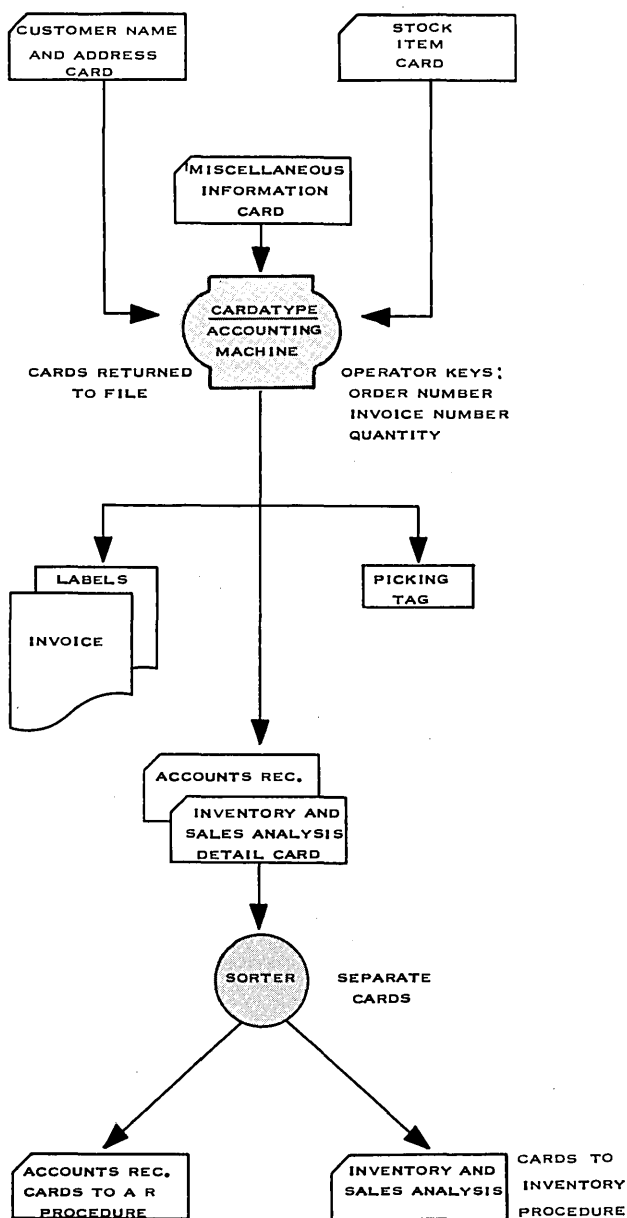


Figure 20.

RAMAC® Systems and In-Line Processing

RAMAC is a registered IBM trademark derived from the phrase: Random Access Method of Accounting and Control.

The outstanding feature of any RAMAC system, that sets it apart from other data processing systems, is the large addressable memory file or disk storage. The disk storage capacity allows the records of a business to be stored in the machine where they are processed. Each unit of data is available with equal facility so that transactions can be processed in any

sequence, as they occur. Each record is current as of the last transaction.

A RAMAC system may consist of a disk storage unit, processing unit, console and such input-output units as card reader, keyboard, typewriter, printer, and card punch (Figure 22). To this basic system, other units may be added. This complete accounting system, with computing ability, permits orders to be processed on-line as they are received, and allows all affected accounts to be adjusted during the same processing step.

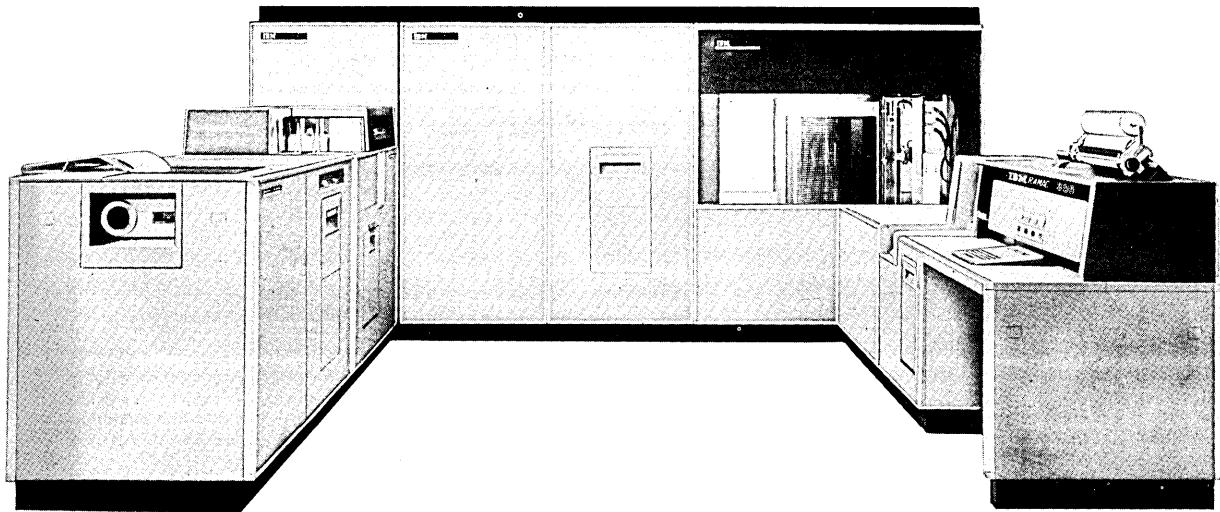


Figure 22.

RAMAC systems are particularly advantageous to large-volume wholesale distributors who require expedited shipments and constant inventory control. Since the RAMAC system features inventory control, it permits prebilling without adjustments. Stock conditions, such as inventory below minimum reorder points and out-of-stock, are automatically detected by the RAMAC system, and buyers receive immediate notice of such conditions.

Facility of interrogation is provided. When a given account or commodity number is typed as an inquiry on the electric keyboard, a typewritten answer is received in less than two seconds.

The disk storage unit can contain inventory and sales records for each commodity, customer name and address records including accounts receivable balances, and vendor records. Careful planning of the organization of the files—that is, assignment of com-

modity codes and customer numbers, etc., for disk storage address purposes—and an understanding of the basic theory of the entire approach are absolutely necessary.

The following procedure represents a possible billing procedure using a RAMAC system:

File Organization

In Figure 23, representative commodity, customer and vendor disk records are shown. Note that in the commodity record, two formats are shown. The first pertains to information necessary under plans for a modified tub and bin approach; the second format is necessary when the file is to contain all the commodity data. Commodity, vendor and customer numbers represent not only the codes assigned to these classifications, but also the disk storage address.

IBM TELE-PROCESSING* Equipment

In all previous discussions it was assumed that all orders were received at the point of shipment and that the invoicing or order writing was done at the same location. However, the nature of any centralized accounting operation requires that reports, bills, analyses and other documents be consolidated from source data received from many different and widespread locations. For years this data has been sent from these locations to the central processing point by mail or messenger service, or, after conversion to the proper medium, by telephone or telegraph. More recently, IBM TELE-PROCESSING equipment has made it possible to send data directly through telephone or telegraph facilities automatically and economically, and without the need for prior conversion to another medium.

The IBM 1001 Data Transmission System offers further economies in sending information from multiple locations, regardless of distance, to a central

processing point, over leased or toll telephone lines.

For example, in chain store organizations, store orders can be sent to headquarters on a schedule that provides for faster shipment of goods. This minimizes both store and headquarters inventories, and reduces losses due to the spoilage of perishable goods.

Each store keeps a tub file of cards prepunched with the commodity number for each item stocked. (An alphabetic description is provided for easy reference.) Cards may be printed to provide for the manager to keep a record of date and quantity ordered over a period of months. The manager makes up his order by pulling cards on commodities needed. His latest notation tells the card reader operator how much to order. As the clerk feeds these cards into the card reader and keys in the required quantity, the data is transmitted to the warehouse, where it is received in the form of punched cards. From these cards, invoices or orders are processed (Figure 27).

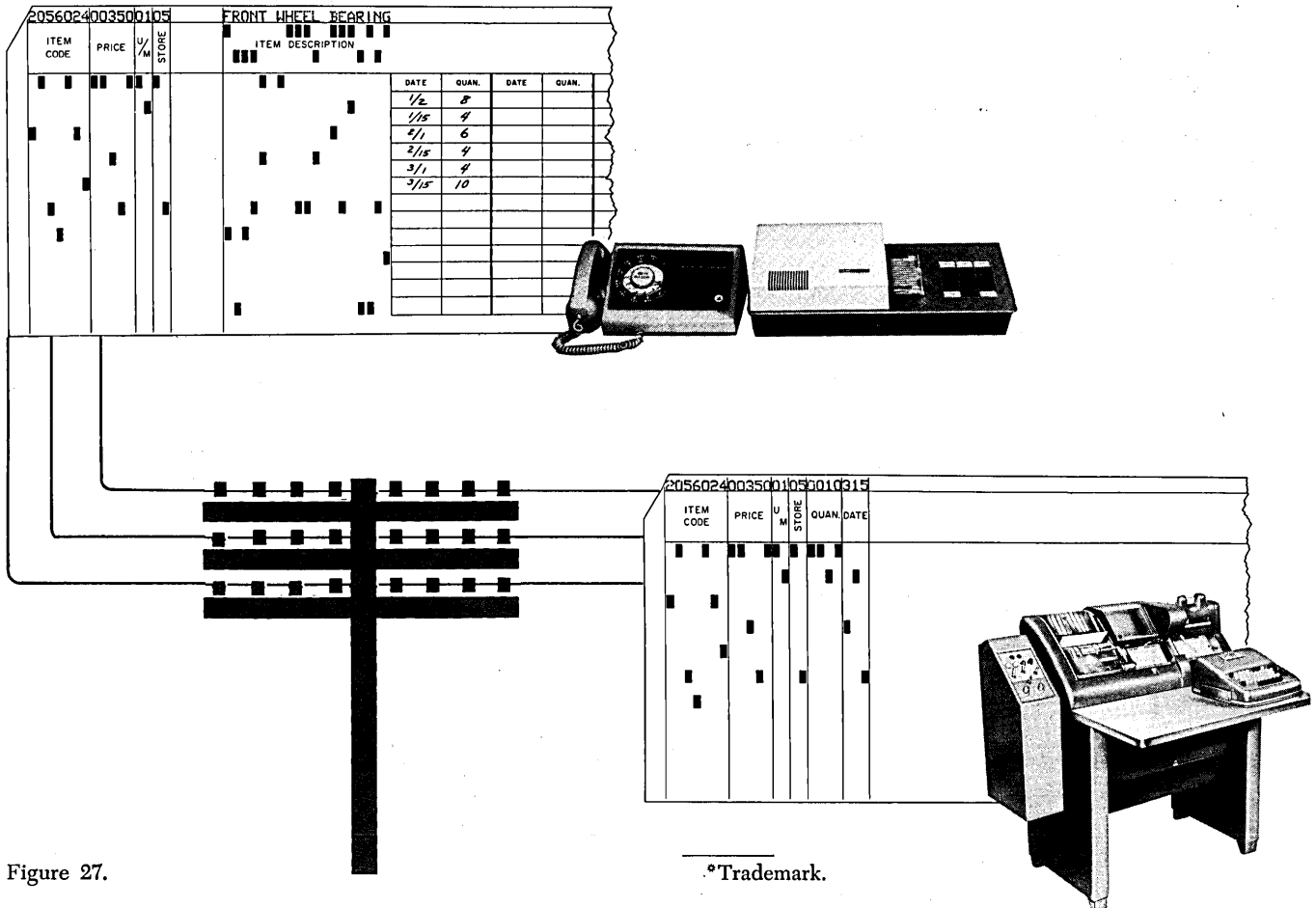


Figure 27.

*Trademark.

Sales by Commodity

Year-to-date commodity summary cards prepared the previous period are sorted with the order commodity cards by commodity code for the preparation of commodity sales analysis. This report not only provides the quantity sold during the current period, but the quantity sold year to date. The cost value is subtracted from the sales value to determine the monthly gross profit of each product. New summary cards are punched simultaneously with the report preparation and are held for the next period's report (Figure 30).

Sales by Customer

Additional analysis factors are shown on the customer sales analysis. Cumulative dollar value summary cards containing current year-to-date and previous year sales amount are sorted with the order commodity cards by customer number. The customer sales analysis is prepared and simultaneously new summary cards are created. The report reveals the sales amount for this month, year to date and last year for each customer (Figure 31).

CONSOLIDATED DISTRIBUTORS, INC.									
PRODUCT SALES ANALYSIS									
DESCRIPTION	STOCK NUMBER	UNIT	QUANTITY		UNIT COST PRICE	THIS MONTH COST AMOUNT	UNIT SALES PRICE	THIS MONTH SALES AMOUNT	THIS MONTH GROSS PROFIT
			THIS MONTH	YEAR TO DATE					
BEARING PILOT	212526	EA	69	367	1375	24.38	155	35.75	11.37
CYLINDER END PLATE	309749	EA	8	65	485	38.80	750	60.00	21.20
TRANSMISSION CASE	429739	EA	15	82	2250	337.50	3425	513.75	176.25
CHAIN TIMING	451643	EA	152	497	595	904.40	915	1390.80	486.40
GASKET VALVE COVER	453812	EA	63	523	925	58.28	130	81.90	23.63
VALVE EXHAUST	455316	EA	9	118	160	14.40	245	22.05	7.65
BEARING CAMSHAFT	455476	EA	209	863	755	157.80	125	261.25	103.45
VALVE INTAKE	459704	EA	12	93	130	15.60	195	23.40	7.80
CABLE BRAKE	461009	EA	135	697	510	688.50	775	1046.25	357.75
WHEEL	462614	EA	20	102	5950	1190.00	9850	1970.00	780.00
SEAL OIL FR WHEEL	506380	EA	193	1002	495	95.54	745	143.79	48.25
CRANKSHAFT	507676	EA	2	37	5750	115.00	845	178.90	63.90
CLUTCH SYNCHRONIZER	508983	EA	11	62	925	101.75	1405	154.55	52.80
CAMSHAFT	509958	EA	11	79	2050	225.50	3275	360.25	134.75
			29815	205922		49372.37		75742.09	26369.72

Figure 30.

CONSOLIDATED DISTRIBUTORS, INC.					
CUSTOMER SALES ANALYSIS REPORT					
DATE JULY 31					
CUST. NO.	CUSTOMER	SALES-MAN	SALES AMOUNT THIS MONTH	SALES AMOUNT YEAR TO DATE	SALES AMOUNT LAST YEAR
96	THOMAS ADAMS	1237	59.50	175.23	582.73
125	AEBERLY REPAIRS	367	.00	2175.52	1797.23
377	AMDS SVC STATION	579	.00	562.25	825.97
608	AUTO SERVICE INC	1075	1302.88	8729.57	17125.92
619	AVENUE MOTORS	1166	119.37	1007.25	8035.46
671	AXEL TIRES INC	931	43.31	125.07	947.51
745	B & K SERVICE	1075	97.10	532.41	433.02
834	BATES CAR PARTS	1002	241.84	1479.34	1219.45
884	BELL SERVICE INC	931	6.39	72.80	57.50
956	BILLS AUTO SHOP	127	75.28	697.11	943.17
1184	BUTLER BOYS	579	61.11	385.46	205.01
1281	CAPITAL CAR PARTS	1166	117.42	811.79	462.13
1314	CASEYS CAR REPAIRS	733	59.63	473.00	25.92
1376	CHARLES BODY SHOP	624	89.02	727.63	803.88
			75742.09	575534.95	

Figure 31.

Sales by Geographic Location

The summary cards produced during the preparation of the customer sales analysis reports are sorted with geographic summary cards containing quantities sold by each salesman, both for the previous year's corresponding month and for the year to date. The cards are processed to produce the geographic sales analysis, in sequence by salesman, branch and state, and to punch new summary cards. The report

sets forth the quantity sold for the month, both this year and last year, and the difference between the two. Similar information is shown on a year-to-date basis (Figure 32).

As shown above, any type of sales analysis report can be prepared from the data in the order commodity cards. Therefore, a complete study of the entire project and requirements should be made before any IBM procedure is adopted.

CONSOLIDATED DISTRIBUTORS, INC.									
GEOGRAPHIC SALES ANALYSIS									
IN DOLLAR VALUE									
DATE									
L. NO.	BR.	SALES-MAN	NAME	CURRENT MONTH			YEAR TO DATE		
				THIS YEAR	LAST YEAR	OVER UNDER-CR.	THIS YEAR	LAST YEAR	OVER UNDER-CR.
6	2	93	HARTFORD CONN						
			ADAMS G K	1611	1531	80	11437	10472	965
		1002	PRATT W R	3440	3435	5	22753	19525	3228
		1237	TANNER S M	3820	2732	1088	25923	21752	4171
20	4		BOSTON MASS						
		579	GEORGE T E	2995	1752	1243	17563	18002	439CR
29	5		TRENTON N J						
		282	GAYCE F A	2495	1972	523	19172	18199	973
		624	JOHNSTON C B	3150	3107	43	22857	20753	2104
		931	OWENS B N	3658	3009	649	27982	25829	2153
		1257	TAYLOR A M	4127	4037	90	30010	27157	2853
31	3		NEW YORK N Y						
		127	BELLOWS J I	4949	3571	1378	35417	31019	4398
		362	DEAN P E	2814	2809	5	21075	22342	1267CR
		367	DENNEY F T	3527	3711	184CR	25912	20978	4934
		480	ERNST A O	2092	1837	255	15079	12511	2568
		1075	RAYMOND P S	5892	4565	1327	39832	34363	5469
		1166	SIMMONS E A	3951	3767	184	29343	25875	3468
37	7		EASTON PA						
		733	LOWELL J M	3970	3120	850	27125	24397	2728
				75742	62933	12809	575535	498009	77526

Figure 32.

Data Processing Systems

As the pace of business quickens, it is imperative that lapses of time between events and their reflection in useful reports be minimized. In addition, the arrangement of information in reports must permit rapid pinpointing of areas requiring attention; otherwise, information may be included in such an obscure way that it will not be readily seen or interpreted. Reporting past events, however, is not enough. New techniques, which permit data to be used more and more as a management tool for policy planning, are gaining importance as business competition intensifies. Through the use of data processing systems, business is meeting these stringent requirements.

The data processing systems are being profitably used in the general application areas of billing, sales, inventory control, etc., in businesses such as utilities, finance, insurance, manufacturing, distribution, textiles, government, publications and retail.

Consisting ordinarily of a combination of units including input, storage, processing and output, data processing systems are designed to handle business data at electronic speeds and with self-checking accuracy. They offer increased productivity automatically with expansion facilities for both equipment and application areas.

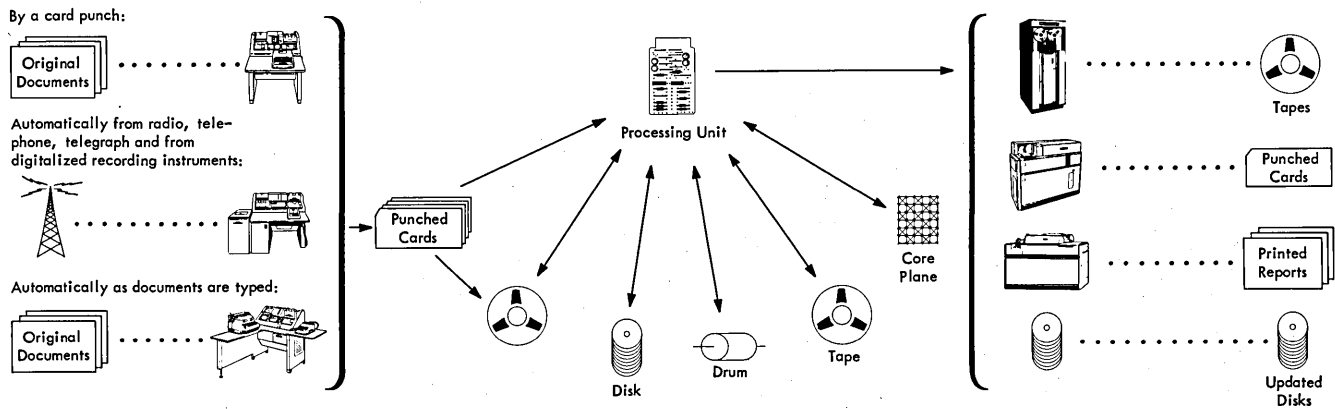
ABCs of IBM Data Processing

A Data is recorded into punched cards...

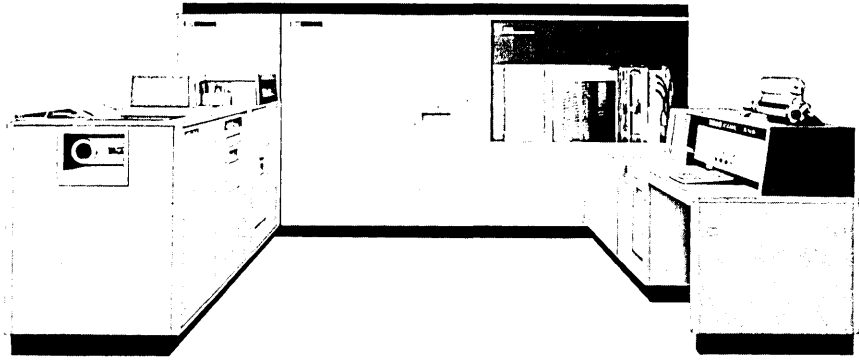
and can be converted to magnetic tape or can serve as direct input to...

B data processing machines or systems which calculate, rearrange, do table look-up and process current data with master data and historical data stored on magnetic tapes, drums, disks or cores...

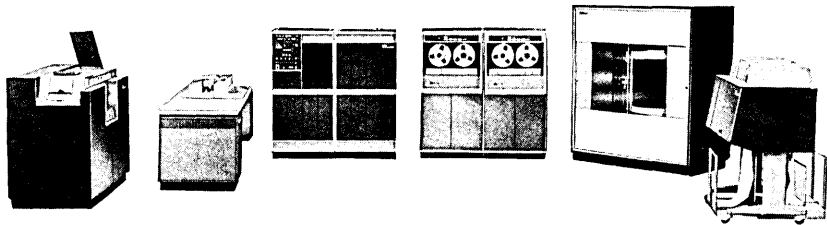
C to produce updated master files and finished results which are recorded into punched cards, magnetic tape, magnetic disk files or printed reports.



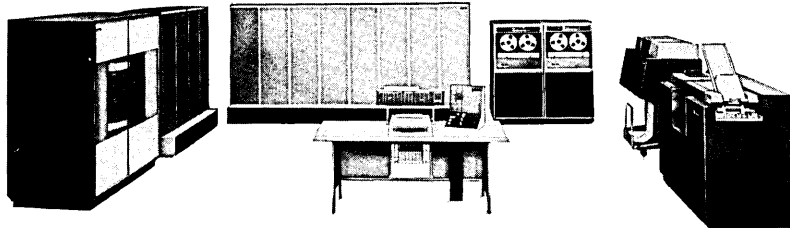
IBM RAMAC® 305



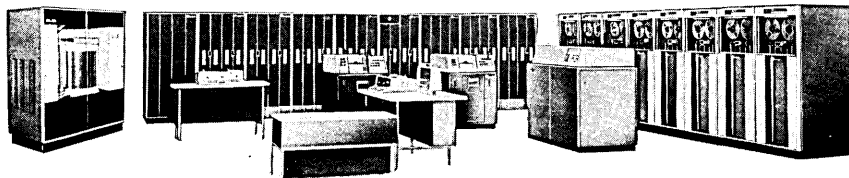
IBM 1401



IBM 1410



IBM 7070



Advantages

In industry today, tighter control over all details gives a strong edge over competition. It is therefore important that management be supplied with all the current data, and it follows that any procedures for handling this data must be designed with care and prudence.

The flexibility inherent in IBM methods permits development of systems most advantageous to the varying requirements within each business. Order writing and billing are basic uses of IBM equipment, and the by-products of these operations and the use of the machines for other functions permit the advantages of IBM techniques to be extended to virtually

all accounting and reporting requirements.

Here are some of the many advantages which the IBM methods offer:

Invoices which are legible and accurate.

Improved customer relations through prompt order processing.

Increased warehousing efficiency through minimal picking effort.

Tighter inventory control.

Comprehensive, timely and accurate analysis of sales and gross profit.

Use of installed IBM equipment for additional accounting procedures.

IBM

**International Business Machines Corporation
Data Processing Division
112 East Post Road, White Plains, N. Y. 10601**