IBM SYSTEM/3

Guide to Order Writing, Billing,
Inventory, Accounts Receivable,
and Sales Analysis

**Guide to Order Writing, Billing,
Inventory, Accounts Receivable,
and Sales Analysis**

The purpose of this manual is to describe the basic approaches for handling
order writing and billing, inventory accounting, accounts receivable, and
sales analysis on the IBM System/3. Coding methods, pricing, documents,
reports, record types, controls, and processing procedures are discussed
in detail. Records, files, report forms, and flowcharts illustrate the text.

Contents

INTRODUCTION

In the design and implementation of any application for a data processing system, we find that information from one application can be used in another area, and vice versa. And, while applications like billing and accounts receivable can stand alone, it is more efficient and profitable to combine them wherever possible. In sales and distribution accounting, the four basic, interrelated applications are:

- Order writing and billing
- Inventory accounting
- Accounts receivable
- Sales analysis

Figure 1 shows these basic applications and their interrelationship. Information on stock shipments can be used to maintain inventory records in inventory accounting; charges billed to customers can be posted directly to accounts receivable; detailed records of all sales made are essential to sales analysis; use of an order writing and billing application sharply reduces the clerical functions otherwise required for processing in each of the other three areas.

Because of this interrelationship these applications are combined in this publication. Basic approaches for the IBM System/3 to each application are described that can be adapted to an individual company's need.

Order Writing and Billing

- Customer orders
- Customer orders
- Invoice register
- Invoices
- System/3

Inventory Accounting

- Stock receipts transfers
- Stock transactions
- System/3
- Stock status register

- Item transactions

Accounts Receivable

- Customer payments
- Cash receipts
- Invoice summaries
- System/3
- Aged trial balance
- Statements

Sales Analysis

- Item transactions
- System/3
- Analysis by salesman
- Item sales analysis
- Customer sales analysis

Figure 1. Sales and distribution accounting applications

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CODING*

In order to achieve success in any of these application areas, codes must be established not only as a means of identification (warehouse location, packaging, etc.) but also as an aid in computer operations that precede and include the preparation of desired reports. In sales and distribution accounting, codes are assigned to customers and customer classifications, products and product classifications, salesmen, sales territories, etc. 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.

Customer Numbers

When a data processing application is installed, it is advisable to examine current numbering systems and to make changes where appropriate. The customer master file is kept in sequence by customer number, not by customer name. To make looking up a customer's record easier, customer numbers should be assigned in customer-name sequence. This becomes particularly important in accounts receivable processing, since customers often make payments without supplying their customer number.

Since new customer accounts are regularly opened in the course of business, customer numbers should be assigned by tens, as shown in Figure 2. This makes it possible to preserve reasonable alphabetic sequence by assigning subsequent numbers between existing ones.

Customer Number: Customer Name:

10010	Affiliated Supply Corp.
10020	J. C. Allen Associates
10030	Allied Brass, Inc.
10040	American and Northern Co.

Figure 2. Method of assigning customer number

When a unit price determination system is used as described under "Price of Item Sold", an item's unit price code is indicated by the last digit of the customer number. In such a case, the price-class digit is appended to each customer's number once the system has been set up. See Figure 3.

Customer Number: Customer Name:

Customer Number	Customer Name
100103	Affiliated Supply Corp.
100201	J. C. Allen Associates
100302	Allied Brass, Inc.
100403	American and Northern Co.

Figure 3. Customer number with price-class appended

Item Numbers

The system of item numbers in use should be critically reviewed. Many companies use an item-numbering scheme that combines product codes, descriptive abbreviations, and similar data with a base item number. The method requires lengthy item numbers, often with a varying number of characters, and its necessity is questionable where a data processing system is used. Descriptive data, item class code, warehouse location, item size and weight, and vendor number are normally provided for separately in the item master records and need not be reflected in the item number itself.

An item-numbering system that usually proves most workable is one using all-numeric item numbers, with all item numbers having the same number of digits. If items are to be renumbered, they may be grouped in some meaningful way. Many companies use a product-type grouping. If a grouping system is employed, item numbers should be assigned by fives or tens, leaving unused numbers for products that may be stocked in the future.

ORDER WRITING AND BILLING

The mechanization of order writing and billing procedures provides an efficient method of handling customer orders from the time of receipt through the preparation of the invoices. In addition to providing invoices that are neat, legible, and accurate, the application provides control reports and registers as well as accurate records for the accounts receivable, inventory accounting, and sales analysis applications.

The first part of this section describes the applications in general, followed by recommended procedures for the three common approaches to order writing and billing.

The Invoice

An invoice has a specific purpose: it is a report to the customer of the merchandise shipped and the prices charged. To serve its function it must be complete, legible, and accurate. Each company's invoice is distinctive. In many industries the invoice is the only document customers see, and part of the customer's impression of the firm's efficiency and business methods stems from the appearance of its invoices. The approach in this publication to order writing and billing permits this distinctiveness to be retained.

An invoice has three sections: (1) the upper section is the heading and contains customer's name and address and other miscellaneous data; (2) in the invoice body are listed, in detail, the item transactions and the amounts charged; (3) below the body lines are the invoice totals and possibly some miscellaneous data such as a statement of the cash discount terms offered. A typical basic invoice is shown in Figure 4; variations are described on following page.

LAURENTIAN INDUSTRIES, INC.												
SOLD TO			SHIP TO			CUSTOMER NO.				CUST NO.	INV. NO.	
S. W. STAPLES 498 RIVERVIEW STREET SAN JOSE, CALIF. 94067			RODRIGUEZ DESIGN HOMES DIVISION OF S. W. STAPLES 8363 OLIVE STREET SUNNYVALE, CALIF. 95117			430875				430975	138265	
										S. W. STAPLES		

DATE	INV. NO.	ORDER NO.	SHIPPING INSTRUCTIONS	STATED TERMS		SALESMAN	
09/15/6	138265	717690	VIA SMITH TRANSPORT	2% 15 DAYS NET 30		G. PEREZ	

QUANTITY ORDERED	QUANTITY SHIPPED	QUANTITY B/O	DESCRIPTION	UNIT PRICE	EXTENDED AMOUNT	DISCOUNT AMOUNT	NET AMOUNT	TAX-ABLE	COST/UNIT	EXTENDED COST	SALES AMOUNT
40	40		B500 TWINLITE SOCKET B	.60	24.00	1.20	22.80		.35	14.00	22.80
350	100	250	B506 SOCKET ADAPTER BRN	.32	32.00	3.20	28.80		.19	19.00	28.80
200	150	50	C151C SILENT SWITCH IVORY	1.20	180.00	9.00	171.00	*	.79	118.50	171.00
175	175		A210 PULL CORD GOLD	.42	73.50		73.50	*	.25	43.75	73.50
60		60	1436 LAMP ENTRANCE	.50							
175	105	70	A200 FIXTURE 5 LIGHT	20.13	2113.65	211.37	1,902.28		10.50	1,102.50	1,902.28
			FREIGHT CHARGE				18.95				
			PACKING CHARGE				45.00				

TAXABLE	TAX	FREIGHT	MISC. SPECIAL CHARGE			INVOICE AMOUNT					
244.50	12.23	18.95	45.00			2,274.56				1,297.75	2,198.38

Figure 4. Sample invoice

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Apart from date and invoice number, computer-printed data in the invoice heading frequently includes:

- Customer number
- Customer "sold to" name and address
- Customer "ship to" name and address
- Customer purchase order number
- Sales information such as salesman's name, number, territory, district, etc.
- Shipping information such as shipping instructions, carrier, delivery dates, etc.

The body of the invoice may include:

- Item number
- Description of item
- Quantity ordered and quantity shipped
- Item unit price and list price, if different
- Discount amount allowed
- Special charges
- Item net sales amount
- Taxes charged on item
- Item extended cost
- Indication, if appropriate, of out-of-stock or back-ordered items

The totals section may include:

- Total net sales amount
- Total special charges
- Total net sales subject to cash discount
- Total taxes

Other descriptive miscellaneous data, such as a statement of cash discount terms offered, may be included in the totals section. The dollar amount of cash discount is not usually standard in invoice calculation nor is cash discount usually reflected in the printed total amount due. The amount subject to cash discount, however, can be determined.

In addition to the variations described above, many companies use invoice forms with detachable tear slips. Side tear slips customarily include the date, invoice number, and customer number, and frequently show customer name, salesman name or number, item net sales amounts and the total, item extended costs and the total, and the total invoice amount. Inasmuch as the side tear slip usually contains cost figures, it is removed before mailing to the customer. A detachable lower section may include customer name and number, and the total amount invoiced. When the customer receives the invoice, he detaches and returns the lower section with his payment. The function of invoices designed in this manner is to ensure that customer payments are properly identified.

INVOICE CONTROL TOTALS

A number of invoices, representing a number of customer orders, are ordinarily run together as a batch. The form following the last invoice is usually used to print four control totals for the batch of invoices printed. These are:

- Total quantity of all items ordered
- Total quantity of all items shipped
- Total of all special charges made
- Total amount invoiced on all invoices

Quantity and special-charge totals may be checked against comparable figures originally made up for incoming customer orders and printed as part of the customer order control listing. The total amount invoiced should match the corresponding figure shown in the subsequently printed invoice register.

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The Invoice Register

The invoice register is a summary listing of all invoices that have been printed. The invoice register usually shows all invoices printed together in a single batch, but in some cases the invoice register may be printed only once a day and may show more than one batch. It is recommended that the invoice register be produced at least daily.

The invoice register can list whatever invoice totals have been taken, as well as identifying data such as invoice number and customer number. The document provides a concise sales summary to management and enables a check to be made of the total amount invoiced. Figure 5 illustrates a typical invoice register.

```
                                    INVOICE REGISTER

                             DATE 09/15/--                                    PAGE 03


                              CUSTOMER NAME
INVOICE INVOICE  CUST.                             EXTENDED    DISC.    TAX     SPECIAL CHARGES      INVOICE
  NO.     DATE    NO.   SPECIAL CHARGE DESCRIPTION  AMOUNT    AMOUNT   AMOUNT   TYPE    AMOUNT       AMOUNT

138265 09/15/-- 430975 S.W. STAPLES               $2,423.15 $ 224.77 $ 12.23
                       FREIGHT CHARGE                                            1    $ 18.95
                       PACKING CHARGE                                            2      45.00    $  2274.56

138266 09/15/-- 431030 SINCLAIR ELECTRIC            238.96     4.78    10.24
                       FREIGHT CHARGE                                            1       5.50       249.92

138287 09/15/-- 432450 WINSTON APPLIANCE CO
                       CREDIT INVOICE                57.70CR           2.03CR                        59.73CR

138288 09/15/-- 434960 YARNELL ELECTRICAL CONTR     208.62    64.17    16.38                        160.83

                       FINAL TOTALS              $11,263.97 $1145.29 $476.20            $357.60  $10,952.48
```

Figure 5. Invoice register

The Order Acknowledgment

The order acknowledgment form is optional in an order writing and billing procedure. It is most often used when a formal customer order must be printed for use by the shipping department. In some manufacturing industries, customer orders are for products that must be assembled prior to shipment, and the order acknowledgment serves as a confirmation to the customer that the order has been received and is being filled.

The order acknowledgment is essentially identical to the invoice except that it includes no sales amount, discounts, taxes, or totals. Usually carbon copies of the invoice are printed and used as the order acknowledgment, as a picking slip subsequently returned to the data processing department marked to indicate which items were in stock and have been shipped, and as a packing slip. Items may be listed in warehouse location sequence in order to simplify picking of the order. Figure 6 shows a typical order acknowledgment.

Customer Order Control List

The customer order control list (Figure 7) is printed during order entry and serves a clerical auditing function to ensure that all customer order data has been correctly transcribed on punched cards.

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```
                                    LAURENTIAN INDUSTRIES, INC.
            TELEPHONE                    111 W. ST. JOHN ST.
           408-286-9100                 SAN JOSE, CALIF.  95113
                                                              CUST. NO.
                                                               430975
       SOLD TO      S. W. STAPLES
                    498 RIVERVIEW STREET                       CUSTOMER
                    SAN JOSE, CALIF.  94067                     ORDER
                                                             ACKNOWLEDGMENT

       SHIP TO      RODRIGUEZ DESIGN HOMES
                    DIVISION OF S. W. STAPLES
                    8363 OLIVE STREET
                    SUNNYVALE, CALIF.   95117


       SHIPPING     DELIVER BEFORE 3PM
       INSTRUCTIONS SHIP VIA SMITH TRANSPORT
```

CUSTOMER		SALESMAN		OUR		
ORDER DATE	ORDER NO.	NUMBER	NAME	ORDER DATE	SHIP DATE	ORDER NO.
7/10/6	S51320	103	G. PEREZ	7/10/6	7/18/6	717690

LOCATION	ITEM NUMBER	DESCRIPTION	UNIT PRICE	QUANTITY ORDERED	BACK ORDER
2A 154	391468	OCTAGON BOX 4 INCH	.23	96	
2A 156	411116	B500 TWINLITE SOCKET B	.60	40	
2A 302	411121	B506 SOCKET ADAPTER BRN	.32	350	
2E 101	411173	C151C SILENT SWITCH IVORY	1.20	200	
2C 120	411280	A210 PULL CORD GOLD	.42	175	
2F 160	411390	1436 LAMP ENTRANCE	.50	60	
2F 180	411520	A200 FIXTURE 5 LIGHT	20.13	175	

Figure 6. Order acknowledgment

All, or most, customer data is shown. Quantities and special-charge amounts, for all orders, are totaled so that these figures can be tallied against the invoice control totals that will subsequently be taken. Use of the customer order control list is important to accuracy during order entry; the procedures are discussed in more detail under "Methods".

```
                CUSTOMER ORDER CONTROL LISTING                    DATE  09/14/--


CUSTOMER                                               SPEC.              SPECIAL CHARGE
NUMBER    ORDER INFORMATION        ZIP    ORDER NO.   ITEM NO.  PRICE  QTY.  OR CREDIT

430975    RODRIGUEZ DESIGN HOMES          717690
          DIVISION OF S. W. STAPLES
          8363 OLIVE STREET
          SUNNYVALE, CALIF.     95117     717690
430975    DELIVER BEFORE 3PM              717690
430975    VIA SMITH TRANSPORT             717690
430975    B500 TWINLITE SOCKET B          717690     411116            40
430975    B506 SOCKET ADAPTER BRN         717690     411121    .32     350
430975    C151C SILENT SWITCH IVORY       717690     411173            200
430975    A210 PULL CORD GOLD             717690     411280            175
430975    1436 LAMP ENTRANCE              717690     411390            60
430975    A200 FIXTURE 5 LIGHT            717690     411520            175
430975    FREIGHT CHARGE                  717690                             18.95
430975    PACKING CHARGE                  717690                             45.00

          TOTALS                                                     1000    63.95
```

Figure 7. Customer order control list

Customer Charges

Amounts charged to customers appearing on the invoice fall into three general categories: (1) prices of items sold, (2) special charges for freight, handling, and other special services rendered, and (3) taxes.

Pricing may be simple or somewhat involved, depending on whether each item has a set price that is always charged or whether item prices vary by customer. Special charges normally involve a flat amount and are straightforward. Taxes are ordinarily determined as a percentage of the price, although for certain excise taxes the sales amount may have no bearing on the amount of tax charged.

PRICE OF ITEM SOLD

Each item transaction may involve three prices: (1) unit price, (2) extended price, and (3) net sales amount. In the simplest case, each item has a single-unit price charged to all customers, and there is no discounting by customer or by item. The price is carried in the item record, and extended price (and net sales amount) is determined by a simple multiplication of price times quantity. The occasional price change is handled by changing the item record to reflect the new price.

Competitive conditions, however, ordinarily demand a pricing method more flexible than this. For example, an item either may have several unit prices or it may have one unit price with several different discount percentages to be applied; then, too, either the extended amount of each line item or the total billing amount can be discounted by a specific percentage. The class of customer determines the price or discount percentage to be applied. The last digit of the customer number can be used to indicate the class of customer.

Two principles must be observed in any method of pricing or price discounting. First, the method should be uniform; where prices are based on customer (or item), then customers (or items) should be classified so that all customers in a particular class get a certain price or discount, all customers in a different class get a different price or discount, and so forth. Second, once the method is set up, changes should be held to a minimum.

PRICE CONVERSION

The unit price for an inventory item is recorded in the item record. This price is usually based on the customary ordering unit. In some cases, however, the unit price may be based on an inventory unit larger than the customary ordering unit. For example, typewriter ribbons might be listed as $100 per gross, although orders are taken only by the dozen.

If this type of pricing is in use, a conversion factor should be included in the item record. This conversion factor will direct the computer to convert the unit price recorded to the actual price per ordering quantity before extending the line item amount. In the example above, the conversion factor would be 12. If conversion is required for one inventory item, it should be used for all items. For those that require no conversion, a factor of 1 is used.

SPECIAL CHARGES

An invoice frequently includes other charges beyond those for merchandise sold. Such charges may be for freight or shipping, special packaging or handling, and miscellaneous.

These charges are not included in the line item records but require a special record for each type of charge for each invoice. All special charges can be totaled separately and included in the invoice total.

TAXES

Provision should also be made to calculate and include applicable taxes in the invoice total. The most commonly used tax categories are excise, state sales, and local sales taxes.

Customers, items, and special charges may be classified as taxable or nontaxable with respect to each tax. Where tax applies, the amount subject to tax should be totaled for each tax category and the tax calculated on the appropriate total. Taxes should also be determined on an item-by-item basis so that they may be shown on the invoice. To avoid rounding errors, however, line item tax figures should not be used for the tax totals.

Each tax calculated by the computer should be determined as a simple percentage of the net sales amount total for the items subject to tax. Certain commodities, however, may be subject to excise tax based on some factor other than price. When this is the case, the unit tax amount in dollars and cents should be precalculated and carried in the item record for each item. The precalculated amounts can then be extended and totaled by the computer during invoice printing.

OTHER INVOICE CALCULATIONS

Two other calculations may be made when the invoice is printed. If cash discount is offered, the amount subject to cash discount can be totaled and printed as part of the statement of terms. Only item net sales amounts are included in the amount subject to cash discount; taxes and special charges should be omitted. If cash-discounting policy varies by item, a code in the item record will indicate whether the item is or is not subject to the discount.

Cost of goods sold may also be determined, and this amount is usually printed on a side tear slip that is detached from the invoice before mailing. When cost is calculated, each item record must carry the cost per unit.

Card Records

Order writing and billing procedures use various punched card records containing information that falls into six categories:

- Customer mailing addresses and other unvarying customer data
- Customer shipping addresses (usually more than one per customer)
- Miscellaneous data, such as shipping instructions, to appear on the order acknowledgment and the invoice
- Item transaction information, including the name, number, and price of each item ordered
- Special charges to be included in an invoice
- Summary information on each invoice printed

Data from the first five categories is used to print the invoice. This data is in several records that are assembled into a customer order file to be processed by the computer. A single invoice summary record is punched by the computer for each invoice printed, and the information in this record is subsequently listed in the invoice register. Invoice summary records are also used to update customer account balances, a function that is discussed under "Accounts Receivable". Physical handling of the records for order writing and billing is covered under the heading "Methods".

CUSTOMER MASTER FILE

A customer master record (Figure 8) contains data that is generally not subject to change, such as:

● Customer number, name, mailing address, zip code, and phone number
● Codes indicating (where policy varies) whether the customer is liable for sales taxes, whether he receives discounts, and whether items may be back-ordered for him
● Information of a miscellaneous nature, such as the name and number of the salesman serving him, his location, his line of business, and credit limits

The customer number and mailing address information must be included in the master records for every customer, as must the codes required for processing. Miscellaneous information should be included if it is to be printed in the order acknowledgment or invoice or if it must otherwise be conveniently available to clerical personnel. When the customer master file is established, care must be taken to include only data that is expected to change infrequently or not at all.

Figure 8. Customer master record

SHIP-TO MASTER FILE

The ship-to master file (Figure 9) is essentially a second master customer file containing shipping addresses. Since some customers have more than one receiving address and since the customer master file has functions to which shipping addresses are not relevant, the ship-to master file is kept separate from the customer master file. When a customer order is assembled, the appropriate ship-to records are taken from the master file for use in printing the order acknowledgment and invoice. Details and variations are discussed under "Order Entry".

Figure 9. Ship-to master record

ITEM TRANSACTION RECORD

The billing file contains an item transaction record (Figure 10) for each item in the customer order. The transaction record normally contains:

- Item number and a description
- Quantity ordered and shipped
- Unit selling price, unit list price, and unit weight
- Codes indicating discounts, back-order policy, sales tax, etc.

All item data printed on the order acknowledgment and invoice or needed for item computation must be included in the item transaction record. If the item transaction records are also used for inventory accounting and sales analysis, requirements for those applications should be considered.

ITEM MASTER RECORD

The item master record contains the data required for the item transaction records. For example, if an item is a price-determination item, all prices/percentages are included in the record; if tax class varies, tax codes are included; quantity conversion codes, size, commission codes (for sales analysis), etc., may also be necessary parts of the item master record. It is also necessary to include additional data on quantities, receipts, issues, vendor, minimum/maximum balances, etc., when the file is used in the inventory control application. The item master file, therefore, may include several item master records for each item.

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Figure 10. Item transaction record

INVOICE SUMMARY RECORD

As each invoice is printed, the system punches an invoice summary record (Figure 11). These invoice summary records are used to prepare the invoice register and as input to the accounts receivable applications.

Figure 11. Invoice summary record

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Methods

There are three basic customer order-handling methods, as illustrated in Figure 12. In the method labeled A, the order is first routed to the data processing department where an order acknowledgment is printed by the computer. The customer's copy of the order acknowledgment may be mailed or included with the shipment, and the picking slip copy is sent to the warehouse. The warehouse packs and ships the order and returns a shipping notice (usually the picking slip marked to indicate which items were shipped) to the data processing department. An invoice is then printed on the computer and mailed to the customer. This method has proved highly successful for a large number of companies.

In method B the customer order is routed directly to the shipping department, and the ordered items are packed and shipped. The customer's order, marked to indicate that shipment has been made, is then sent to the data processing department, where an invoice is printed on the computer and mailed to the customer. While this method eliminates some of the clerical handling of method A, it presents at least two possible problems. The first is that no formal document is available to accompany the shipment, and the second is that customer orders may lack uniformity and completeness (such as customer- and item-identifying data). The control procedures necessary to ensure ordering uniformity may offset the advantages of direct order handling.

In method C, the customer order is routed to the data processing department and an invoice is printed on the computer before shipment is made. A copy of the invoice serves as the picking slip for the warehouse. The customer's copy of the invoice is usually included with the shipment and there is no need for the warehouse to return formal confirmation of shipment. In order to print the invoice before the order is picked, the computer must be able to determine stock availability. This automatic determination is performed through the use of item master record cards (one or more cards for each item stocked) that contain accurate inventory balances. The degree of warehouse inventory control required in this method is often not practical. Such practices as undershipping and overshipping will obviously invalidate computer-maintained inventory balances.

While method C generally involves a greater time lag between receipt of the customer order and shipment, it offers the advantages of uninterrupted processing of the order by the data processing department and a definite notice to the warehouse of stock availability.

In methods A and B the invoice is printed after the shipment has been made, and these two methods are called postbilling. They differ in that method A requires printing of an order acknowledgment and method B does not. In method C, the invoice is printed before goods have been picked and shipped. This is a prebilling system. Details of the work flow in the data processing department for both post- and prebilling are discussed later in this section.

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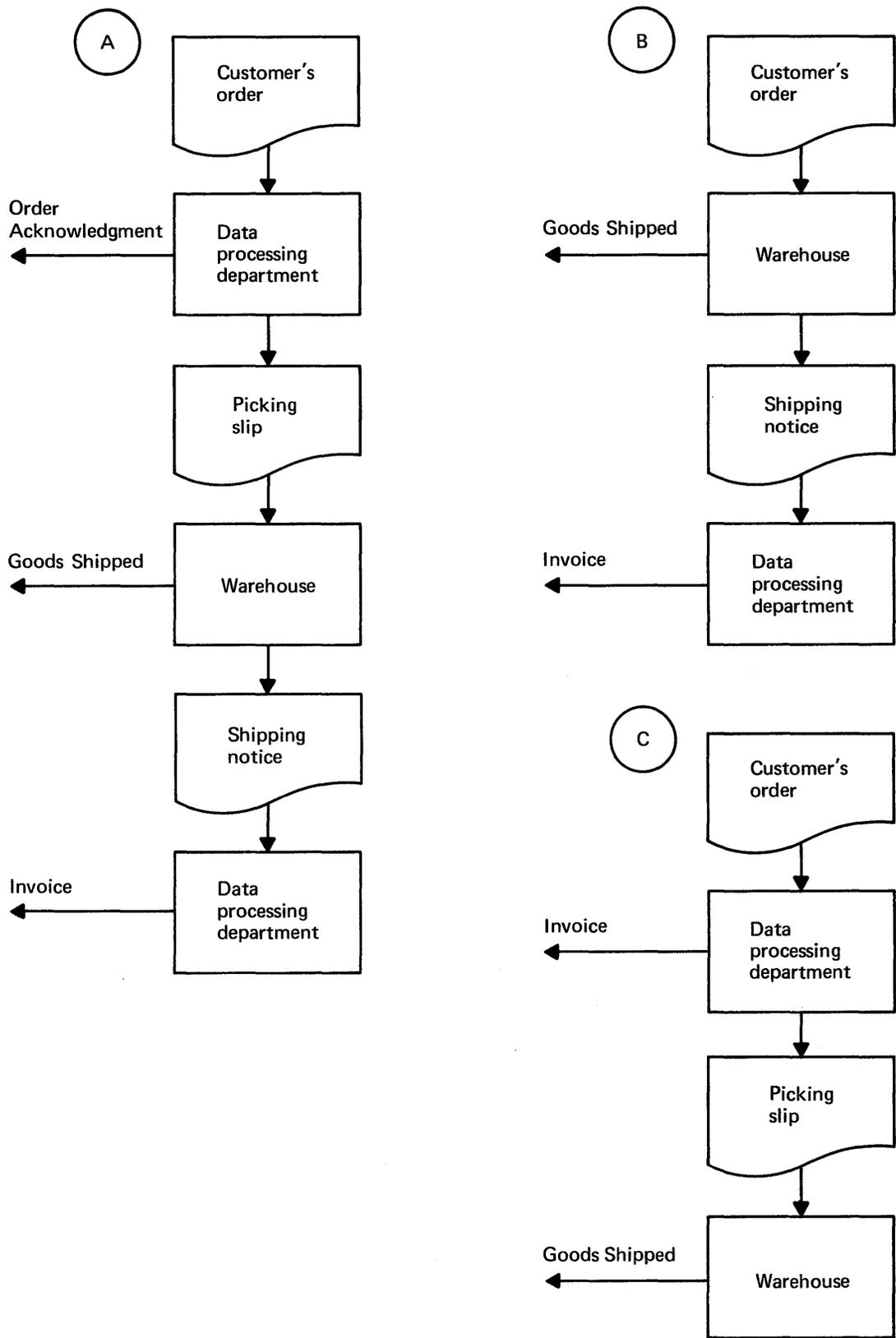
Figure 12. Basic order-handling methods

ORDER ENTRY

The establishment of the general order-handling method is one of the two key decisions in setting up an order writing and billing system. The second decision involves order entry procedures within the data processing department.

The customer order enters the data processing cycle in written form, on what is called a source document. How this source document is written and who writes it vary, of course, from company to company. In many cases, an order form, such as the one in Figure 13, is filled out by the salesman and delivered directly. In other businesses, salesmen or customers may telephone orders, which are written down by an order clerk as they come in. Many distributors supply customers with preprinted order forms as shown in Figure 14, and these forms are then mailed or delivered by customers themselves. In addition to the obvious advantage that preprinted order forms permit the customer to review the entire product line when he places the order, they also ensure that all item numbers are transmitted accurately.

A company usually has control over the source document that is used, and the source document should be designed so that it is convenient to handle and includes all necessary data. A well-designed source document will simplify the entire order-entry procedure.

Figure 13. Order form

COMMODITY CODE NO.	DESCRIPTION – PK. & SIZE
55109	72 REG PA
55111	50 LG LA
55113	50 LA
55117	50 PA
55119	72 PA
55122	18 4 RGSW
55123	48 BATH SW
55124	D12 4 SW
55125	72 REG SW
55126	D18 4 SW
55128	D12 4 SW
55129	50 CA
55130	D24 3 BTH CA
55131	72 CA
55135	50 LU
55136	D12 4 BTH LU
55145	50 BATH LU
55147	72 LU
55149	72 REG LU
55165	100 BATH ZE
55166	D24 4 BTH ZE
55167	144 REG ZE
55171	50 BATH DI
55173	50 DI
55175	50 DI
55179	72 REG DI
55180	D24 3 RGDI
55181	72 REG DA
55182	D24 3 RGDI
55183	72 REG DI
55184	D24 3 RGDI
55187	50 BTH LI
55189	50 BATH LI
55193	72 REG LI
55195	72 REG LI
55201	50 BATH PR
55203	72 REG PR
55204	D24 3 RGPR
55207	50 DO

DESCRIPTION AND SIZE	PACK	ITEM CODE	ITEM RETAIL	STORE RECORD				ORDER #4		ORDER #3	
				4	3	2	1	CODE	QTY.	CODE	QTY.
CH K CH CHW MEIN 303	12	1268	45				6	1268		1268	
CHU KNG CANT CHKN	12	1269	99		4			1269		1269	
CHU KN SOY SAUCE 50	12	1270	17					1270		1270	
CHU KNG CANT MUSH	12	1271	89					1271		1271	
CHU KNG NOODLES 2½0	12	1272	27		4			1272		1272	
ST BEAN SPROUTS 303	24	1279	2/29		3			1279		1279	
ST CHKN CHP SUEY 303	24	1281	29					1281		1281	
ST NOODLES 303	24	1284	16		7			1284		1284	
ST SAUCE 50	24	1288	19			3		1288		1288	
LA CHOY SAUCE 30	24	1293	10					1293		1293	
CIGARETTES											
CAMEL REG	5	1312	345				5	1312		1312	
CHESTERFIELD REG	5	1314	345			6		1314		1314	
FATIMA CORK KING	5	1316	355					1316		1316	
FATIMA PLN KING	5	1317	355					1317		1317	
KOOLS REG	5	1320	345			6		1320		1320	
L&M FLT REG	5	1322	366					1322		1322	
LUCKY STRIKE REG	5	1323	345			9		1323		1323	
OLD GOLD REG	5	1324	345					1324		1324	
PH MORRIS REG	5	1325	345			5		1325		1325	
CAVALIER KING	5	1332	345					1332		1332	

Figure 14. Preprinted order form

There are five basic steps in order entry, as illustrated in Figure 15:

1. Customer orders are received by a clerk who edits them for completeness, making sure that each order includes the customer's number, item numbers, item quantities, and any other information considered necessary. Where a customer has not supplied a purchase order number, an internal control number is assigned. The clerk assigns transaction-type codes such as the ones listed below, so that individual transactions can be handled appropriately during later computer processing.

Code	Transaction Type
N	Normal order
C	Cash sale
D	Drop shipment
R	Returned merchandise

Depending on the order-handling method used, the coding clerk may or may not assign a common batch number to all orders. In methods B and C, in which processing continues until the invoice has been printed, a batch number is assigned. In method A, customer orders usually do not remain together in the shipping department. Instead, the shipping notices are batched when they are returned from the warehouse, and a batch number is assigned at that time.

2. All item quantities in the batch are totaled on an adding machine, and the adding machine tape is clipped to the batch of customer orders. This total is later used (in step 5) as a check that all item transactions shown on the orders have been correctly entered into the data processing system.

3. The customer order file is assembled (as described below).

4. After the customer order file is assembled in punched card form, it is processed on the System/3 to print a control listing.

5. Item quantities are totaled during the control-listing run, and this total is checked against the adding machine tape prepared in step 1. If the figures match, processing continues normally. If the figures do not match, the error is found and corrected and the control listing reprinted if necessary. It is important that there be a definite checkpoint for all orders entering the data processing system. It is much easier to identify errors at the point of entry than to correct records later in the processing cycle.

CUSTOMER ORDER FILE ASSEMBLY

During step 3 in Figure 15, the customer order file is assembled. Records for ship-to addresses are optional for any customer and may be omitted when the ship-to address is the same as the sold-to address. When they are omitted, the word SAME is printed in the ship-to area of the order acknowledgment and/or invoice.

The customer ship-to records are ordinarily filed in sequence by customer number, with one pair of records for each different shipping address. The records are pulled from the file and duplicated. The customer's purchase order number is also punched into the duplicated records. The original ship-to master records are then refiled and used again when that customer reorders. The newly created ship-to records are used for only one customer order and are destroyed afterwards.

Customer master records are not assembled at this point in the procedures as there may be several orders from the same customer.

The miscellaneous data record is normally completed for each order. Where miscellaneous data is always the same for a customer (cash discount terms, for example), the miscellaneous data record may be prepared in advance and filed with the ship-to records.

If special charges apply to the customer order, one special-charge record is needed for each charge. In most businesses the same special charges occur repeatedly; it is often feasible to establish a prepunched special-charge file, organized alphabetically by special-charge description. The appropriate charge record is pulled for each order, and customer number and order number are recorded into it. This method ensures accuracy in special-charge amounts and maintains uniformity in the wording of special-charge descriptions.

Figure 16 illustrates the handling of the ship-to, miscellaneous data, and special-charge records.

Most of the records in a customer order file are item transaction records, one for each item on the order. Item transaction records are created through one of two basic approaches as illustrated in Figure 17.
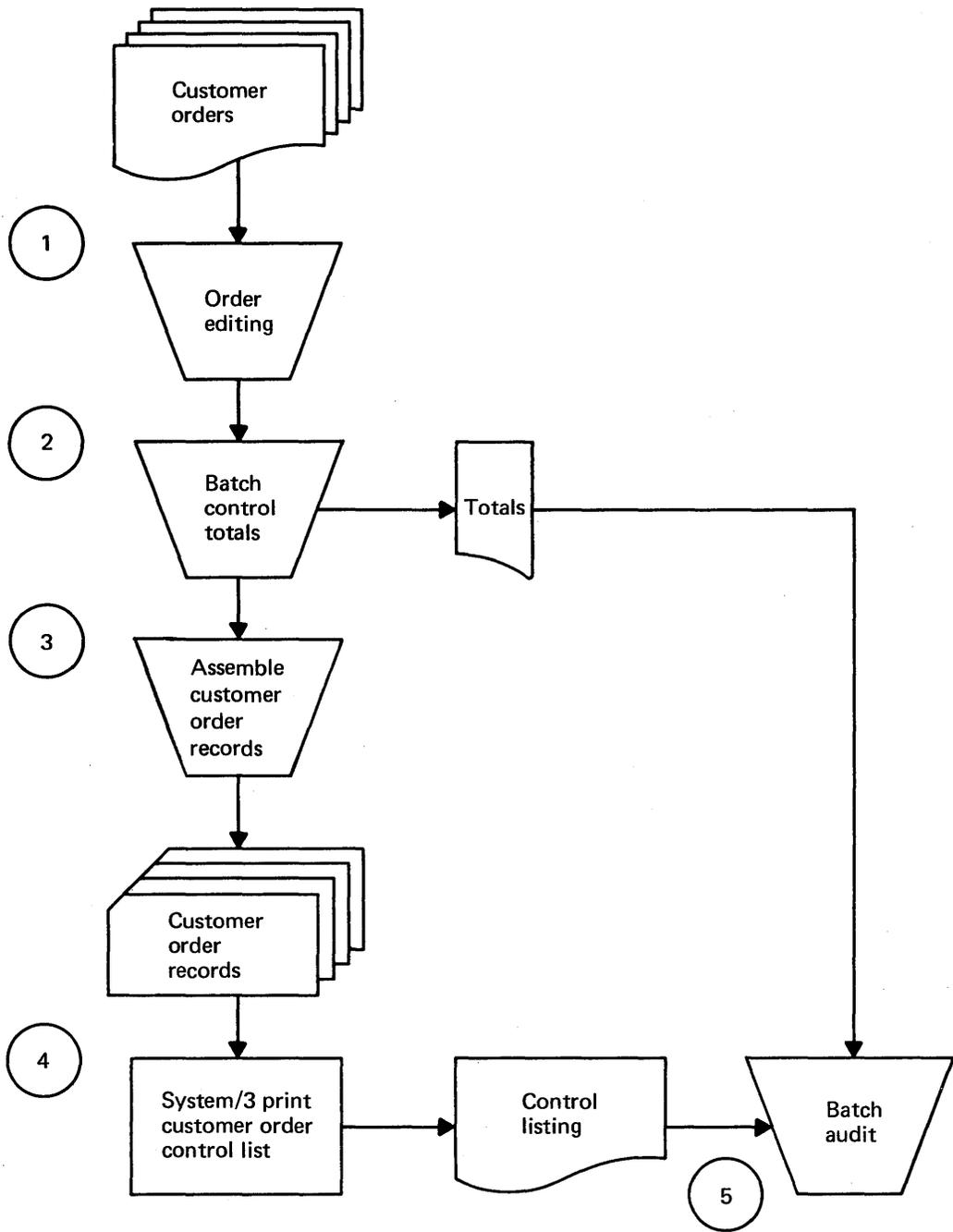
Figure 15. Order-entry data flow
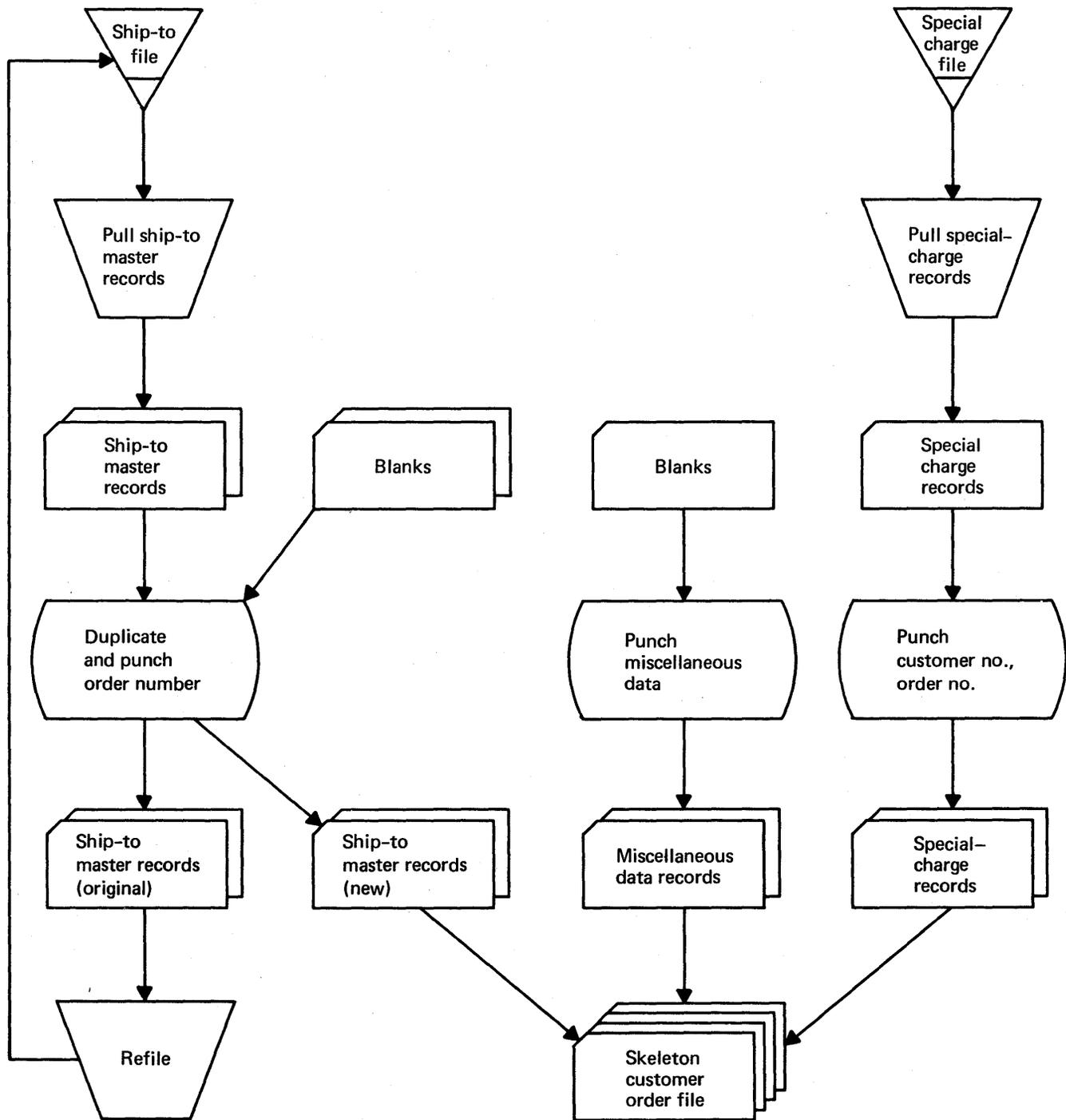
Figure 16. Ship-to, miscellaneous data, and special-charge record preparation

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Card punch approach

Customer orders

Blanks → Punch

Item transaction records

To customer order file for the order

Tub file approach

Customer orders

Pull item transaction records ← Tub file

Item transaction records

Punch

Item transaction records

To customer order file for the order
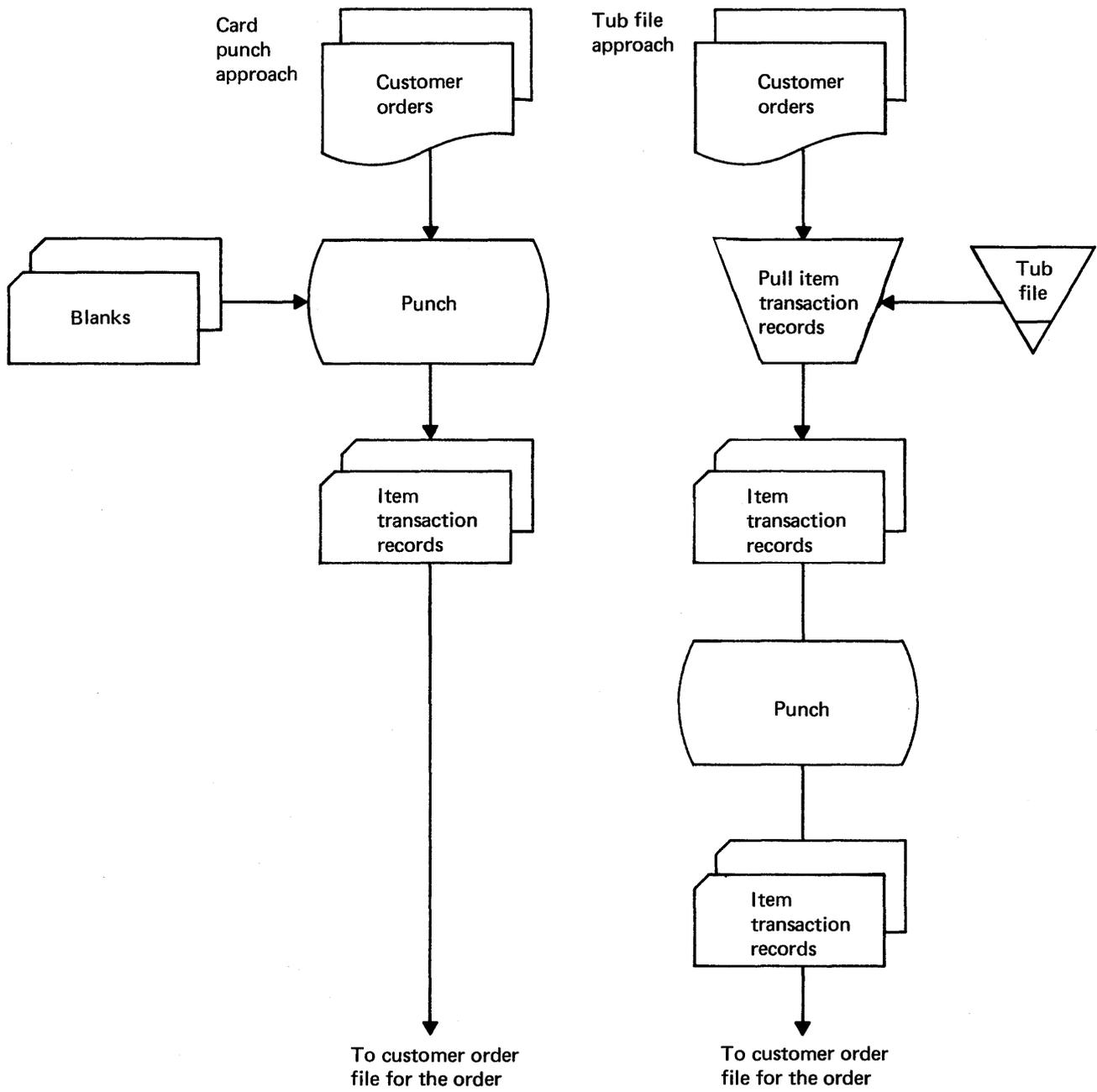
Figure 17. Order assembly (item transactions only)

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Card Punch Approach

Item transaction records contain:

- Customer number
- Order number
- Item number
- Quantity
- Transaction-type code

This provides basic item transaction records for inclusion in the skeleton customer order file. Additional data, such as item description and price, are reproduced into the item transaction records from item master records later in the order processing cycle.

Tub File Approach

The tub file approach involves files of prepunched item transaction records. A reservoir of records is maintained for each item stocked. The records, containing item number, item description, price, and appropriate codes, are pulled manually from the file—one for each item on the customer order. Item transaction records in the tub file are usually separated by divider cards to facilitate order pulling. Figure 18 illustrates the organization of transaction and divider cards in a tub file.

Once item transaction records have been pulled from the tub file, they are completed by recording customer number, order number, quantity, and transaction-type code. This additional data can be included in the record that was pulled, or the pulled record can be used as a master. When the pulled record is used as a master, its data is duplicated into a blank item transaction record, the variable data is added, and the original record is returned to the tub file. The former method is usually preferable, if for no other reason than that several orders in a batch may include the same item.

If item unit-price determination by the computer is not required, the use of tub files eliminates the need for a later computer run to reproduce the appropriate price from the item master records into the item transaction records.

A variation of the tub file method is called the warehouse bin plan, and is often used successfully in situations where the customer order goes directly to the warehouse (method B, discussed earlier). In the warehouse bin plan, there are no tub files as such. Instead, prepunched item transaction records are kept in the warehouse, physically located with the items they represent. Shipping clerks pull item transaction records as they pick the items on the order. The transaction records then accompany the shipping notice when it is sent to the data processing department.

If the tub file approach is used, groups of item transaction records can have various item quantities prepunched along with the other item data. Such a tub file is called a denominated tub file. The quantity denominations may be arbitrary or conform to customer ordering habits.

The decision on the use of tub files versus prepunching is influenced by a number of factors: the number of different items kept in stock, the inventory activity that an average order batch represents, the number of order batches to be processed during the day or week, the allowable time lag between receipt of the customer order and shipment of goods, and the number of clerks available to pull records from the tub file. Of these, inventory activity is probably the most important factor. The inventory activity of a batch is:

$$\frac{\text{the number of items in all customer orders in the batch}}{\text{the total number of items carried in stock}}$$

22
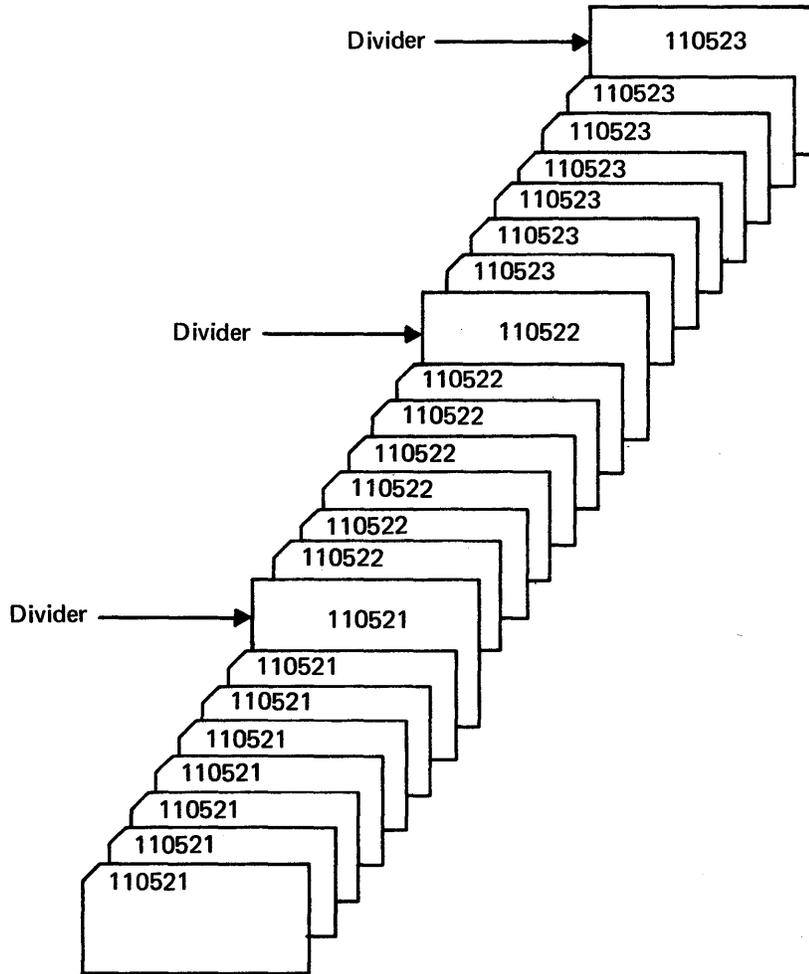
Figure 18. Tub file organization

After an order has been assembled in punched card form, no matter which method is used, it is placed in a batch file until all orders in the batch are ready for computer processing. How frequently batches are processed depends on the requirements of the business, the number of customers, the number of items kept in stock, and the processing methods used. A company carrying a relatively small number of items and using a postbilling system might process several batches a day. Another company, carrying a large, diversified inventory, but with a less urgent requirement for rapid handling of customer orders, might process only three batches a week.

The following two sections discuss batch processing for the two basic order-handling methods (postbilling and prebilling) mentioned earlier. The steps are described in sequence as they occur.

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POSTBILLING

Figure 19 shows the first five steps of the procedure for a postbilling system (method A):

1. Customer orders are assembled in punched card form in a batch file.

2. The control list of orders is printed. During the printing of the control list, the computer separates the item transaction cards from the other order cards. The ship-to address, miscellaneous data, and special-charge cards are held aside for step 4.

3. This step is required if tub files are not used, or if item unit price is determined by the computer. During this step, all item transaction records are sorted into item-number sequence. They are then processed against the item master file, and the computer punches data from appropriate item master records into each item transaction record. All item data that will be needed for invoicing and later for sales analysis and inventory control is punched at this time. This data includes verbal description of the item, words or abbreviations for its quantity or weight units (box, crate, dozen, oz, lbs, for example), codes for warehouse location, product classification, taxability, applicability of discounts, unit price, cost, and weight. Item unit prices may be computer-determined during this step as described earlier.

4. The item transaction records are first sorted by warehouse location sequence, and then, together with the order data records are sorted into order number and customer number sequence. The sorted order records and the customer master records are processed to print order acknowledgments. Customer master records may be either pulled by hand or selected by computer during this step. In general, for small batches, pulling cards by hand is usually faster. Where a batch represents orders from a large percentage of customers, computer selection may be faster.

A copy of the order acknowledgment (with item transactions listed in warehouse-location sequence) is used as a picking slip. The customer copy of the order acknowledgment and the picking slip are usually sent to the warehouse, where the goods are packed and the order acknowledgment included with the shipment.

5. The customer order records themselves are placed in a holding file, and no further processing is done until shipment confirmation is received.

Order-handling methods A and B differ only slightly in their processing workflow. In method B (in which customer orders are first handled by the shipping department and goods have been shipped by the time the orders enter the data processing cycle), no order acknowledgment is printed in step 4, and customer orders continue directly to invoicing instead of being placed in a holding file.
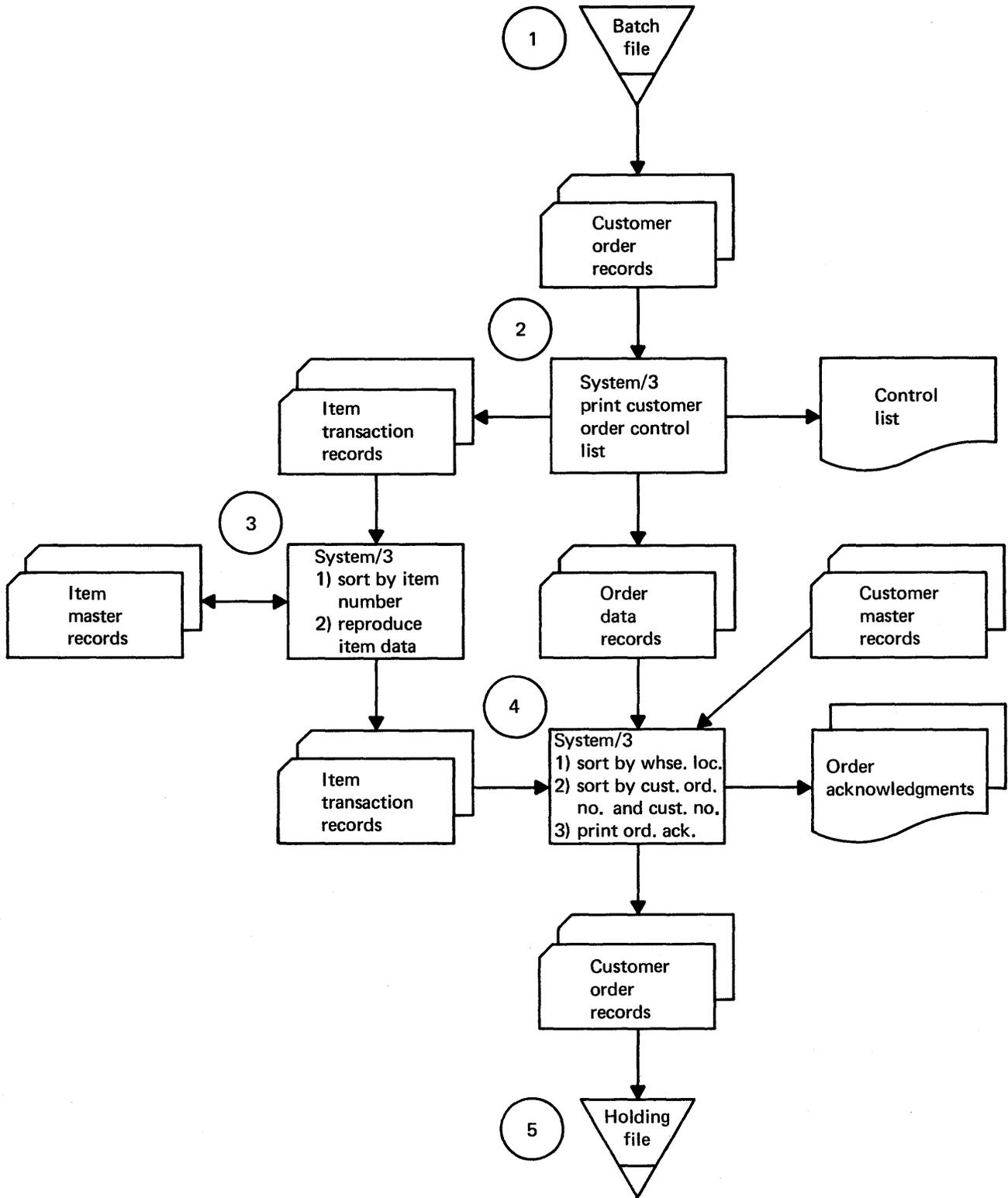
Figure 19. Flowchart for order entry and order acknowledgment printing

Figure 20 shows the processing sequence after orders have been shipped.

6. The picking slips are returned from the warehouse marked with quantities shipped. The appropriate customer order records are taken from the holding file, and quantity shipped is punched for each item transaction. Miscellaneous data, such as total shipment weight and additional special charges, may be added. Invoices to be processed together are assigned a common batch number at this point.

Order-handling method B omits this step since the original punching of the order includes quantities shipped.

7. The customer order records are then used to print the invoices. During this processing the invoice summary records, one for each invoice, are punched by the computer. During invoice printing, the net sales amount (extended price less any extended-price discount) is calculated for each item transaction and punched into each item transaction record. Item transaction records are again separated by the computer from the customer order file for later use as input to inventory accounting and then sales analysis. The customer data records may be filed or destroyed.

8. The invoice summary records are used to print the invoice register. Once the invoice register is printed, the invoice summary records are used for accounts receivable processing. All invoice summary data shown in the invoice register, and all customer charge data needed for accounts receivable, must be included in the invoice summary record when it is produced during billing.
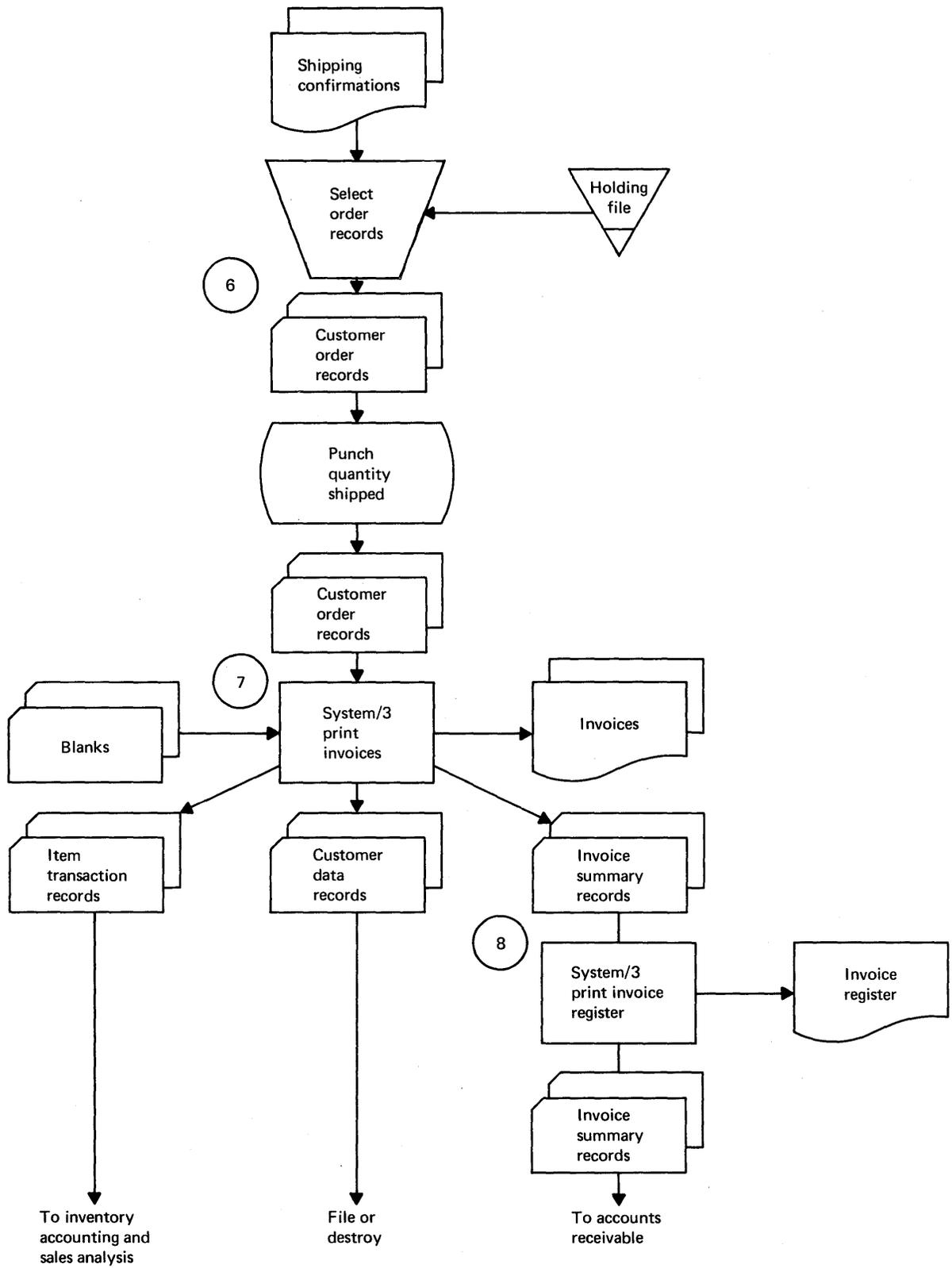
Figure 20. Flowchart for invoice writing after shipment

Back Orders

When insufficient stock is available to fill an order, the item may be placed on back order for the customer. If back-order processing is done, the computer punches a back-order record during invoice preparation for any item whose quantity shipped is less than the quantity ordered. Back-order records are then manually filed, and held until stock has been received. This procedure is shown in Figure 21. The back-order file should be in item-number sequence. When the item is received in stock, all back-order records for the item are pulled manually from the file. Customer number, purchase order number, etc., are determined from the back-order record itself, and a customer order file for the customer back order is reassembled for entry to the data processing cycle in essentially the same manner as has been previously described.

Preventing back-ordering is sometimes desirable. For example, a discontinued item should not be placed on back order. Back-ordering of an item may be prevented by an appropriate code in the item transaction record. Likewise, back-ordering may be prevented for any customer by a similar code in the customer master record.

Miscellaneous Transactions

Miscellaneous transactions that affect order writing and billing include cash sales, first orders for new customers, merchandise returned, and credit given where merchandise is not returned.

Cash Sales

Since sales made for cash are usually handled by counter clerks, they do not follow the normal order-handling procedures. A cash-sale summary card (an invoice summary with a customer number of all 9's) is punched for the day's total cash transactions. The cash-sale summary record is inserted manually with the invoice summary cards produced during invoicing and then listed as part of the invoice register.

If the computer performs inventory accounting or sales analysis that includes cash sales, individual item transaction records are required. The item transaction records are assembled in the same manner as for noncash customers; but the customer order file for a cash sale does not include shipping addresses, miscellaneous data, or special charges. Actual selling price (unit price) is punched for each cash-sale transaction. Cash-sale item transaction cards are included in the first three steps of the procedure for a postbilling system shown in Figure 19 and are then used as input to inventory accounting and sales analysis.

New Customers

When an account is opened for a new customer, customer master records must be punched. The master records are included with the customer's first order in the batch file and are listed on the customer order control listing so that all punched data can be verified during the batch audit. After the control listing has been printed, the new customer master records become part of the customer master file.

If the mailing address and shipping address differ, two pairs of ship-to records must be punched for the first order for the new customer. One pair is manually filed in the ship-to master file. The other pair, containing the purchase order number, is processed as part of the billing file.

Miscellaneous data, item transactions, and special-charge records for the first order are assembled in the same way as for other orders.
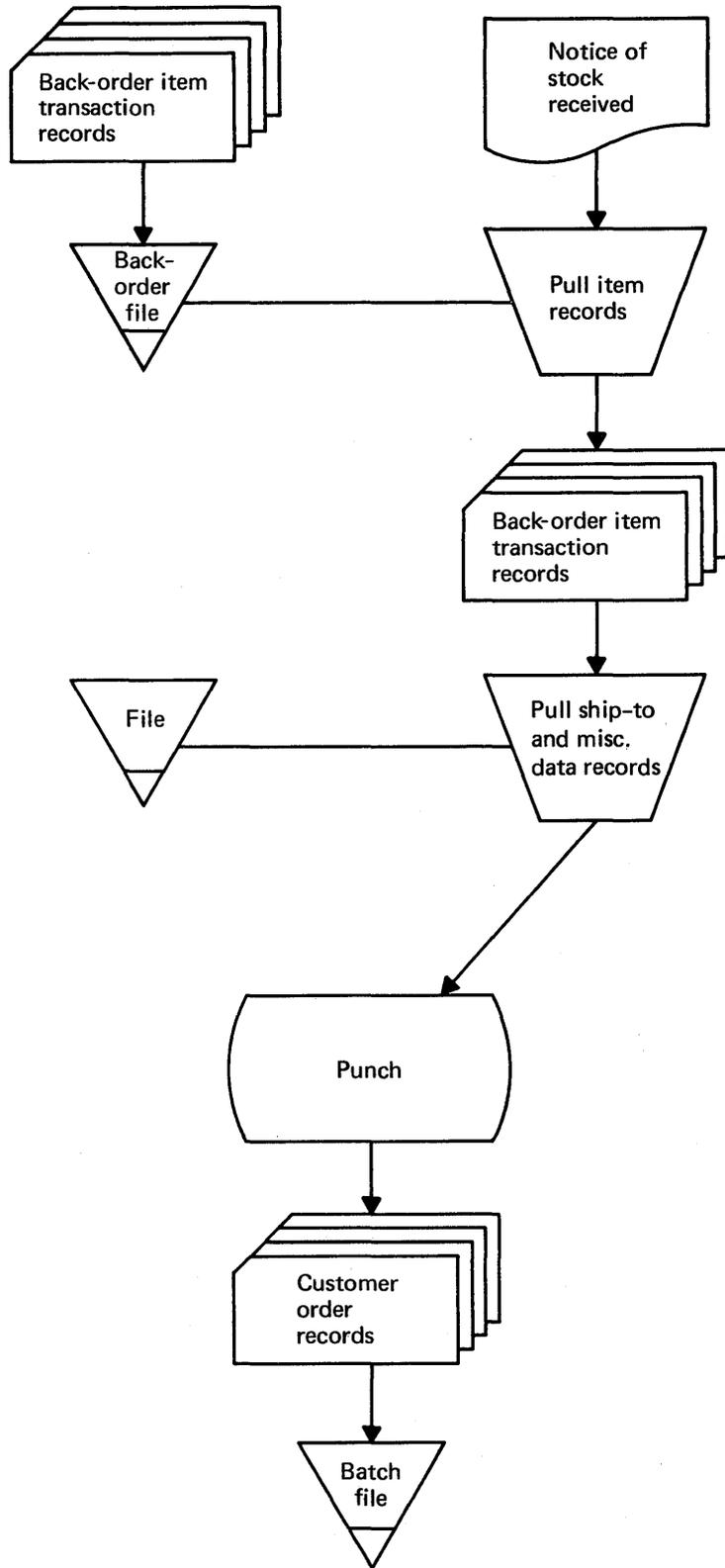
Figure 21. Back-order processing

Returned Items

When merchandise has been returned for credit, a skeleton customer order file containing one miscellaneous data record and item transaction records for the returned items is assembled. The item transaction records are punched with negative amounts for quantity ordered and quantity shipped. If the actual unit selling price is known, this is also punched as a negative amount. The records are processed in the same way normal customer orders are, and an invoice (credit memo) is printed showing credit for the returned items, less any discount originally given, plus credit for taxes originally charged.

Credits

Many companies give credits for merchandise damaged in shipment or for other situations that arise in the course of doing business. Credits are treated as negative special charges and are processed in the same way as normal customer orders. The printed invoice shows a credit amount.

In some instances, particularly where a shipment has been partially damaged and replacement merchandise is to be sent, the exact credit amount cannot be conveniently determined. In such a case, the replacement merchandise is treated as if it had been ordered normally. The customer's number is noted at order entry, and his invoice is removed from the batch of invoices printed. At this point, the exact credit amount is known, and a journal entry record is punched as an adjustment to accounts receivable.

PREBILLING

In a prebilling system the customer's invoice is printed before goods are picked and shipped. The method is workable only in a tightly controlled inventory environment, since the computer must maintain stock balances that reflect the actual warehouse inventory.

Figure 22 illustrates the first five steps in order handling for a prebilling system.

1. Customer orders are assembled in punched card form in a batch file.

2. The control list of orders is printed. As this list is printed, item transaction records are separated from the other records in the customer order file. The ship-to address, miscellaneous data, and special-charge records are held aside for step 5. Item transactions go through steps 3 and 4, the sort/reproduce step and the inventory accounting step. Step 3 is required if tub files are not used or if item unit price is determined by the computer.

3. All item transaction records are sorted into item-number sequence. They are processed with the item master record file, and the computer punches data from appropriate item master records into each item transaction record. All item data that will be needed for invoicing, and for later sales analysis, is punched at this time. This data includes a verbal description of the item, words or abbreviations for its quantity or weight units (box, crate, dozen, oz, lbs, for example), codes for warehouse location, product classification, taxability, applicability of discounts, unit price, cost, and weight. Item unit price may be computer-determined during this step, as described earlier.

4. The computer determines, for each item transaction, whether enough stock is on hand and punches the quantity that will be shipped into the item transaction record. The item master file's stock balances are updated at this time, and a stock status report may be printed, listing the inventory activity for the batch. (This procedure is described in greater detail under "Inventory Accounting" in this manual.)

5. The item transaction records are first sorted by warehouse location and then, along with the customer order data records, are sorted by order number and customer number in preparation for invoicing.

30
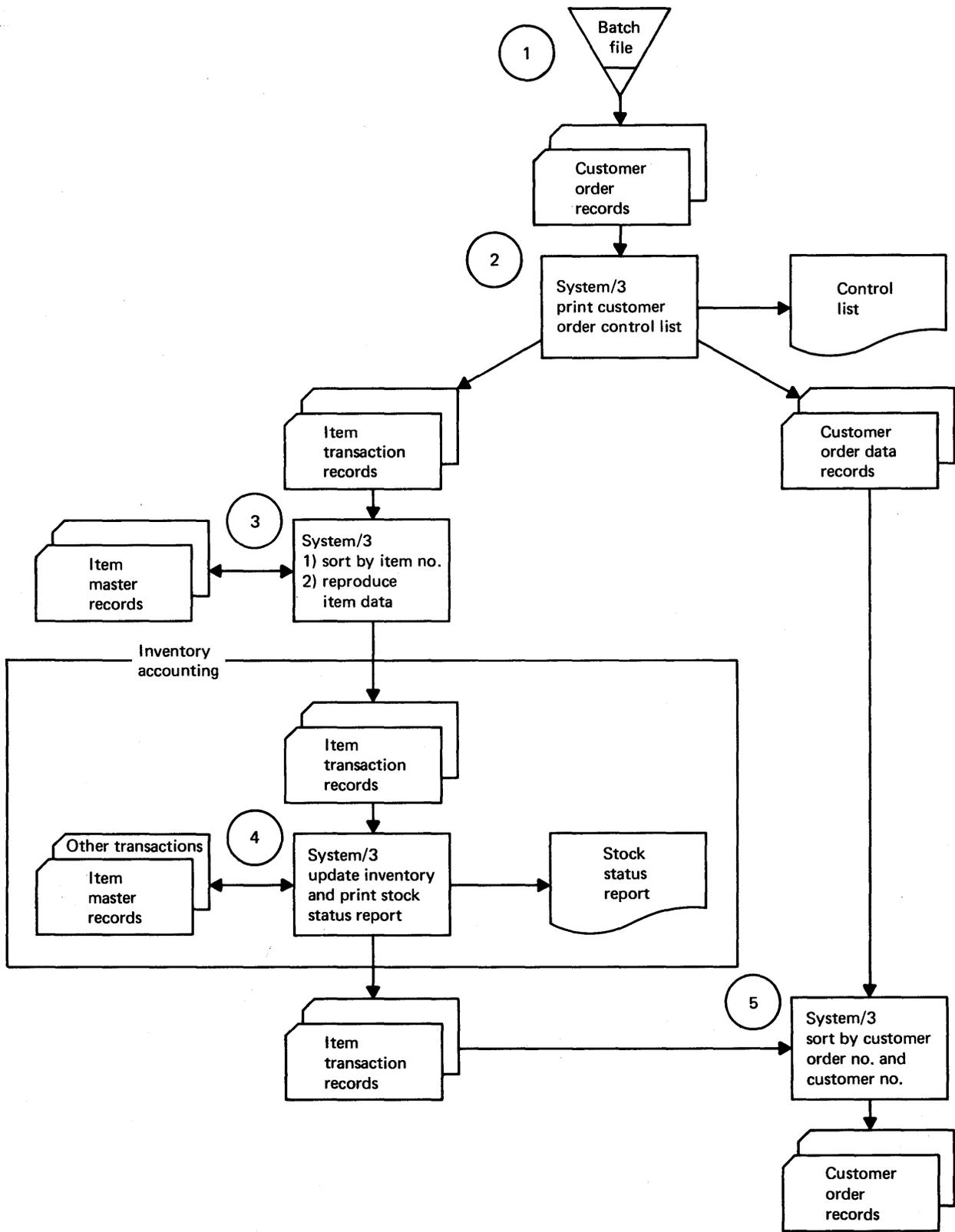
Figure 22. Preparation for invoicing before shipment

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Figure 23 shows the completion of the data processing cycle for billing.

6. This step is the order-acknowledgment option. An order acknowledgment can be printed, if required, from the customer order file. For most companies, carbon copies of the invoice serve as the picking slip, office copy, and salesman's copy.

7. Invoices are printed from the customer order file, one for each invoice, are punched by the computer. A copy of the invoice, with item transactions listed in warehouse-location sequence, is the picking slip. The invoice customer's copy and picking slip are usually sent together to the warehouse, where goods are packed and the invoice included with the shipment. During invoice printing the net sales amount (extended price less any extended-price discount) is calculated for each item transaction and punched into each item transaction card. Item transaction records are automatically separated from the file for later input to sales analysis.

8. In this step the invoice register is printed. This is a listing of all invoice summary cards for the batch. Once the invoice register is printed, invoice summary cards are used for accounts receivable processing. All invoice summary data shown in the invoice register and all customer charge data needed for accounts receivable must be included in the invoice summary record when it is produced during invoicing.

9. During the printing of the invoice the system separates item transaction records and customer data cards. Item transaction records are used as input to sales analysis. The customer data records may be filed or destroyed.

Back Orders

When insufficient stock is available to fill an order, the item may be placed on back order for the customer. If back-order processing is done, the computer punches a back-order card, during the inventory accounting run, for any item whose quantity shipped is less than the quantity ordered. The billing file for the order, containing the shipping address, miscellaneous data, and unshipped item transaction records is then reassembled and placed in a back-order file (Figure 24).

The back-order file is periodically reprocessed as part of a daily batch of new orders, usually after a shipment has been received for an item that has been out of stock. Where back orders still cannot be filled, the items remain on back order for processing at a later date.

Preventing back-ordering is sometimes desirable. For example, a discontinued item should not be placed on back order. Back-ordering of any item can be prevented by an appropriate code in the item record. Likewise, back-ordering can be prevented for any customer by a similar code in the customer master record.

Miscellaneous Transactions

Miscellaneous transactions that affect order writing and billing include cash sales, first orders for new customers, merchandise returned, and credit given where merchandise is not returned.

Cash Sales

An item transaction record that includes unit selling price is punched for each item sold over the counter. Cash-sale transactions are handled in essentially the same way as other customer orders, but the customer order file for a cash sale does not include shipping addresses, miscellaneous data, or special charges. Cash sales are removed from processing at step 5 in Figure 22 and held for later input to sales analysis.

Once each day, a cash-sale summary record (an invoice summary with a customer number of all 9's) is punched for the day's total cash transactions. The cash-sale summary record is inserted manually with the invoice summary records produced during invoicing and then listed as part of the invoice register.

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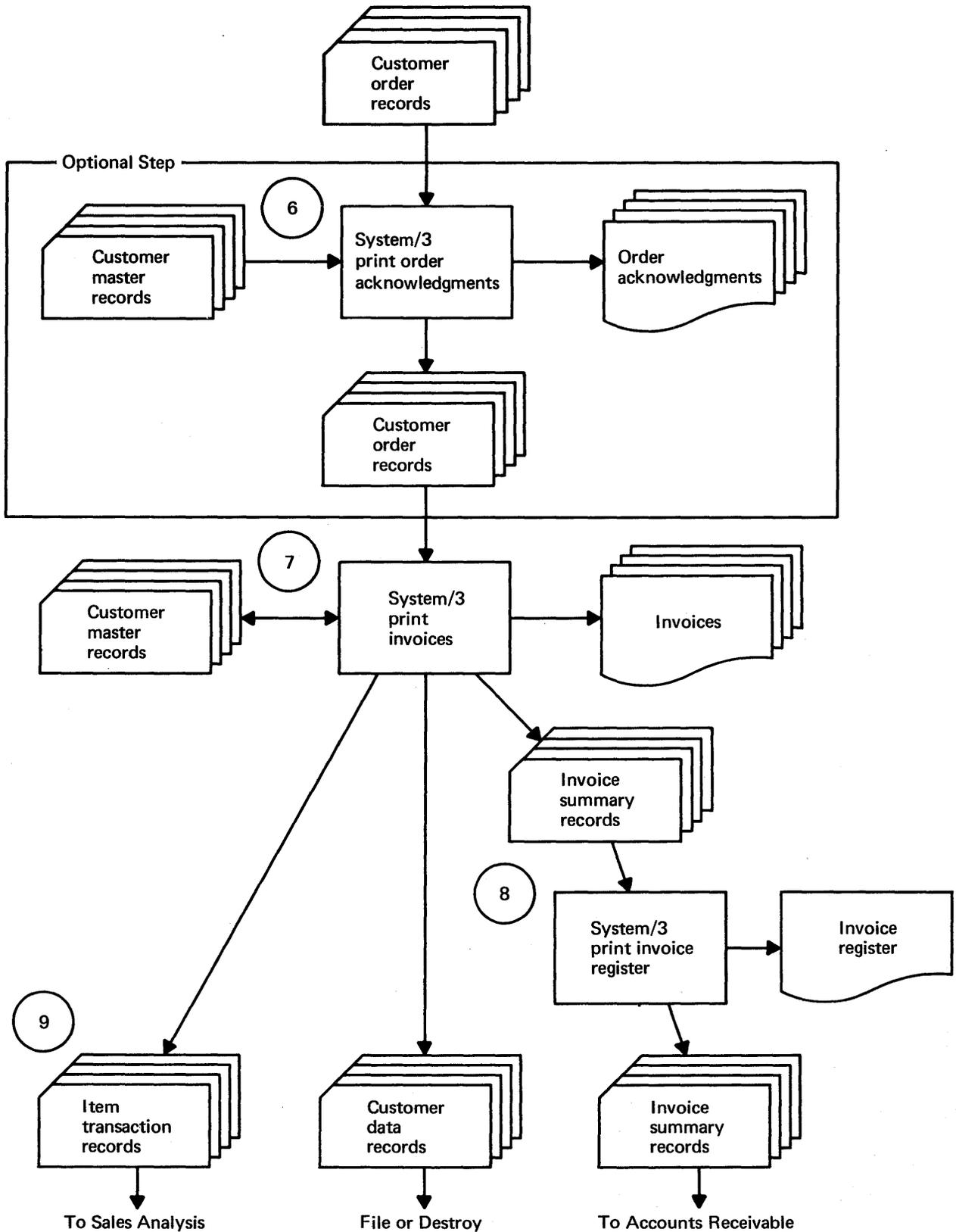
Figure 23. Flowchart for invoicing before shipment
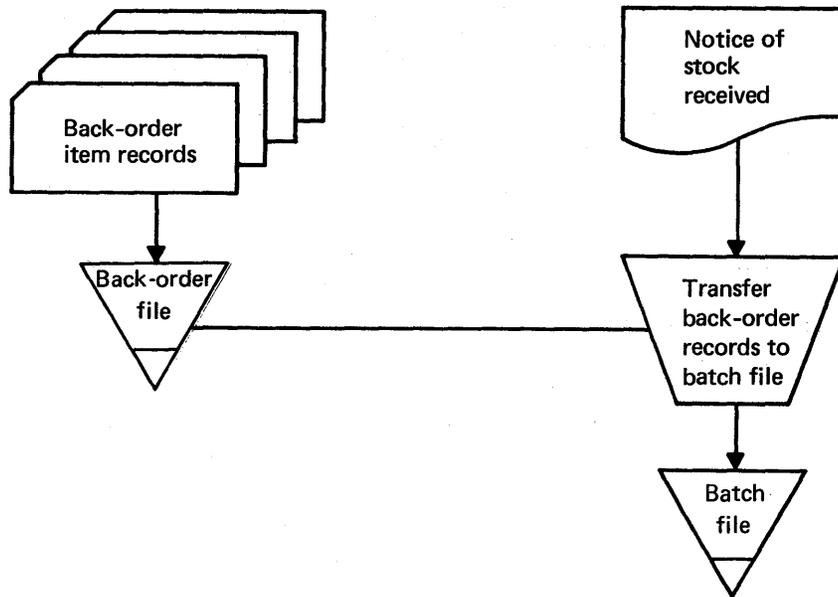
Figure 24. Back-order processing

New Customers

When an account is opened for a new customer, customer master records must be punched. The master records are included with the customer's first order in the batch file and are listed on the customer order control listing so that all punched data can be checked during the batch audit. After the control listing has been printed, the new customer master records become part of the customer master file.

If the mailing address and shipping address differ, two pairs of ship-to records must be punched for the first order for the new customer. One pair is manually filed in the ship-to master file. The other pair, containing the purchase order number, is processed as part of the billing file.

Miscellaneous data, item transactions, and special-charge records for the first order are assembled in the same way as for other orders.

Returned Items

When merchandise has been returned for credit, a skeleton customer order file containing one miscellaneous data record and item transaction records for the returned items is assembled. The item transaction records are punched with negative amounts for quantity ordered and quantity shipped. If the actual unit selling price is known, this is also punched as a negative amount. The records are processed in the same way normal customer orders are, and an invoice (credit memo) is printed showing credit for the returned items, less any discount originally given, plus credit for taxes originally charged.

Credits

Many companies give credit for merchandise damaged in shipment or for other situations that arise in the course of doing business. Credits are treated as negative special charges and are processed in the same way as normal customer orders. The printed invoice shows a credit amount.

In some instances, particularly where a shipment has been partially damaged and replacement merchandise is to be sent, the exact credit amount cannot be conveniently determined. In such a case, the replacement merchandise is treated as if it had been ordered normally. The customer's number is noted at order entry, and his invoice is removed from the batch of invoices printed. At this point, the exact credit amount is known, and a journal entry card is punched as an adjustment to accounts receivable.

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INVENTORY ACCOUNTING

Many businesses have a substantial portion of their assets represented in inventory, and accurate inventory accounting plays an important part in profitable operation. The most common inventory accounting application involves a computer-maintained item master file that is updated to reflect all inventory activity. In addition to the item identification and quantity on hand, inventory records may also include such information as quantity currently on order, value of on-hand inventory, unit cost, dates of the most recent issue and receipt, total quantity issued to date, and minimum and maximum balances. This method is called balance-forward inventory accounting—one of the cards comprising the master record for each item is essentially a balance-forward record. Inventory accounting ties in closely with billing (it is an integral part of a prebilling system, in fact), and in most cases the applications are used together.

Inventory Reports

Two main reports are produced during inventory accounting: the stock status report and the stock transaction register. The stock status report provides management with information on all inventory activity and notes those items whose balances have fallen below the minimum acceptable level so that immediate action can be taken. When required, all items can be listed on the stock status report to give a complete statement of all merchandise the company handles. The stock transaction register is primarily a control listing of inventory transactions that do not involve sales to customers. It enables a check to be made that all receipts, purchase orders, adjustments, and transfers have been entered correctly so that they will be properly recorded.

STOCK STATUS REPORT

A stock status report, like the one shown in Figure 25, is printed whenever inventory is updated and gives detailed information on all active merchandise. Ordinarily, the first line for each item in the listing shows standard descriptive data on the item, including its number and an identifying description. The on-hand and on-order balances are also shown. Subsequent lines give the detail on current transactions involving the item: purchase orders sent to suppliers, receipts from suppliers, sales to customers, etc. The quantities remaining on hand and on order are shown on the line below the last transaction listed. Whenever shipments reduce stock below the item's predetermined minimum balance or receipts push the current balances above the predetermined maximum, the exception condition is noted on the report.

Maximum and minimum balances can be carried in the item master file for all items so that these checks can be made by computer whenever the inventory balance changes. Minimum levels can be set either for the item's normal reorder point or for the danger level—the point at which outstanding purchase orders must be expedited. The meaning of "minimum level" should be the same, however, for all items. Maximum balance points are usually reached less frequently. Companies can set a maximum balance figure to indicate that outstanding purchase orders should be canceled.

The stock status report also has value as an aid to management review of inventory at the end of an accounting period or when physical inventory is taken. At this time, it is printed to show the current status of all items (with no transactions). If date of last issue or sale is maintained by computer, it is good practice to include this date as part of the item's descriptive information. The date is not so important during regular inventory accounting runs since only active items are shown, but when the complete inventory is listed the information tags slow-moving items so that appropriate action can be taken. Inventory value can also be printed and totaled on the stock status report.

STOCK TRANSACTION REGISTER

The stock transaction register (Figure 26) is a control listing of all stock transactions (transactions other than issues and returns). Each transaction is listed, and totals are normally taken on quantities and cost amounts. These figures are checked against totals taken from the original stock-transaction documents to ensure that all transactions have been correctly punched. Details on the clerical handling of stock transactions are given under the heading "Methods".

ITEM NO.	DESCRIPTION	QUANTITY ON HAND	QUANTITY ON ORDER	TRANSACTION QUANTITY	QUANTITY B/O	AVERAGE UNIT COST	EXTENDED COST	LAST RECEIPT	LAST ISSUE	MIN. BAL.	MAX. BAL.
411116	B500 TWINLITE SOCKET BLUE	458	500			.35	160.30			800	1600
	ADJUSTMENT			42		.35	14.70				
	RECEIPT			500		.37	185.00				
	ISSUE			50-		.36	18.00-				
		950*				.36	342.00	2/11/--	2/14/--		
411122	B506 SOCKET ADAPTER BROWN	325				.19	61.75			300	800
	ISSUE			20-		.19	3.80-				
	ISSUE			38-		.19	7.22-				
	ISSUE			10-		.19	1.90-				
		257*				.19	48.83	12/19/--	2/11/--	UNDER	
411173	C151C SILENT SWITCH IVORY	50	150			1.16	58.00			100	200
	RECEIPT			150		1.20	180.00				
		200*				1.19	238.00	2/10/--	2/03/--		
411254	A210 PULL CORD GOLD	62	75			2.25	139.50			80	165
	ISSUE			16		2.25	36.00				
	ISSUE			30		2.25	67.50				
		16*	75			2.25	36.00	11/17/--	2/09/--		
	FINAL TOTALS	BEG. INV.	48295.26								
		CHANGE	700.08								
		NEW VALUE	48995.34								

Figure 25. Stock status report

TRANSACTION DATE	TRAN CODE	ITEM NO	DESCRIPTION	QUANTITY	COST AMOUNT	VENDOR NO	P.O. NO	RECEIVING NO
07/23/--	R	413010	CH001 BR BOX 100A FLUSH	10	$ 720.00			103764
07/23/--	P	412146	CH148 BREAKER 15A	100		10927	A5902	
07/23/--	R	411116	1500 TWINLITE SOCKET B	500	175.00			103767
07/24/--	R	503029	MOTOR L/2 HP 60 CYC	2	18.50			103762
07/24/--	A	317802	TERMINAL CLIP	100CR	50.00CR			
07/24/--	R	326917	TERMINAL BAR	100	75.25			103766
07/24/--	R	411121	1506 SOCKET ADAPTER BROWN	400	76.00			103765
07/24/--	A	412997	CH173 BREAKER 30A	60CR	159.00CR			
07/24/--	P	413088	CH176 BREAKER 60A	40		27618	A5903	
07/24/--	R	411174	C151 SILENT SWITCH BROWN	200	158.00			103763
07/24/--	P	413090	CH005 BR BOX 150A	10		27618	15903	
07/24/--	R	718326	FC803 FUSE 15A	200	20.00			103768
			TOTALS	6314*	$4169.37*			

Figure 26. Stock transaction register

Inventory Costing

Inventory cost figures are often maintained by computer to cost issues and to report the value of inventory on hand. The most frequently used inventory costing procedures are the average-cost method and the last-cost method. A third method—standard cost—proves workable for many companies, and although standard cost is not computer-maintained, it can be used without difficulty within the framework of the balance-forward inventory application. First in first out (FIFO) and last in first out (LIFO) methods are not usually incorporated within this method of inventory accounting and are not discussed in this publication. For reference to FIFO and LIFO procedures see *IBM System/3 Guide to Inventory and Material Accounting* (E20-0321).

AVERAGE COST

The average-cost method is normally used by distributors whose merchandise cost fluctuates, where temporary cost changes are not relevant to the company's long-range planning, and where a relatively high or low current item cost does not truly reflect the item's normal cost or the inventory value. The method is commonly used by companies dealing with raw materials or similar commodities. Manufacturers, produce distributors, and lumber dealers are typical users of the average-cost method.

In addition to quantity on hand, item records must contain the average unit cost and the cost amount. The average unit cost is the cost amount divided by the on-hand quantity and is recalculated whenever a stock receipt is entered. Cost amount is the total value of the inventory on hand (cost of beginning inventory + cost of receipts – cost of issues). This is adjusted whenever the inventory balance changes.

For example, 250 units on hand of an item with a current cost price of 70¢ would represent an item cost amount of $175. When an additional 1000 units are received at a total cost of $750 (75¢ each) the total cost amount becomes $925. The item's unit cost price is then carried at 74¢ — the average unit cost of 1250 units with a cost amount of $925.

The average-cost method is best suited to situations where cost differs with each receipt of an item and where cost fluctuates both up and down. Over a period of time, the average-cost method ordinarily gives cost figures that in most cases approximate the FIFO method of costing—and with considerably less clerical effort.

LAST COST

Use of the last-cost method of inventory costing usually gives good results for inventories whose costs are relatively static, where there is no regular up-and-down fluctuation in supplier's prices. The cost carried for an item reflects current market conditions, and in this sense accurately represents the current replacement value of the merchandise on hand.

For the last-cost method, the item master record contains the quantity on hand and the item unit cost price. When stock is received, the computer simply replaces the previous unit cost price in the item record with the new unit cost. The item's cost amount (quantity x cost price) may also be carried to show the item's current inventory value, but this is not a necessity for the unit cost to be maintained. If cost amount *is* included, it must be kept in mind that this figure may not represent the actual cash outlay for the inventory on hand; it represents the replacement value of goods at the current market price.

STANDARD COST

Standard cost is used primarily by manufacturers whose inventory of finished goods includes a value-added cost in addition to the cost of raw materials. Each item's standard cost is determined by the company's accounting department, and ordinarily reflects wage rates, equipment usage, and other direct or indirect costs, as well as the cost of materials. An item's standard unit cost is punched when the item's master record is punched. When a cost is reevaluated and changed, the item record is repunched.

Standard cost is often used in situations where neither average cost nor last cost reflects the inventory's true value. Costs should be subject to regular review, of course, but it should be kept in mind that cost changes will require the punching of new records, and so standard cost should be used only where management expects item costs to remain constant for substantial time periods.

COSTING THE INVOICE

If the card punch method is used for customer order entry during order writing and billing, the cost of goods sold can be shown on the invoice (usually on a tear slip detached before mailing). The figure used for an item's cost is the unit cost carried in the item's master record.

If the tub file method is used, the item cost per unit must be punched in each item transaction record in the tub file in order for cost to be shown on the invoice. With the balance-forward inventory methods, tub files, computer-maintained costs, and costing of the invoice are not compatible, and it is recommended that these three options not be used in combination.

Cost of goods sold and other invoice calculations are discussed in the preceding section.

Card Records

Inventory accounting uses card records having three distinct functions:

- Item master records contain descriptive information and balances for every item the company handles
- Item transaction records represent sales of individual items (and merchandise returned)
- Stock transaction records carry data on inventory changes not involving specific customers—receipts from suppliers, orders placed, and adjustments

All of these records are used when inventory is updated and the stock status report is produced. The item master file is also used in the order writing and billing procedure with the punch order entry method, or with the tub file method when price determination is performed by the computer. The same item transaction records needed for inventory accounting are used for billing and for sales analysis, and their functions in those areas are described elsewhere in this manual.

ITEM MASTER FILE

The item master records contain descriptive data that is generally not subject to change and balance information that is revised regularly by the computer. The constant information usually includes:

- The item's number, an identifying name or description, a code or abbreviation indicating its location in the warehouse, its product-line classification, its unit weight, and predetermined figures indicating maximum and minimum inventory levels

- Unit price data—either a single unit price, a set of unit prices applicable to different customer classifications, or a list price with discounts applicable to different customer classifications

- Codes indicating (where policy varies) whether the item is taxable, whether it is discounted when sold, whether it is subject to cash discount, and whether it may be back-ordered

- Information of a miscellaneous nature, such as the number of the vendor supplying the item or the number of the department producing it, and a code indicating the sales commission associated with the item

Much of the item master data—the price information and codes—is used for billing procedures. If the item master file is not used for billing, the file needs only the descriptive information that is to be printed in the stock status report, and any other data used in inventory accounting.

The master file also includes item balance data, such as:

- The quantities on hand and on order and the total quantity issued to date
- Unit cost and current inventory cost amount
- The dates of the last issue and the last receipt of the item

Quantity on hand is revised by the computer whenever a transaction changes the inventory balances. If quantity on order is to be maintained, purchase orders for merchandise are punched as stock transactions and the computer records them. When a shipment arrives, quantity on order is reduced and quantity on hand increased by the receipt quantity.

If the number of issues to date is included in the item master records, this figure is kept up to date by computer for all items.

ITEM TRANSACTIONS

Item transaction records are used to record item sales to customers. For inventory accounting purposes, the record should carry an item number, the item quantity shipped, and a code indicating the type of transaction and whether on-hand inventory is increased, decreased, or unchanged. Suggested transaction-type codes are listed below.

Code	Description	Action
N	Normal Order	— Decrease Inventory
C	Cash Sale	— Decrease Inventory
B	Filled Back Order	— Decrease Inventory
D	Drop Shipment	— No Change
R	Returned Merchandise	— Increase Inventory

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Where billing is done, the item transaction record must also include whatever item information is to be shown on the invoice. Sales analysis may also require certain additional information such as product class.

STOCK TRANSACTIONS

Stock transaction records are used to record receipts of stock from suppliers, purchase orders for stock, and inventory adjustments. The record carries the item number, the quantity involved, and a code indicating the type of transaction. The suggested stock-transaction codes are:

Code	Description	Action
R	Stock Received	– Increase Inventory
A	Adjustment	– Decrease or Increase Inventory
P	Purchase Order	– No Change

Methods

Clerical procedures for inventory accounting are straightforward, as shown in Figure 27. Stock transactions enter the data processing cycle in written form: a bill of lading, a notice from the warehouse that a shipment has been received, or a copy of a purchase order sent to a vendor. Item transactions enter in punched card form from the billing procedure, either before the invoice is printed (prebilling) or after the invoice is printed and goods are shipped (postbilling).

The frequency of posting stock transactions ordinarily depends on the company's methods of customer order handling. Where a postbilling system is in use, inventory transactions—both customer sales and stock receipts—are normally recorded only once a day and sometimes as infrequently as once or twice a week. Infrequent inventory processing is workable, as long as it is not necessary for inventory balances to be constantly up to date. For companies taking telephone orders (where it is often necessary to check the item file to see whether an order can be filled) or for companies depending on the regular minimum-balance checking that inventory accounting provides, daily inventory processing is recommended.

In a prebilling situation, inventory accounting takes place and a stock status report is printed with every customer-order batch processed. For prebilling, absolutely current stock balances are a necessity, and stock transactions are held only briefly before they are recorded. Figure 27 is a flowchart of the inventory accounting procedure.

In step one, the stock-transaction source documents are edited by a coding clerk who makes sure that item numbers and quantities are correct and that any other necessary data has been included. The coding clerk dates each transaction and adds the appropriate transaction-type code.

In step two, control totals are taken on all incoming transactions: the item quantities and the total cost of items received (if recorded for costing). The figures taken at this point will be checked against the totals subsequently taken by computer as a safeguard that all transactions have been correctly recorded.

40
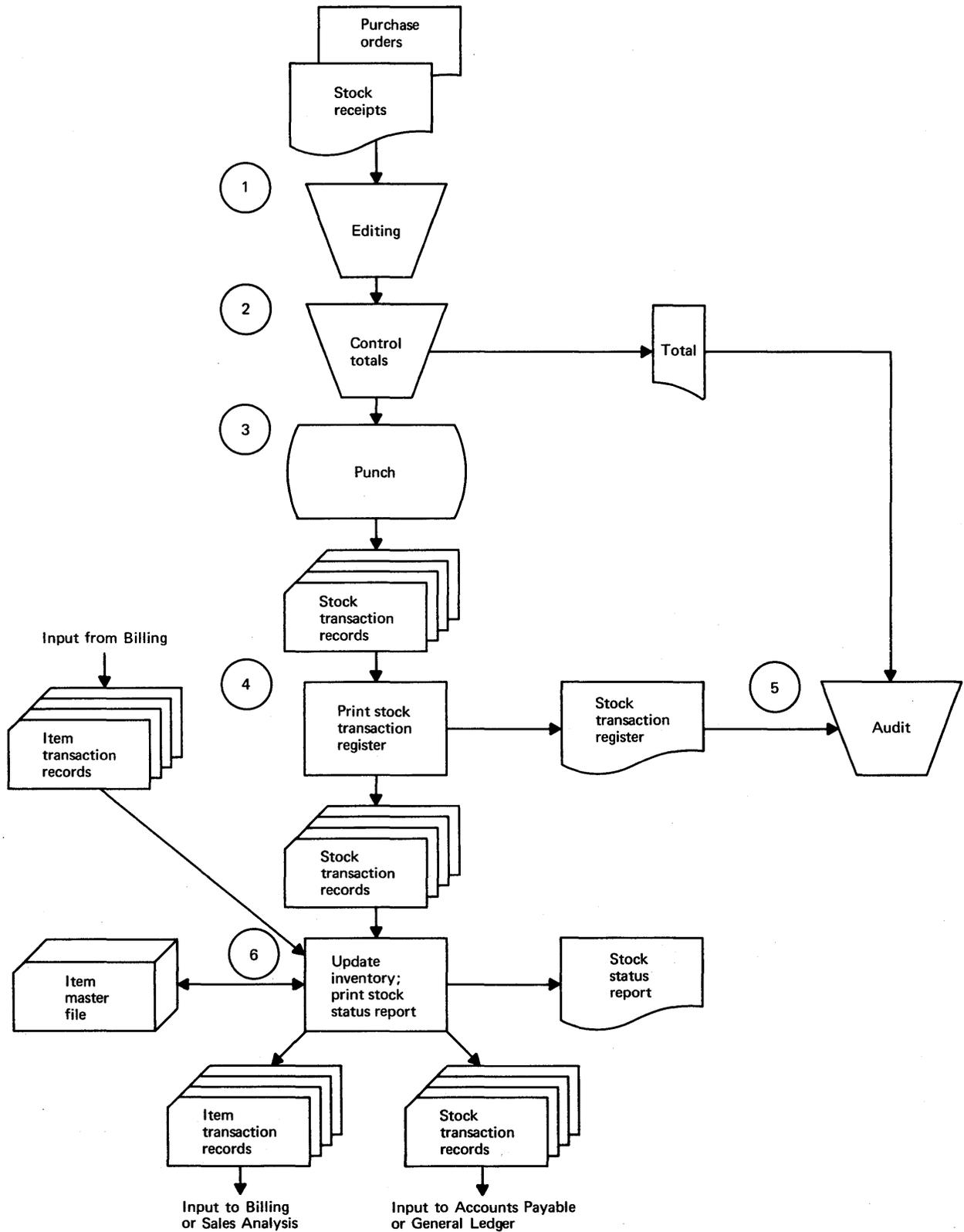
Figure 27. Flowchart for inventory processing

Stock transactions are recorded in step three, one card for each item received or ordered. Each card includes, at the minimum, the item number, the quantity received (ordered), and the transaction-type code.

For receipts, the transaction date and the total cost are also recorded for each item if this data is needed for inventory accounting. Other informative data—such as vendor number and the number of the company's purchase order—may be included if it is to be shown in the stock transaction register or the stock status report.

In step four, all stock transactions are sorted and listed by computer. Totals are ordinarily taken on item quantities and costs, and these totals are compared (step five) with the adding machine totals taken previously, as illustrated in Figure 28. If the totals match, processing continues normally. If they do not match, the error is found and corrected and the stock transaction register is reprinted if necessary. The control-total audit at this early point in processing provides an opportunity for errors to be caught before they can be recorded in the master file.

After the stock transaction register is printed, stock transactions are combined with the item transactions from the billing procedure and the complete set of transactions is processed against the item master file (step six) to update item balances, costs, and dates last active, and to print the stock status report. Processing in this step includes:

1. Sorting item transactions into item number sequence
2. Merging the item transactions and stock transactions
3. Match-merging the combined transactions with the item master file
4. Updating the active item master records by punching the new balance-forward information into blank cards as the transactions and master records are processed and the stock status report is printed
5. Merging the updated item master records back into the item master file

After the inventory has been updated, stock transaction records may be separated by type. The orders may be filed for reference in the stockroom and the receipts may be held for use in accounts payable or general ledger applications. The item transaction records may be involved in further processing in the billing and sales analysis applications.

ITEM NUMBER	VENDOR NUMBER	TRANS. TYPE	QUANTITY	COST EXTENSION
40390	19005	P	500	
12520	37410	R	700	910.00
28615	37410	R	2500	925.00
51375	28600	P	100	
36465	28600	P	2000	
48360	13625	R	550	338.25
42875	13625	R	1500	462.00
10850	13625	R	2000	340.00
TOTALS			9850	2975.25

91000
92500
33825
46200
34000
297525*

500
700
2500
100
2000
550
1500
2000
9850*
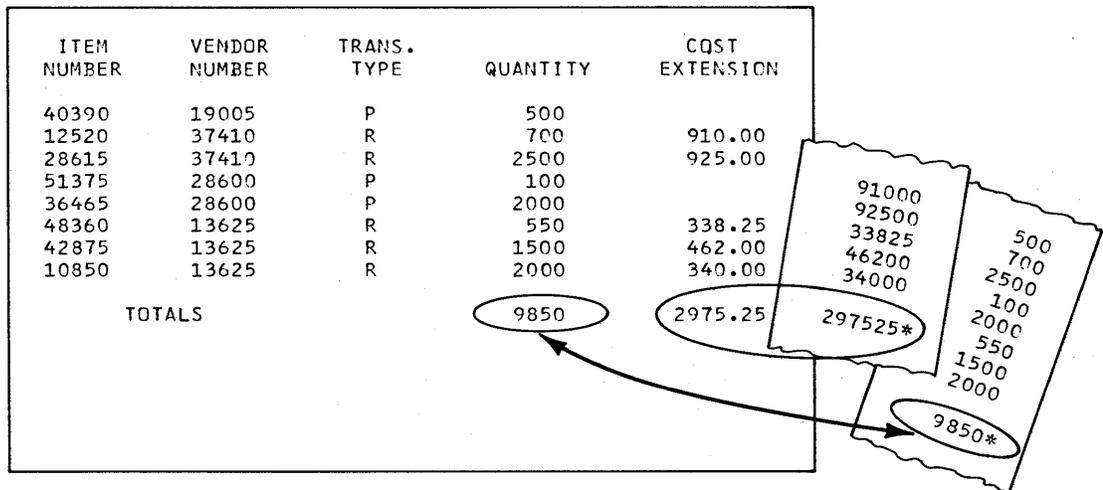
Figure 28. Balancing control totals

Physical Inventory

A regular physical count of the merchandise on hand is a necessity in any inventory accounting system. How often physical inventory is taken depends on company policy, the number of different items the company stocks, and the data processing methods it follows. Where prebilling is used for customer orders, the balances carried in the item master file must reflect the actual balance on hand in the warehouse, and a monthly physical inventory is recommended.

By reproducing information from the item master file, the system can provide physical inventory records, showing the item number and quantity on hand, to be used by the employees who take inventory. Figure 29 shows the first part of the procedure. The entire item master file is processed by the stock status program, which prints a stock status report showing all items, and produces item balance records (Figure 30) to be handed out to the inventory staff.
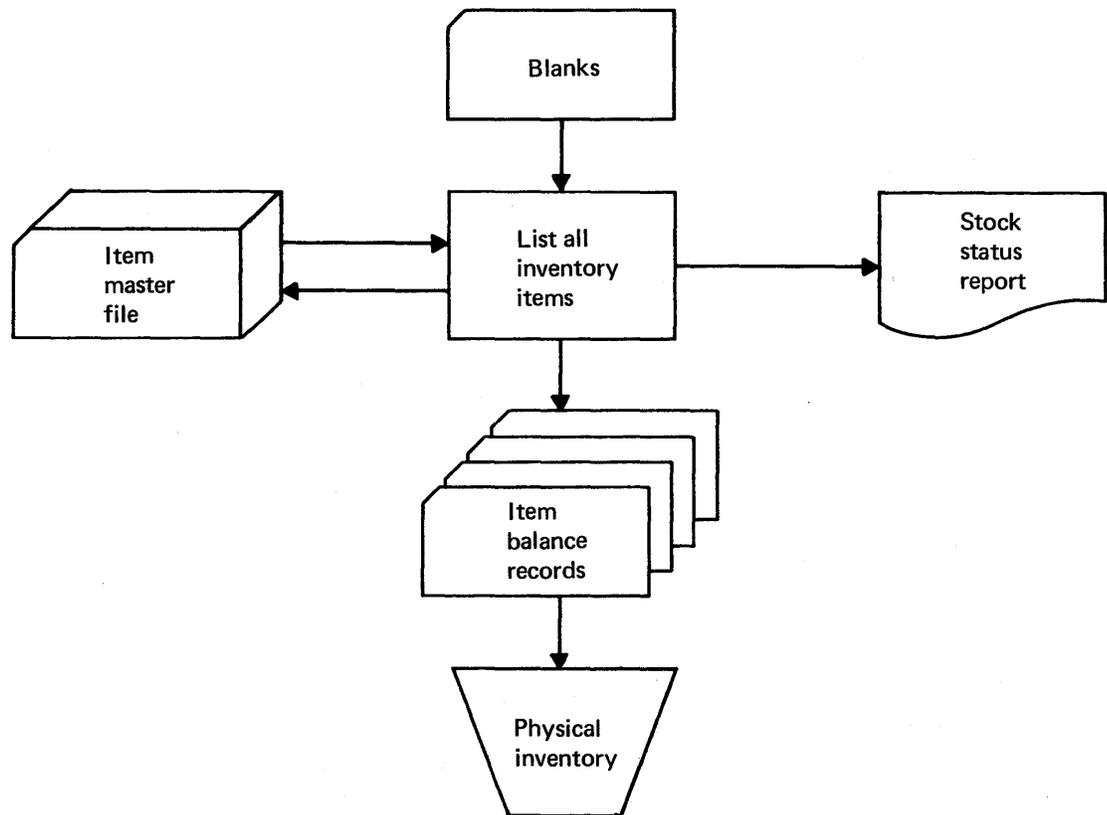
Figure 29. Flowchart for producing cards for physical inventory

| 23 | 2 0 1 3 5 | | 1 | | 1 2 - 3 2 6 |
| CLASS | STOCK NUMBER | U/H | | | LOCATION |

S C R E W D R I V E R , P H I L L I P S , 3   I N , M E D I U M

| DESCRIPTION | SIZE |

INVENTORY ACCOUNTING   B A 8 4 2 1

| CARD CODE | MATERIAL CLASS | STOCK NUMBER | LOCATION | QUANTITY | | | B A 8 4 2 1 | PHYSICAL INVENTORY CARD |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

ITEM COUNT	COUNTER	CHECKER

Figure 30. Physical inventory record

During physical inventory, the item balance records are used as inventory tickets. As each item is counted, its actual balance is written down on the balance card. The cards are then returned to the data processing department for the recording of any adjustments necessary.

Figure 31 shows the recording of adjustments—essentially the same steps shown earlier (Figure 27) for entry of normal stock transactions.

The coding clerk examines the balance cards, discarding those that show warehouse inventory to be the same as the current balance in the item master file. Where there is a difference, the coding clerk notes the amount of the difference on the balance card so that an adjustment can be made.

When all cards are in, the adjustment quantities are totaled, and stock transaction records are punched for each item to be adjusted. The transaction register is then printed, the totals are checked, and inventory processing continues as it normally would for regular recording of stock transactions. The stock status report that is printed gives management an opportunity to review all inventory adjustments.

The procedure described above can be followed to put the inventory accounting application in initial operation. When the item master file is converted, the item quantity on hand is left blank in all records. Item balance records are then punched by computer, physical inventory is taken, and the quantities are recorded. Where costing is done, the stock transactions are recorded as receipts (not as adjustments) so that the current inventory value may be included as part of the stock transaction.
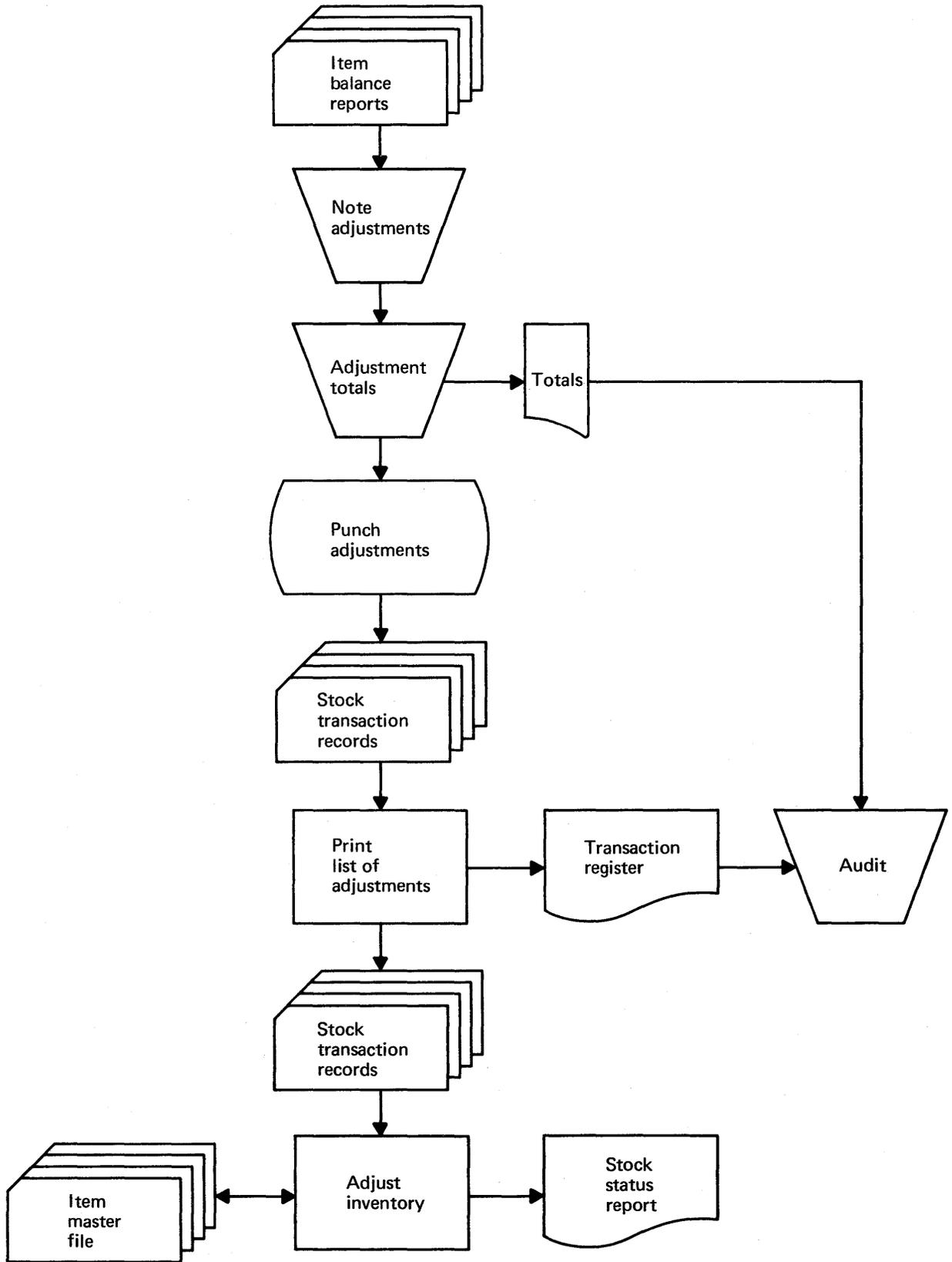
Figure 31. Flowchart for adjustments to inventory

ACCOUNTS RECEIVABLE

Accounts receivable is the amount of money owed to a company by its customers for merchandise sold or services rendered on a credit basis. The purpose of this section of the manual is to show how the IBM System/3 can be used to record, handle, and manage the data arising from accounts receivable operations. The importance of this function is underlined when one considers that almost 90% of the nation's business is done on credit and that to many companies the estimated income from accounts receivable is a prime budgetary consideration when planning their own expenditures. In general, the purpose of accounts receivable procedures, in addition to accounting for all receivable transactions, is to facilitate the collection of money owed, to minimize any losses from bad debts, and to maintain customer good will through prompt and accurate recordkeeping.

All transactions, including charges for merchandise sold or services rendered, cash receipts, and journal entries are recorded in chronological sequence and then charged or credited to the proper customer accounts. There are two basic approaches to this function: open-item and balance-forward. The fundamental difference between the two is the way in which cash receipts are applied. Cash receipts, under the open-item method, are credited against specific invoices, while cash receipts under the balance-forward method are applied to the total outstanding balance of the account. The detailed discussion that follows will show examples of each approach.

The choice of a particular method depends upon the requirements of individual companies. In either approach, however, five basic reports are required for a comprehensive accounts receivable system. The five reports are:

1. Accounts receivable transaction register
2. Cash receipts register
3. Customer statements
4. Aged trial balance
5. Delinquency notices

Six types of input records are required to produce the five basic reports. The six are listed below:

1. Customer master records
2. Invoice summaries
3. Journal entries
4. Cash receipts records
5. Customer balance-due records
6. Aged period date record

Required Records

CUSTOMER MASTER RECORDS

Prior to application implementation, the customer master records are punched from the user's original customer name and address file. As new accounts are added to the system, customer master records must be punched for these accounts and manually inserted into the file.

The customer master records contain such information as customer number, name and address, interest and late charge code (if applicable), statement code and credit limit amount (see Figure 8, under "Order Writing and Billing"). In the example to be used here, the customer master record will be mandatory input for three of the five basic reports: customer statements, the aged trial balance, and delinquency notices.

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INVOICE SUMMARIES

Invoice summaries are created in one of two ways. They are either a by-product of the billing application or they are punched from copies of the invoices.

These records contain, among other fields of information, customer number, invoice number and date, invoice amount, terms, and account debit or credit information from credit memoranda (see Figure 11, under "Order Writing and Billing"). The invoice summaries will be used as input to two of the basic reports: the accounts receivable transaction register and the customer statements.

JOURNAL ENTRIES

Journal vouchers are prepared by the accounting department to adjust small differences, write off bad debts, and provide for other miscellaneous entries. Since the volume of these items is low, they are usually written up at the end of the month in the accounting department and forwarded to the data processing department, where one journal entry record is punched for each journal voucher entry. These records become input for two of the five reports: the accounts receivable transaction register and the customer statements.

CASH RECEIPTS RECORDS

After the mail is opened and separated, the customer remittances are sorted into the sequence maintained in the accounts receivable file, which, in this example, is by customer number. The amount received is marked either on the tear slip that was originally part of the invoice, on the customer's remittance statement, or on the envelope if no stub or statement was included with the payment. In the latter case, it may be necessary to make use of a cross-reference file of customer names, or to perform other research in order to identify the payment by customer number.

The cash receipts records will be used as input for the accounts receivable transaction register, the cash receipts register, and the customer statements. Among other fields of information, they contain customer number, amount of payment, amount of credit received, invoice number (open-item method only), and date of payment.

CUSTOMER BALANCE-DUE RECORDS

These records are prepared by the computer during the statement printing operation. They are the updated records of accounts. They contain such information as customer number, statement date, total amount due, current amount due, and interest and late-charge amounts where applicable, and they may contain up to seven fields of aging.

Using either the balance-forward or the open-item approach to accounts receivable, these records will be used as input to the aged trial balance report and to the delinquency notices. They will not be used as input to the open-item customer statement preparation because, by definition, an open-item statement is one that lists all open items regardless of date, thereby developing the customer balance due at statement time. However, since the balance-forward statement shows only current-month transactions, it must depend upon a previous balance-due record to develop the current customer balance due.

Therefore, in the open-item method, the customer balance-due records are mandatory input to two reports, the aged trial balance and delinquency notices, whereas the balance-forward method requires these records for preparation of customer statements in addition to the other two reports.

AGED PERIOD DATE RECORD

This record is punched to be used as input to customer statement preparation. It contains the current period date and up to seven aged period dates. The dates are used by the computer to compare with invoice or balance dates for aging purposes.

Required Reports

ACCOUNTS RECEIVABLE TRANSACTION REGISTER

This is a control listing of all entries to accounts receivable. These entries include invoice summaries, journal entries, and cash receipts. The register may be printed as often or as seldom as necessity dictates during the monthly accounting period. However, we shall assume, for the purposes of this example, that it will be run on a daily basis.

This report is essentially a balance run although it also serves as an audit trail. In preparation for the running of the accounts receivable transaction register, a control clerk runs an adding machine tape, by type of all the daily receivable entries. The documents are then recorded and verified. The System/3 prepares the register, the totals of which are compared to the original adding machine tape. Any differences that exist must be resolved at this point and the register rerun until it is free of errors. Figure 32 is one example of an accounts receivable transaction register. Figure 33 is a flowchart illustrating the steps necessary to produce this register.

```
                        ACCOUNTS RECEIVABLE TRANSACTION REGISTER

                                    07/11/6                                    PAGE   01


            CUST        CUSTOMER        JOURNAL   INVOICE    CASH      INVOICE   JOURNAL
   DATE      NO           NAME            NO        NO      AMOUNT     AMOUNT    AMOUNT

07/11/--   759820   SOUND OF THE SEVENTIE           063420            $ 46.23
07/11/--   633870   OLDE VILLAGE SHOPPE             063421              89.70
07/11/--   642990   PARAGON TV SALES                C63422              20.30
07/11/--   122620   CANNIZONI STUDIOS               063422             129.76
07/11/--   682030   RAYMONDS RAPID REPAIR                    $ 63.80
07/11/--   742950   SARATOGA VARIETY                           29.72
07/11/--   014280   BAKER BRADLEY & CO                         43.50
07/11/--   872060   UNIVERSITY ELECTRIC                        97.75
07/11/--   883290   VILLAGE MUSIC & TV     07-036                                $18.23CR
07/11/--   006280   ALLSTONS               07-037                                10.70CR

                    TOTALS                                  $234.77*  $285.99*  $28.93CR*
```

Figure 32. Accounts receivable transaction register

From
billing
appl.

Cash receipts

Journal
vouchers

Control
totals

·Control
totals

Punch

Invoice
summaries

Journal entries

Cash receipts

Accounts
receivable
transaction
register

System/3

Balance to
control
totals

Journal entries

Invoice
summaries

Cash receipts

A/R
file

To cash receipts
reg. run
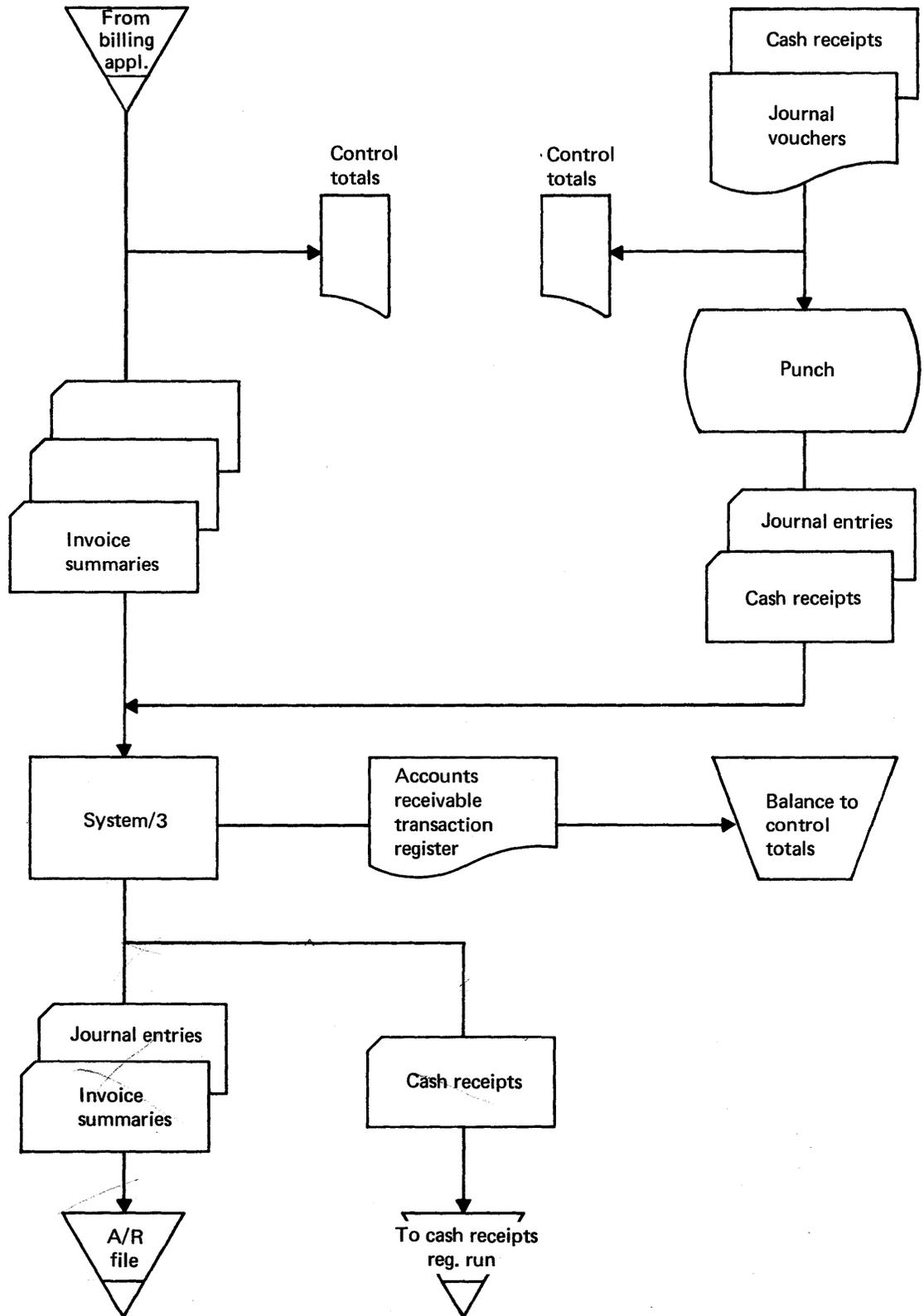
Figure 33. Accounts receivable transaction register preparation

CASH RECEIPTS REGISTER

Once it has been established that the accounts receivable transaction register is in balance with the established control totals, the cash receipts register can be prepared. This register not only serves as a permanent record of accounts receivable cash entries, but it also provides a ready means of reference and it becomes the basis for auditing cash entries to the accounts receivable file.

The cash receipts records, all of which were selected by the computer during the accounts receivable transaction register run, are sorted by customer number and the cash receipts register is listed. Figure 34 is one example of a cash receipts register. The total cash received must agree with the total cash amount from that day's accounts receivable transaction register.

```
                              CASH RECEIPTS REGISTER

                              11/30/--                                    PAGE   01


   CUST         CUSTOMER           INVOICE    DATE    CHECK   BANK       CASH     DISCOUNT      A/R
   NO           NAME                 NO       PAID     NO      NO      RECEIVED    TAKEN      CREDIT

  104430   ANDREW A ANDERSON & CO   141220  11/29/--   2310  90-5401  $1,213.24   $12.26   $1,225.50

  105864   ANNADALE & MC COY        143780  11/29/--   3228  90-3280    357.28     3.61      360.89

  106900   BAKER HOME DECORATING CO 149261  11/29/--   4267  90-4360     96.10     1.92       98.02

  108005   CANADIAN AMERICAN IMPORTS 144231 11/28/--   3650  90-8135  4,213.34    42.56    4,255.90

  232561   FARRAGUT FINE FURNISHINGS 146524 11/30/--   1218  90-3209     79.79     1.60       81.39

  635860   PLANTATION HOME PRODUCTS  148296 11/28/--    216  90-1261      5.80                5.80

  827093   SILVERTHORNE & STONE     143876  11/28/--    403  90-3221    380.75     7.62      388.37

  926300   WHORTON MILL & GEAR      143280  11/30/--   1616  90-1380    429.98     8.60      438.58


           TOTALS                                                    $6,776.28*  $78.17*  $6,854.45*
```

Figure 34. Cash receipts register

CUSTOMER STATEMENTS

At the end of the month, statements can be written for all customers with open balances. Showing the customer the status of his account serves to speed collections by reminding him of amounts due, gives the customer proof of what he has paid, and provides a means of graphically pointing out overdue items. This is so whether the statement is open-item or balance-forward. The difference is in format only.

Using the open-item approach, the accounts receivable file contains all the detail required to prepare statements accurately and promptly. The procedure is as follows:

At statement time, the customer master record file is match-merged with the accounts receivable file. That is, the customer master record for each account is collated in front of the previously unpaid invoice summaries, any cash receipts for the month, and all journal entries for the month. Customer master records for inactive accounts are selected and set aside. The cards are then processed on the System/3 computer to prepare customer statements (Figure 35). In addition, the computer punches customer balance-due records, which will be used for the preparation of the trial balance report and for delinquency notices.

```
         LAURENTIAN INDUSTRIES, INC.                          LAURENTIAN INDUSTRIES, INC.
               250 HACIENDA AVE.                                    250 HACIENDA AVE.
               SAN JOSE, CALIF.                                     SAN JOSE, CALIF.

                 STATEMENT                                            STATEMENT

                                     CUSTOMER NO.                                        CUSTOMER NO.
    H. J. ELLIOTT                                         H. J. ELLIOTT                      253680
    ELLIOTT TRANSFORMER CO            253680              ELLIOTT TRANSFORMER CO
    1418 E. FIRST AVE.                 DATE               1418 E. FIRST AVE.                  DATE
    CLINTON, CALIF.        95588                          CLINTON, CALIF.       95588       9/30/--
                                      9/30/--
                                                                RETURN WITH REMITTANCE
```

DATE MO	DY	YR	INVOICE NUMBER	DESCRIPTION	AMOUNT
8	31	--	663108	INVOICE	$285.96
9	09	--	663214	INVOICE	86.54
9	12	--	663821	INVOICE	185.23
9	23	--	854217	INVOICE	326.55
9	25	--	663108	FREIGHT ADJUST.	24.83CR

$859.45
TOTAL DUE

DATE MO	DY	YR	INVOICE NUMBER	DESCRIPTION	AMOUNT
8	31	--	663108	INVOICE	$285.96
9	09	--	663214	INVOICE	86.54
9	12	--	663821	INVOICE	185.23
9	23	--	854217	INVOICE	326.55
9	25	--	663108	FREIGHT ADJUST.	24.83CR

$859.45
TOTAL DUE

Figure 35. Open-item customer statement

The total accounts receivable amount (accumulated by the system as statements are being prepared) is balanced to the control totals, and the original copies of the statements are mailed to the customers. The second copies are forwarded to the credit department for their use, and the third (if three copies are prepared) are bound in customer number sequence and held in the data processing department for reference purposes.

After printing of the statements, the accounts receivable file, which has been separated from the customer master records and the customer balance-due records, is purged of closed items. That is, all open items for which full payment has been received are removed from the file, along with their respective cash receipts cards and journal entries. The removed records are held for reference and the remaining records become next month's accounts receivable file, to which will be added any transactions affecting accounts receivable as the cycle begins again. The customer master records and the customer balance-due records are ready for preparation of the aged trial balance report. Figure 36 is a flowchart of the procedure just described.

Open-item file

Master file

Journal entries

Cash receipts

Invoice summaries

Customer master records

System/3

Journal entries

Cash receipts

Invoice summaries

Customer master records

Blanks

System/3

Customer statements

Journal entries

Cash receipts

Invoice summaries

New balance due

Customer master records

Balance and mail to customers

Purge and file

To trial balance run

Figure 36. Open-item customer statement preparation

Balance-forward statements (Figure 37) are prepared in a similar manner but with the following differences:

1. The customer balance-due records from the previous month are required as additional input to the statement run.
2. No purge of the file is required.

Figure 37. Balance-forward statement

AGED TRIAL BALANCE

To list the aged trial balance, two input records are required: customer master file and customer balance-due records. The balance-due records are created from blank cards during the statement preparation run.

The aged trial balance is printed showing cross-foot totals for each account, and totals for each aged column. These totals can be used to establish controls for accounts receivable. For example, they can be balanced against the control sheet or against other reports such as the delinquency notices.

In this last instance, assume that a user desires all accounts with balances greater than 90 days to be dunned. The aged columns on the trial balance for amounts due over 90 days should balance with the delinquency-notice amounts.

Figure 38 is a sample of an aged trial balance report.

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```
                                LAURENTIAN INDUSTRIES INC                                    PAGE 1

                                   AGED TRIAL BALANCE                                DATE   7/17/--

CUST.        CUSTOMER          TELEPHONE    LAST PAY   CREDIT       TOTAL      CURRENT            OVERDUE ACCOUNTS
 NO.          NAME              NUMBER      MO  DA  YR  LIMIT     OUTSTANDING   AMOUNT      30 DAYS      60 DAYS    90 & OVER

 108   ALLEN & CO.             415-378-1089  2  16  --  $15,000  $ 7,296.35  $ 6,919.77  $  376.58
 165   ANDERSON AUTO SUPPLY    408-286-6741  1  28  --    2,500    1,665.49    1,665.49
 178   ANDREWS AND SONS INC    408-262-2074  2  05  --      750      146.64                          $  146.64
 189   ARGONAUT ENGINEERING    415-867-2506 12  27  --    2,000    3,125.41    2,111.30     611.54      312.13    $  90.44
 247   BERKLEY PAPER CO        408-251-4189  2  21  --    6,300    5,289.00    1,185.50   2,652.45    1,400.05       51.00
 252   BEST DISTRIBUTION CO    408-296-1667 10  06  --    1,000      765.44        3.25                             762.19


       FINAL TOTALS                                               $35241.33*  $21,085.31* $5,601.57* $3,831.82*  $998.63*
```

Figure 38. Aged trial balance

DELINQUENCY NOTICES

It is necessary to analyze accounts receivable records periodically in order to identify delinquent
accounts and to provide for a follow-up procedure. This function is extremely important because
experience has shown that the older an outstanding balance becomes, the more difficult it is to collect.
In addition, a heavy load of past-due receivables ties up working capital, exercising a restricting effect
on other functions of a business operation.

The System/3 user, when he defines his aged periods in an age period date card, may define any of
his periods as overdue. Customers who have had unpaid balances for a period equal to or greater than
the overdue period can then be dunned using the following procedure:

The customer master record followed by the customer balance-due record for each account is entered
into the computer and the aging fields of the balance-due record are analyzed. If the account, by
definition from the age period date card, is overdue, a delinquency notice is printed. If not, the cards
are simply passed through the system and the next account is analyzed.

The delinquency notices, as does the aged trial balance, require the balance-due records as input.
Therefore, they too must be printed after aging has occurred during the statement run. However,
either the aged trial balance or the delinquency notices can be printed first, depending upon
individual requirements.

This, then, is a description of a basic accounts receivable application with the choice of open-item or
balance-forward left to the individual user. There follows a brief discussion of procedural details.

Accounting Control

Accounting controls are an important part of data processing, as they are of all good accounting procedures. In accounts receivable, these controls check the functioning of both the procedure and the personnel, and in many cases also provide the entries to be made to the general ledger. Essentially, a typical control procedure is as follows:

As a group of accounts receivable records is created for each group of invoices, credit memos, or cash receipts, they are listed on the system to prepare control registers. These registers show the details of each transaction and the total of each group of transactions. The totals are checked with predetermined totals from the originating source for each type of transaction and are then recorded on the control sheet. The cards representing the transactions are filed in the accounts receivable file.

At the end of the month, the items recorded on the control sheet are totaled and combined with the previous month's balance to obtain the current month's balance. The cards in the accounts receivable file are then listed on the system to prepare the trial balance. Since all entries were proved back to the preestablished controls, and since the trial balance total is obtained by reading and accumulating the information previously punched in the accounts receivable cards, the trial balance usually balances. However, if any discrepancies do occur, they can be located relatively easily, because the accounts receivable file can be automatically sorted into date sequence and the control totals reestablished to locate any discrepancies, and because sufficient data has been provided on the registers so that any transaction can be reconstructed. Figure 39 shows this concept in outline form and the following paragraphs describe it in more detail.

The Control Sheet

At the start of each accounting period, the accounts receivable balance from the previous accounting period is entered on the control sheet. Then each day, as debits and credits affect the accounts receivable balance, they are posted to the control sheet in summary form. The control sheet then represents the latest status of the accounts receivable. Let us consider the source of the entries to the illustrative control sheet shown in Figure 40.

Invoices, Credit Memorandums and Journal Entries

Each day, the accounts receivable debit records representing the day's billing are listed on the accounts receivable register. This register, then, is a completely detailed list of all invoice entries to the accounts receivable. The total billing figure (arrived at during the billing procedure) is balanced with the total receivables amount (from the accounts receivable register) and is posted to the accounts receivable control sheet. Thus, for example, on December 31 the total of the invoices billed, $7,764.44, is posted to the control sheet.

In a similar manner summary figures are balanced and posted to the control sheet for credit memorandums and journal entries.

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Sales, credit
memorandum

Accounts
receivable
register

Journal entries,
misc. entries

Accounts
receivable
register

Accounts
receivable
file

Trial
balance

Cash receipts
register

ACCOUNT RECEIVABLE
CONTROL SHEET

DATE	INVOICES BILLED	INVOICES PAID	CASH RECEIVED	DISCOUNT ALLOWED	RETURNS	ALLOWANCES	MISCELLANEOUS		
	DEBIT A/R	CREDIT A/R	DEBIT	DEBIT	DEBIT	DEBIT	EXP	DR A/R	CR A/R
BALANCE									

Figure 39. Control procedure

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Cash Receipts

Cash receipts can be entered into cards by any one of several methods, to suit the needs of the business and to comply with either the open-item method or the balance-forward method. In either case, as soon as the cards have been prepared, they are detail-printed on the system, producing the cash receipts register.

This register serves several purposes. Its immediate function is to prove that the accounts receivable records are in balance with actual cash receipts. It is also a permanent record of accounts receivable cash entries, and provides a means of ready reference. Furthermore, it is the basis for auditing credit entries to the accounts receivable ledger file.

ACCOUNTS RECEIVABLE CONTROL SHEET MONTH OF *December*

DATE	INVOICES BILLED (DEBIT A/R)		INVOICES PAID (CREDIT A/R)		CASH RECEIVED (DEBIT)		DISCOUNT ALLOWED (DEBIT)		RETURNS (DEBIT)		ALLOWANCES (DEBIT)		MISCELLANEOUS EXP	MISCELLANEOUS DR A/R		MISCELLANEOUS CR A/R	
BALANCE LAST MO.	62 565	16															
12 1	10 468	06	4 528	60	4 473	19	55	41									
2	8 487	27	6 818	93	6 774	08	44	85									
3	9 296	20	1 993	68	1 981	50	12	18	61	80							
6	6 435	33	3 654	82	3 633	57	21	25									
7	5 061	40	2 413	97	2 358	45	55	52									
8	9 091	84	751	28	749	87	1	41									
9	5 438	39	2 782	15	2 751	84	30	31									
10	6 695	23	6 877	39	6 749	70	127	69	316	65							
13	5 927	66	11 892	44	11 753	61	138	83									
14	7 289	61	2 822	97	2 772	32	50	65	261	17							
15	6 908	23	8 680	86	8 544	03	136	83									
16	7 165	16	7 153	88	7 037	95	115	93									
17	7 642	18	12 360	82	12 264	78	96	04	25	25							
20	7 468	82	19 562	50	19 259	84	302	66	525	75							
21	9 608	77	2 468	56	2 442	70	25	86	138	50							
22	6 950	16	3 067	43	2 996	10	71	33	163	47							
23	8 211	62	3 178	43	3 109	98	68	45									
24	7 679	56	15 170	86	14 862	58	308	28			401	83					
27	9 301	84	10 876	39	10 822	15	54	24									
28	7 574	57	9 556	07	9 444	94	111	13									
29	7 925	28	9 888	62	9 708	97	179	65									
30	7 402	15	15 697	80	15 484	02	213	78					JE			395	42
31	7 764	44															
BALANCE																	

Figure 40. Control sheet

When the cash receipts register has been proved, the clerk uses it to post entries to the control sheet, and the cash receipts records are filed in the accounts receivable-ledger file as credit entries to the individual accounts. Notice in Figure 41 that the total credit to accounts receivable of $6,975.07 and the corresponding debits to cash of $6,904.21 and to discount allowed of $70.86, all of which were accumulated on the cash receipts register, are posted to the control sheet.

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Thus at the end of the period, the control sheet contains the totals of all entries made to the accounts receivable file. These totals are added and the new accounts receivable balance is:

- The total outstanding at the beginning of the accounting period
- Plus all invoices issued during the period
- Less the invoices paid
- Less all returns
- Less any allowances made
- Plus (or minus) the totals of any journal entries, debit memorandums, or any other miscellaneous entries.

The resulting total is the control figure to which the accounts receivable ledger file must balance.

A slight variation to the above, frequently used, is to maintain a running total of the outstanding accounts receivable by crossfooting the control sheet daily and adding the result to (or subtracting it from) the previous day's total.

Figure 41. Posting cash receipts

SALES ANALYSIS

Comprehensive sales analysis reports are of major importance to a distribution organization. Through accurate and up-to-date knowledge of sales activities, management can control present conditions and plan future policies. With this timely information management can direct the efforts of salesmen, check the effectiveness of advertising, regulate purchases, meet competition, and provide sales facilities and policies that promote the profitable conduct of the business.

Sales analysis factors usually include what items are sold, who sold them, and to whom they were sold. The user of an IBM System/3 has a wide latitude in designing the types of sales analysis reports best suited to his own operation. This section of the manual discusses the requirements for producing five of the more commonly used types of reports:

- Item sales analysis
- Item class sales analysis
- Item-within-customer sales analysis
- Item-class-within-customer sales analysis
- Customer-within-salesman sales analysis

Figure 42 shows an example of each type of report.

Report Options

In the design of a sales analysis sytem, careful consideration should be given to the many options that can be incorporated into each type of report. Examples of these options, which can greatly increase a report's meaning and profitable use, are:

- Current year-to-date analysis
- Comparative year-to-date analysis
- Percent change in sales
- Percent change in quantity sold
- Determination of gross profit dollars
- Determination of gross profit percentage

CURRENT ANALYSIS

Sales analysis reports may be designed to reflect sales activity on a current year-to-date basis. A report of this type includes sales for the current month and sales year-to-date for the current year.

One of the many uses for current analysis can be seen in a report in which customer sales are listed for each salesman. Management can evaluate the performance of the sales force and compare salesmen's results. If the report reflects item sales, fast-and slow-moving items are highlighted.

COMPARATIVE ANALYSIS

Sales analysis reports may also be designed to include comparative figures showing current month and current year-to-date compared with the same month and year-to-date of the preceding year.

This kind of report highlights cyclic or seasonal trends in sales and sales performance.

A B C COMPANY

COMPARATIVE ANALYSIS OF SALES BY ITEM

PERIOD ENDING 10/31/6   PAGE

ITEM NO.	DESCRIPTION	CURR. PERIOD QUAN. THIS YR	LAST YR	PCT CHG	YTD QUANTITY THIS YR	LAST YR	PCT CHG
624634	D20068 OVERHAUL GASKET	10	14	29-	90	98	8-
624832	17D0011 BELT DYNAMIC FAN	190	150	27	1,820	1,905	4-
624901	DMK6448 HUB ASSEMBLY J2	1-	5	120-	18	18	0

A B C COMPANY

SALES BY ITEM CLASS

MONTH ENDING 03/31/6

ITEM CLASS	CLASS DESCRIPTION	SOLD THIS MONTH	GROSS PROFIT	PROFIT PERCENT	SOLD THIS YEAR	GROSS PROFIT	PROFIT PERCENT
1	ABRASIVES	2,720.19	271.36	10	9,900.17	907.60	10
2	ACIDS AND CHEMICALS	1,216.27	170.27	14	3,139.68	408.07	13
3	BRASS	6,220.83	435.45	7	16,341.47	1,143.87	7
4							
5							
6							
7							
8							
9							
10							

A B C COMPANY

SALES ANALYSIS BY ITEM FOR EACH CUSTOMER

PERIOD ENDING 03/31/6   PAGE

CUST NO.	ITEM NO.	CUSTOMER/ITEM NAME	SOLD THIS PERIOD QUANTITY	AMOUNT	PROFIT PRCNT	SOLD THIS YEAR QUANTITY	AMOUNT	PROFIT PRCNT
0667		CONTINENTAL ELECTRIC CO						
	411116	B500 TWINLITE SOCKET B	320	192.45	14	1,200	720.03	14
	411122	B506 SOCKET ADAPTER BROWN	1,000	320.05	9	5,240	1,677.34	9
	411173	C151 SILENT SWITCH IVORY	25	30.00	12	865	1,038.23	12
		CUSTOMER TOTALS		542.50	12		3,435.60	12
0955								

A B C COMPANY

COMPARATIVE SALES ANALYSIS

BY ITEM CLASS FOR EACH CUSTOMER

MONTH ENDING 05/31/6   PAGE

CUST NO	ITEM CLASS	CUSTOMER/ITEM CLASS NAME	MONTHLY SALES THIS YEAR	LAST YEAR	PRCNT CHG	YEAR TO DATE SALES THIS YEAR	LAST YEAR	PRCNT CHG
3310		TARBELL HARDWARE						
	11	BUILDER HARDWARE	103.19	91.31	13	515.92	729.43	29-
	12	ELECTRICAL SUPPLIES	87.58	85.02	2	435.57	375.29	16
	13	GIFTS AND SUNDRIES	63.01	.00		315.09	490.36	35-
	14	HOUSEWARES	198.05	150.23	32	990.32	1,123.19	12-
	15	METAL AND PIPE	201.52	25.40	704	1,005.48	840.86	20
	16	NAILS AND SCREWS	75.04	40.89	88	373.46	264.91	41
	17	PAINT AND SUPPLIES	316.51	250.62	26	1,588.48	1,248.72	27
	18	POWER AND HAND TOOLS	425.58	385.12	10	1,704.29	1,392.32	22
	19	SPORTING GOODS	227.91	209.29	9	1,331.50	850.45	57
	20	YARD AND GARDEN EQUIPMENT	146.54	55.65	165	732.61	616.18	19
			1,844.93	1,293.53	43	8,992.72	7,931.71	13
3619								
3824								

A B C COMPANY

COMPARATIVE SALES ANALYSIS BY CUSTOMER

FOR EACH SALESMAN

PERIOD ENDING 07/31/6   PAGE

SLMN NO.	CUST. NO.	SALESMAN/CUSTOMER NAME	THIS PERIOD THIS YEAR	THIS PERIOD LAST YEAR	YEAR-TO-DATE THIS YEAR	YEAR-TO-DATE LAST YEAR
10		A R WESTON				
	1426	HYDRO CYCLES INC	3,210.26	4,312.06	10,010.28	9,000.92
	2632	RUPP AQUA CYCLES	7,800.02	2,301.98	20,822.60	11,020.16
	3217	SEA PORT WEST CO	90.00CR	421.06	900.00	593.10
		SALESMAN TOTALS	10,920.28	7,035.10	31,732.88	20,614.18
12		H T BRAVEMAN				
	0301	BOLLINGER ASSOCIATES	100.96	0.00	100.96	0.00
	1941	MACK HARDWARE CO	4,201.85	860.82	13,922.68	1,866.22
	2601	RECREATIONAL UNLIMITED	180.60	420.96	8,029.22	1,200.00
		SALESMAN TOTALS	4,483.41	1,281.78	22,052.86	3,066.22

	FINAL TOTALS	98,473.26	91,805.82	656,002.17	598,771.49

Figure 42. Typical sales analysis reports

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PERCENT CHANGE IN SALES

This information can be reported in two ways: (1) percent of change for the current month versus the same month for the previous year, or (2) percent of change year-to-date this year versus year-to-date last year.

The results are a reflection of the percentage of increase or decrease in the dollar amounts of gross sales. For example, if last year in July a firm had sales of $10,000.00 for item number 646223, and sales of $12,000.00 for the same item in July of the current year, the report would show the percent of increase in gross sales for that item:

Item Number	Sales This Period	Same Period Last Year	Percent Change
646223	$12,000.00	$10,000.00	20

If, on the other hand, the figures in the example above were reversed, showing a decrease in gross sales, the percent change would show a negative number reflecting that decrease.

Item Number	Sales This Period	Same Period Last Year	Percent Change
646223	$10,000.00	$12,000.00	16.7–

The percent change tells at a glance whether sales for a particular item, item class, etc., have increased, decreased, or remained constant.

PERCENT CHANGE IN QUANTITY SOLD

Percent change in quantity sold can also be reported on a current month versus same month prior year basis, or on a current year-to-date versus prior year-to-date basis. The change, either increase or decrease, is expressed in percent of units sold.

Item Number	This Year Quantity Sold	Sales Amount	Last Year Quantity Sold	Sales Amount	Percent Change
646223	10	18.75	5	9.38	100

The percent of change in quantity sold is computed on the basis of the difference between the number sold this year and the number sold last year. Again, if the above figures were reversed, the percent change figure would be a negative number.

DETERMINATION OF GROSS PROFIT

The gross profit, in dollar amounts, is usually reported either for the current month only or for the current month and current year-to-date.

This figure, expressed in dollar amounts, is computed on the basis of unit cost times quantity sold subtracted from sales amount. For example, a report for customer sales within salesman might look like this:

Salesman Number	Salesman Name	Customer Number	Customer Name	Sales Amount	Gross Profit
01	Adams				
		100	Jones	100.00	16.00
		110	Thomas	208.00	33.28
		120	Uvas		
		130	Zeers	404.00	63.64

GROSS PROFIT PERCENTAGE

Given the cost per unit and the selling price per unit, the system can compute the percent of gross profit. This option may also be reported either on a current month only basis or on a current month and current year-to-date basis.

Records Used

Four types of punched card records are required to produce the five typical sales analysis reports previously mentioned. The four records are:

- Customer name record
- Salesman name record
- Item transaction record
- Sales summary record

CUSTOMER NAME RECORD

The customer name record permits customer name to be printed on the item sales within customer and item class sales within customer reports. It contains (as a minimum) record identification code, customer number, and customer name.

If the system is being used to perform order writing and billing, the customer master records from that application may be used to reproduce customer name records automatically. When master records are not available, the name records must be punched from present customer files.

SALESMAN NAME RECORD

The salesman name record permits salesman's name to be printed on the customer-within-salesman report. It contains (as a minimum) record identification code, salesman number, and salesman name. These records must be punched from current information.

ITEM TRANSACTION RECORD

Item transaction records that represent the current period's sales are required for each of the five sales analysis reports. The record contains (as a minimum) record identification code, customer number, item number, item class code, item description, unit cost if gross profit determination is required, quantity sold, and sales amount.

If the order writing and billing is performed on the system, item transaction records are available as an automatic by-product of that application (see Figure 43). Otherwise, they must be punched from sales invoices.

Figure 43. Item transaction record

SALES SUMMARY RECORD

A different sales summary record is required for each of the five sales analysis reports. The sales summary record contains year-to-date sales data that is summarized according to the requirements of a specific report (such as by item, by item class, etc.).

Initially, sales summary records for both the current year and the prior year (if comparative reporting is desired) must be punched from existing sales records. Once the sales analysis application has been implemented on the system, new sales summary records are automatically generated during each period's reporting. The new updated records, which contain current year-to-date sales data, become input for the next period's reports. The current year-to-date sales summary records for each period can be retained and used the following year to provide prior year-to-date data for comparative reporting. Figure 44 shows a sales summary by item record.

Figure 44. Sales summary by item record

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Typical Procedures

Although the specific input records required vary with the five types of sales analysis reports, the general procedures for producing each report are essentially the same (see Figure 45).

SORT ITEM TRANSACTIONS

Regardless of the type of report to be produced, the first step is to sort the item transaction records. This sorting establishes a sequence based on the control fields required by an individual report. Specifically, the item transaction records are sorted by item number for item sales analysis, by item class code for item class analysis, etc.

MATCH-MERGE SALES SUMMARIES

If comparative year-to-date reporting is used, the current year's sales summary records must be match-merged with the prior year's summary records. Control fields for the match-merge are the same as for the item transaction sort; the specific fields depend on the type of sales analysis report to be printed. This match-merge step is of course omitted when comparative sales summary figures are not required. The merged current and prior year summaries or current year only summaries are match-merged with the sorted item transaction records. Again, the control fields for the match-merge are determined by the type of report to be printed.

REPORT PREPARATION

Sales analysis reports that do not require the printing of customer's or salesman's names are prepared by processing the merged item transaction and sales summary records on the system. Prior to preparing item-within-customer, item-class-within-customer, or customer-within-salesman reports, the appropriate name records (customer or salesman) must first be match-merged with the item transaction and sales summary records. Any unmatched name records should be checked for appropriate action and then the merged sales records can be processed on the system.

As each type of sales analysis report is being prepared from appropriate input records, blank cards are entered into the system. New current year sales summary data is automatically punched into the blank cards, thus creating updated sales summary records for use during the next reporting period. When all the required sales analysis reports have been completed, the new sales summary records are filed and held for use in preparing the next period's reports; the old (previous period) sales summary records are filed for use the following year to provide comparative figures; the item transaction and prior year summary records may be history filed; and the name records are returned to their respective files.
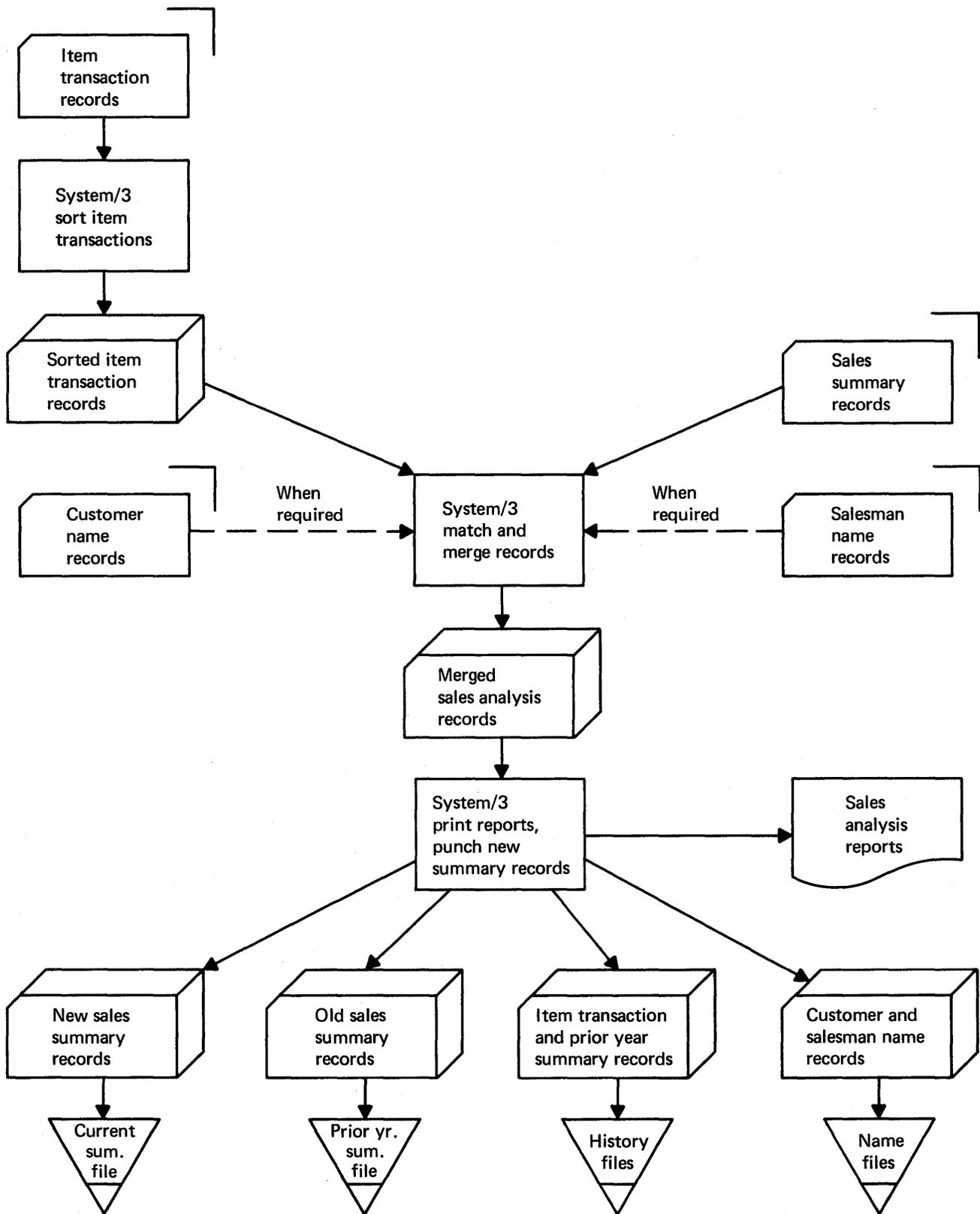
Figure 45. Flowchart of general procedures

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