INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications	Data Transmission, Stock and Inventory Control, Communications
Type of Industry	Food Distribution
Name of User	National Food Stores Inc. Milwaukee, Wis.

Equipment Used	Teletype Model 35 ASR Sets IBM 1440 Computer System

Synopsis

National Food Stores of Milwaukee, Wis., uses a data communications network comprised of Teletype Model 33 ASR sets to transmit orders from some 61 stores in the Wis. Division to headquarters in Milwaukee for next-day shipments. Every day, the entered orders are called in to headquarters' data processing department for next-day delivery to the store and for billing and reordering inventory stock for the warehouse. The system is also used to communicate special messages to store managers by headquarters, and on weekends, weekly sales figures are transmitted to headquarters by store managers. Punched paper tape is converted to punched cards which are fed into the computer for later generation of pick lists, invoices and office work copies.

National Food Stores is the fifth largest grocery chain in the country and the nation's ninth largest retailing organization. 18,000 full time and 9,000 part time persons are employed in a total of 900 stores. There are National stores in Detroit, Indianapolis, Milwaukee, Minneapolis, New Orleans, St. Louis and Youngstown. Total annual sales are $1,190,494,686.

National first started testing different electronic data communications systems several years ago, using its present computer equipment in the warehouse office. Six stores in the Milwaukee office were involved in the test, and complete records were maintained to show results and costs. The teletypewriter system was chosen over another hookup. One of the deciding factors was the time required to transmit the order from the store to the warehouse. The project was an experimental one, and the only problems occurred when the teletypewriters were first installed. "Store managers," reports Division Accountant Cornelius Rodgers, "would forget to leave the machines turned on, and would have to return to the store at one or two in the morning. They would only forget once, though."

THE SYSTEM

A specially prepared catalog lists every product supplied by the National Food Co.'s Wis. division warehouse along with the product's numeric code. Pages of new items and special sale items are shipped separately to the stores on sheets to be inserted into the product catalog. There areare also blank pages in the back of the catalog where other product information may be written. All of the new items and the special sale items have special numeric codes (or commodity codes) assigned to each. The catalog is printed every two weeks and during any one week, National expects to make two or three grocery deliveries to each of its stores.

Each National grocery store is equipped with a Teletype Model 33 automatic send-receive set with a numeric keyboard. The ASR includes a keyboard send-receive page printer, a paper tape punch and a paper tape reader which can be used in a variety of combinations. Besides the numerals 1 through 9 and 0, the keyboard contains four alphabetical characters (A through D) which extends the possible number of code combinations. However, National does not repeat item code numbers until six months have elapsed.

Other keys, called information separators, make it possible to punch certain code combinations into tape for computer use without activating the printing mechanism. The set can receive and print out the range of alphanumeric characters, enabling it to receive administrative and other messages. The unit operates at speeds of 100 words per minute (10 characters a second) and uses the U.S.A. Standard Code for Information Interchange (ADCII).

The machine is located in the cashier's office at the front of the store. Every day, a store manager or another member of personnel checks shelf quantities and lists each item to be reordered. Throughout the working day, a member of the store staff punches the commodity code, the catalog page and the line number of each product to be reordered. As each item is typed on the keyboard, a hard copy of the item appears and the same information is duplicated on a punched paper tape. Orders for produce, bakery goods, groceries and meats, health and beauty aids are transmitted during the week; sales report information and payroll information are transmitted on Saturdays.

In order for the store manager to check the accuracy of his order before it is transmitted, a transparent plastic overlay is placed on the printed copy of the order. It separates the letters and numbers into commodity code, quantity, and page number. This check will allow the manager to make corrections before the order is called in. The punched paper tape is then placed in the Teletype ASR set reader.

GROCERY-FROZEN FOOD-DIARY

PAGE NO.	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY
DDDTTT	100	961	981																				
DDDTTT	101	021	041	061	081	101	121	161	201	241	261	281	441	561									
DDDTTT	102	101	141	881																			
DDDTTT	103	221	241	261	281	521	541	701	721														
DDDTTT	106	041	101	161																			
DDDTTT	107	964																					
DDDTTT	110	162	202	561																			
DDDTTT	111	621	701	881	901	941	441	461	481														
DDDTTT	114	461																					
DDDTTT	115	021																					

WEEKLY SALES AND PAYROLL REPORT

CODE	SALES THIS WEEK	NO. OF EMPL.		TOTAL HOURS AND PAYROLL		CUSTOMER COUNT
		FULL TIME	PART TIME	HOURS	PAYROLL	
						EOT

BAKERY

DAY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY	LINE NO. QUANTITY

PLASTIC OVERLAY IS PLACED ON THE PRINTED COPY OF THE ORDER TO SEPARATE THE LETTERS AND NUMBERS INTO COMMODITY CODE, QUANTITY, AND PAGE NUMBER.

MESSAGE TRANSMISSION

During the night shift at the warehouse data processing dept., the operator of a Teletype Model 35 ASR set calls in the tape information from the 61 stores in a predetermined sequence.

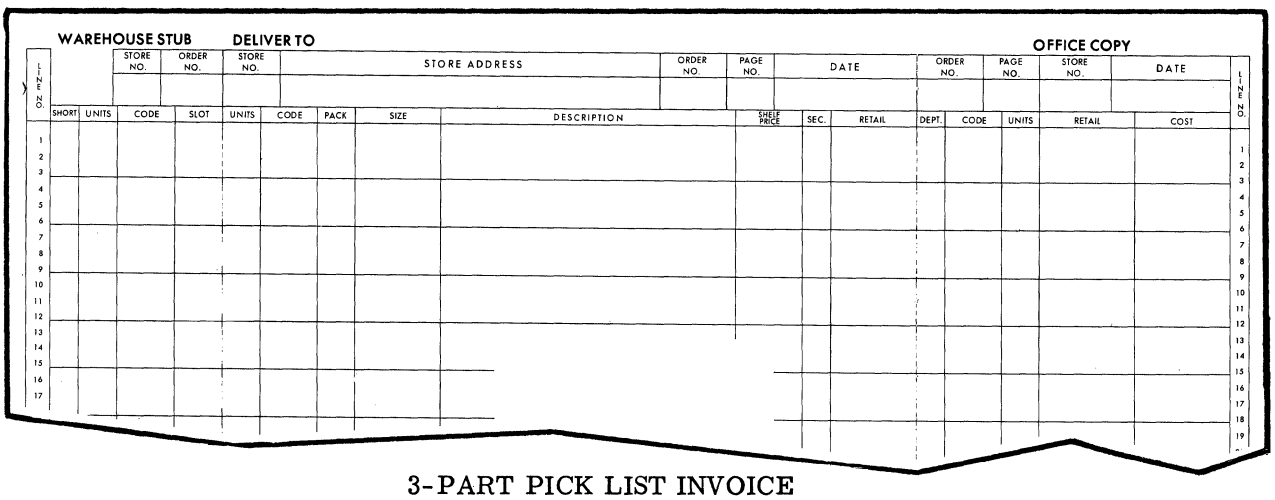
This is accomplished by inserting a card dialer, designed by the Bell system, into the Model 35 ASR set. The card dialer--which is a plastic card punched with a store call number--automatically starts the tape reader of the teletypewriter at a store and that data is transmitted to the data processing department via Bell System Dataphone service.

At the data processing department, the Model 35 is a heavy-duty printer which has similar send-receive capabilities, paper tape punch and paper tape reader as the Model 33, and also operates at 100 words per minute. Its keyboard differs in that it is similar to that of an ordinary office typewriter. This unit receives orders in several forms: a duplicate paper tape, held for the record; page copy for immediate sight verification (the operator checks copy with an overlay also), and the paper tape which is fed into a conversion device called TelePath, manufactured by Canadiation Aviation Electronics, Inc. The TelePath unit converts the information on the punched paper tape to punched cards at about the same operating speed at the Teletype set.

National's IBM 1440 computer system has two disc drives and about 25 disc packs. All of the information used by the system is on the Master Inventory disc--essentially four different files of information are maintained on one disc. The inventory disc contains the slot or bin number in the warehouse, the page and line number where the item appears in the catalog, the commodity code number, pack size (24 cans, etc.), the case weight, the warehouse section number for the warehouse personnel. All the pricing information is listed: the National stores' shelf price, the case retail price, the Del Farm (a National brand name) shelf price and case retail, the average cost of a case in the warehouse at the present time, actual last cost of a case, the amount of price difference between the two figures (for gross profit figures).

Inventory quantity on hand is listed, as is a combination code which is the regular item code along with the "deal" or special sale item code. Buyer number, number of receipts for the day, the number of receipts (in case quantity) for the week, the number moved out of the warehouse for the week. Information on quantity shipped for previous periods and quantity shipped at year-to-date are listed; also, the number of weeks of the year that the item has been on the system.

The program runs the cards punched from the store orders against the inventory disc items. As each card order is run against inventory, the quantity ordered is subtracted from the inventory quantity on hand listed in the disc file. If the quantity on hand is depleted by incoming orders, the item is still printed out on the pick list invoice (see 3-part form), but with the work "out" printed in the "units" column. This is a notification to the store manager who receives the invoice to order the quantity again, next time. Since the items on the disc are arranged in warehouse picking location, the items appear on the subsequent picking list in picking order.



3-PART PICK LIST INVOICE

The cards are fed into computer to produce the three-part form for each store. The first part is a warehouse stub (picking list), the middle part is a delivery ticket used to invoice the store and the third section is an office copy used by the division's accounting office for re-ordering merchandise and as a record.

The warehouse stub is divided into four sections. If the order is to be shipped short of the quantity orders, the "short" area will be checked. "Units" indicate the number of cases; "code" is the commodity code, and "slot" indicates warehouse location. In the invoice-delivery ticket section, "pack" refers to the number of items in a carton or case. "Size" is the item size or weight. Under "description," the name of the item, shelf price, section and retail, all refer to prices and item classification. On the office copy section: "dept." refers to grocery or health aid; "code" is the commodity code, "units" is the quantity of cartons or cases ordered, and the remaining columns are for pricing information. The "deliver to" section is checked by the store manager against the goods actually received. If there is a short shipment or an excess quantity delivered, the manager makes out a "request for credit" or a "request for charge." These requests must be approved by the district manager and by the sales manager. When the requests are approved, they are keypunched and processed into each store's particular "record of store sales," an inventory listing.

Billing is done nightly, as the stores are polled and the billing form (the second section of the three-part form) is used as an invoice. Adjustments are made on this copy. When the warehouseman picks the items wanted, he draws a line through an out-of-stock item, through the warehouse copy and the middle store invoice copy. The warehouse copy with the adjustment travels to the accounting department for the appropriate action.

The inventory in the National warehouse is printed out once a week. The "buyers stock status report" is used primarily by buyers to check their product quantities in the warehouse.

National uses IBM's IMPACT program to generate a suggested order quantity for item replenishment. The program is used to forecast future demand for inventory items, to measure and to adjust to changing demands. It indicates when and how much to purchase and ensures that quantity discounts and the most economic freight rates are realized. IMPACT works with the master inventory records--on disc, in National's case. According to Division Accountant Rodgers, National does not depend absolutely on the IMPACT order quantities, but rather uses the figures as general guidelines. About 3,400 items of the 4,400 items in the warehouse depend on IMPACT for re-order quantites.

Replenishment

Most of National's replenishment ordering has not yet been transferred to the computer. National uses IMPACT information, and buyers make subsequent decisions.

Each week, the data processing department runs posting cards. These are 80-column cards printed with 25 lines of information--item movement for the same month or week last year. Using this information and the suggested quantities from IMPACT, the buyer can calculate the item quantity needed to fill demand on the warehouse. Data processing runs the purchase order forms for the buyers, pulling vendor information off an address disc. Necessary quantities are entered by hand.

Receipts are checked in each day at the warehouse receiving dock. There, warehouse personnel hold copies of all purchase orders. Incoming orders are checked against the purchase orders, and the quantities actually received are written on the copies. These copies are sent to data processing for keypunching into cards, and the cards are added to the master inventory disc every day before the evening invoicing run.

Other Activities

Along with orders, each store also transmits weekly figures for sales, payroll, a customer count and the total number of employes for computerized sales and cost analysis and projection.

Certain stores, located all over the state, are used as division barometers showing whether sales are up or down compared with sales for last year, and are called daily for figures from which the sales manager, produce and meat manager make projections. Then management can decide which products to stress in Wisconsin's traditional Wednesday evening food advertisements that appear in the newspapers.

When computer processed, the order data is also used for sales analysis by type of item, all of which is helpful in determining buying policies, promotional tactics and so forth. "For instance," explains Rodgers, "there might be a call for only fifty cases of an item a year -- hardly worth stocking it. But on closer inspection, the 50 cases may represent only two stores where such an item is in constand demand. In that case, we'd arrange for a direct store delivery, and save the warehouse space and the warehouse handling."

The new system is also used to transmit price changes to the store. And if headquarters learns that a bad check problem exists in a certain area, all the National stores in the vicinity can be notified to be on the look-out.

In addition to the Teletype units with numeric keyboards, the division also has several Model 33 ASR sets with standard keyboards that it uses for communication with its various procurement offices throughout the country. In Fresno,Calif.; and Lakeland, Fla.; for instance, produce offices tell the National div. what is available, the price and the quality or condition of the produce. In Denver, Colo., the meat packing and slaughter center does much the same. From Fergus Falls, Minn., information on pork is transmitted. All this is done over the Bell System Teletypewriter Exchange Service (TWX). This information comes to Wisconsin div. headquarters every day.

The S. L. I. M. system

Using the Teletype and computer system, National has devised its own inventory and stock control system called Store Labor and Inventory Management (S. L. I. M.). National feels that the system is a step toward more efficient store ordering and labor use. This is how the system is working in the three stores testing it: grocery orders for a given store are maintained for a 26-week period. These orders are kept for a 26-week period. These orders are accumulated, and computer-processed to provide a printout showing the commodity code, the commodity description, pack and size, page and line in the order guide, gross profit, percent, price, the 26 individual weeks' order quantities and the average weekly order.

The average weekly order quantity is first examined for extraordinary situations. For example, if a store orders 24, 24 and 24 units of a particular item every week and then orders 148, it is likely that the last figure was a sale item and should be pulled out of the average. Now it is possible to assume that the weekly order average is the weekly sale movement of this item.

So that there will not be an out-of-stock condition, National calculates that for an item that exists in a case pack of 12 with a movement per week of 6, the minimum space or shelf allocation should be 18.

If the store has 18 units on the shelf and moves 6 units per week, the reorder point will be 6. In other words, a week's supply will always be on hand. The S. L. I. M. system involves labeling every item in the store. The label shows item description, case pack and size, current retail price, page number in the order guide, commodity code number, number of facings (the

number of items showing at the front of the shelf and the re-order point.) A manager can order his stock by looking at the label on the shelf. He checks the re-order point and if merchandise is below or at this level, he orders. If not, he passes up the item and orders it next time. Using this method, the store manager only orders what he needs for the shelf. Store labor is more efficient because supply trucks can be unloaded and the required merchandise can go immediately onto the shelf, as opposed to being stacked in the back room. In this way, every item can be handled only once to get it onto the shelves.

There are three stores on the system, and five more will adopt the stocking system later. There are, of course, extensive revampings required by the new inventory control system. For instance, physical resetting of the store is required. This means, using the new inventory figures to reflect true demand, shelf spaces will have to be completely rearranged. Perhaps an exotic hot sauce (and the space allocated to it) would be much reduced. Another problem that National had to solve was finding a label suitable for the use. Plastic numbers in slides were not the answer, because children regularly pushed rows of price numbers into a mega-number at one end of the shelf. Paper labels were peeled off by the same crew. National finally settled on a gummed label covered with a plastic protector. This was effective bacause sprocketed sheets of gummed labels could be computer-printed; instead of a price change list, stores on S. L. I. M. could be sent computer-produced price change labels.

The system will move National even more into palletized deliveries and since a palletized shipment can be moved from the truck directly into store aisles for shelf stocking, more night stocking will take place. There is also a large variance in store orders (300 pieces on Tuesday, 1,200 pieces on Friday) making a warehouse operation difficult to control. National expects the more accurate S. L. I. M. to smooth out operations.

There are problems, too, however. "We know that some of the older stores are simply not set up for this sort of arrangement," explains Rodgers, "because of small unloading area. For instance, there are a couple of stores where we could never get palletized loads in." (The old stores are stocked by a conveyor system, and goods are unloaded in the rear. They must be reloaded onto carts to stock shelves.) "But S. L. I. M. is working fantastically well and we are thinking of the future."

Future Plans

According to George R. Denninger, data processing manager for the Wisconsin div., National is presently studying the conversion of direct delivery items to the network. This is merchandise that the store manager orders directly from suppliers such as bread. The manager now sends the receipts for goods after they've been delivered to division headquarters, where they are paid. Only original delivery tickets are accepted by the store manager who must count the items delivered to make sure that quantities match. The delivery tickets are signed and code stamped. Headquarters gets all the delivery tickets, and the vendor bills headquarters weekly. The accounting dept. matches delivery tickets from the store manager with the bills. When the bill is paid, the particular grocery department number is added to the bill which is keypunched to be added to the system under the particular store's inventory.

Eventually all this merchandise will be coded and all such transactions handled on the teletypewriter network, thus relieving the store manager of unnecessary clerical work and at the same time maintaining greater efficiency and accuracy. The store would automatically be charged for the purchase and data processing at headquarters would prepare a payment check to be mailed to the vendor.

Delivery time has been reduced from the original three or four days to about 24 hours. The system has also reduced backroom inventories at stores by about half, allowing conversion from non-productive storage space to shelf space. The system, National feels, has been successful. The company is presently setting up a similar network for its Minnesota Div. of 90 stores.