INDUSTRIAL DATA PROCESSING APPLICATIONS REPORT

Applications

Inventory Control, Billing, Sales Analysis,

Order Processing

Type of Industry

Paper Products and Non-perishable Food

Name of User

Martin-Brower Co.

Chicago, Ill.

Equipment Used

Honeywell H-200 Computer System

Synopsis

About three-quarters of Martin-Brower Co.'s business is done with franchise, quick service restaurants. The firm is using a Honeywell Model 200 computer to perform its accounting, payroll, order entry and billing functions. In order to keep company warehouses stocked, an inventory management system called PROFIT (Programed Reviewing, Ordering and Forecasting Inventory Technique) prepares item usage forecasts and stock status reports. It is designed to deal with seasonal demand fluctuations in different parts of the country. Another series of computer-generated reports are regular reports for customers, showing how much of each item has been ordered by each outlet from a Martin-Brower distribution center.

MARTIN/1

Martin-Brower Co. is a nationwide distributor of paper products, non-perishable food products and service supplies to 600 organizations which operate approximately 10,000 outlets across the nation. Among its national customers are Baskin Robbins, Burger Chef, Dunkin Donuts, McDonalds, Red Barn and Tastee Freez. Other customers include grocery, drug and department store chains, mail order houses and industrial plants. Distribution warehouses are in Los Angeles, Calif.; Woodbridge, N.J.; Atlanta, Ga.; Milwaukee, Wis.; New York City; Canton, O.; Jackson, Tenn.; Chicago and Peoria, Ill. Martin-Brower supplies each outlet individually from the nearest warehouse location.

The System

Orders arrive at Martin-Brower by phone or by mail on pre-printed order forms with only the quantity to be marked next to the item code number by the customer. These orders are first edited and then routed to the Credit Department for credit approval. Orders go next to Input Control, where they are batched for ease in balancing. Quantities on the orders in a batch are then totaled, and the total is entered on a batch control sheet. The orders are then routed to Keypunch. This process continues during most of the working day. About 750 orders (5,000 transactions) are processed during a typical working day. These include orders from the other Martin-Brower warehouses which have come into the Chicago headquarters on teletype paper tape.

At the keypunch stage, priority items are the current day's orders and credit memos-merchandise returned by customers and short shipments sent out during the previous day. Orders and memos are keypunched and key verified. Punched are the customer's account number, the item order number, the item code number and the number of cases required. All of the customer's individual product codes are preceded by the Martin-Brower stock number for that product; this is the number used for processing.

The cards then go to the computer room where a preliminary edit run checks out batch balances to make sure they are correct. A final edit picks up corrections and the cards that feed the system initially are sorted into stock number sequence. The second computer pass is against the inventory file. This adds in receipts and deducts the day's shipments. The pass also generates a daily stock status report. This is a requirements inventory containing information on future stock requirements. Management examines the report to see what items will be out of stock.

The third computer pass is against the accounts-pricing file. Item cost and particular account number for accounting purposes are pulled out of the master file. Prices, allowances and discounts are determined at this time.

The fourth computer pass is against the customer name and address file. This pass provides the name, address and truck routing and prepares for printing picking tickets sorted by routing group. For example, all orders scheduled for the west side of Milwaukee, Wis., would be gathered into that route. Warehouse location numbers (for each item) are printed on the picking ticket. The order will be assembled in the warehouse so that the first stop on the route will match the first goods out of the truck. A bill of lading (which describes from 80 to 100 freight classes) is also printed at this time. Both the picking ticket and bill of lading go to the warehouse to be used in preparing the materials for shipment.

In order to provide shipping information and invoices for the branch warehouses, each day at noon Martin-Brower calls its branch warehouses via Teletype Model 35 ASR over WATS Lines. Each warehouse receives its own orders from the surrounding territory, but control

of order processing, accounting and inventory functions are maintained at Chicago head-quarters by use of the computer. The send-receive installation includes a paper tape punch, and a paper tape reader along with a send-receive page printer. In preparation for the mid-day headquarters call, each warehouse prepares a punched paper tape that includes customer name, order number, stock number and item quantities. The tape is inserted into the warehouse paper tape reader and is ready to be called in by the Chicago headquarters. The information is transmitted at 100 words per minute and is received at headquarters as both punched paper tape and as typed copy on the page printer. Paper tape information is processed in the same manner as punched card information, after being converted to magnetic tape. By the end of the computer run, the order information has been converted into a new paper tape containing item description, name, address and shipping instructions. It is relayed back to the originating warehouse for shipping action.

The data Martin-Brower returns to the branch warehouses are received automatically at the branches on a seven-part printed form, sprocket-fed through the Teletype page printer. The typed-in form shows the complete order coded and printed out to specify the item, warehouse location, quantity, bill of lading with customer name and address and instructions for shipping along with a shipping label. The branch warehouse "picker," as at headquarters warehouse, uses one of the carbon copies for assembly, packing and shipping the customer's order.

End of Cycle

At the end of each business day, the Chicago headquarters polls each warehouse again for order-shipping confirmations of the previous day's business. The confirmation may show substitutions from the original order which provide a new inventory figure at the branch warehouse, also updated to show receipt of any incominb items from vendors. Data is then fed into the computer at the control center and changes, including the new inventory reports, are recorded.

After processing for warehouse documents, the open order file is updated by adding all the orders received and deleting orders shipped during the day. Shipment information is extracted from the open order file and the invoice is printed. Billing is done about 9 P.M. for orders shipped during the day. An invoice register is also printed, with accounts receivable and sales item magnetic tape records written.

The PROFIT System

It is the responsibility of the PROFIT system to maintain warehouse inventory. PROFIT (Programed Reviewing, Ordering, and Forecasting Inventory Technique), is comprised of 13 computer programs; the system calculates the optimum inventory level for a single item by considering such variables as the customer's need; buying, purchasing and carrying costs; past demands on inventory; the level of past forecast errors; vendor lead time and discount structures.

Martin-Brower's inventory control department worked for over a year to prepare inventory descriptions, quantities, product groups, lead times and purchasing information for the system. Data on all items had to be prepared using card input or magnetic tape input which was assembled into the PROFIT master files. History and other master file information is stored on magnetic tape.

The system uses three major files stored on magnetic tape: the inventory master file, the forecast file and the vendor file. The forecast file serves the same purpose as a history file. A file maintenance procedure updates the PROFIT system.

Information about each product can be printed out regularly as an Edit Report. This report is a listing of information of each item in the PROFIT system along with its annual usage figures. This report is available to customers who wish to see product demand at various sections of the country.

MARTIN-BROWER CO.

12/31/68				EDII KEPU)кт – р	ROFIT SYSTE	-M			PAGE	2
				. IT	EM INFOR	MATION .					
ITEM NO.	10312	*130A	ITEM DES	CRIPTION.	TEST I	TEM SEVEN					
VENDOR NO PROD. GRO VENDOR FL FORECAST STATUS	UP AG	0194CCSLF 002 U 0 A		VENDOR CO COST UNDI ORDER WEI MIN. OTY.	SC. GHT	\$3.60000 1.00 24		SHELF LI ITEM SER P/ORDER NO. ITEM	VICE MULT.	* • % 24	
				D	EMAND HI	STORY					
1. 2. 3. 4. 5. 6. 7. 8. 9.	10 30 50 70 *108 898 36 58 78	14 32 52 72 *138 1048 38 60 80	14 34 54 74 178 20 40 62 82 *120	16 36 56 76 258 22 42 64 84 *150	18 38 58 78 318 24 46 66 86	20 40 60 80 388 26 48 68 88 240	22 42 62 82 468 28 50 70 90 300	24 44 64 84 558 30 52 72. 92	26 46 66 86 658 32 54 74 94	28 48 68 88 768 34 56 76 96	
						3A		TOT	AL DEMANDS	100	
				I	TEM DISC	OUNTS					
1.	NONE			2•	NONE			3.	NONE		
				ANN	UAL QUAN	TITIES					
ANNUAL UN	ITS	8148		: ANNUAL DO	LLARS :	\$ 29333	3	- ANNUA	L WEIGHT	81	.48
		BLE ERROR		ANNOAL DO	LEAKS .	J 29333	,	ANNOA	L WEIGHT	01	40

EDIT REPORT IS PRINTOUT OF THE ITEMS IN MARTIN-BROWER INVENTORY. UNDER THE DEMAND HISTORY HEADING, THE OLDEST DEMAND IS THE SECOND COLUMN FROM THE LEFT; THE NEWEST DEMAND IS THE FAR RIGHT COLUMN. NUMBERS 1 - 10 INDICATE THE WAREHOUSE INVOLVED.

Essentially, PROFIT is an early warning system, generating a series of item usage forecasts and stock status reports which can be acted upon by management.

Each month, a Forecast Report is printed out, showing how much of each of the 5,000 products the company will need in each of the ten warehouses to meet customer demand. A mathematical model is used to calculate economic order quantity. The system prints a forecast once a month, one forecast for each of the ten warehouses to factor the variables peculiar to each section of the country.

Each day, stock is replenished at Martin-Brower warehouses by truck and railroad car from product vendors. The vendor master file, comparable to the forecast file, contains all vendor information including contact names and vendor lead times. The file is run yearly or when it is necessary, in order to include new vendors or to update vendor information.

PROFIT SYSTEM	OFIT SYSTEM FORECASTING REPORT		DATE 1/02/68 PA			l					1
ITEM NO.	ITEM DESCRIPTION AND SIZE	DEMAND	FCST	MAD	AVERAGE	SOE F	4 ALP	CON	YTD	S.O.E.C.	S. I. THIS NEXT
05200	24/8 OZ A B INST MASHED POTATOE	10	5	4	5.4	12-	4 2R	00	00	00 00	
05202	12/1 LB A B INST MASHED POTATOE	2	. 4	6	3.8	26	4 2R	00	00	01 01	
14750	24/1 OZ A B SPAGH SAUCE MIX	2	2	1	2.5	0 1	3 R	00	00	00 00	
18951	24/6 1/2 =987 PUSS N BOOT CHIX PART CA	T 12	10	2	10.7	1 4	3 3R	. 00	00	00 00	
18953	24/6 1/2 #988 PUSS N BOOT CHIX/LIVER	15	16	4	15.5	1-	1R	00	00	00 Q0	
18954	24/6 1/2 =977 PUSS N BOOT GOURMET FEAS	T 24	20	2	19.9	10	1R	00	00	00 00	
18957	24/6 1/2 =985 PUSS N BOOT LIVER/GRAVY	30	29	3	28.7	7	3R	00	00	00 00	
18958	24/6 1/2 =978 PUSS N BOOTS FISH/BROTH	3	5	7	17.9	32	3R	oó	00	01 01	
18960	24/6 1/2 =984 PUSS N BOOT HORSEMEAT	15	17	7	18.1	5- 1	3 R	00	00	00 00	
18963	24/8 OZ =997 PUSS N BOOT MEAT CAT FOO	27	26	5	26.2	11	1R	00	00	00 00	
18966	24/15 1/2 =999 PUSS N BOOT MEAT CAT FOO	.11	15	5	20.2	4 1	3 2R	00	00	00 00	
18968	48/6 OZ =981 PUSS N BOOT TUNA CAT FOO	10	11	5	11.1	15	1R	00	00	00 00	
18969	48/8 OZ #990 REGULAR PUSS N BOOTS CAT	67	49.	8	49.3	8 4	1R	00	00	00 00	
18970	24/15 1/2 =989 PUSS N BOOTS CHICKEN CAT	8	8	4	7.7	2- 4	2R	00	00	00 00	
18972	48/15 1/2 =993 REGULAR PUSS N BOOTS CAT	84	108	35	107.7	93- 4	1R	00	00	00 00	
18975	24/25 1/2 =994 PUSS N BOOT FISH FORMULA	14	16	4	15.8	10 4	1R	00	00	00 00	
18976	24/15 1/2 =998 PUSS N BOOT LIVER FLAVOR	7	8	2	7.5	5 4	1R	00	00	00 00	
19105	48/1 LB 0900 KEN L RATION DOG FOOD	417	267	110	266.7	299- 4	3R	00	00	00 00	
19107	24/26 OZ 0906 KEN L RATION DOG FOODALG	£ 21	20	6	33.6	10 1	JR	00	00	00 00	
19113	24/15.5 OZO913 KEN L RATION LIVER DOG FE	23	35	19	35.2	12- 4	1R	00	00	00 00	
19116	24/15 1/2 0830 KEN L RATION HASH	11	14	2	13.8	4- 4	2R	00	00	00 00	
19117	24/15 1/2 0912 KEN L RATION STEW	27	28	6	25.5	8- 8	3R	00	00	00 00	
19194	12/36 OZ 0917 KEN L BURGER	19	19	8	19.3	25- 4	2R	00	00	00 00	
19195	24/18 OZ 0916 KEN L BURGER	10	11	5	11.1	10 4	1R	00	00	00 00	
19337	12/24 OZ =979 PUSS N BOOTS SAUCY PAMPER	. 0	1	0	1.2	0- 4	1R	00	00	00 00	
19344	12/22 OZ =982 PUSS N BOOTS PAMPER	5	5	3	5.4	2- 1	3R	00	00	00 00	
19576	10/4 LB 0919 KEN%L%RATION MEAL DOG FD	20	14	9	11.1	6- 8	2R	00	00	00 00	
19585	12/24 OZ 0940 KEN L RATION TREATS	4	6	3	6.2	11- 4	2R	00	00	00 00	
21940	12/8 OZ A B MED EGG NOODLES	7	11	4	9.0	6- 8	2R	00	00	00 00	
21941	12/12 A B MED EGG NOODLES	18	11	6	10.7	19- 4	3R	00	00	00 00	

FORECAST REPORT FACSIMILE

On the forecast shown, DEMAND is the current demand, FCST is the new forecast, MAD is the new mean average deviation. The mean average deviation is a figure calculated from the demand pattern of an item to measure forecast error. It is also a factor in determining the type of forecasting to be used for an item. AVERAGE is the new average, SOE is the new sum of errors, FM is the new selected forecast model, ALP is current alpha--a smoothing constant stat specifies the number of periods of demand history and weightings used in the exponential smoothing factor. The D. F. C. is the demand counter filter, the S. O. E. C. is the sum of errors counter (current and year to date) and S. I. is seasonal indices (this period and next period).

A Stock Status Report (last two pages of article) is generated several times a week on management demand. It shows the demand rate for each item in the Martin-Brower inventory. Asterisks appear next to items that are critical (where demand exceeds forecast). The stock status report recommends how much to order, if replenishment is necessary. If, after management examination, it is decided to order, the computer will print out purchase orders for the flagged items.

PROFIT SYSTEM	VENDOR MASTER FILE LISTING	01/02/68	
ZENDOR NC. 00000B1002	P.O. NAME: BREAKER POINTS LTD P.O. ADDR: 35 ALPINE DRIVE P.O. CITY: WASHINGTON DC P.O. ZIP CODE: 20020	A/P NAME: BREAKER POINTS LTD A/P ADDR: 35 ALPINE DRIVE A/P CITY: WASHINGTON DC	
	TELE NO.: 202 14 1213	A/P ZIP CODE: 20020 CASH TERMS:	
	BROKER NAME: ALLIED BROKERAGE NO. OF BREAK POINTS: 3 BR	REAKPOINT FLAG: U BEST BREAK POINT NO.: 2	
	VENDOR MIN. 3TY 0001000 BREAKPOINT 1 3TY 0001500 BREAKPOINT 2 3TY 0002000 BREAKPOINT 3 3TY BREAKPOINT 4 3TY BREAKPOINT 5 3TY	% REDUCTION 5.00 \$ ADDITION . % REDUCTION 7.50 \$ ADDITION . % REDUCTION 10.00 \$ ADDITION . % REDUCTION . \$ ADDITION . % REDUCTION . \$ ADDITION . % REDUCTION . \$ ADDITION .	
	MAXIMUM ORDER WEIGHT ***	TOLE ABOVE MIN .20	
	NORMAL LEAD TIME: 1.00 EMERGENCY LEAD TIME: .75 LEAD TIME VARIABILITY: 1.00 REVIEW TIME: 1.00 ORDER CONTROL: S A0] OR FOI: 2.00	VENDCR SERVICE: .950 VEND SHELF LIFE: 52 CARRYING COST: .150 HEADER COST: 1.50 LINE COST: .50	
-C- CHANGE FLAG	FOB CODE A	WAREHOUSE CODE F14 SHIP VIA TRUCK	
*** ERRCR FLAG	USER COMMENT		

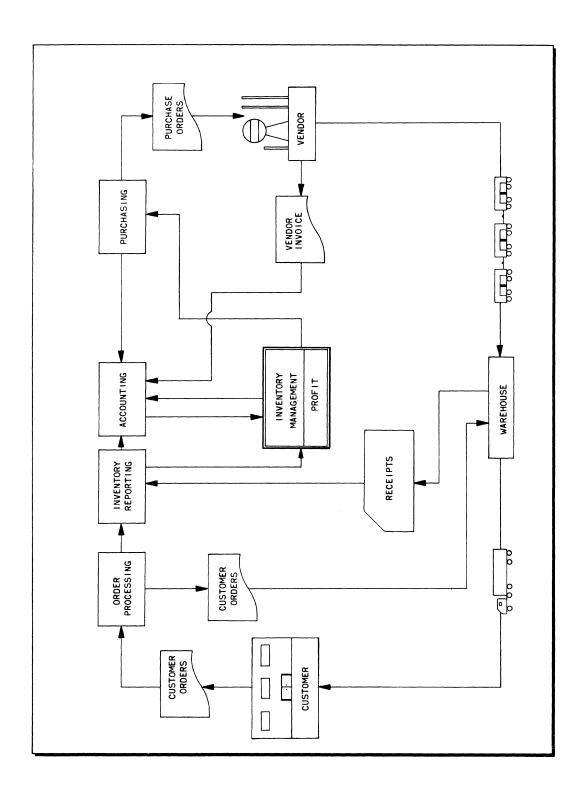
VENDOR MASTER FILE LISTING FACSIMILE. BREAKPOINTS ARE QUANTITIES AT WHICH DISCOUNTS ARE GIVEN. AOI AND FOI TRANSLATED: AVERAGE ORDER INTERVAL OR FIXED ORDER INTERVAL.

Problems arise at Martin-Brower when, for a variety of reasons, shipments are delayed. M-B's inventory control department has designed a computer-printed letter to vendors, urging along tardy shipments. The first letter states the order numbers, the branch and the due date of the items, and requests phone confirmation of arrival times. The second request adds currently expected shipments to the letter along with questions on potential delays.

Each shipment that arrives at M-B warehouses is acknowledged to the inventory file at the beginning of the computer cycle. Payment of the vendor's invoice serves as acknowledgment of the shipment received.

Results and Future Plans

The Martin-Brower Company is pleased with its computer system. President Melvin Schneider admits that without the computer and its activities, "I'd have to hire four more people. Before, a girl typed purchase orders all day long. Now, the computer does it in 30 minutes."



PROFIT SYSTEM INTERACTION WITH OTHER PHASES OF THE BUSINESS OPERATION. ALTHOUGH ONLY ONE WAREHOUSE IS SHOWN, MARTIN-BROWER IS A MULTI-WAREHOUSE OPERATION.

(1)													(2)			3
VENDOR	NO.	55670	ND SIZE ROLLS 24/4P NSSRT =4878		STOCK S	STATUS	REPORT	- PROFIT	SYSTE	M (B)	(9)		DATE	1/02/	68 F	PAGE	0015
VENDOR SC	OTT PAPI	ER CO		38155	91 E00	1.71	ELT 1	1.71 LTV 37800 TOL	1.00 E051	AOI 3.4 MIN 3600	3 SERV.	.970 C	DR.CTL.	S VEN	D.FLAG	= ER	R.CDE
(3)		(20)		CURR.) (5 Cos⊤	FCST	(6) (23) DMD	24) (DMD=1	⑦ ②5 DMD-2	(B) (26) DMD=3	ANN.UNIT	28 0 • M •	@9 MIN•	30 0.H.	(31) NEEDED		(4 E
ITEM NO.	DESC	RIPTION A	ND SIZE	SVF0A (32) - (36)	5ERV.	MAD (38)	L.S.	5 I = 1 5 I	51+1	ADJ5T5	ODR WT.	RECPT	MAX.	0 0 (45)	E00 (46)		0TY. C
47635	AK SCO	1/96F TTISSUE A	ROLLS 24/4P ASSRT =4878	8 • A=4M3	15000 •970	34 10	26	40	39	55	1492 42.00	20	20 1768	100		1•	20
			ROLLS 24/4P WHITE =4870			8	6	. 8	15	8	432 42.00	20	20 416	16 20		1.	20
			ROLLSSCOTT			19 10	13	15	34	40	884 32.00	25	25 988	55	15	1.	75
			ROLLSSCOTT			60 18	51	51	91	140	3167 32.00		25 3120	96	90	1.	225*
47661	ISSUE	1/48 GREEN =4	ROLLSSCOTT 154	A=4M1	59000 •970	19 8	11	17	47	53	1071 32.00		25 988	61	3	1.	50
47664	ISSUE	1/48 YELLOW =	ROLLSSCOTT	5. A=,4M3	59000 •970	42 21	31	29	74	101	2163 32.00		25 2184	67	87	1.	200*
			ROLLSSCOTT =4158			8 6	3	12	10	2	432 54.00	39	39 416	27	8	1.	39
			OROLLSSCOTT			96 26	52	99	139	180	4935 54.00		39 4992	274	19	1.	273
49 SALES LOST SAL 51 ACTUAL S SERV.DES	ES	\$1494 \$	ON HAND ON ORDER	53 (54)	\$5735 \$978								QTY. REQI	. AF	©5) RRIVAL DATE (GF) ORDER QTY
(51) ACTUAL S SERV.DES	ERV. IRED	100.0 % 97.0 %	SUG.ORDER (S	56	\$7035 \$2337								1141	12 *	01/14	1. 3	36128
	VEN	DOR FILE	58 \$11893 62 8	T TO	LF. DF	MOITALV	OFF:			68 (69	\$						
1100	,,,,,		<u></u>		(63)	J N		SERV ON H	ICE	70	•0 %						

STOCK STATUS REPORT FACSIMILE

STOCK STATUS REPORT EXPLANATION:

1,2,3	Vendor number, date and page of the run	15	Vendor minimum
4	Vendor name	16	Vendor maximum
5	Normal lead time in forecast intervals	17	Tolerance percentage of vendor
6	Emergency lead time in forecast intervals		maximum over vendor minimum
7	Lead time variability in forecast intervals	18	Breakpoints (discount levels).
8	Average order interval in forecast		1 (lowest), 2,3,4,5,6 (highest)
	intervals		, , , , , , , ,
9	Service percent as specified by the user	Item	Information
10	Order control		The state of the s
	F = fixed interval	19	Item number
	S = pure service	20	Description and size
	L = service look-ahead	21	Current cost (undiscounted cost
	I = independent		of item)
11	Vendor flag (breakpoint)	22	Forecast (current forecast in
	U = units		seasonalized units)
	# = pounds	23	Ship (demand)
	\$ = dollars	24	Ship 1 (first prior demand)
	C = cubic feet	25	Ship 2 (second prior demand)
	P = pallets	26	Ship 3 (third prior demand)
12	Error code	27	Annual units
13	Broker name		
14	Telephone number		

STOCK STATUS REPORT EXPLANATION (continued)

- 28 Order multiple. This field enables the user to constrain his orders to gain ware-housing efficiencies. For example, if an item to be ordered has a vendor minimum of 500 (which must be ordered) and an order multiple of 300, an order for 600 would be placed.
- 29 Minimum
- 30 On hand
- 31 Needed quantity
- 32 Status code

Character	Octal	Description
Blank	15	Item is off system
A	21	Item fully on the system
F	26	Item on system for forecasting only
T	63	Item temporarily off system

- 33 Vendor breakpoint flag (refer to vendor flag above)
- 34 Forecast model (same as the forecast model codes described in Key to Edit Report)
- 35 Order model code

Character	Octal	Description
A	21	Annual item
F	26	Filler item
I	31	Independent item
M	44	Multiple or joint item
X	1	Fixed order point

- 36 Alpha .1, 2. or .3
- 37 Service percentage (specified for item by user)
- 38 MAD (mean average deviation current)
- 39 Lost sales
- 40 Seasonal indices (last, this, next)
- 41 Adjustments
- 42 Order weight (order total in dollars)
- 43 Receipts this period
- 44 On order
- 45 Maximum
- 46 EOQ (economic order quantity)
- 47 Order quantities. If followed by a B, quantity was ordered through a buyer override. If followed by an *, the supply on hand is lower than emergency lead time usage.
- 48 Error codes (see error codes following the key to the report)

Vendor Summary Information (off system)

- 68 Number of vendor items not on system 69 Current annual sales in dollars
- 69 Current annual sales in dollars (off-system items)
- 70 Current annual lost sales in dollars (off-system items)

Vendor Summary Information (on system)

This information is developed for all items having the same vendor number (joint and/or independent). Information is accumulated for on-system and off-system items.

- 49 Dollar sales this period
- 50 Dollar lost sales this period
- 51 Percent of customer service achieved
- 52 Percent of customer service desired (user-specified)
- 53 Dollar value of goods on hand for the vendor
- 54 Dollar value of goods on order for the vendor
- 55 Suggested order in dollars for the vendor (total item quantities multiplied undiscounted cost for the item)
- 56 Dollar forecast for current period
- 57 Annual dollars for vendor at initialization
- 58 Current annual dollars for vendor
- 59 TOLE (tolerance) percent of allowable change in annual dollars over initialization (user-specified)
- 60 Deviation percent of actual change in annual dollars at initializationcurrent annual dollars
- Number of items for vendor at initialization
- 62 Current number of items for vendor
- 63 Percent of actual changes, number of vendor items at initialization-current vendor items
 - Current order summary for vendor
- 64 Quantity required:

first order = total needed quantity second orders = quantity needed less previous order

- 65 Arrival date
- 66 Order (up to five)
- 67 Order quantity in terms of time supply

NOTE: Arrival dates overridden by buyer are marked by an asterisk. If supply is lower than use in emergency vendor lead time in one or more items, it is also flagged with an asterisk.

- 71 Service percent achieved (off-system items)
- 72 Current on-hand in dollars (off-system items)
- 73 Current on-order in dollars (off-system items)