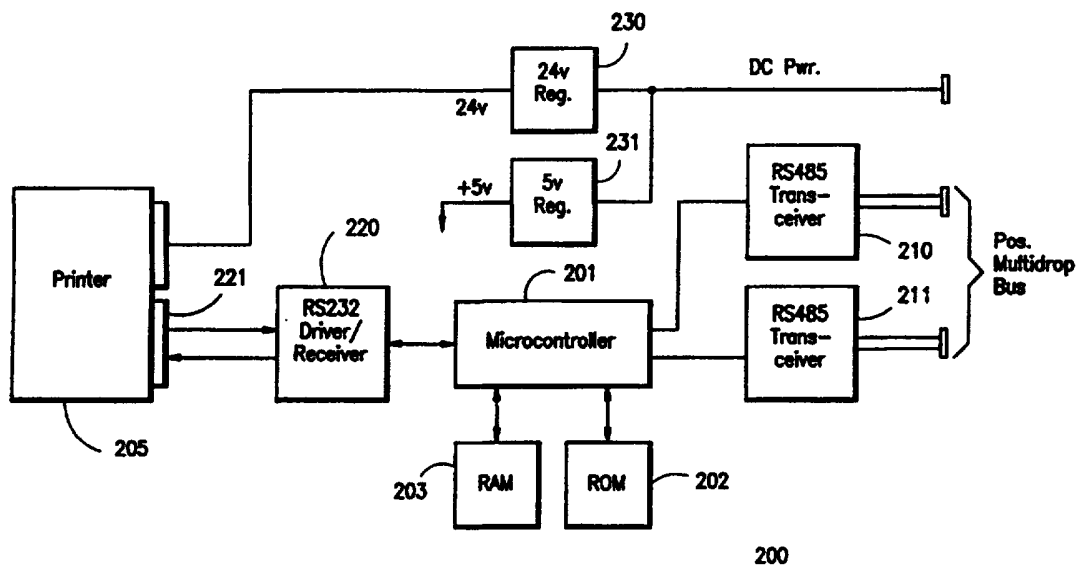




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>6</sup> : G07G	A2	(11) International Publication Number: WO 97/32287 (43) International Publication Date: 4 September 1997 (04.09.97)
(21) International Application Number: PCT/US97/02823 (22) International Filing Date: 25 February 1997 (25.02.97)  (30) Priority Data: 08/607,617 27 February 1996 (27.02.96) US  (71) Applicant: DCNS, INC. [US/US]; 14885 N. 83rd Place, Scottsdale, AZ 85260 (US).  (72) Inventors: CURTISS, Charles, D., Jr.; 9290 N. 106th Way, Scottsdale, AZ 85258 (US). ECKERT, Bradley, N.; 549 South Visalia, Mesa, AZ 85202 (US).  (74) Agent: LENKSZUS, Donald, J.; O'Connor, Cavanagh, An- derson, Killingsworth & Beshears, Suite 1100, One East Camelback Road, Phoenix, AZ 85012-1656 (US).		(81) Designated States: European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).  <b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i>

(54) Title: POINT OF SALE PRINTER AND INTERFACE



## (57) Abstract

A point of sale printer and printer circuit is described which permits high speed printers to be connected into existing point of sale store systems. The printer includes a circuit which may be included with the printer directly or provided separately as an interface unit which, by monitoring data exchanged within the register system, will control the operation of the printer to produce "clean" receipts. An additional feature provided is that each receipt may be customized to include a selected store logo where the logo is stored in memory in the circuit, or a selected receipt trailer which is selectable from a number of trailers also stored in memory in the printer circuit. A further feature of the system is that the circuit will provide information to the printer for printing both the front of the check and provide a restrictive endorsement on the back of the check. The information relative to the restrictive endorsement is similarly contained in memory in the circuit.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AM	Armenia	GB	United Kingdom	MW	Malawi
AT	Austria	GE	Georgia	MX	Mexico
AU	Australia	GN	Guinea	NE	Niger
BB	Barbados	GR	Greece	NL	Netherlands
BE	Belgium	HU	Hungary	NO	Norway
BF	Burkina Faso	IE	Ireland	NZ	New Zealand
BG	Bulgaria	IT	Italy	PL	Poland
BJ	Benin	JP	Japan	PT	Portugal
BR	Brazil	KE	Kenya	RO	Romania
BY	Belarus	KG	Kyrgyzstan	RU	Russian Federation
CA	Canada	KP	Democratic People's Republic of Korea	SD	Sudan
CF	Central African Republic	KR	Republic of Korea	SE	Sweden
CG	Congo	KZ	Kazakhstan	SG	Singapore
CH	Switzerland	LI	Liechtenstein	SI	Slovenia
CI	Côte d'Ivoire	LK	Sri Lanka	SK	Slovakia
CM	Cameroon	LR	Liberia	SN	Senegal
CN	China	LT	Lithuania	SZ	Swaziland
CS	Czechoslovakia	LU	Luxembourg	TD	Chad
CZ	Czech Republic	LV	Latvia	TG	Togo
DE	Germany	MC	Monaco	TJ	Tajikistan
DK	Denmark	MD	Republic of Moldova	TT	Trinidad and Tobago
EE	Estonia	MG	Madagascar	UA	Ukraine
ES	Spain	ML	Mali	UG	Uganda
FI	Finland	MN	Mongolia	US	United States of America
FR	France	MR	Mauritania	UZ	Uzbekistan
GA	Gabon			VN	Viet Nam

## POINT OF SALE PRINTER AND INTERFACE

### Background of the Invention

This invention pertains to a printer and an interface unit for a printer, in general, and to a printer for use in point of sale systems and to an interface for coupling a printer to point of sale systems.

### Description of Prior Art

Point of sale systems, such as those commonly found in grocery and other retail stores, include a store controller or computer and one or more point of sale terminals. The controller is typically located in a back room or some other area of the store which is not accessible by customers. The sales terminals are typically located at checkout lanes where the sales transactions are completed.

Point of sale systems initially introduced into the marketplace were key entry type systems. Key entry systems require the store checkout person to manually enter the price of the item being purchased. Later terminals were modified to include scanner arrangements which would read bar code information affixed to each product. The bar code information included the so-called Universal Product Code or UPC for the item scanned.

Point of sale systems are generally "closed" systems which utilize proprietary architectures and communication protocols. Closed systems are not designed to facilitate the addition or attachment of external peripheral units unless they were supplied by the system's original manufacturer. Therefore if a store desires to expand the capabilities of its system it was necessary to purchase the unit from the original system manufacturer or buy a new system incorporating the desired features or equipment.

Recently, significantly improved printers have become available which include a thermal printer which operates at high speed to print receipts and also include an impact printer which is usable to print checks or check endorsements. One line of such printers are now available from Seiko Epson Corporation. These printers are not

directly usable with many existing point of sale systems. It is therefore desirable to provide an interface arrangement which will permit the use of high speed high quality printers in existing point of sale systems.

5        Additionally, it is desirable to provide an arrangement wherein a printer can provide for so called "clean receipts" without affecting or requiring any modification to the existing store system. A clean receipt is a receipt that is printed at the end of an order. The purpose of this receipt  
10 is to provide a customer with a receipt which clearly and precisely shows all of the pertinent events that took place during the checkout process. A clean receipt provides a document that the customer as well as store personnel can look at and easily determine what was purchased and how much  
15 each item cost. There are no standards for clean receipts and in many instances, the store owner has unique requirements for the receipt. There are certain features that are particularly desirable in a clean receipt such as multiple item pricing, item and coupon listing, net out  
20 voids and single sub-totals. It is desirable to consolidate items on the receipt which are priced for a multiple quantity, e.g., 3 for \$1.00, regardless of when individual items may be scanned in the checkout process. It is also desirable to list on the printed receipt a coupon credit  
25 immediately after the listing for the couponed item. Additionally, when an item is purchased but the purchase is voided out before the transaction is closed, it is desirable to provide no listing of either the product or of the void on the receipt. This is desirable to not confuse or mislead  
30 the customer into thinking that an item was scanned into but not removed from the order. In certain instances, individuals may inadvertently or deliberately utilize the void outs which occur in large orders to obtain additional product which appears on the receipt because of the  
35 difficulty in reading receipts. Additionally, during a checkout, the clerk may for various reasons have subtotals entered during the transaction. It is desirable that the

subtotals not be printed out on the final receipt. It is further desirable that products purchased be listed on the receipt not in accordance with the randomness with which the items are scanned in but in accordance with a more logical sequence, such as in groupings according to store department and/or in accordance with the manufactures UPC symbol.

In addition, present printer arrangements require that the clerk either physically tear off the receipt at the end of a transaction, or manually activate a cut off of the register tape.

At the end of a transaction, the customer may desire to pay for the order with a check. The time it takes customers to fill out a check often slows the checkout process. In addition, the clerk normally must then verify the information entered on the check by the customer and then typically hand stamp the back of the check to provide the restrictive endorsement. It would be desirable if this portion of the transaction can be automated to provide for greater accuracy and speed up the transaction.

## Summary of the Invention

In accordance with the principles of the invention, a point of sale printer is described in which a printer having both a high speed printer for printing receipts and an impact printer for printing checks is coupled to a store controller or store terminal such that various features may be provided at the printer without requiring any modifications or changes in the operation of the store controller or terminal. Further in accordance with the principles of the invention, the foregoing features may be provided by an interface unit for interfacing printers to store controllers or store terminals.

The interface or the printer at each check out lane each includes a circuit having a microcontroller along with associated memory. The microcontroller monitors data being made available over a databus. In accordance with one

embodiment of the invention, the microcontroller monitors UPC symbol data generated by a scanner and further monitors print data provided by the store controller to the check out register. The microcontroller associates each UPC symbol  
5 with the corresponding product information received from the register system. Upon receipt of a signal that a tender of payment is being made, the microcontroller utilizes the information stored in memory to sort the product information to produce a "clean" receipt. In accordance with the  
10 principles of the invention, all processing of data to produce a clean receipt is done in the printer circuit in the interface or associated with the printer.

Further in accordance with the principles of the invention, the result of a customer tendering a check is  
15 that the printer circuit utilizes information received from the register system to print the front of the check with the store name and the total being tendered by check. Further in accordance with the invention, the microcontroller will automatically print a restrictive endorsement on the back of  
20 the check. The restrictive endorsement is also stored in memory in the circuit.

Further in accordance with the invention, the printer or interface circuit has stored in its memory one or more store logos which will be selected for print out as a  
25 receipt header based upon information coded in a header message transmitted by the store controller or store terminal. Still further in accordance with the invention, the microcontroller memory also includes a plurality of selectable trailer messages which may be selected.

30 In accordance with the invention, a second printer interface includes a small microprocessor-based device that prints what is known as a "clean" receipt. It does this by storing the printer data until the end of the order, doing some data processing and printing out the data. In  
35 producing the receipt, information is removed that may be confusing to the customer. Information is grouped as to related items in order to make the receipt easier to read.

Brief Description of the Drawings

The invention will be better understood from a reading of the following detailed description taken in conjunction with the drawing in which:

5 Fig. 1 illustrates a system to which a point of sale printer in accordance with the principles of the invention may be applied;

Fig. 2 illustrates a block diagram of a point of sale printer in accordance with the principles of the invention;

10 Fig. 3 illustrates a block diagram of a second point of sale printer;

Fig. 4 illustrates a functional flow diagram of the operation of the apparatus illustrated in Figs. 2 and 3;

15 Fig. 5 illustrates a prior art receipt produced by a point of sale register;

Fig. 6 illustrates a "clean" receipt produced in accordance with the principles of the invention;

Fig. 7 illustrates a receipt with a logo;

Fig. 8 illustrates an alternate logo; and

20 Fig. 9 illustrates representative trailer messages.

Detailed Description

Fig. 1 illustrates a store check out system which is representative of a commercially available system installed in many stores. One such system is known as the ICL 2001.

25 In this system, a store controller 100 is connected via a multidrop busing arrangement to check out stations located at lanes 1 through N. Each check out station typically includes a terminal 101 which is connected to a display 102, a cash drawer 103, a scanner unit 104, and a printer 105.

30 It should be understood that the terminal unit 101 includes a keyboard for manual entry of items by the store clerk. Each check out lane 1 through N is coupled to the store controller by a corresponding bus included in the group of buses 120. In operation, products are scanned to read their  
35 UPC symbols which are encoded as bar code information. As UPC symbols are scanned into the system by scanner 104 on line 2, the store controller 100 receives the scanned

information via one of the buses 120 and returns to lane 1 via buses 120 print data which includes a description of the product being purchased along with the price of the product and, in some instances, additional information such as whether the item is taxable or not. The data return to the terminal 101 is printed out on printer 105 and displayed on display unit 102. Although not shown in lane 1, it should be understood that each check out terminal may also include other devices such as a scale. Upon completion of an order, the clerk would depress a "total" key at the terminal 101, tell the customer how much the order was, and then either press a "cash tender" or a "check tender" key or, in the event of a credit card transaction, utilize additional equipment. Upon tendering of cash or check, drawer 103 is opened and the clerk makes change and tears off the receipt from printer 105.

Turning now to Fig. 2, a printer unit 205 is coupled into the system of Fig. 1 by unplugging the existing printer from the point of sale multidrop bus and connecting the circuit 200 via connectors to the point of sale multidrop bus. The circuit 200 includes a microcontroller 201 which has associated with it a program memory 202 and a random access memory 203. The microcontroller 201 is interfaced to the point of sale multidrop bus via commercially available transceivers 210 and 211 which may be RS 485 type transceivers. Although RS 485 transceivers are shown, it should be understood that transceiver 210 is utilized only in a receive mode and transceiver 211 is utilized only in the transmit mode. The microcontroller 201 is coupled to the printer 205 via an RS 232 driver/ receiver 220 via a connector assembly 221. The terminal unit provides unregulated 28 volt DC power which is regulated by a 24 volt regulator 230 to provide 24 volts to the printer 205. In addition, a 5 volt regulator 231 converts the 28 volt power to 5 volts or a logic level voltage suitable for operating the microcontroller 201 and associated electronics. An alternate embodiment of a printer and printer circuit is



shown in Fig. 3. In Fig. 3, a printer 305 is coupled to the store controller via connectorized bus 306. The circuit 300 includes a microcontroller 301 which has read only memory 302 and random access memory 303 connected thereto. The microcontroller 301 is interfaced to the store controller bus via transceivers 310 and 311. The microcontroller 301 is likewise interfaced to the printer 305 via the RS 232 driver receiver 320. In this instance, 24 volt regulated voltage is supplied from the store controller and is coupled directly to the printer. The 5 volt or logic voltage regulator 331 is coupled to the 24 volt line.

The microcontrollers 201 and 301 is a commercially available microcontrollers such as the 8051 microcontroller available from Intel and other vendors. The memory modules 202, 302, 203, and 303 are likewise conventional memory modules available from numerous sources. Alternatively, at least a portion of the memory modules 202, 302, 203, and 303 may be incorporated with the 8051 microcontroller. The transceivers 310, 311, and 320 shown in Fig. 3, and transceivers 210, 211, and 220 shown in Fig. 2, are likewise commercially available parts. The voltage regulators shown in both Figs. 2 and 3 are similarly commercially available components. Also shown in Fig. 3 is an auxiliary printer input at a connector 351. This auxiliary input is coupled to an RS 232 driver/receiver circuit 352. The driver/receiver 352 is coupled to the microcontroller 301. The auxiliary input is provided to allow sharing of the printer 305 with third party devices. Data from this input is stored in a separate queue in the memory 305 and is printed out after a clean receipt has been printed.

Each record in memory 203, 303 indicates one line of printer data, a UPC symbol and a byte indicating record type such as normal, discount, header text, coupon, etc. If the item doesn't have a UPC symbol, a code of all zeros is stored.

For each order, as each new print record is intercepted, it is added to the memory in such a way that the items remain ordered with respect to record type, UPC code and spelling. Thus, items without a UPC symbol will get printed in alphabetical order (i.e., Bakery prints before Meat). Some record types (such as header text) aren't sorted and remain in chronological order.

Because of this sorting, items with a UPC symbol will be grouped by manufacturer, so items with multiple pricing will appear together, even though they may have been scanned at different points in the check out process. Different products within a pricing group will have UPC codes from the same manufacturer and will be listed next to each other. For example, Del Monte Cream Corn and Del Monte Whole Corn will be adjacent.

When a purchased item is subsequently voided, the void is not added to the print buffer. Instead, the corresponding print record is removed so as not to appear on the receipt tape.

At the end of the order, when it has been tendered, the printer output data is sent to the printer. Beginning header data is printed out first, followed by purchased items, the total and other data, and the trailer data.

Multiple subtotals are removed by removing the last total from the buffer each time a new one is encountered.

Turning now to Fig. 4, the functional operation of the system of Fig. 1 with the printers of Fig. 2 and 3 is illustrated. The following description makes reference to the components of Fig. 3 but it should be understood that it, likewise, could be making reference to the structure shown in Fig. 2. In operation, the circuit 300 monitors data received on a system bus. The system bus will typically provide scanned data from a scanner and data received from the store controller. Each piece of data received is checked 401 to see if it falls into one of several categories. As illustrated in Fig. 4, in the event that the bus data received is a UPC symbol from the scanner,

the microcontroller 301 will hold the UPC information as indicated at 403 until such time as the next data is provided over the bus. The next data received will be print data 404 and upon receipt of the print data, the  
5 microcontroller 301 will store the UPC symbol information and corresponding print data, as illustrated at 405. This process will be repeated for each scanned product. In the event that the information is manually entered rather than scanned in, the data so received from the bus will be  
10 treated in the same manner as a UPC symbol.

Assuming that the entry of all order items is complete, the clerk will hit the total key on his/her register. If the total key is hit only once within a predetermined period of time, the identity of the total key and the resulting  
15 total information will be identified as print data and stored by the microcontroller 301. Presumably at that point in time, the clerk will tell the customer what the total of the order is. The customer either will elect to pay by cash or by check. In the event that the customer elects to pay  
20 by cash, the clerk will operate the cash tender key at the register. The receipt of a cash tender signal 407 will initiate the microprocessor to begin a sort 408 of the print data which it has caused to be stored in its random access memory. The sorted information will then be provided to the  
25 printer by the microcontroller 301 so that the receipt may be printed out 409. Each receipt when printed out will include header information as well as trailer information. Upon receipt of the trailer information and providing of trailer information to the printer, a signal will be sent to  
30 the printer by the microcontroller 301 indicating that the register tape is to be cut as indicated by the cut tape function 410. Upon cutting of the register tape by the printer, the system resets and awaits initiation of a new transaction.

35 In the event that a check tender 411 was made, upon receipt of the bus data indicating a check tender, the same sort 408, print 409, and cut tape 410 actions are initiated.

In addition, the microcontroller 301 monitors the printer 305 to determine whether or not a check has been placed into the printer as illustrated at function 412. Upon detection of a check in the printer, the front of the check is printed to include the total amount being paid as well as the store as the payee 413. After the check has been removed and signed by the customer, the check is reinserted into the printer 414 with the check turned around so that the printer will print on the back of the check. After detecting that the check has been reinserted into the printer, the back of the check is printed with a restrictive endorsement 415. The restrictive endorsement 415 may be stored in the memory 305 of the circuit 300 of the invention.

Additional operational features are provided by the use of the microcontroller and its associated program memory.

In the event that the clerk wishes to see a print out of recent items entered in, he/she will depress the "total" key three to five times. As indicated in Fig. 4, this occurs at 416. The microcontroller 301 includes a program which will initiate a timing sequence after the total key is depressed. The microcontroller waits for a predetermined time, e.g., 0.25 seconds, after each depression of the total key to determine whether additional depressions of the total key are being made. In the event that the total key has been depressed at least three times but no more than five times as indicated at 416, a portion of the transaction to that point in time will be printed out. As indicated at box 417, the last "N" entries will be printed out in the order in which they were entered. This allows the clerk to review whether or not appropriate entries have been made. Immediately after the last "N" entries have been made, a signal is provided to the printer to cut the tape as illustrated at box 418. The check out process then continues.

In the event that the clerk prefers to have a continuous tape print out showing all the entries being made as they occur, he/she will depress the total key at least

six times in rapid succession as indicated at box 419. The microcontroller 301 responds to the six or more depressions of the total key to cause the print data which is received via the bus to be printed out as received on a continuous basis as illustrated by function 420 in the flow diagram. Upon detection of the end of an order which is initiated either by a cash tender 407 or a check tender 411, the register tape is cut by sending a signal to the printer as illustrated at 421. In all instances it should be noted that, prior to printing a receipt, header and trailer information are received from the system controller. Upon receipt of header information prior to printing out the register receipt, a predetermined logo which is stored in memory may be retrieved for printing out. This will be described in detail below. Upon receipt of trailer information from the store controller, the receipt is printed out.

Turning now to Fig. 5, a receipt produced in accordance with prior receipt printing arrangements is shown. The receipt 500 includes a header portion 501 and a trailer portion 502. The header portion typically identifies the store, the date of the transaction, the time of the transaction, the customer number, the register, and the register operator. However, it should be noted that the header may be customized for a store and may include other information or less than the information that is shown in this receipt. In addition, the trailer 502 typically includes a predetermined message. In the course of checking out a customer, the register operator or clerk will scan each item. After the item is scanned, scanned data, i.e., the UPC symbol information, is typically transmitted to the store's central computer via a databus. The store's central computer utilizes the UPC symbol scanned in to provide print information to the register. The print information is typically a description of the item and the price. In addition, the central computer may provide additional information such as whether or not the item is taxable.

Furthermore, for those items which are not scanned in, the clerk may manually enter the department and the amount. Additional situations occur such as the scanning in or entering in of coupons or the voiding of an item. In the receipt 500 shown in Fig. 5, the clerk has scanned in a large number of items. As each item is scanned in, the UPC symbol which has been scanned is transmitted to the store's central computer over the databus. The store's central computer then transmits back to the register information which identifies the product corresponding to the UPC symbol and the price. The store computer may also transmit information back which indicates whether the item is taxable or not. In addition, the clerk may separately key in the identity by store department of items which do not carry a UPC symbol. That information will be transmitted from the register to the central computer, be verified at the central computer and transmitted back over the databus to be displayed at the register. In a typical transaction such as shown in receipt 500, each scanned item is separately printed out. Therefore, in looking at the receipt 500, it is seen that packages of Apple Newtons were scanned in at lines 503, 532, and 538. Whole corn was scanned in at lines 504 and 517. California raisins were scanned in at lines 505, 515, and 520. Three cans of Pennzoil were scanned in at lines 506, 519, and 527. A single Glade plug-in was scanned in at line 507. Six packages of Pepsi were scanned in with a single package being scanned in at line 508, two packages being scanned in at line 514, and additional single packages scanned in at lines 525, 526, and 542. Four cans of spray paint were scanned in with single cans being scanned in at lines 509, 516, 535, and 543. A single package of car wax was scanned in at line 510. Two packages of Coca-Cola were separately entered at lines 511 and 539. Nine packages of Kraft Macaroni and Cheese were entered with single packages being scanned in at lines 512, 513, 530, and 536. Five packages of Kraft Macaroni and Cheese were entered by the clerk at line 521. A deli item was entered

at line 522 and a coupon applicable to the deli item was entered at line 523. The store computer indicated that the coupon is a double bonus coupon at line 524. A grocery item was entered at line 528. Prior to the end of the order, the customer decided that she did not want either the Glade plug-in or the car wax and the clerk scanned in the items and keyed in a credit at lines 540 and 541, respectively. After totalling the order, the customer tendered \$80.00 in cash. Subsequent to the cash tender, the printer prints out a subtotal along with the tax paid, then indicates the change due. At the end of the receipt, a trailer message 502 is provided. It should also be noted that, with prior art printers and receipt tapes where multiple units of a product were being entered, the prior receipts utilize two lines wherein the quantity and price are entered on one line, and the product and total cost are entered on the subsequent line, e.g., line 521.

Turning now to Fig. 6, a clean receipt produced in accordance with the principles of this invention is shown. Receipt 600 has been generated utilizing the same sequence of product entry utilized in receipt 500 of Fig. 5. The receipt 600 includes a header 601 and a trailer 602. In accordance with the present invention, the receipt 600 is not printed as each item is scanned or entered, but rather, the receipt 600 is produced upon completion of scanning or entering when a total key is punched. The forty line items of receipt 500 are reduced to 19 items in receipt 600. The system of the present invention groups products by UPC symbol and is therefore capable of indicating for each item of product, the quantity for that product, the price per unit, and the total. Thus, for example, the six entries for Pepsi occupying six lines in receipt 500 appear in one line 603 in receipt 600. Similarly, the Kraft Macaroni and Cheese items which occupied five lines in receipt 500 are reduced to one line 604 in receipt 600. Also, the receipt 600 is formatted such that the departmental entries such as deli and grocery are separated out and appear at a

predetermined position on the receipt. The deli items, 616, 617 and 618, appear after the scanned items. The grocery item appears at line 619 after the deli items.

It is therefore apparent that the clean receipt 600 is much easier to read and, in addition, it should be noted that the voided items, i.e., one of the Glade plug-ins which was scanned in at line 518 and the car wax scanned in at line 510 and which were subsequently voided out at lines 540 and 541, respectively, do not even appear on the clean receipt 600.

As noted above, it is possible to store various logos which may be used when printing out the receipts. These logos would be typically stored in one of the memories 302 or 305 associated with a microcontroller 301. Fig. 7 illustrates a receipt in which the header information is preceded with a logo 701 that had been stored in memory in unit 300. Depending on available memory, a number of logos may be stored and may be selected by the store controller. The first line of header information (customized by the end user) which is transmitted from the store controller to the terminal contains information which identifies the desired logo. The microcontroller will decode the information from the first line of the header to address the appropriate section of memory to cause the logo to be read out.

Fig. 8 illustrates an additional logo 801 which may be utilized. One advantage of this type of arrangement is for companies that own different stores, the logos for each of the stores may be stored in the memory and, if it is necessary to change a printer from one store to another, the printer will automatically respond to the header information sent by the store controller in that store to produce the proper store logo.

Fig. 9 illustrates a number of different trailer messages which may be similarly selected. As shown in Fig. 9, eight distinct messages 901 through 908 are provided in the memory associated with the microcontroller. The header or trailer information provided by the store controller



contains an identity which identifies which of the predetermined trailer messages is to be printed out.

Turning back to Fig. 3, it should be appreciated that the circuitry 300 may be incorporated physically into the printer 305 such that the printer 305 may be plugged directly into a point of sale system. Alternatively, circuit 300 may be provided as an intelligent interface to interface a printer 305 to a terminal or store controller to provide these expanded capabilities. One significant advantage of the system that has been described is that all the features such as the printing of clean receipts, the printing of store logos, the printing of customized trailers, the printing of the front of checks, and the printing of the endorsement on the backs of checks may all be accomplished without any program changes to a store controller. All of these functions are provided directly in the circuit 300 thereby permitting stores to significantly improve the printers being used to produce receipts which are more useful to both the customer and the clerk.

In addition, as shown in Fig. 3, the printer 305 includes a receipt printer which, in the illustrative embodiment, is a thermal printer. Printer 305 also includes an impact type printer as a check printer. Conventional printer control electronics and logos are utilized with the receipt and check printers.

As will be appreciated by those skilled in the art, various modifications may be made to the embodiment of the invention which has been described without departing from the spirit or scope of the invention. It is intended that the invention be limited only by the claims that are appended hereto.

## WHAT IS CLAIMED IS:

- 1 1. A printer for use in a point of sale system having a  
2 register, a scanner, a controller coupled to said register  
3 and said scanner by a data bus, said data bus carrying scan  
4 data from said scanner and first data from said register to  
5 said controller and carrying print data from said controller  
6 to said register, said printer comprising:  
7 a first printer for printing receipts at high speed;  
8 and  
9 a circuit for coupling said first printer to said data  
10 bus, said circuit including a microprocessor, a program  
11 memory coupled to said microprocessor, a data memory coupled  
12 to said microprocessor, first circuitry coupling said  
13 microprocessor to said data bus, and second circuitry  
14 coupling said microprocessor to said printer, said  
15 microprocessor being operated in accordance with a first  
16 program stored in said program memory such that scanned  
17 product information transmitted on said data bus for a  
18 customer order is stored in said data memory and associated  
19 print information transmitted to said register from said  
20 controller is stored in said data memory, said microprocessor  
21 being responsive to a signal indicating the end of a  
22 transaction for transmitting print data to said printer via  
23 said second circuitry to cause said first printer to print a  
24 receipt in a predetermined format.
- 1 2. A printer in accordance with claim 1, wherein:  
2 said printer is responsive to a specific command for  
3 causing a receipt to be cut off from a register tape, and  
4 wherein:  
5 said microprocessor transmits said specific command to  
6 said printer automatically at the end of said receipt being  
7 printed.
- 1 3. A printer in accordance with claim 1, comprising:  
2 memory for storing at least one predetermined logo; and

1       said microprocessor selectively reading said  
2       predetermined logo from said memory and causing said logo to  
3       be transmitted to said first printer for print out.

1       4.    A printer in accordance with claim 1, comprising:  
2       memory for storing at least one predetermined trailer  
3       message; and

4       said microprocessor being responsive to receipt of  
5       predetermined information from said controller to read said  
6       predetermined trailer message and transmit said  
7       predetermined trailer message to said first printer.

1       5.    A printer in accordance with claim 1, comprising:  
2       a second printer for printing checks or the like; and  
3       said microprocessor being responsive to predetermined  
4       signals to cause said second printer to print a total amount  
5       and a payee on the front of a check inserted into said  
6       second printer.

1       6.    A printer in accordance with claim 1, wherein:  
2       said controller is located remote from said register  
3       and said scanner.

1       7.    A printer in accordance with claim 1, wherein:  
2       said microprocessor sorts at least a portion of said  
3       print data such that said first printer prints a clean  
4       receipt.

1       8.    An interface for use with a printer for use in a point  
2       of sale system having a register, a scanner, a controller  
3       said scanner and coupled to said register and said scanner  
4       by a databus, said databus carrying scan data from said  
5       scanner and first data from said register to said controller  
6       and carrying print data from said controller to said  
7       register, said printer comprising a first printer for  
8       printing receipts at high speed, said interface comprising:  
9       a circuit for coupling said first printer to said  
10      databus, said circuit including a microprocessor, a program  
11      memory coupled to said microprocessor, a data memory coupled  
12      to said microprocessor, first circuitry coupling said  
13      microprocessor to said data bus, and second circuitry  
14      coupling said microprocessor to said printer, said

15 microprocessor being operated in accordance with a first  
16 program stored in said program memory such that scanned  
17 product information transmitted on said databus for a  
18 customer order is stored in said data memory and associated  
19 print information transmitted to said register from said  
20 controller is stored in said data memory, said microprocessor  
21 being responsive to a signal indicating the end of a  
22 transaction for transmitting print data to said printer via  
23 said second circuitry to cause said printer to print a  
24 receipt in a predetermined format.

1 9. An interface in accordance with claim 8, wherein:

2 said printer is responsive to a specific command for  
3 causing a receipt to be cut off from a register tape, and  
4 wherein:

5 said microprocessor transmits said specific command to  
6 said printer automatically at the end of said receipt being  
7 printed.

1 10. An interface in accordance with claim 8, comprising:

2 memory for storing at least one predetermined logo; and

3 said microprocessor selectively reading said  
4 predetermined logo from said memory and causing said logo to  
5 be transmitted to said first printer for print out.

1 11. An interface in accordance with claim 8, comprising:

2 memory for storing at least one predetermined trailer  
3 message; and

4 said microprocessor being responsive to receipt of  
5 predetermined information from said controller to read said  
6 predetermined trailer message and transmit said  
7 predetermined trailer message to said first printer.

1 12. An interface in accordance with claim 8, comprising:

2 a second printer for printing checks or the like; and

3 said microprocessor being responsive to predetermined  
4 signals to cause said second printer to print a total amount  
5 and a payee on the front of a check inserted into said  
6 second printer.

1 13. An interface in accordance with claim 8, wherein:

1       said controller is located remote from said register  
2 and said scanner.

1   14.   An interface in accordance with claim 8, wherein:

2       said microprocessor sorts at least portions of said  
3 print data prior to transmitting to said printer to produce  
4 a clean receipt.

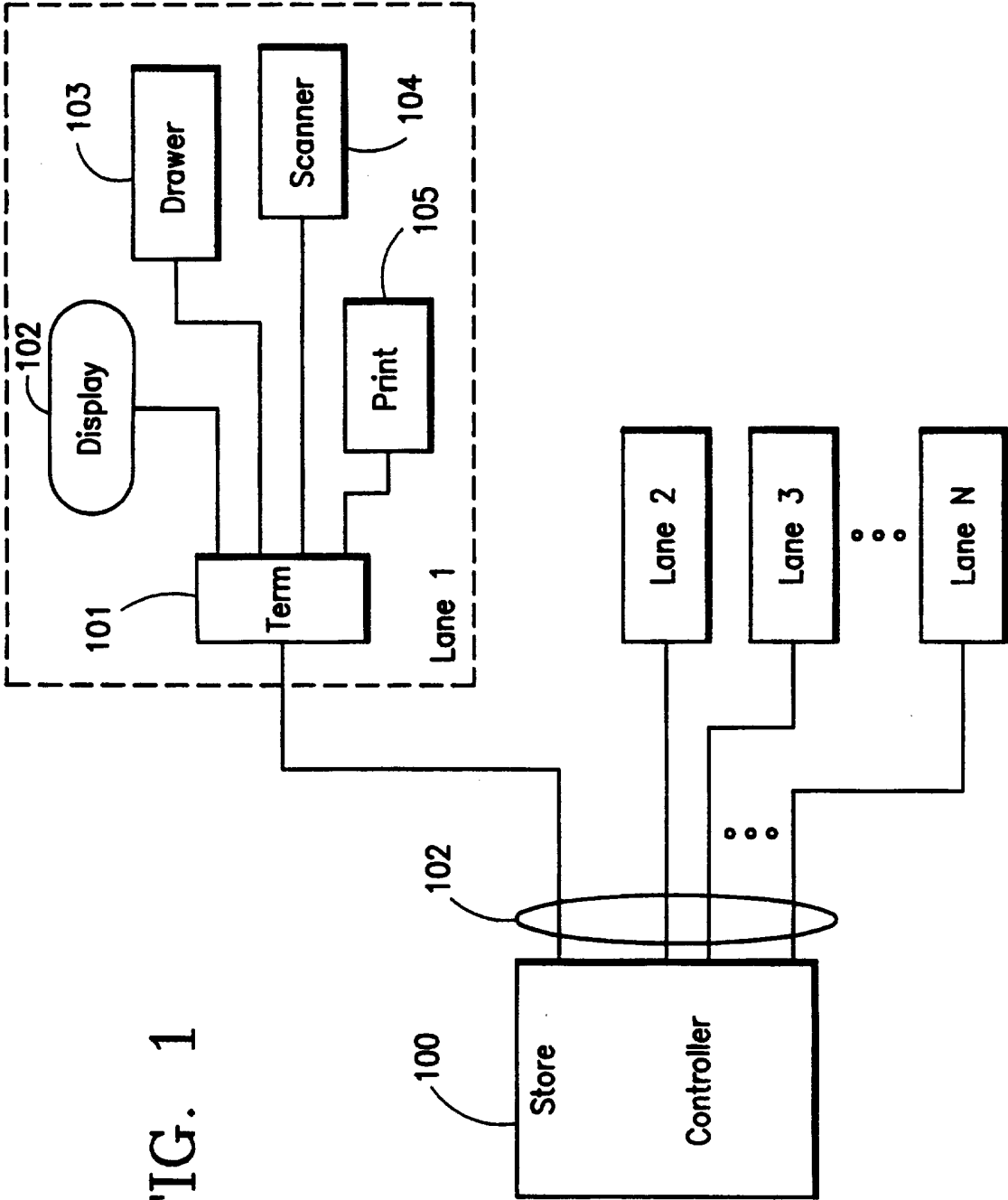
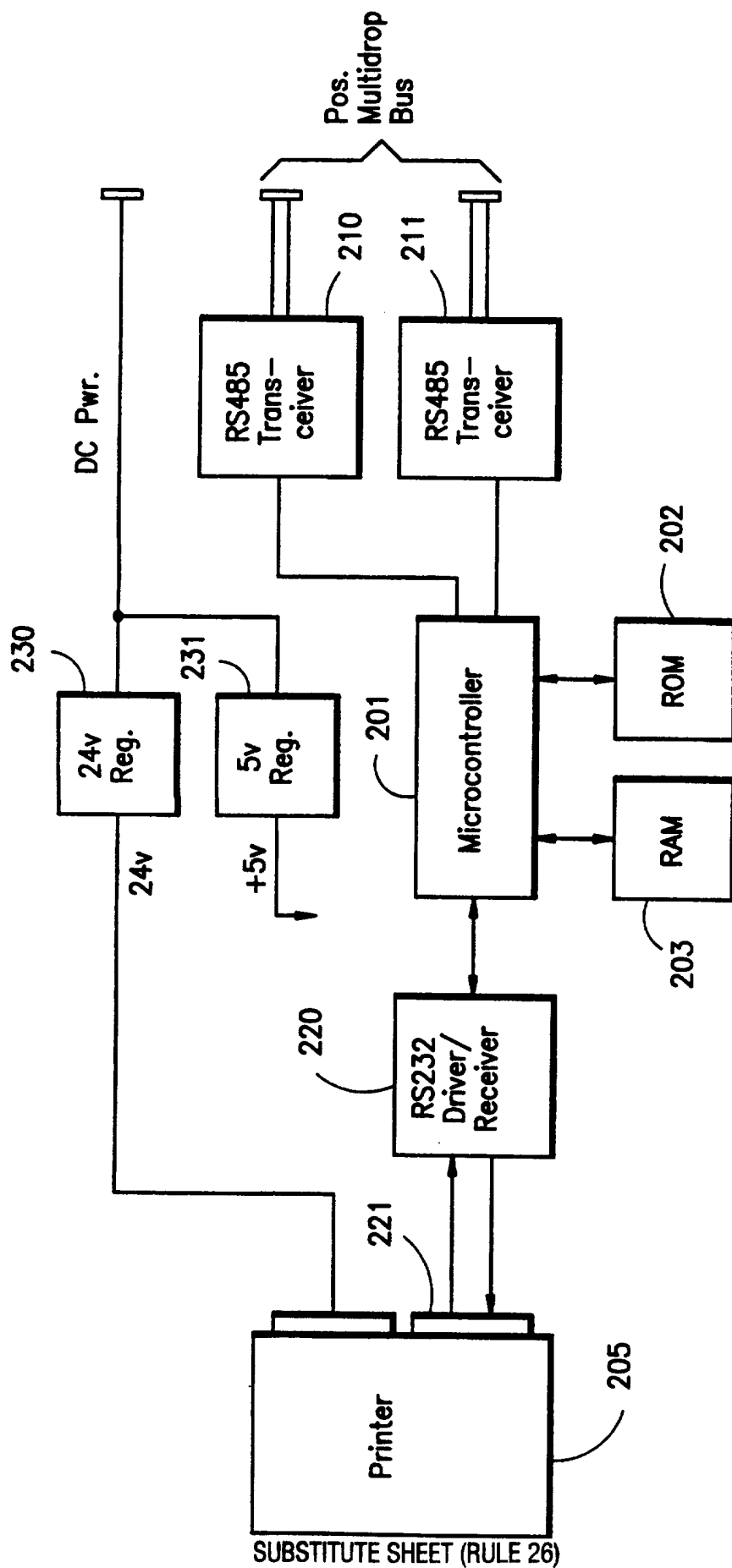


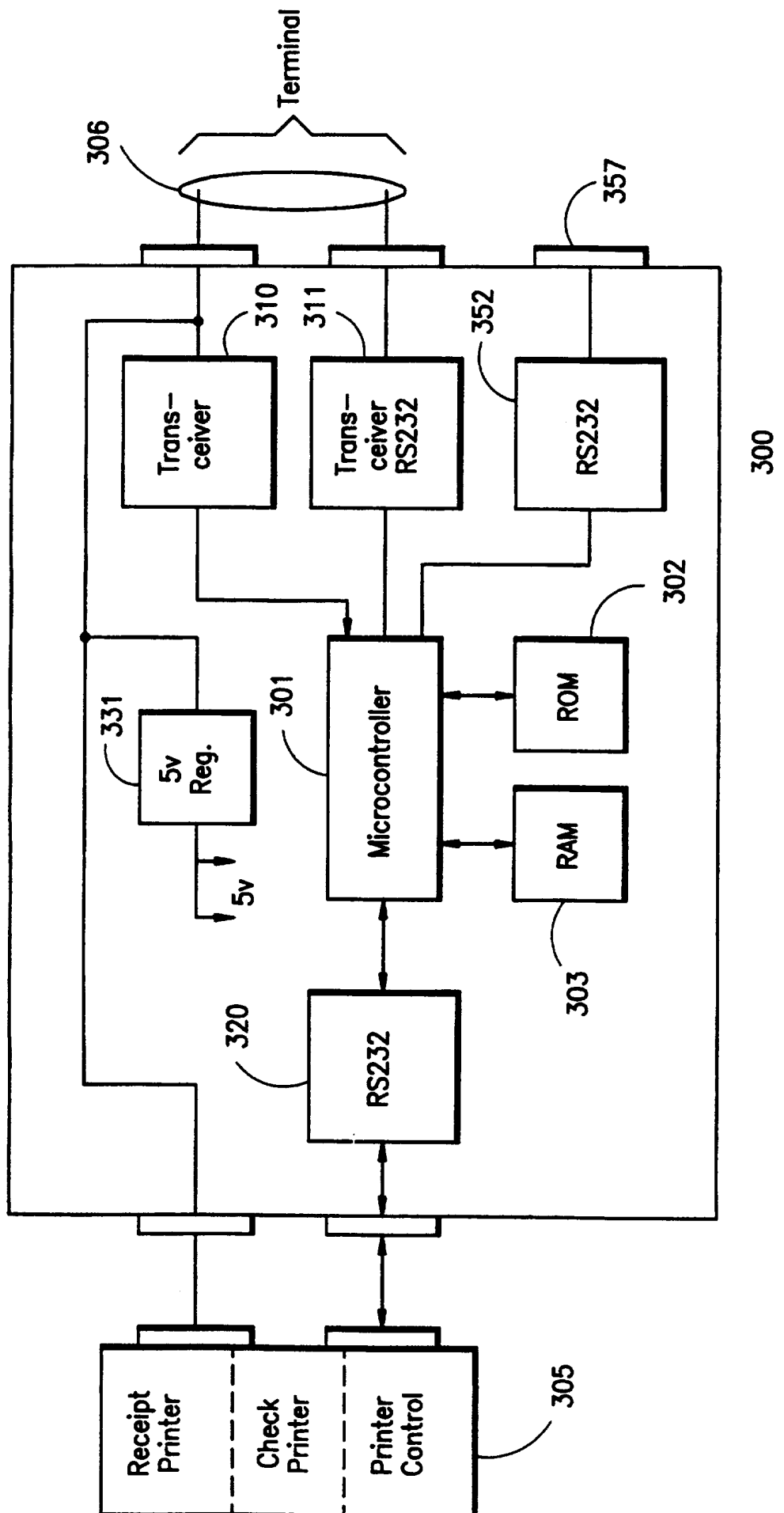
FIG. 1



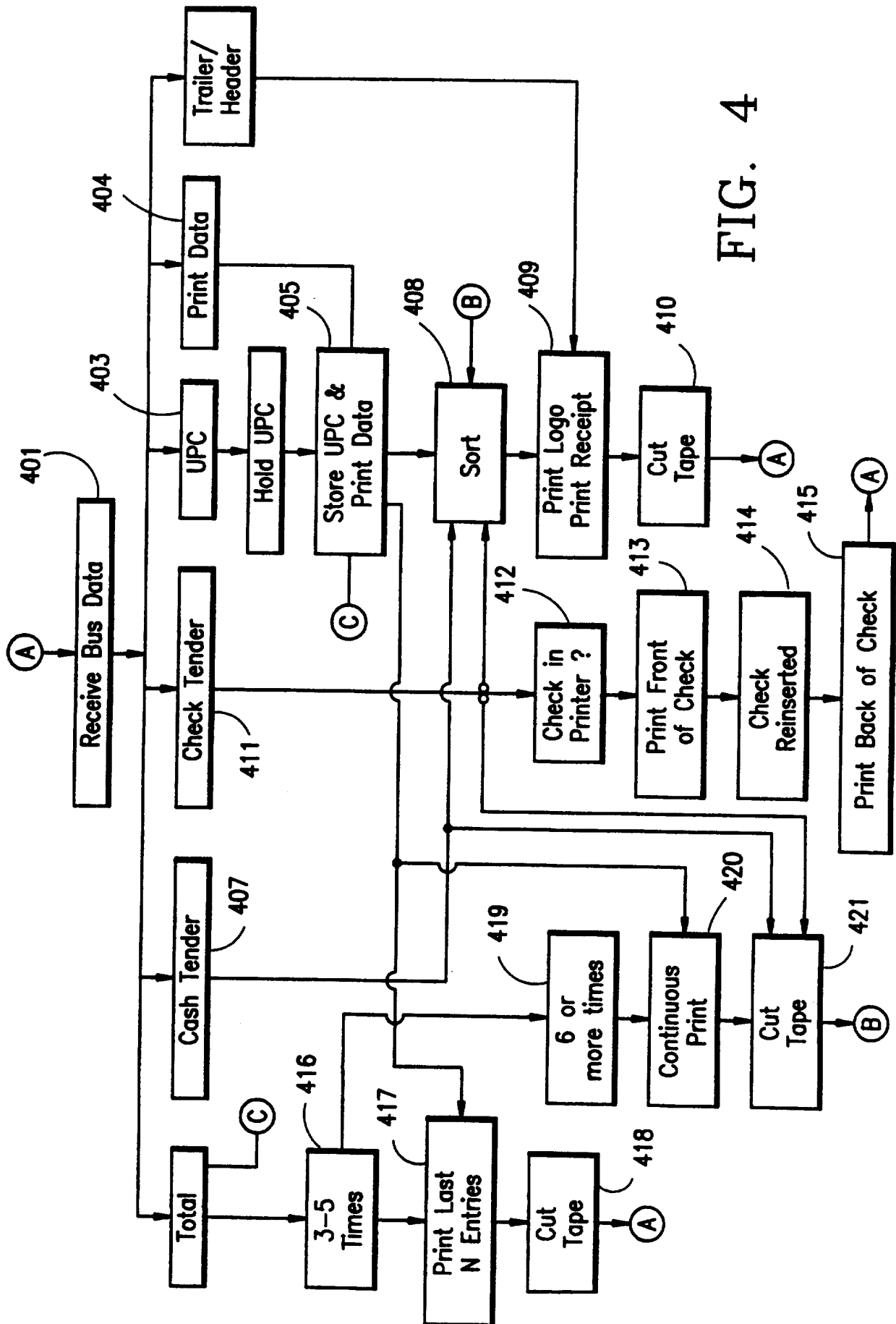
200

FIG. 2

FIG. 3







5/8

EXAMPLE OF A  
NORMAL RECEIPT:

501

CURTISS GROCERY  
SCOTTSDALE, AZ

2/24/96 10:14AM STORE 999  
CUST 56 REG 11 OPR 1104

503	APPLE NEWTONS	1.79	504
	WHOLE CORN	.34	
505	CAL RAISINS	1.99 T	
	PENZOIL	1.59 T	506
507	GLADE PLUG-INS	2.79 T	
	PEPSI	2.99	508
509	SPRAY PAINT	3.99	
	CAR WAX	3.81	510
511	COCA-COLA	2.89	
	KRAFT MAC CHEESE	.33	512
513	KRAFT MAC CHEESE	.33	
	2 @ 1/2 .99		
515	PEPSI	5.98	514
	CAL RAISINS	1.99 T	
517	SPRAY PAINT	3.99	516
	WHOLE CORN	.33	
519	GLADE PLUG-INS	2.79 T	518
	PENZOIL	1.59 T	
	CAL RAISINS	1.99 T	520
521	5 @ 1/.33		
	KRAFT MAC CHEESE	1.65	
523	DELI	1.39	522
	DELI	.25	
	VCP	.25	524
525	VC BONUS	NX	
	PEPSI	2.99	526
	PEPSI	2.99	
527	PENZOIL	1.59 T	528
	GROCERY	2.99	
529	CAR WAX	3.81	530
	KRAFT MAC CHEESE	.33	
531	MUSTARD	1.79 T	532
	APPLE NEWTONS	1.79	
533	MUSTARD	1.79 T	534
	MUSTARD	1.79 T	
535	SPRAY PAINT	3.99	536
	KRAFT MAC CHEESE	.33	
537	CREAM CORN	.33	538
	APPLE NEWTONS	1.79	
539	COCA-COLA	2.89	540
	GLADE PLUG-INS	-2.79 T	
541	CAR WAX	-3.81	542
	PEPSI	2.99	
543	SPRAY PAINT	3.99	544
	TOTAL \$	76.94	
545	CASH TEND	80.00	546
547	SUBTOTAL	75.61	
	TAX PAID	1.33	
500	3.06 CHANGE		502

FIG. 5

THANK YOU FOR SHOPPING HERE  
PLEASE COME AGAIN

SUBSTITUTE SHEET (RULE 26)

6/8

## EXAMPLE OF A CLEAN RECEIPT :

601 → CURTISS GROCERY  
SCOTTSDALE, AZ  
2/24/96 10:14AM STORE 999  
CUST 56 REG 11 OPR 1104

603	PEPSI	6 @ 1/2.99	17.94	604
605	KRAFT MAC CHEESE	9 @ 1/.33	2.97	
	APPLE NEWTONS	3 @ 1/1.79	5.37	
	GLADE PLUG-INS		2.79	606
607	PENZOIL	3 @ 1/1.59	4.77	
	WHOLE CORN		.34	608
609	WHOLE CORN		.33	
	CREAM CORN		.33	610
611	COCA-COLA	2 @ 1/2.89	5.78	
	MUSTARD	3 @ 1/1.79	5.37	612
613	SPRAY PAINT	4 @ 1/3.99	15.96	
	CAR WAX		3.81	614
615	CAL RAISINS	3 @ 1/1.99	5.97	
	DELI		1.39	616
617	DELI	VCP	.25	
	DELI	VC BONUS	.25	NX
619	GROCERY		2.99	618
	TOTAL \$		76.94	
	CASH TEND		80.00	
	SUBTOTAL		75.61	
	TAX PAID		1.33	
600				
	3.06 CHANGE			602

THANK YOU FOR SHOPPING HERE  
PLEASE COME AGAIN

FIG. 6

7/8

**VONS**<sup>®</sup> 701

SCOTTSDALE, AZ  
2/26/96 9:32AM STORE 999  
CUST 61 REG 11 OPR 1104

MEAT	1.23*
BAKERY	1.25*
PRODUCE	1.24*
TOTAL \$	3.72
CASH TEND	4.00

.28 CHANGE

FIG. 7


**VONS**  
  
**VALUE** 801

FIG. 8

8/8

## FIG. 9

Thank you for Shopping at  
Charlie's Supermarket

---

Thank You for Your Patronage  
Come Back Soon

---

We at Charlie's Supermarket  
Wish You a Happy Holiday

---

Happy Holidays  
From the People at Charlie's Supermarket

---

You Have Just Purchased  
The Highest Quality Meat and Produce  
In Scottsdale, Arizona  
Thank You and Come Again Soon

---

When You Want the Best  
Simply Shop at Charlie's  
We'll Do the Rest

---

When the Question is Quality  
The Answer is  
Charlie's Supermarket

---

Let Us Help You  
Plan Your Next Picnic  
At Charlie's Supermarket  
Every Shopping Trip is a Picnic

---