UNITED STATES DISTRICT COURT NORTHERN DISTRICT OF GEORGIA ATLANTA DIVISION

Softcard Systems, Inc.,
Plaintiff,
v.

Target Corporation and VISA U.S.A. Inc., ) Defendants.

## ORIGINAL



Civil Action File No.



103 CV 3585
-Ty

## COMPLAINT FOR <br> PATENT INFRINGEMENT AND INJUNCTIVE RELIEF

Plaintiff Softcard Systems, Inc. ("Softcard") hereby makes the following allegations in support of its claims for relief:

## THE PARTIES

1. Softcard is a Delaware corporation with its principal place of business at 1592 Mars Hill Road, Suite B, Watkinsville, Georgia 30677.
2. Upon information and belief, Target Corporation ("Target") is a Minnesota corporation with its principal place of business at 1000 Nicollet Mall, Minneapolis, Minnesota, 55403. Target's local agent for service of process is C.T. Corporation System, 1201 West Peachtree Street, N.E., Atlanta, Georgia, 30361.

3. Upon information and belief, Visa U.S.A. Inc. ("Visa") is a Delaware corporation with its principal place of business at 900 Metro Center Boulevard, Foster City, California, 94404. Visa's local agent for service of process is C.T. Corporation System, 1201 West Peachtree Street, N.E., Atlanta, Georgia, 30361.

## JURISDICTION AND VENUE

4. This Court has subject matter jurisdiction over this controversy under 28 U.S.C. §§ 1331 and 1338(a).
5. Upon information and belief, this action arises out of the transaction of business, commission of tortious injuries, and other activities of Target and Visa within the judicial district of the United States District Court for the Northern District of Georgia and elsewhere. Accordingly, upon information and belief, Target and Visa are subject to personal jurisdiction in Georgia and the judicial district of this Court.
6. Upon information and belief, venue is proper in this judicial district pursuant to 28 U.S.C. § 1391 (b) \& (c) and § 1400 (b).
7. In this action, Softcard seeks damages and injunctive relief against Target and Visa for acts of patent infringement in violation of the Patent Act of the United States, 35 U.S.C. §§ 1, et seq.

## COUNT ONE INFRINGEMENT OF THE ‘038 PATENT

8. U.S. Patent No. 6,012,038 ("the ' 038 patent"), titled "System and Method for Controlling Distribution of Coupons", was duly and legally issued by the United States Patent and Trademark Office on January 4, 2000. A copy of the '038 patent is attached hereto as Exhibit A.
9. Softcard owns the ' 038 patent and has the right to sue for infringement thereof.
10. Upon information and belief, Target and Visa have and are infringing, inducing the infringement of, or contributing to the infringement of one or more claims of the ' 038 Patent in violation of 35 U.S.C. § 271 by making, using, selling, and/or offering to sell the invention patented in the ' 038 patent.

## COUNT TWO

INFRINGEMENT OF THE '526 PATENT
11. U.S. Patent No. 6,067,526 ("the ' 526 patent"), titled "System and Method for Distributing Coupons Through a System of Computer Networks", was duly and legally issued by the United States Patent and Trademark Office on May 23, 2000. A copy of the ' 526 patent is attached hereto as Exhibit B.
12. Softcard owns the ' 526 patent and has the right to sue for infringement thereof.
13. Upon information and belief, Target and Visa have and are infringing, inducing the infringement of, or contributing to the infringement of one or more claims of the '526 Patent in violation of 35 U.S.C. § 271 by making, using, selling, and/or offering to sell the invention patented in the ' 526 patent.

## COUNT THREE INFRINGEMENT OF THE ‘135 PATENT

14. U.S. Patent No. 5,890,135 ("the ' 135 patent"), titled "System and Method for Displaying Product Information in a Retail System", was duly and legally issued by the United States Patent and Trademark Office on March 30, 1999. A copy of the ' 135 patent is attached hereto as Exhibit C.
15. Softcard owns the ' 135 patent and has the right to sue for infringement thereof.
16. Upon information and belief, Target and Visa have and are infringing, inducing the infringement of, or contributing to the infringement of one or more claims of the '135 Patent in violation of 35 U.S.C. § 271 by making, using, selling, and/or offering to sell the invention patented in the ' 135 patent. PRAYER FOR RELIEF

WHEREFORE, as a direct and proximate result of Target's and Visa's infringement of any and all of the ' 038 , ' 526 , and ' 135 patents, Softcard has been
and continues to be damaged in its business and property, including, among other ways, the loss of substantial profits.

WHEREFORE, by reason of Target's and Visa's infringing acts, Target and Visa have caused, are causing, and unless enjoined and restrained by this Court, will continue to cause Softcard great and irreparable injury to, among other things, the good will and business reputation of Softcard and its business relations with its customers, and will continue to infringe, contribute to the infringement of, and induce others to infringe the patents-in-suit, all of which cannot be adequately compensated or measured in money. Softcard has no adequate remedy at law for this harm.

WHEREFORE, Target's and Visa's infringement of any and all of the ' 038 , ' 526 , and ' 135 patents is, has been, and continues to be committed with full knowledge of Softcard's rights under these patents, and in willful, wanton and deliberate disregard thereof.

WHEREFORE, Softcard prays for judgment against Target and Visa as follows:
(a) That Target and Visa, their officers, agents, servants, and employees, and all persons acting in concert with them, and each of them, be preliminarily and
permanently enjoined from infringing, contributing to, and inducing others to infringe U.S. Patent Nos. 6,012,038; 6,067,526; and 5,890,135;
(b) That U.S. Patent Nos. $6,012,038 ; 6,067,526$; and $5,890,135$ be adjudged to be infringed;
(c) That Softcard be awarded damages under 35 U.S.C. § 284 adequate to compensate it for patent infringement, which are in no event less than a reasonable royalty, together with interest and costs as fixed by the Court;
(d) That the damages awarded to Softcard in connection with Target's and Visa's willful patent infringement be trebled pursuant to 35 U.S.C. $\S 284$;
(e) That prejudgment interest be assessed on all damages;
(f) That Softcard be awarded its reasonable attorney's fees and costs of suit under 35 U.S.C. § 285 ; and
(g) That Softcard be awarded such other relief as the Court may deem just and proper.

DATED: November 25, 2003.


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# EXHIBIT / ATTACHMENT 


(To be scanned in place of tab)
[54] SYSTEM AND METHOD FOR CONTROLLING DISTRIBUTION OF COUPONS
[75] Inventor: Ken R. Powell, Athens, Ga.
[73] Assignee: SoftCard Systems, Inc., Walkinsville, Ga.
[ ${ }^{2}$ ] Notice: This patent is subject to a terminal disclaimer.

Appl. No.: 09/100,868
Filed: Jun. 22, 1998

## Related U.S. Application Data

[63] Continuation of application No. 08,603,482, Feb. 2(1, 1990, Pat. No. $5,800,044$.
[51] Int. Cl. ${ }^{7}$ $\qquad$ G06F 17/60
[52] U.S. Cl. $\qquad$ 705/14; 709:200; 709/213; 709/219
[58] Field of Search $\qquad$ 235/375,383. 235/385; 364/400; 370/400, 401; 395/200.3, 200.31, 200.43, 200.49, 200.6, 200.79; $705 / 10,14,20,24,400 ; 709 / 200,201$,

213, 219, 230, 249; 700;90

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[45]
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ISO/EC 7816-3: 1989 (E), Identification cards-Integrated circuit(s) cards with contacts-Part 3: International Organization for Standardization (ISO).

> (List coolinued on next page.)

Primary Examiner-Edward R. Cosimano
Atrorney, Agent, or Firm-Jerome D. Jackson

## [57] <br> ABSTRACT

A system for dispensing and redeeming the electronic discount coupons. The system includes a personal computer (PC) having hardware and software for receiving an electronic coupon from the system of computer networks, translating the received coupon into a binary format, and sending the binary-formatled coupon to a card-writiog device. The card-writing device writes the coupon data onto a portable customer card ("smart card") approximately the size of a credit card. Subsequently, the customer goes to the store with the card. Upon completion of shopping, the customer redeems the electronic coupons at the checkout area, by inserting the card into the checkoul station. During cbeckoul, the customer is credited with the value of a coupon when UPC data from a bar code reader corresponds to a coupon stored on the card.

39 Clainıs, 21 Drawing Sheets

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Fig. 1A

TO Fig. 18

Jan. 4, $2000 \quad$ Sheet 2 of 21
6,012,038

Fig. $1 B$



Fig. 3A


Fig. 3B


Fig. 3C


Fig. 4
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Fig. 5

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Fig. 6




Fig. 8A


Fig. 8C
U.S. Patent

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Fig. 10A
Fig. 10B


Fig. 10 C


Fig. 11


Fig. 12


Fig. 13

## U.S. Patent <br> Sheet 16 of 21 <br> 6,012,038



FIG. 14

## U.S. Patent

30: $\quad 7170312350$

Fig. I5A
Fig. 15B


FIG. 16


FIG. 17


Fig. 18


FIG. 19

## 1

## SYSTEM AND METHOD FOR CONTROLLING DISTRIBUTION OF COUPONS

This Application is a continuation of application Ser. No. 08/603,482 of KEN R. POWELL filed Feb. 20, 1996 for SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS, now U.S. Pal. No. 5,8(16,044 issued Sep. 8, 1998, the contents of which are hereby incorporated by reference.

## BACKGROUND OF THE INVENTION

## 1. Field of the lavention

This invention relates generally to a retaid system and, more particularly, to a system and method for distributing discount coupons tbrough a system of compuler networks.
2. Description of Related Arl

Discount coupons are a popular means to stimulate sales, of products such as groccry store items. In 1992, approximately 310 billion coupons were distributed and 7.7 billion coupons were redeemed, saving customers $\$ 4$ billion. It has been estimated that in-store couponing coupled with adverlising increases sales by $544 \%$.

A typical marketing scheme involves placing coupons in a newspaper, by printing the coupons in the newspaper or by inserting coupon inserts into the newspaper, and allowing customers to bring the printed coupons to a store for redemption. One problem with this scheme is that the redemption rate is typically only a few percent of the coupons printed, the unredeemed coupons representing an overhead associaled with this scheme. To alleviate this overhead, another marketing scheme involves distributing the coupons in the store, thereby avoiding the cost of printing coupons in a newspaper, and capitalizing on the fact that $66 \%$ of buyer decisions are made at the time of product purchase. Both the in-store scheme and the ncwispaper scheme, however, are susceptible to fraud by an unscrupulous retailer that requests reimbursement payments by presenting unredeemed coupons to the clearing bouse. Oiher schemes include delivering coupons to customers through the mail, distributing coupons in or on the product package, and distributing coupons at checkout. All of these schemes have an overhead cost of handling the coupons and of sending the redeemed coupons to a clearing house to enable product manufacturers to reimburse retailers for the reduction in procecds resulting from coupon redemplions.

## SUMMARY OF THE INVENTION

According to an aspect of the present invention, in a system including a computer nelwork, a plurality of cusiomers, and a computer that sends a coupon signal in a first signal on the conputer network, the first signal ineluding a respective destination signal corresponding to a customer in the plurality of customers, a coupon processing system comprises a receiver that receives the coupon signal seat in the first signal; a determiner that determines whether a coupon, corresponding to the coupon signal, has been previously processed; and a transmitter that conditionally transmits the coupon, if the coupon has not leen previously processed.

According to another aspect of the present invention, in a system including a compuler network, and a plurality of customers, a method comprises the sleps, performed for a customer in the plurality of customers, of sending a first conditionally processing the coupon, if the coupon has not been previously processed.

## BRIEF DESCRIPTION OF THE DRAWINGS

According to yet another aspect of the presen invention, there is a coupon system for a system including a computer network, and a plurality of customers. The coupon system comprises means for sending a first signal on the computer network, the first signal including a respective destination signal corresponding to a customer in the plurality of customers, and a coupon signal; means for receiving the coupon signal; means for determining whether a coupon, corresponding to the received coupon sigoal, has been previously processed; and means for condilionally processing the coupon, if the coupon has not been previously processed.

According to yet anotber aspect of the preseat invention, there is a coupon system including a communication system, a plurality of customers, and a computer that sends a coupon signal in a first signal in the communication system. The coupon system comprises a receiver that receives the coupon signal sent in the first signal; a deteminer that uses a record for previous coupons to delermine whether a coupon, corresponding to the coupon signal, has been previously processed; and a transmitter that conditionally transmits the coupon, if the coupon has not been previously processed.

According to yet another aspect of the present invention, there is a method in a system including a communication system, and a plurality of customers. The method comprises 35 the steps, performed for a customer in the plurality of customers, of sending a first signal in the communication system, the first signal including a coupon signal; receiving the coupon signal; after the receiving step, using a record for previous coupons to determine whether a coupon, corresponding to the coupon signal, has been previously processed; and conditionally processing the coupon, if the coupon has not been previously processed.

FIGS. 1A and 1B are a schematic diagram of a system of computer networks, in accordance with a first preferred embodiment of the present invention.

FIG. 2 is a diagram emphasizing a part of the system shown in FIGS. 1A and 1B.

FIGS. 3A, 3B, and 3C. are diagrams showing a discount coupon sent through a system of computer networks from 50 computer 230 to Home 160.

FIG. 4 is a diagram of a personal computer iaside Home 160.

FIG. 5 is the display of the personal computer showing an electronic coupon received through the system of computer networks into home $\mathbf{1 6 0}$.

FIG. 6 is a side view of the card-writing device in the personal computer for writing coupons onto portable cards in tome 160.

FIGS. 7A and 7B are a schematic diagram of a retail store in the preferred system.

FIGS. 8A, 8B, and 8C are enlarged views of some products shown in FIGS. 7A and 7B.

FIG. 9 is a flow chart of a processing performed in the preferred system.

FlG. 10A is a plan view of one of the customer cards in the preferred system.

FIG. 10 B is a side $3 \quad 6,012,038$

FIG. 10C is an enlarged of the card show in FIG. 10 A
in FIG. 10A. enlarged, parlial view of the card shown
FIG. 4 is a block diagram card shown
FlG. 12 is a block diagram of the eustomer card,
stown in FIG. 4 . FTG. 13 is a block diagram of the chect
in FIG. 7 B.
FIG. 14 is a flow changram of the check out station shown in FIG. 94 is a flow chart of a step of the processing shown
FlGS. 15 A and 15 B are diagrams of some contents of a customer card at differens points ine memory F7G. 16 is a flow chan of anotherent points in time. shown in FiG. 9. of step 9035 of FIG. 9 . FIG. 18 is a block.
clearing house and oultiaghram of a systern including a FIG. 19 is a flow chart check-out stations. preferred sysuem. The accompanying drawings which are incor embodiments of the pan of this specification, illustrate description, explain the priacion and, logether with the additional advaniages the principles of the javer with the corresponding parts are labeled with correspondiuwings,
ence numbers.

## DESCRIPTION OF THE PREFERRED <br> EMBODIMENTS

diag reter.
distributing coupans in a system of compuler networks for embodiment of the present invance with a first preferred 281, 111, 115, 130, 135, 138, invention. Computer nefworks includes a plime interconbecled. E9, 142, 148. 144, 146, 156, 158, 160 , 162 of compurers. Each computer network $181,182,310,162,164,166,168,171$ of homes 152, 154 , oelworks via a respect is coupled to one of 174, 176, 178,
the system incluctive relephone signal path coouputers 235, 245,255 includes poriable custonal path 177. $367,369,375,275,285,190,315,325,335$ cards 215,225 , customes card, and 385. Each customer card is a 35,365 , card contains a pproximately the size of card is a portable. coupons. ${ }^{2}$ a random access memory for sloring card. Each A computer 230 for storing electronic coupons and distrib within network 115 represented schemates the stored coupons stores eleetranic carries her respecically in FIGS. 1A ans the homes. As computer in each bive card from her and 1 B, a cusiomer 230, via one each bome receives a her bome to a store. A the received or more of the compuler nelworks computer computer in home anto one of the cards. For end slores computer 230 via ne 160 receives a cords. For example, a received coupon ontworks 115, 130, and 135 signal from
FIG. 2 shows a sectard 190 . and 135 and stores the
sizing a path between cornpuice 230 peferred system, ernpha115 is a local area network (LAN) and home 160 . Network area ne lwork (WAN), berwork 135 is in LAN 130 is a wide
279 in a LAN. Nelwork 115 includes. computers $234,238,230,236$, andity of first compuiers, computers has a respective network address uniquely ide first tifying the compurer on network 115 address uniquely iden-

[^0] pacocol of network 115 . of hit has a destination adoraning, for example, that the of bis from the statt of the pestield offsel a cerrain number acdress field has a certaine packet, and that the destination to pardes circuitry (bardware and sofiwar of hits. Computer 230 includes through transmission cable 117 . Thding a data packet format for constructing a packel circuitry ideutifying a product ark 115, containing a dis, having the Nerwork 130 includes a computers $254,250,252$ a second plurality of computers Computer 230 seads this 258, 256, 262, 260, and 272. helow Eavia computer 238, as describedition signal to second network these second computered in more detail on network 130 . Tress uniquely identifying a respective each other by sending second computers communicate witer 130.
formal for network address field allowing computer $\mathbf{2 3 0}$ includes a destination 238 packet is to be received ber 238 to recognize that the meaning that address on both IAN computer 238. Computer its own ardress in ater 238 bas circuitry for WAN 130 , network 115, in a network-115-formated recognizing an address in a nead has circuitry for recoed packet seat over work 130. Thus, work-130-formatled packel sent ats own networks 115 , computer 238 acts to roule sent over netiacludes circuitry 130 . In other words packets berween for receivingiry, responsive 10 an address, computer 238 laining an ele a packet in the format of ass on network 115, and tor sending a coupon identifying a cerk 115, con130, the second a seound packet in the a certaio product, certain product. Whet containjng a signal iden of network destined for When compuler 238 al identifying the packel addressed network 130 . Computer 272 has 135 and, therefore, compress on both WAN 130 and reween networks 130 atier 272 acts to routc pack receives the packel 130 and 135. When comp packets addressed to packel, computer 272 constomputer 272 135.

More specifically, eompute protocol of network
Compuler 230 computer 276 , using tonsifucts an "I $P$ " packet 115-foma hen imbeds this IP protocol of packet addressed to packer within a networkpackel, comptwork 11s. Wheo compuputer 238, using the 5 the IP packel shor 238 reads the IP address, 238 receives the the it pact should be sent over networs, delerinines that addressed to within an uetwork-130 130, and imbeds 130. 0 computer 272, using the protomatted packet

$$
\text { When computer } 272
$$

reads the $1 P$ address, decejves the packet, computer 272 packet to computer 276, and imat the IP address correnetwork 135.

FIG. 3A shows data proteol of
 tifying compu a 20 hit dessination address 117. Header field on nehwork 115 Destind 3011 idea-

5
field $\mathbf{3 0 1 1}$ is 16 -bits removed from the beginning of the data package 3002. Header 3010 contains other fields, including a 20 -bit field containing the address of the sender of packet 3002, and a field containing data corrcction bits. Field 3020 includes an Internel Protocol (IP) address field 3021 idenlifying computer 276. Field $\mathbf{3 0 3 0}$ includes electronic coupon information in ASCII (American Standard Code for Intormation Interchange) tex1 form.
Computer 238, which resides on both LAN 115 and WAN 130, includes circuitry to translate packet 3002 received from computer 230, into packet 3004 shown in FIG. 3B. Packel 3004 includes header field 3012. Header 3012 includes a 16 bit destination address field 3013 identifying computer 272 on WAN 130. Address field $\mathbf{3 0 1 3}$ is 32 -bits removed from the start of packel 3004. Header 3012 bas other fields, including a field idenifying the sender of packet 3004, and a field containing data correction bits.

Computer 238 determines that the packet should be sent to computer 272 on network $\mathbf{1 3 0}$ by reading a routing table. The routing table has an entry for network 135. The entry for network 135 identifies network 130 and computer 272 as the path to be used when computer 238 is sending a packet to a computer on network 135 . Thus, computer 238 constructs packet $\mathbf{3 0 0 4}$ in response to IP address field $\mathbf{3 0 2 1}$ in packet 3002.

As shown in FIG. 2, computer $\mathbf{2 3 8}$ sends a packet to computer 272 , via computers $250,254,258$, and 260 .
In other words, each packet is essentially a type of signal having a network address of a certain length and having a certain number of digits. A signal on one network may include a first network address Ol digits removed from the start of the signal. A signal another network may include a second network address is O 2 digits removed from the slart of the signal, wherein O 1 is not equal to O 2 , and the first network address includes N1 digits and the second network includes N 2 digits, wherein N 1 is not equal to N 2 .
Computer 272, which resides on both WAN 130 and LAN 135, includes circuitry to translate packet 3004 received from computer 238, into packet 3006 stown in FIG. 3C. Packel 3006 includes beader field 3014. Header 3014 includes an address field $\mathbf{3 0 1 5}$ identifying computer 276 on LAN 135. Header 3014 includes a 16 bil destination address field $\mathbf{3 0 1 5}$ identifying computer 276 on LAN 135. Address field 3015 is 24 -bits removed from the start of packel 3006. Header 3014 has other fields, including a field identifying the sender of packel 3006, and a field containing data correction bits.

Thus, the preferred system may be conceptualized as computers sending packets containing electronic coupons. The preferred sysiem may also he conceptualized as programs, running on the computers, that send electronic mail (Email) messages to each other. Each Email message includes one or more of the packets described above. The programs include a coupon server (nol shown), running on computer 230, for constructing the Email message and sending the Email message to a customer, and Mail Transfer Agents and a User Agent (not shown) that route the Email messages between each other and ultimately store an Email message into an electronic mail box for the recipient of the message. An electronic mailbox is a memory area readable by the owner of the mail box. For example, FIG. 2 shows mail box 277 readable by personal computer 400 in home 160.

FIG. 4 shows a personal computer 400 within home 160 . Computer $\mathbf{4 0 0}$ includes a modem 410, a CRT display 420, a keyboard 425, a mouse 423, and a coupon-writing device

More specificatly, Product Area 110 has bottles of ammonia $\mathbf{1 1 2}$ grouped together on multiple shelves. Bottles of
ammonia 112 are contiguously grouped, meaning that no other product is between any two botiles of ammonia 112.
FIG. 8A shows an conlarged view of some of the bottics of ammonia 112. Each bottle of ammonia has a common Universal Product Code (UPC) label 114, which is a group of parallel lines that encodes a number that uniquely idenlifies acme ammonia. In other words, label 114 is different than labels of units of other products. Each boutle of ammonia 112 also has a common character label 113. Character label $\mathbf{1 1 3}$ is "ACME AMMONIA." Label 113 is different than labels of units of other products.
Product Area $\mathbf{1 2 0}$ has boxes of pasta $\mathbf{1 2 2}$ grouped together on multiple shelves. Boxes of pasta 122 are contiguously grouped, meaning that no other product is between any iwo boxes of pasta 122.

FiG. 8B shows an enlarged view of sone of the boxes of pasta 122 Each box of pasta 122 has a common Universal Product Code (UPC) label 124, which is a group of parallel lines that encodes a number that uniquely identifies Old World pasta. In other words, label 124 is different than labels of units of other products. Each box of pasta 122 also has a common character label 123. Character label 123 is "OLD WORLD PASTA." Label 123 is different than labels of units of other products.

Product Area 271 has boxes of light bulbs 132 grouped logether on multipic shelves. Boxes of light bulbs 132 are contigunusly grouped, meaning that no other product is between two boxes of light bulbs 132 .

FIG. 8C shows an enlarged view of some of the boxes of light bulbs 132. Each box of light bulbs 132 has a common Universal Product Code (UPC) label 134, which is a group of parallel lines that encodes a number that uniquely identifies Lighthouse light bulbs. In other words, label 134 is different than labels of other products. Each box 132 also bas a common character label 133. Character label 133 is "LIGHTHOUSE LIGHT BULBS." Label 133 is different than labels of other products.

Similarly, other product area in the store eacb have a set of respective products contiguously grouped together and a corresponding product station adjacent to the products. The respective units of a certain product have a common labed, different than labels on units of other products, that uniquely identifies the certain product. Product area 140 has bottles of ketchup 142 contiguously grouped together. Product area 284 has loaves of bread 162 contiguously grouped together. Product area 170 has cartons of milk 172 contiguously grouped together. Product area 180 has packages of hacon 182. Producl area of 191 has packages of butter 192 contiguously grouped together.
Product area $\mathbf{1 5 0}$ has boxes of cereal $\mathbf{1 5 2}$ contiguously grouped together.

FIG. 9 shows a processing performed in the preferred system. Computer 230 scnds an clectronic coupon, in the form of an E-mail message, through computer networks 115 , 130, and 135. (Step 9003). A customer, such as customer 290, receives the electronic coupon, through modem 410 , onto her home computer (step 9005). The coupon is compared to a list of previously processed coupons and written onto her customer card 190 using writing device 415 (step 9010). The customer then brings ber respective customer card to a store 1000. (step 9020).
At store 1000, the customer removes producls from shelves 10, 20, and $\mathbf{3 0}$ and brings the products 10 checkout station 900 (step 9025). In other words, while shopping in store 1000, each of customers $210,220,231,240,250,270$ 280 , and 290 carries his or her respective customer card.

Customer 290 carries card 190, customer 220 carries card 225, custumer 231 carries card 235, customer 240 carries card 245, customer 250 carries card 255, customer 270 carries card 275, cuslomer 280 carrics card 285, and custorner 290 carries card $\mathbf{1 9 0}$. Each customer tows a shopping cart to bold selected products. Customer 210 tows cart 212, customer 220 tows cart 222, customer 231 tow cart 232, customer 240 tows cart 242, customer 250 tows cart 252, customer 270 tows cart 291, cuslower 280 tows cart 282, and customer 290 tows cart 292. The customer then removes a product from the shelf and places the removed product into her cart. The customer thus shops throughoul the store.

Checkout station 900 then scans the products and determines a price for each product depending on whether the customer card contains coupons for the scanned product (step 9035). More specifically, the customer redeems the electronic coupons at the checkout area, by inserting her customer card into checkout station 915. For example, a customer such as customer 240 in FIG. 7B completes the purchase of her selected products 243 by transferring products 243 from her cart 242 to counter 900 , and by inserting card 245 into checkoul station 915 . Subsequently, a checkout clerk (not shown) scans each selected product past UPC bar code reader 910. Bar code reader 910 is an optical detector. In other words, bar code reader 910 detects an electromagnetic signal. A processor coupled to station 915 and reader 910 determines whether the most recently scanned product is on a discount list stored in card 245. If the most recently scanned product is idenified in this discount list, a price for the product is determined using the discount data corresponding to the product, and the resulting price is displayed on display 917. Checkout connter 900 scans and processes each product 243 in a similar manaer.
Sirnilarly customer $\mathbf{2 8 0}$ in FIG. 7B follows the procedure of FIG. 9 by transferring products 283 from her cart 282 to counter 900 , and by inserting card 285 into checkoul station 915; and the checkout clerk (not shown) scans each selected product $\mathbf{2 8 3}$ past UPC bar code reader 910 . Customer 270 follows ibe procedure of FIG. 9 by transferting products 273 from ber cart 291 to counter 900 , and by inserting card 275 into checkout station 915; and the checkout clerk (not shown) scans each selected product 273 past UPC bar code reader 910.
Because of the large number of electronic coupons that may be available to a customer, a customer such as customer 310 may wish to insert their card into display station 710, to review what coupons are currently stored on the card. Station 710 may also present the vicwer with additional information about the products identified by the coupons on the card. Station 710 is described in detail in application of KEN R. POWELL for SYSTEM AND METIIOD FOR DISPLAYING PRODUCT INFORMATION IN A RETAIL SYSTEM Ser. No. 08/603,483, tiled on Feb. 20, 1996, now U.S. Pat. No. 5,890,135 issued Mar. 30, 1999 the contents of which is hercin incorporated by reference.

Step 9005 includes a slep of reading an electronic mail (Email) ressage. An Email message from computer 230, for the user of PC $\mathbf{4 0 0}$ in home $\mathbf{1 6 0}$, resides in an electronic mailbox 277 , which is a memory area on computer 276. The user of PC $\mathbf{4 0 0}$ dials into computer $\mathbf{2 7 6}$ using a telephone line, submits appropriate user identification including a password, and then invokes a program that reads the Email message from the memory of computer 276 into the memory of PC $\mathbf{4 0 0}$.

The user then execules the driver for device 415, by printing the Email message to device "SCW:". The driver
translates the textual coupon shown in FIG. 5 into a binary formal, described below. Thus, the driver program and device 415 are essentially respoasive to the coupon data computer 238 . 3004 , which was constructed by routing
To prevent
a single Email couperupulous user from repeatedly writing conirary to the maintains a list of Email coupons coupon issuer, the diver ing the time and date of he Email a FIG. 5. Before writing an electranic cown in field 5010 of card, the diver compares the correspondiug to à customer to the list to verify that an corresponding Enail message processed.
Further ion

Further, to prevent
field of a previoust a user from changing the date and time the modified mossly-printed Email message and reprinting each Email message to thwart this protection mechanism, contains the encage from the coupon server on nude 230 driver both verifies that an Emaile in field 5020. Thus, the lime has not heen previnaly arneessed and with the date and unencoded date and time in area 5010 matchersies the that the date and time in fick 5020 .

There are two preferred metbods for gelling the Email address for PC 400 to the coupon server on node 230, to allow the server is send a coupon to PC 400. The first preferred method is to progran the coupor server using dara collected from sources off of the Internet. The second preferred method is to allow the user of PC 400 to send her Email address, through the computer aetworks, to node $\mathbf{2 3 0}$. To implement this second method, it is presently preferred web browser for the World Wide Web PC 400 be sent by a scbeme, a usersene World Wide Web (WWW). With one for a specific producl Ey il message requesting a coupon Hypertext in a document, by invoking the browser to select of the Hypertext invokes advertising the product. Selection the browser to prompt the "Form" in the document, causing the Email address as keyboard ingut from address, accept construct an Email message addressed from the user, and 230. The message contains the Emajl address siven on mode user and data identifying the product corresponding by the selected hyperrext. Upon receiving the message the toupe server sends an Email message to the users's addre coupon
An alternate scherne is to thave the user's address.
club. by invoking the browser to user of PC $\mathbf{4 0 0}$ join a document advertising the club The select Hypertext in a mailing list for certain types of coupons is essentially a hypertext invokes a Form in the dons. Selection of the browser to prompt the user for the document, causing the Email address as keyboard inpul from the user, and accept the an Email message addressed to the server user, and consiruct message contains the Email address given node 230. The data identifyiag the club aurresp given hy the user and bypertext. Upon receiving the mpondiag to the selected adds the Email address to the list forsage, the coupon server message. Subsequently, some tor the club identified in the server to send a coupon to eache event causes the coupon

Dre such event would be receipe, by in the list. (FIG. 19). an Email message from a coupon issuer. (FIG. 19 step 1) The coupon issuer may be a distributor of the 19 step 1) The sponding to the coupon. The coupon server, in this case coreas "mail exploder," and essentially ectoes ine this case, acts message from the coupon issuer to each member of the list.
(FTG. 19 step 2) (FTG. 19 step 2)
FlG. 10A shows a plan view of customer card 190, and
FIG. 10B shows a side view of card customer card 190, Card 190 is 8.5 cm
by 5.4 cm , the length and width of a typical financial credit card. Card 190 is slightly thicker than a lypical financial credit card. Cand 190 includes a magaetic stripe 2410, stations and the checko 2420 for communicalion with the producs for displaying the card owner's name embossed area 2430 allows a conventional credit same. Magnetic stripe 2410 data from the card. Magnetic stripe 2410 is por to read basic the operation of the preferred embodiment of necessary to described in more detail below. FIG. 10C shows interface contacts 2420 in more detail. Interface contacis 2420 are contigured in accordance with 1SO7816-2: 1988(E), Identification cards-Integrated circuil(s) cards with contact-Pan 2: Dimensions and locaOrganization contacts, promulgated by the International the American National Standion (ISO), and available from 42 nd Sireet, New York, Ny Y 10036 Instite (ANSI), 11 West 7816-2, conlacl 2421 is assigne 10036. According to ISO contact $\mathbf{2 4 2 2}$ is assigned to RST (resel sige (supply voltage), is assigned to CLK (clock signal), contact 2424 , contact 2423 for future use, contact 2425 is assigned to 2424 is rescrved conlact 2426 is assigned to VPP (progran and voltage), conlact 2427 is assigned to $1 / O$ (data inpul/output), and conlact 2428 is reserved for future use. Card 190 communicales with the product stations and the checkout stations througb contact 2427 using a half duplex scheme, meaning Ihal contact 2427 is for communicating data signals either to
or from the card.
ing central processing unit 2450 , memory 2460 , and batud2470 for supplying power to interface 2425 , processor 2450 and memory 2460 . Memory 2460 is a random 2450 , addressable device Siation 2460 is a random access, to parallel converter for iransferace 2425 includes a serial condact 2427 and CPU $\mathbf{2 4 5 0}$ transering data signals between 2460 stores a program 2465 executed bus $\mathbf{2 4 5 2}$. Memory customer identifig 2465 executed by processor 2450 , 2468. Customer identificata 2467, and authorization dala of digits that uiquication dala 2467 includes a sequence Customer identificalely identifies the bolder of the card. social security 2467 in customer card 235 for example, identification data Authorization data 2468 also iocly identifies customer 231. an expitation dale for 248 also includes date data indicating contains a field identifying that the card is a data 2468 also

Memory 2460 also sting that card is a cuslomer card. list 2435. When a customer incerts a coupons in coupon device 415 , processor 2450 receives a customer card inlo for the product from interface $\mathbf{4 1 5}$ and identification code list 2435.

Each of customer cards $215,225,235,245,25$
$315,325,335,345,355,365,367,369,375,255,275,285$, same hardware stricture as $367,369,375$, and 385 has the FIG 12 sher card 190.
provessing unit $\mathbf{4 3 5}$, meck diagram PC. $\mathbf{4 0 0}$, including central 450. Menory 440 is a random 440 , and $A C-D C$ transformer Memory 440 stores driver prom aceess, addressable devive. to card-writing device 415 . CPU 435 for seading coupons

FIG. 13 is block diver 445. shown in FIG. 7B. Disk 925 of checkout counter 900 CPU 950 executes ink 925 provides long term storage. able memory 920 . Checkuut counter 900 access, addressreader 910 for reading bar codes on 900 also includes UPC station 915 for commg bar codes on products, and checkout station 915 is in store 100 n and cand-writing card. Since
in home 160 , which is a separate building from slore 1000 , station 915 is spalially rernoved from card-writing levice 415.

CPU 950 and program 922 act to detect a product scanncd by UPC reader 910, determine a reference price for the product, search for the product's identification in the memory of a customer card, and deduct a discount from the reference price if the product is identified in the customer card mewory. CPU 950 then displays the price of the product on display 917 . In other words, CPU 950 and program 922 act to receive a purchase signal identifying a product, to receive to receive a card signal, and to detemmine a price for the product depending on whether the product identified by the card signal corresponds to the product identified by the purchase signal.

CPU 950 writes coupon redemption data onto disk 925 . Periodically, CPU 950 sends the redemption data to an electronic clearing house through modem 930.

FIG. 14 shows the processing of step 9010 of FIG. 9 in more detail. CPU 435 exceutes device driver program 445 in memory 440 to perform the processing shown in FIG. 14. When a person prints text to device "SCW:", device driver program 445 reccives the text and verifics that identical text has not been processed before, by comparing the lext received with a list of previous Email messages received. Program $\mathbf{4 4 5}$ also compares the time and date in field $\mathbf{5 0 1 0}$ of the text with the encoded time and date in field $\mathbf{5 0 2 0}$ of the text, to verify that the text is an authentic Email message from the coupon server on computer 230. If the Email message is an authentic message that has not been processed before, program 445 then translates the text in field $\mathbf{5 0 2 0}$ into binary coupon data. (step 14005).

Subsequently, program 445 sends a reset command to card interface 415 , causing interface $\mathbf{4 1 5}$ to reset the card by applying a clock signial to card contact 2423. (The card then answers the resct by sending an answer-to-reset data block, including identification data 2467 and authorization data 2468, through card contact 2427. Authorization data 2468 contains a card-type code indicaling a customer card.) Program 445 then receives the answer-tn-resel data block from card interface 415 (slep 14010).

The communication protocol between interface $\mathbf{4 1 5}$ and a customer card is described in more detail in ISO/IEC 7816-3: 1989 (E), Identification cards-Integrated circuit(s) cards with contacts-Part 3: Electronic signals and transmission protocols; and ISO/IEC 7816-3: 1989/Amd.1: 1992 (E), Parl 3: Electronic signals and transmission prokewls, AMENDMENT 1: Protocol type technique $=1$, syncbronous half duplex block transmission protocol. Both of these standards are promulgated by the International Organization for Standardization (ISO) and distributed by the American National Standards Institutc (ANSI).

CPU 435 analyzes the authorization data io the received answer-10-resel block to determine whether the card is a customer card that is eligible to receive electronic coupons from interface 415 (step 14020). CPU 435 delermines that the card is a customer card if the received authorization data contains a card-lype code indicating a customer card. If the card is a customer card, meaning that the authorization data is authorization data 2468. CPU 435 determines if the card is eligible to receive electronic coupons if authorization data 2468 contains certain codes, and the date and time in Email field $\mathbf{5 0 1 0}$ is not later than the date data in authorization data 2468. If the card is an eligible customer card, CPU 435 sends to the customer card a block containing a slation-type code. indicating a PC interface, and the binary coupon data (step
14040) The binary coupon data includes an identification code for the product received from PC $\mathbf{4 0 0}$ (Old World Pasta 122) and the discount currently being offered for that prod$\mathbf{u c t}$. If the card is not an eligible customer card (step 14020), there is no further processing.
FIG. 15 $\Lambda$ shows some the contents list $\mathbf{2 4 3 5}$, starting at location 30 memory 2460 , of customer card 190 , before CPU 435 of PC $\mathbf{4 0 0}$ executes step 14040. An electronic coupon is represented by three rows in list 2435: a 10 digit UPC product code in the first row, discount format data in the sccond row ("1" signifying cents, "2" signifying percentage), and discount quantity data in the third row. In FIG. 15A, the customer card is storing two electronic coupons. After CPU 435 executes step 14040 (thereby sending another electronic coupon to the customer card), CPU 2450 in custumer card 190 receives the data and adds the data to list 2435, resulting in three electronic coupons in list 2435 as shown in FIG. 15B.
In list 2435 in FIGS. 15A and 15B, the memery field having the product code 7170312350 corresponds to the UPC code on boxes of Lighthouse Light Bulbs 134. The nex1 memory field stores the format of the discount quantity data, with " 1 " signifying cents and "2" siguifying perecnlage in tenths of a percent. The next memory field stores the discount quality data, 200, signifying that the discount being offered for Lighthouse Light Bulbs 134 is $\$ 2.00$. The memory field having the product code 7170312780 corresponds to the UPC code on ammonia bolles 112 . The next memory field stores the format of the discount quantity data, with " 1 " signifying cents and " 2 " signifying percentage in lenths of a perceal. The next memory field stores the discount quality data, $\mathbf{5 0}$, signifying that the discount being offered for ammonia bottles 112 is 50 cents. In list 2435 in FIG. 15B, the memory field having the product code 7170312682 corresponds to the UPC code on boxes of Old World Pasta 124. The next memory field slores the format of the discount quantity data, with " 1 " signifying cents and " 2 " signitying percentage in tenths of a percent. The next memory field stores the discount quality data, 150, signifying that the discount being offered for Old World Pasta 124 is $\$ 1.50$.
FIG. 16 shows aspects of the processing of step 9035 of FIG. 9. The processing of FIG. 16 is processing performed by CPU 950 and program 922 in checkout counter 900 , when a customer chceks out of store $\mathbf{1 0 0 0}$. When a customer, such as customer 290, insers customer card 190 into interface slot 914, a switch (not shown) in interface slot 914 alerts CPU 950 that a card has been inserted into the slot. When a customer card is in interface slot 914, conduclive conlacts (not shown) inside interface slot 914 louch each card contact 2420. Subsequently, CPU 950 causes card interface 925 to resel the card by applying a clock signal to card contact 2423. (If the card is a customer card, the card then answers the reset by sending a block of data, including identification data 2467 and authorization data 2468 , through card contact 2427.) CPU 950 then receives the answer-10-reset from the card (step 16002). CPU 950 then sends a data block containing a station-lype code indicating a checkout station (step 16004). CPU 950 then receives the contents of table $\mathbf{2 4 3 5}$ in memory $\mathbf{2 4 6 0}$ ) of the customer card, and temporarily stores these table contents in memory 920 of the checkout station (step 16005). During step 16005, CPU 950 also causes customer card 190 to remove all entries from list 2435, so that the electronic coupons in the list cannot be redeemed again. When the checkout clerk (not shown) moves a product past UPC reader 910, UPC reader 910 detects the UPC code on the product and sends the UPC

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code to CPU 750 (slep 16010). CPU 950 searches the received table conatents to delermine whetber the product scanaed is identified in the table (step 16020). If the product is not in the received table, CPU 950 displays the price (step 16040). If the product is in the received table, CPU 950 subtracts the discount, as determimed by the discount data stored in the received table, from a product reference price read from disk 925 (step 16030), and displays the resulting price of the product on display 917 (step 16040). If there are products remaining (step 16042), processing proceeds to step 16010. If there are no products remaining, processing proceeds to step 16044 for display of the total price.

Product dala, customer identification data 2467, authorization data 2468 , and the data in list $\mathbf{2 4 3 5}$ are each a type of signal.

In other words, the preferred retail system $\mathbf{1 0 0 0}$ includes product areas 110, 120, 271, 140, 284, 170, 180, and 191; a plurality of cuslomer cards each having a memory, and a checkout counter 900 having checkout station 915 acting as a communication device. A method of operating system 1000 comprises the steps of writing a first signal into memory $\mathbf{2 4 6 0}$ of a card in the plurality of cards, in response to a person inserting the card into the interface slot of a PC card interface, the tirst signal identifying a product; reading the first signal from memory $\mathbf{2 4 6 0}$, in response to a person inserting the card into the interface slot of the checkout station; receiving another signal, from UPC reader 910, identifying a product; and determining a price for the product depending on whether the product identified by the first signal, read in the reading slep, corresponds to the product identified by the otber signal.

In summary, after UPC barcode reader 910 scans a product, processor 950 determines eligibility for a discount. If a product qualifies, processor 950 displays the discounted price on display 917.

HGG. 17 shows aspects of the processing of steps 9010 and 9035 of FIG. 9. The processing of FIG. 17 processing is performed by one of the customer cards, such as customer card 190, in the preferred retail system. After the card is reset through contacts 2420, the customer card sends an "answer to reset" data block in accordance with the ISO standard ISO/CEE 7816-3: 1989(E), cited above. The customer card sends identification data 2467 and authorization data 2468 in the answer-to-reset data block (step 17010). If the station then sends a block of data to the customer card, the customer card then receives the block of data through contact 2427 (step 17015). If the block contains a station-type code indicating a PC card interface (step 17020), the customer card then adds product coupon information, from a certain location in the block, to the list 2345 (step 17030).
If the customer card is not eligible, the PC interface will not send a block of data, step 17015 therefore does not execute, and processing ceases until the customer card is reinserted into an interface slot, at which time the station will reset the card and processing will restart at step 17010.
Alternatively, if the block contains a station-lype code indicating a Checkout station (slep 17070), the customer card then seads list 2345 to the display station (step 17080). In other words, CPU 2450 reads list 2435 from memory 2460, in response to a customer inserting card 190 into checkoul station 915, and sends a signal corresponding to the list 2345 to the checkout station (step 17080). If the block does not contain a station-type code indicating a Checkout station, there is no additional processing.
FIG. 18 shows a block diagram of a preferred retai! system including a clearinghouse 990, and a plurality of
checkout stations 900 . Periodically, checkout counter 900 sends redemption data to an electronic clearing house. The redemption data sent to the clearing house includes the identification of the store, identification of the coupons redeemed and of respective quantities of coupon redemptions. Periodically, checkoul counter 900 sends redemption data to a market research center. The redemption data sent to the research center includes the identification of the store and of the customers who presented electrouic coupons for redemption. The checkout slations send the redemplion data blocks, over telephone signal paths 714.

Checkout stations 903 are located within a single company. Checkout stations 903 are similar to checkout stations 900, described above, except that checkout slations 903 have circuitry for communicating over network 912. Checkout stations 903 send transaction data blocks to central tinancial computer 911 located within the company. Central financial computer 911 periodically sends the compiled transaction data to clearing house 990 , over telephone signal paths 714 .
Thus, the preferred systems provides a convenient and stimulating shopping environment. The systems allow the user to receive electronic coupons at bome and then bring the received coupons to a relail store.
Other applications of electronic coupons are the subject of copending application of KEN R. POWELL for RETAIL SYSTEM, Scr. No. 08/468,816, filcd on Jun. 6, 1995, Ihe contents of which is herein incorporated by reference; and of application of KEN R. POWELL for DEVICE AND METHIOD OF PROGRAMMING A RETALL SYSTEM, Ser. No. 08/468,820, filed on Jun. 6, 1995, now U.S. Pat. No. 5,727,153 issued Mar. 10, 1998 for RETAJL STORE HAVING A SYSTEM OF RECEIVING ELECTRONIC COUPON INFORMATION FROM A PORTABLE CARD AND SENDING THE RECEIVED COUPON INFORMATION TO OTHER PORTABLE CARDS, the contents of which is hercin incorporated by reference.

Additional advantages and modifications will readily occur to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or the scope of Applicants' geoeral inventive concept. The invention is defined in the following claims.

What is claimed is:

1. $\Lambda$ systern comprising:
a plurality of portable cards;
a first computer network including a first plurality of computers, each having a respective first network address, the plurality of first computers including a first computer having means for sending a first signal including a first network address, an inter-network address corresponding to a computer on another network, and a sigual corresponding to a product;
a second computer network including a second plurality of computers, each having a respective second network address;
means, responsive to the inter-network address from the first signal, for sending a second signal including a second network address and the signal corresponding to the produet; and
means, responsive to the signal corresponding to the product from the second signal, for sending a card signal, to a portable card in the plurality of cards; and
means, spatially removed from the previous means, for reading the card signal from the portable card.
2. In a system including a computer network, a plurality of customers, and a computer that sends a coupon signal in a first signal on the computer network, the first signal including a respective destination signal corresponding to a customer in the plurality of customers, a coupon processing system comprising:
a receiver that receives the coupon signal sent in the first signal;
a determiner that determines whether a coupon, corresponding to the coupon signal, has been previousty processed; and
a transmitter that conditionally transmits the coupon, if the coupon has not been previously processed.
3. The coupon processing system of claim 2 wherein the respective destination signal includes an inter-network address.
4. The coupon processing system of claim 2 whercin the respective destination signal includes an electronic mail address.
5. The coupon processing system of claim 2 wherein the transmitter includes
a card interface that transmits the coupon to a card in a plurality of portable cards.
6. The coupon processing system of claim 5 further including
a processor, spatially removed from the transmitter, that receives a transmitted coupon from the card.
7. The coupon processing system of claim 2 further including
a second receiver that reccives a purchase signal corresponding to a product; and
a determiner that determines whether a transmitted coupon corresponds to the purchase signal.
8. The coupon processing system of claim 7 further including
an electromagnetic detector for generating the purchase signal.
9. In a system including a computer network, and a plurality of customers, a method comprising the steps, performed for a customer in the plurality of customers, of:
sending a first signal on the computer network, the first signal including a respective destination signal corresponding to the customer, and a coupon signal;
receiving the coupon signal;
after the receiving step, determining whether a coupon, corresponding to the coupon signal, has been previously processed; and
conditionally processing the coupon, if the coupun has not been previously processed.
10. The method of claim 9 wherein the sending step includes sending the first signal wherein the respective destination signal includes an inter-network address.
11. The method of claim 9 wherein the scading stcp includes sending the first signal wherein the respective destioation signal includes an electronic mail address.
12. The method of claim 9 further including the sleps of
receiving a purchase signal corresponding to a product; and
determining whether a coupon. processed by the processing step, corresponds to the purchase signal.
13. The method of claim 9 further including the steps of
generating a purchase signal with an electromagnetic os delector, the purchase signal corresponding to a product;

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receiving the purchase signal; and
determining whether a coupon, processed by the processing step, corresponds to the purchase signal.
14 The method of claim 9 wherein the scoding step 5 includes
sending an inter-network address, to cause a routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between two computers.
15. The method of claim 9 wherein the syslem further includes a plurality of porlable cards and the method further includes
sending the coupon to a card in the pluratity of portable cards;
subsequently, moving the card; and
receiving the coupon from the card.
16. The method of claim 15 wherein the system further includes a plurality of portable cards and the processing step includes
sending the coupon to a card in the plurality of portable cards.
17. The method of claim 15 wherein the system further includes a plurality of portable cards and the meihod further includes the steps, performed after the determining slep, of:
sending the coupon to a card in the pluratity of portable cards;
subsequently, moving the card; and
receiving the coupon from the card.
18. A coupon system for a system including a computer network, and a plurality of customers, the coupon system comprising:
means for sending a first signal on the computer network, the first signal including a respective destination signal corresponding to a customer in the plurality of customers, and a coupon signal;
means for receiving the conupon signal;
means for determining whether a coupon, corresponding to the received coupon signal, bas been previously processed; and
means for conditionally processing the coupon, if the coupon has not been previously processed.
19. The coupon system of claim 18 wherein the respective destination signal includes an inter-network address.
20. The coupon system of claim $\mathbf{1 8}$ wherein the respective destination signal includes an electronic mail address.
21. The coupon system of claim 18 wherein the system further includes a plurality of portable cards and the means for conditionally processing includes a card interface.
22. The coupon system of claim 18 further including
a receiver that receives a purchase signal corresponding to a product; and
a determiner that determines whether a coupon, processed by the processing means, corresponds to the purchase signal.
23. The coupon system of claim 18 wherein the destinaoo tion signal includes
sending an inter-network address, to cause a routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between two computers.
24 In a system including a communication system, a plurality of customers, and a computer that sends a coupon

(To be scanned in place of tab)
signal in a first signal in the communication system, a coupon system comprising:
a receiver that receives the coupon signal sent in the first signal;
a determiner that uses a record for previous coupons to determine whether a coupon, corresponding to the coupon signal, has beco previously processed; and
a transmitter that conditionally transmits the coupon, if the coupon has not been previously processed.
25. The coupon system of claim 24 wherein the first signal includes a destination signal corresponding to a customer in the pluality of customers.
26. The coupon system of claim 24 wherein the first signal includes an electronic mail address
27. The coupon system of claim 24 wherein the transmitler includes
a card interface that transmits the coupon to a card in a plurality of portable cards.
28. The coupon system of claim 27 further including a processor, spatially removed from the transmitter, that receives a Iransmitled coupon from the card.
29. The coupon system of claim 24 further including
a second receiver that receives a purehase signal corresponding to a product; and
a determiner that determines whether a transmitted coupon corresponds to the purcbase signal.
30. The coupon system of claim 29 further including
an electromagnetic detector for generating the purchase signal.
31. In a system including a communication system, and a plurality of customers, a method comprising the steps, performed for a customer in the plurality of customers, of:
sending a first signal in the communication system, the first signal including a coupon signal;
receiving the coupoo signal;
after the receiving slep, using a record for previous coupons to determine whether a coupon, corresponding to the coupon signal, has been previously processed; and
conditionally processing the coupon, if the coupon has not been previously processed.
32. The method of claim 31 wherein the sending step includes sending a destination sigual corresponding to a customer in the plurality of customers.

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33. The method of claim 31 wherein the sending slep includes sending an electronic mail address.
34. The method of claim 31 furiher including the sleps of
receiving a purchase signal corresponding to a product; and
delerwinuing whether a coupon, processed by the processing step, corresponds to the purchase signal.
35. The method of claim 31 furiter including the sleps of
generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;
receiving the purcbase signal; and
determiaing whether a coupon, processed by the processing step, corresponds to the purchase signal.
36. The method of claim $\mathbf{3 1}$ wherein the sending step includes
sending an inter-nelwork address, to cause a routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path belween two computers.
37. The method of claim 31 wherein the system further includes a plurality of portable cards and the method further includes
sending the coupon to a card in the plurality of portable cards;
subsequently, moving the card; and
receiving the coupon from the card.
38. The method of claim 37 wherein the system further includes a plurality of portable cards and the processing step includes
sending the coupon to a card in the plurality of portable cards.
39. The method of claim 37 wherein the system further includes a plurality of portable cards and the method further includes the steps, performed after the determining step, of: sending the coupon to a card in the plurality of portable cards;
subsequently, moving the card; and
receiving the coupon from the card.

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[54] SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS
lnventor: Ken K. Powell, Athens, Ga.
Assignee: Softcard Systems, Inc., Watkinsville, Ga .
[ " $]$ Notice: This patent is subject to a lerminal disclaimer.
[21] Appl. No: 09/245,419
[22] Filed
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## Related U.S. Application Data

[63] Continuation of application No. 09/100,8t8, Jun. 22, 1998, which is a continuation of application No. 08/603,482, Feb. 20, 1996, Pat. No. 5,8(4,044.
[51] Int. CI. ${ }^{7}$ $\qquad$ G06F 17/60
$\qquad$
709/238
Field of Search
370/351, 389, $370 / 392,466 ; 395 / 200.6,200.68 ; 705 / 14 ;$ $709 / 230,238$
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## ABSTRACT

A system for dispensing and redeeming the electronic discount coupons. The system includes a personal computer (PC) having hardware and software for receiving an elecIronic coupon from the system of computer networks, translating the received coupon into a binary format, and sending the binary-formatled coupon to a card-writing device. The card-writing device writes the coupon data onto a portable customer card ("smart card") approximately the size of a credit card. Subsequently, the customer goes to the store with the card. Upon completion of shopping, the customer redeems the electronic coupons at the checkout area, by inserting the card into the checkout station. During checkout, the customer is credited with the value of a coupon when UPC data from a bar code reader corresponds to a coupon stored on the card.

51 Claims, 21 Drawing Sheets


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Fig. 1A

T0 Fig. 1B

Fig. 1B



Fig. 3A


Fig. 3B


Fig. 3C


Fig. 4

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415

Fig. 6

Fig. 7A



Fig. 8A


Fig. 8C


Fig. 9


190
Fig. 10A


190
Fig. 10B


2420
Fig. 10C


Fig. 11


Fig. 12


Fig. 13
U.S. Patent


FIG. 14
30: 7170312350
I
200
7170312780
I
50
30: 7170312350
I
200
7170312780
I
50
7170312682
I
150
2435
Fig. 15A
Fig. 15B


FIG. 16


FIG. 17



## 2

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\text { FIG. } 19
$$

## 1

## SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROCGHS SYSTEM OF COMPUTER NETWORKS

This Application is a Continuation of copending application Ser. No. $09 / 100,868$ of KEN R. POWELL filed lun 22, 1998 for SYSTEM AND METHODS, the contents of LING DISTRIBUTION OF whish is hercty ionding application Ser. No. (68!603,482 Continuation of copending apple 30,1996 for SYSTEM AND of KEN R. POWELL filed Yeb. 20, 1998 COUPONS TIIROUGH METIIOD FOR DISTRIDUTING COURKS, now US. PaI. ASYSTEM OF COMPUTER NETW are hereby incorporated No. $5.816,044$
by reference

## BACKGROUND OF THE INVENTION

1. Field of the lavention

This invention relates generally in a retail system and, wore particularly, to a system and method for distributing discouns coupons through a system of computer networks.
2. Deseriptios of Related Art

Discount coupons are a popular means to stimulate sales of products such as grocery store items. In 1992, approximately 310 billion coupons were distributed and 7.7 billion coupons were redeemed, saving customers $\$ 4$ billion. It has been estimated that in-store couponing coupled with advertising increases sales by $544 \%$. A typical marketing scheme invin in the newspaper or by insering coupon insers into the newspaper, and allowing customers to briag the printed coupons to a store for redemption. One problem with this scheme is that the redemption rate is typically only a few percent of the coupons printed, the unredeemed coupons representing an overhead associated with this scheme. To alleviate this overbead, another toarketing scheme involves distributing the coupons in the store, thereby avoiding the cost of printing coupons in a ncwspaper, and capitalizing on the fact that $66 \%$ of huyer decisions are made at the ime of product purchase. Both the in-store scheno fraud by an unscrupuscheme, however, are suscepimbursemed paymeds by prelous retailer that requess mons is the clearing house. Oiber senting unredeemed coupons ko mons to customers inrough scbenses include delivering soup or on the product package, the mail, distributing coupons in or on All of the schemes and distrituting coupons at cost of handling the coupons and of have an overtead con coupons to a clearing house to enable sending the sedeemed couponarse relailers for the reducproduct manufacturers to reimburse enon redemptions.
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SUMMARY OF THE INVENTION
According to an aspect of the present inveation, there is 5 a retail system in a system including a plurality of portable cards, a plurality of tomes, a slote and a routing system for receiving a signal and generatiog ae the received signal. response to at incr-network address in of wide area comthe rouling system including a plurality of wide area commurication links. The retail systen comprisefirst conpuler puter; and a second compuler, first signals to the routing includes circuitry for senngling a signal corresponding to system, each firsi signal inclurk address corresponding to the a product, and an inter-nctwork adress system to generate a second computer, to cause the routiog syse the plurality of
plurality of network addresses, each of the the routing systern- including a plurality of wide area communication links. The method comprises sending, from a first conuputer, a tirst signat to the routing sy a product, and an signal including a signal correnponing a a prond compuler, inter-delwork address corresponding to a searality of roution 10 cause the routing system ing to a respective partion of a signal path hetween the first ing in a respective partion of a signal path hetween the first

3
and second computers; receiving first signals, and the step, performed in one of the bomes, of sending, responsive to a first signal received in the previous step, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, and the step of subsequently, moving the portable card to the store, and the step, performed in the store, of receiving the card signal from the portable card.

According to yet another aspect of the present invention, there is a retail system in a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises means for sending, from a lirss computer, a first signal to the routiog system, each first signal including a signal corresponding to a product, and an inter-nctwork address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective compuler in a respective computer network; means for receiving first signals; means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and means for receiving the card signal from the portable card in the store.

According to yet another aspect of the present invention, there is a relail system in a system including a slore, a plurality of portable cards, a plurality of bomes, and a routing system for receiving a signal and generatiog network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links. The retail system comprises means for sending, from a first computer, a first signal to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to gencrate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second compulers; means for receiving first signals; means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and means for receiving the card signal from the porable card in the store.

According to yel another aspect of the present invention, there is a retail system in a system including a first computer, a second conputer, a plurality of portable cards, a plurality of homes, a store with a first receiver that receives signals from the plurality of porable cards, and a routing system for receiving a signal and generatiog network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide areal communication links. The retail system comprises circuitry, in the first computer, that sends first signals to the routing system, cach first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals; and a plurality of home computers, each located in one of the plurality of homes, responsive to a first signal received by the second
computer, for sendiag a card signal to a portable card in the plurality of cards, the card signal corresponding to the product.

According to yet another aspect of the present invention, there is a method in a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the rouling system including a plurality of wide area communication links. The method comprises sending first signals from a first computer to the routing system, cach first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signats. The method further compriscs the step, performed in one of the homes, of sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product. The method further comprises the step of subsequently, moving the portable card to the store, and the step, performed in the store, of receiving the card sigoal from the portable card.

According to yet another aspect of the present invention, there is a retail system in a system including a first computer. a second computer, a plurality of porlable cards, a plurality of hones, a store with a first receiver that receives signals from the plurality of portable cards, and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received sigoal, the routing system including a plurality of wide area communication links. The retail system comprises circuitry, in the first computer, that seads first signals to the routing system, cach lirst signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corrcsponding to a respective portion of a signal path between the first and second computers, thereby enabling the second conputer to receive first signals; and a plurality of home computers, each located in one of the plurality of homes, responsive to a first signal received by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product.

According to yet another aspect of the present iovention. there is a method in a system including a store, a plurality of porlable cards, a plurality of homes, and a rouling system for receiving a signal and generating network addresses in response to an inter-nctwork address in the received signal, the routing system including a plurality of wide area communication links. The method comprises sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding is a second computer, to cause the routing system to generate a plurality of network addresscs, each of the plurality of network addresses corresponding to a respective computer in a respective onmpuler network, thereby enabling the second computer to receive tirst signals. The method further comprises the slep, performed in one of the homes, of sending, responsive to a first signal received by the second compuler, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product. The method further comprises the step of subsequently, moving the portable card to the

According 10 yet another aspect of the present invention, Ace ts a retail system in a system including a plurany

## 5

store, and the step, performale card.
card signal from the porable card. of the present invention. According to yct anown a system including a firss compuler; there is a reminsyster, a plurality of portable cards, a pluramy a second a sture with a firse receiver that revting system for from the plurality of porrable cards, and a routing signal in receiving a signal and generkless in the received signal, response to an inter-network a plaralily of wide asta comthe routing systern The relail system comprises circuiry, in munication lisks. The that sends first signals 10 the rouling the first complent sirst sigal includiog a signal corresponing to the system, and and inter-network address conesproder generate a second computer, to cause the routiog system to pluratiy of routing plurality of routing signals, caccurive portion of a signal path signals corresponding a cond compulers, theseby conabling between the first and second receive first signals; and a plurality the seend computer to rech located in one of the plurality of of bone computers, each loct signal received by the second homes, responsive
computer, for sending a card signal io a ponabpoding to the plurality of cards, the card signal corresporing product. Accerding to yet another aspect including a store, a plurality there is a method in a syality of homes and a muting system of portabic cards, a pral and geoerating a roung in the recived signal, response to an inter-network address pluratity of wide area com- 3 the rouing system including a plomprises sending first sigmunication links. The method the routiog system, each firsi nals from a first computer conesponding to a product, and an signal including a signal corresponding to a second computer, inter-nciwork address cortesponemerate a plurality of routiog 3 to cause the routing slurality of routing signals cortespond-
signals. each of the plur ing to a respective portion of a signal path herweecond comand second computers, thereby enabling further comprises puter to receive tirst signals. The momes, of sending, responthe step, performed in one of the hones, ond computer, a card sive to a first signal card in the plurality of carts, The canter
signal to a portable cold signal corresponding to the product. The me portable card comprises the step of subsequenty, moving store, uf receiving to the store, and the step, pertormed card.
the card signal from the portable card. According to yet another aspectiag a plusatity of portable there is a retail in a system receiver thal receives signals from cards, a stare with a first recelve a plurality of homes, and a the plurality of portable card, signal and gencrating network routing system for rectiving a inter-network address in the addresses in responsc io andiog system including a plurality of received signal, the mation links. The reail system compriscs wide area commubiciation hignals from a first computer to the means for sending first first signal including a signal correrouting syslem, each first siggal internetwork addecss corfesponding 10 a precur compurer, to cause the routing system sponding to a secendity of network addecsscs, ace respective to generate a pwork addresses corresponding nerk, thereby plurahty of in a respective computer network, als; and enabling the second computer to receive signal received by means for sending, responsive in a to a purtable card in tbe the second computer, a card signalsal corresponding to the is plurality of cards, the card signats focated in noe of the proxiuct,
homes.
 FLGS. 7 A and 78 are a scbematic diagr in the preferced system. 8 C are enlarged views of some FIGS. 8A, 8B, and 8S 7A and 7B. products shown in figs. 7 A and 7 b. preferred sysiem.
FIG. 10 A is a plan view of one of the custurner cards in the preferred systert.

FIG. 10 B is a side view , partial view of the card shown
in FIG. 10A.
FIG. 11 is a block diagrami of the personal computer FIG. 12 is a block diagram of 4 , station shown shown in FIG. 4. diagram of the check-out station shown FIG. 13 is a block diagram of the processing shown ia FiG. 78 .

FiG. 14 is a flow chan memory contents of a customer card at difterent poins ine processing
FIG. 16 is a how chan 9. shown in FBG. 9. Fici. 17 is a dow char of step 9035 of FIG. 9.

FTG. 18 is a block diagram of a system including a clearing house and multiple check-out stalions.
FIG. 19 is a flow charr of a possible processing in the preferred system.

The accompanying drawings which are incorporated in and which constitute a part of this specification, illustrate embodiments of the invention and, together with the description, explain the principles of the invention, and additional advantages thereof. Throughoul the drawings, corresponding parls are labeled with corresponding reference numbers.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

FlGS. LA and $1 B$ show a system of computer networks for distributing coupons in accordance with a first preferred embodiment of the present inveation. Computer networks $105,111,115,130,135,138,125,279,142,148,144,146$, 281, and 151 are interconnected. Each computer network includes a plurality of compulers. Each of homes 152,154, $156,158,160,162,164,166,168,171,172,174,176,178$, 181, 182, 310, and 320 is coupled to one of the computers networks via a respective telephone signal path 177.

The system includes portable customer cards 215, 225, $235,245,255,275,285,190,315,325,335,345,355,365$, $367,369,375$, and 385 . Each cuslomer card is a portable customer card, approximately the size of a credit card. Each card contains a random access memory for storing electronic coupons.

A computer 230 within network 115 stures electronic coupons and distributes the stored coupons to the homes. As represented schematically in FIGS. 1A and 1B, a customer carries ber respective card from her home to a slure. A computer in each home receives a coupon from computer 230, via one or more of the computer networks, and slores the received coupon onto nne of the cards. For example, a computer in home 160 receives a coupon signal from computer 230 via networks 115, 130, and 135 and stores the received coupon onto card 190.
FIG. 2 shows a section of the preferred system, emphasizing a path between computer $\mathbf{2 3 0}$ and bome 160. Network 115 is a local area network (LAN), nelwork 130 is a wide area network (WAN), network 135 is an LAN, and network 279 in a LAN.

Network 115 includes a plurality of first computers, computers 234, 238, 230, 236, and 232. Each of thesc first computers has a respective network address uniquely identifying the computer on network 115. The first computers can communicate with each other by sending data packets in a cerlain formal. Each network-115-packet has a field containing the destination address of the packet. Each network115 -packet is in a format conforming to the communication protocol of network 115, meaning, for example, that the packet has a destination address field offset a cerlain number of bits from the start of the packet, and that the destination address field has a certain number of bits. Compuler 230 includes circuitry (hardware and software) for sending a data packet itrough transmission cable 117. The circuitry includes soflware for constructing a packet, having the packet format of network 115, containing a discount coupon identifying a product.
Nelwork 130 includes a second plurality of computers. computers $254,250,252,258,256,262,260$, and 272. Computer 230 sends this product-identification signal to bome 160 via computer 238, as described in more detail helow. Each of these second computers has a respective
second network address uniquely identifying the computer on network 130. The second computers communicate with each other by sending a packet in the formal for network 130.

The data packet from computer $\mathbf{2 3 0}$ includes a destination address field allowing computer 238 to recognize that the data packet is to be received by computer 238. Computer 238 bas an address on buth LAN 115 and WAN 130, meaning that computer 238 bas circuitry for recognizing an its own address in a network-115-formalted packel sent over network 115, and has circuitry for recognizing an its own address in a network-130-formatted packet sent over network 130. Thus, computer 238 acts to roule packets between networks 115 and 130 . Io ohher words, computer 238 includes circuitry, responsive to an address on network 115, for receiving a packel in the format of network 115, cunlaining an electronic coupon identifying a certain product, and for sending a second packet in the format of network 130, the second packet containing a signal identifying the cerlain product. When compuler 238 receives a packel destined for computer 276, computer 238 constructs a packet addressed to computer 272, usiag the protocol for network 130.
Computer 272 has an address on both WAN 130 and LAN 135 and, therefore, computer 272 acts to route packets between networks 130 and 135. When computer 272 receives the packet, computer 272 constructs a packet addressed in computer 276, using the protocol of network 135.

More specifically, computer 230 constructs an "IP" packet addressed to computer 276, using the Internet Protocol (IP). Computcr 230 then imbeds this $1 P$ packet within a network115 -formatted packet addressed to computer 238, using the protocol of network 115. When computer 238 receives the packet, computer 238 reads the IP address, determines that the IP packet should be sent over network 130, and imbeds the IP packet within an network-130-formatled packet addressed to computer 272, using the protocol of network 130.

When computer 272 receives the packel, computer 272 reads the IP address, delermines that the IP address corresponds to computer 276, and imbeds the IP packet in a packet addressed to computer 276, using the protocol of network 135

FIG. 3A shows data packet $\mathbf{3 0 0 2}$ in the format of network 115, sent by computer 230 through cable 117. Header field 3010 includes a 20 bit destination address field 3011 identifying computer 238 on network 115. Destination address field $\mathbf{3 0 1 1}$ is 16 -bits removed from the beginning of the data package 3012. Header 3010 contains other fields, including a 20 -bit field conlaining the address of the sender of packet $\mathbf{3 0 0 2}$, and a field containing data correction bits. Field $\mathbf{3 0 2 0}$ includes an Internet Protocol (IP) address field $\mathbf{3 0 2 1}$ identifying computer 276. Field $\mathbf{3 0 3 0}$ includes electrunic coupon information in ASCII (American Standard Code for Information Interchange) lext form.
Computer 238, which resides on both LAN 115 and WAN 130, includes circuitry to Iranslate packel 3002 received from compuler 230, into packet 3004 shown in FIG. 3B. Packet 3004 includes header field 3012 . Header 3012 includes a 16 bit destination address field 3013 identifying computer 272 on WAN 130 . Address field 3013 is 32-bits removed from the start of packet 3004. Header 3012 bas other fields, including a field identifying the sender of packet 3004, and a field containing data correction bits.
Computer 238 determines that the packet should be sent in computer 272 on network 130 hy reading a routing table.

The routing table has an entry for network 135. The entry for atwork 135 identities network 130 and computer 272 as the path to be used when computer 238 is sending a packel to a computer on network 135. Thus, computer 238 constructs packet $\mathbf{3 0 0 4}$ in response to IP address field $\mathbf{3 0 2 1}$ in packet 3002.

As shown in FIG. 2, computer 238 sends a packel to compuler 272 , via computers $250,254,258$, and 260.
In other words, each packet is essentially a type of signal having a network address of a certain length and baving a certain number of digits. A signal on one network may include a firsi network address O 1 digits removed from the start of the signal. A signal another nelwork may include a second nelwork address is O 2 digits removed from the slart of the signal, wherein O 1 is nut equal to $\mathrm{O}_{2}$, and the first network address includes N 1 digits and the second network includes N 2 digits, where in N 1 is not equal to N 2 .

Computer 272, which resides on both WAN 130 and LAN 135, includes circuitry to translate packet 3004 received from computer 238, into packel 3006 shown in FIG. 3C. Packel 3006 includes header field 3014 Header 3014 includes an address field $\mathbf{3 0 1 5}$ identifying compuler 276 on LAN 135. Header 3014 includes a 16 bit destination address field $\mathbf{3 0 1 5}$ idenlifying compuler 276 on I AN 135. Address field 3015 is 24 -bits removed from the slart of packet 3006. Header 3014 has otber fields, including a field identifying the sender of packet 3006, and a field containing data correction bils.
Thus, the preferred system may be conceptualized as computers sending packets containing electronic coupons. The preferred system may also be conceptualized as programs, running on the computers, that send electronic mail (Email) messages to each other. Each Email message includes one or more of the packets described above. The programs include a coupon server (oot shown), runaing on computer 230, for constructing the Email message and sending the Email message to a customer, and Mail Transfer Agents and a User Agent (not shown) that route the Email messages between each other and ultimately store an Email message into an electronic mail box for the recipient of the message. An electronic mailbox is a memory area readable by the owner of the mail box. For example, FIG. 2 shows mail box $\mathbf{2 7 7}$ readable by personal computer $\mathbf{4 0 0}$ in home 160.

FIG. 4 shows a personal computer 400 within home 160 . Compuler 400 includes a modem 410, a CRT display 420 , a keyboard 425, a mouse 423, and a coupon-wriling device 415. To receive an electronic coupon, the user establishes a telephone connection between computer 400 and computer 276 through modem 410. Subsequently, the user logs onto computer 276 and invokes a program to read Email stored in mailbox 277.

HIG. 5 shows CRT display 420 after the mail-reading program reads a coupon message from mailbox 277. As shown in FIG. 5, coupon data $\mathbf{3 0 3 0}$ includes the ASCII text of an electronic mail (Email) message. Message field 5010 identifies the sender and receiver of the message, "couponhouse@usretail.com" being the Email address of the coupon server on node 230 and "bsmith@aol.com" being the Email address of the customer residing in home 160. Message field 5015 is user readable text identifying the coupon. Message field $\mathbf{5 0 2 0}$ is electronic coupon information encoded in text formal. The user sends coupon data 3030 to device $\mathbf{4 1 5}$ by issuing a print command and specifying device "SCW:", which is a name designating cardwriting device 415. Adriver program for device 415 receives
the text data and ranslates the data into a certain binary format, described below, and sends the binary data to device 415. Device 415 couples to a customer card 190 and sends data to card 190.

FIG. 6 shows a side view of card-writing device 415, including interface slot $\mathbf{4 1 7 0}$. Interface slot $\mathbf{4 1 7 0}$ has a width sufficient to accommodate the width of one of the customer cards 190. When a card 190 is in interface slot 4170 , conductive contact 4177 inside interface slot $\mathbf{4 1 7 0}$ touches contact 2427 (described below) on the customer card. Interface slot $\mathbf{4 1 7 0}$ has other contacts (not showa) for touching the other card contacts 2420 (described below).
FIGS. 7A and 7B show grocery store 1000. FIGS. 7A and FIG. 7B are each a parlial view of store 1000 . Customers $210,220,231,240,250,270,280$, and 290 , shop in the store. Before shopping in the store, each of these customers obtained a customer carl. For example, customer 231 oblained customer card $\mathbf{2 3 5}$ from a bank, by completing an application for the bank. The application contained questions to collect demographic data, including birth date, income level, past buying patterns, geographic location, size of family, level of education, and job-related data. The bank subsequently wrote customer identification data for customer $\mathbf{2 3 1}$ onto customer card 235, and issued customer card 235 to customer 231, and sent the customer's demographic data to a clearinghouse which then stored the demographic data on disk. Each of customers 210, 220, 240, 250, 270, 280, and 290 obtains a respective customer card in a similar manner. In other words, for each customer the preferred method writes demographic data for the cusiomer onto a disk in the market research center, and writes personal identification data for the customer onto a respective card for the customer.
After redemption data, including customer identification data from a plurality of cards, is compiled and sent to a market research center, as described below, the customer idenification data is used to access the corresponding demographic data, thereby providing the manufacturer with valuable marketing data on coupon program effectiveness and eustomer demographics.
Store $\mathbf{1 0 0 0}$ includes shelves $\mathbf{1 0}, \mathbf{2 0}$, and $\mathbf{3 0}$, de fining aisles belween the shelves. The supermarket has a plurality of product areas, each corresponding to a respective product. Product Area 110 bas Acme brand ammonia. Product Area 120 bas Old World brand pasta. Product Area 271 bas Lighthouse brand light bulbs.
More specifically, Product Area $1 \mathbf{1 0}$ has bottles of ammonia 112 grouped together on multiple sheives. Bottles of ammonia 112 are contiguously grouped, meaning that no other product is between any two bottes of ammonia 112.

FIG. 8A shows an enlarged view of some of the botlles of ammonia 112. Each bottle of ammonia has a common Universal Product Code (UPC) label 114, which is a group of parallel lines that encodes a number that uniquely identifies acme ammonia. In other words, label 114 is different than labels of units of other products. Each bottle of ammonia 112 also has a common character label 113. Character labcl 113 is "ACME AMMONIA." Label 113 is different than labels of units of other products.
Product Area $\mathbf{1 2 0}$ bas boxes of pasta 122 grouped together on multiple shelves. Boxes of pasta 122 are contiguously grouped, meaning that no other product is between any two boxes of pasta 122.
FIG. 8B shows an enlarged view of some of the boxes of pasta 122. Each box of pasia 122 has a common Universal Product Code (UPC) label 124, which is a group of parallel

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lines that encodes a number that muiquely identifies Old World pasta. In uther words, label 124 is difierent than labels of units of other products. Each box of pasta 122 also has a common character label 123. Character label 123 is "OLD WORLD PASTA." Label 123 is different than labels of units of olter products.
Product Area 271 has hoxes of light hulbs 132 grouped together on multiple shelves. Buxes of light bulbs 132 are contiguously grouped, meaning that no other product is between two boxes of light bulbs 132 .

F1G. 8C shows an enlarged view of some of the boxes of light bulbs 132. Eact box of light bulbs 132 bas a common Universal Producl Code (UPC) label 134, which is a group of parallel lines that encodes a number that uniquely identifies Ligbthouse light bulbs. In other words, label 134 is different than labels of other products. Eact box 132 also has a common characler label 133. Character label 133 is "LIGHTHOUSE LIGHT BULBS." Label 133 is different than labels of other products.

Similarly, other product area in the store each have a set of respective producls contiguously grouped logether and a corresponding product station adjacest to the products. The respective units of a cerlain product have a common label, different than labels on units of other products, that uniquely idenifies the certain product. Product arca 140 has botlles of ketchup 142 contiguously grouped Ingether. Product anca 284 has loaves of bread 162 contiguously grouped tegether. Product area 170 bas cartons of milk 172 contiguously grouped together. Product area 180 has packages of bacon 182. Product area ol 191 has packages of buther 192 contiguously grouped together.

Product area $\mathbf{1 5 0}$ has boxes of cereal $\mathbf{1 5 2}$ contiguously grouped together.

FIG. 9 shows a processing performed in the preferred system. Computer 230 sends an electrunic coupon, in the form of an E-mail message, through computer networks 115, 130, and 135. (Step 9003). A customer, such as customer 290, receives the electronic coupun, through modem 410, onto ber home compuler (slep 9005), and writes the coupon onto ber customer card 190 using writing device 415 (stcp 9010 ). The customer then brings her respective customer card to a store 1000. (step 9020).

At store 1000, the customer removes products from shelves 10, 20, and $\mathbf{3 0}$ and brings the products to checkout station 900 (step 9025). In olber words, while shopping in storc 1000, each of customers $\mathbf{2 1 0}, \mathbf{2 2 0}, \mathbf{2 3 1}, \mathbf{2 4 0}, \mathbf{2 5 0}, 270$, 280, and 290 carries his or her respective cusiomer card. Customer 290 carries card 190, customer 220 carries card 225. customer 231 carrics card 235 , customer 240 carries card 245 , customer 250 carries card 255, customer 270 carries card 275 , cuslomer 280 carries card 285 , and customer $\mathbf{2 9 0}$ carries card $\mathbf{1 9 0}$. Each customer tows a sbopping cart to hold selected products. Customer 210 tows cart 212, customer 220 tows cart 222, customer 231 inw cart 232, customer 240 lows cart 242, customer 250 tows car 252, customer 270 tows cart 291, customer 280 tows cart 282, and customer 290 tows cart 292. The customer then removes a product from the shelf and places the removed product into her cart. The customer thus shops throughout the store.
Checkout station 900 then scans the procucts and determines a price for each product depending on whether the customer card contains coupons for the scanned product (step 9035). Mure specifically, the customer rederms the electronic coupons at the checkout area, by inserting her customer card into checkout station 915. For example, a customer such as customer 240 in FIG. 7B completes the
purchase of her selected products 243 by transferring products 243 from ber cart 242 to counter 900, and by inserting card 245 into checkoul station 915. Subsequently, a checkout clerk (oot shown) scans each sclected product past UPC bar code reader 910. Bar code reader 910 is an optical detector. In other words, bar code reader 910 detects an electromagnetic signal. A processor coupled to station 915 and reader 910 determines whether the most recently scamed product is on a discount list stored in card 245. If the most recently scanned product is identified in this discounl list, a price for the product is determined using the discount data corresponding to the produet, and the resulting price is displayed on display 917. Cbeckout counter 900 scans and processes each product 243 in a similar manncr.
Similarly customer $\mathbf{2 8 0}$ in FIG. 7B follows the procedure of FIG. 9 by transferring products 283 from her cart 282 to counter $\mathbf{9 0 0}$, and by inserting card $\mathbf{2 8 5}$ into checkout station 915; and the checkout clerk (act shown) scans each selected product 283 past UPC bar code reader 910 . Customer 270 follows the procedure of FTG. 9 by Iransferring products 273 fron her cant 291 to counter 900, and by inserting card 275 into checkout station 915; and the checkout clerk (bot shown) scans each selected product $\mathbf{2 7 3}$ pasi UPC bar code reader 910.
Because of the large number of electronic coupons that may be available to a customer, a costomer such as customer 310 may wish to insert the ir card into display station 710, to review what coupons are currently stored on the card. Station 710 may also present the viewer with additional information about the products identified by the coupons on the card. Station 710 is described in detail in application of KEN R. POWELL for SYSTEM AND METHOD FOR DISPLAYING PRODUCT INFORMATION IN A RETALL SYSTEM, Ser. No. 08/603,48.3 filed on Feb. 20, 1996, now U.S. Pat. No. $5,890,135$ issued Mar. 30, 1999 the contents of which is berein incorporated by reference.
Step 9005 includes a step of reading an electronic mail (Enail) message. An Email message from omputer 239, for the user of $\mathrm{PC} \mathbf{4 0 0}$ in home $\mathbf{1 6 0}$, resides in an electronic mailbox 277 , which is a memery area on computer 276. The user of PC $\mathbf{4 0 0}$ dials into computer $\mathbf{2 7 6}$ using a telephone line, submits appropriate user identification including a password, and then invokes a program that reads the Emai! message from the memory of computer 276 inlo the memory of PC 400.
The user then executes the driver for device 415 , by printing the Email message to device "SC'W:". The driver translates the textual coupon shown in FIG. 5 into a binary format, described below. Thus, the driver program and device $\mathbf{4 1 5}$ are essentially responsive to the coupon data slored in packet 3004, which was constructed by routing computer 238.

To prevent an unscrupulous user from repeatedly writing a single Email coupon onto a customer card, which would be contrary to the intent of the coupon issuer, the driver maintains a lisl of Email coupons already processed, including the time and date of the Email as shown in field 5010 of FIG. 5. Before writing an electronic coupon to a customer card, the driver compares the correspooding Email message to the list to verify that an identical coupon has not been processed.

Further, to prevent a user from changing the date and time field of a previously-printed Email message and reprinting the modified message to thwart this protection mectanism, each Email message from the coupon server on node 230 contains the encoded date and time in field $\mathbf{5 0 2 0}$. Thus, the
driver both verifies that an Email message with the date and time has not been previously processed, and verifies that the unencoded date and time in area 5010 matches the encoded date and time in ficld 5020.

There are two preferred methods for gelling the Email address for PC $\mathbf{4 0 0}$ to the coupon server on oode 230 , to allow the server to send a coupon to PC 400. The first preferred method is to program the coupon server using data collected from sources off of the Internet. The second preferred rethod is to allow the user of PC $\mathbf{4 0 0}$ to send ber Email address, through the computer nerworks, to node 230.

To implement this second method, it is presently preferred that the Email address for the user of PC $\mathbf{4 0 0}$ be sent by a web browser for the World Wide Web (WWW). With one scheme, a user sends an Email message requesting a coupon for a specific product, by invoking the browser to select Hypertext in a document advertising the product. Selection of the Hypertext invokes a "Form" in the document, causing the browser to prompt the user for her Email address, accept the Email address as keyboard input from the user, and construct an Email message addressed to the server on oode 230. The message contains the Email address given by the user and dala identifying the product corresponding to the selected hypertext. Upon receiving the message, the coupon server sends an Email message to the user's address.

An alternate scheme is to have the user of PC $\mathbf{4 0 0}$ join a club, by invoking the browser to select Hypertext in a document adverlising the club. The club is essentially a mailing list for certain types of coupons. Selection of the byperiext iovokes a Form in the document, causing the browser to prompt the user for her Email address, accept the Email address as keyboard input from the user, and construct an Email message addressed to the server on node 230. The message contains the Email address given by the user and data identifying the club corresponding to the selected bypertext. Upon receiving the message, the coupon server adds the Email address to the list for the club identified in the message. Subsequently, some event causes the coupon server to send a coupon to each address in the list. (FIG. 19)

One such event would be receipt, hy the coupon server, of an Email message from a coupon issuer. (FIG. 19 Step 1) The coupon issuer may be a distributor of the product corresponding to the coupon. The coupon server, in this case, acts as "mail exploder," and essentially echoes the single Email message from the coupon issuer to each member of the list. (FIG. 19 step 2)

FIG. 10A shows a plan view of customer card 190, and FIG. 10B shows a side view of card 190. Card 190 is 8.5 cm by 5.4 cm , the length and width of a typical financial credit card. Card $\mathbf{1 9 0}$ is slightly thicker than a typical financial credit card. Card 190 includes a magnetic stripe 2410 , interface conlacts $\mathbf{2 4 2 0}$ for communication with the product stations and the checkout station, and embossed area 2430 for displaying the card owner's name. Magoetic stripe 2410 allows a conventional credit card stripe reader to read basic data from the card. Magnetic stripe $\mathbf{2 4 1 0}$ is not necessary to the operation of the preferred embodiment of the invention, described in more detail below.

FIG. 10C shows interface contacts 2420 in more detail. Interface contacts $\mathbf{2 4 2 0}$ are configured in accordance with ISO7816-2: 1988(E), Identification cards--Inlegrated circuit (s) cards with contact-Part 2: Dimensions and locations of the contacts, promulgated by the Interational Organization for Standardization (ISO), and available from the American National Standards Iostitute (ANSI), 11 West 42nd Street, New York, N.Y. 10036. According to ISO

7816-2, contact 2421 is assigned to VCC (supply voltage), cootact 2422 is assigned to RST (resel signal), contact 2423 is assigued to CLK (clock signal), contact 2424 is reserved for future usc, contact 2425 is assigned to GND (ground), contact 2426 is assigned to VPP (program and voltage), contact 2427 is assigned to I/O (data input/output), and contact 2428 is reserved for future use. Card 190 communicates with the product stations and the checkout stations through contact 2427 using a half duplex scheme, meaniug that contact 2427 is for communicating data signals either to or from the card.
FIG. 11 is a block diagram of customer card 190 , including central processing unil $\mathbf{2 4 5 0}$, memory $\mathbf{2 4 6 0}$, and battery 2470 for supplying power to interface 2425 , processor 2450 , and memory 2460 . Mernory 2460 is a random access, addressable device. Station interface $\mathbf{2 4 2 5}$ includes a serial to parallel converter for transferring data signals between contacl 2427 and CPU 2450 over parallel bus 2452. Memory 2460 stores a program 2465 execuled by processor 2450 , customer identification data 2467, and authorization data 2468. Customer identification data 2467 includes a sequence of digits that uniquely identifies the holder of the card. Customer identification data 2467 includes the card holder's social security number. For example, idenlification data 2467 in customer card 235 uniquely identifies customer 231. Authorization data 2468 also includes date data indicating an expiration date for the card. Authorization data 2468 also contains a field identifying that the card is a customer card.
Memory 2460 also slores electronic coupons in coupon list 2435 . When a customer inserts a customer card into device $\mathbf{4 1 5}$, processor 2450 receives an identification code for the product from interface $\mathbf{4 1 5}$ and adds the code to the list 2435.
Each of customer cards 215, 225, 235, 245, 255, 275, 285 , $315,325,335,345,355,365,367,369,375$, and 385 has the same hardware structure as customer card 190.
FIG. 12 shows a block diagram PC 400, including central processing unit 435, memory 440, and AC-DC transformer 450. Memory 440 is a random access, addressable device. Memory 440 stores driver program 445 for sending coupons to card-writiog device 415. CPU 435 execules driver 445.

FIG. 13 is a block diagram of checkout counter 900 shown in FIG. 7B. Disk 925 provides long term storage. CPU 950 execules instructions in random access, addressable memory 920 . Checkout counter 900 also includes UPC reader 910 for reading bar codes on products, and checkout station 915 for communicating with a customer card. Since station 915 is in store 1000 and card-writing device $\mathbf{4 1 5}$ is in home 160, which is a separate building from slore 1000 , station 915 is spatially removed from card-writing device 415.

CPU 950 and program 922 act to detect a product scanned by UPC reader 910, determine a reference price for the product, search for the groduct's identification in the memory of a customer card, and deduct a discount from the reference price if the product is identified in the customer card memory. CPU 950 then displays the price of the product on display 917. In uther words, CPU 950 and program 922 act to receive a purchase signal identifying a product, to receive to receive a card signal, and to determine a price for the product depending on whether the product identified by the card sigual corresponds to the product identified by the purchase signal.
CPU 950 writes coupon redemption data onto disk 925. Periodically, CPU 950 sends the redemption data to an electronic clearing house through modem 930.

## 16

UPC code on boxes of Lighthouse Light Bulbs 134. The next UPC code on boxes of thermat of the discount quantity data.

## 15

FIG. 14 sbows the processing of slep 9010 of FIG. 9 in more detail. CPU 435 executes deviue driver program 445 in memory 440 to perform the processing sbown in FlG. 14. When a person prints lext to device "SC.W:, device driver program 445 receives the text and by comparions the text has ool been processied before, by comparing the lext received with a list of previous Email messages received Program 445 also compares the time and date in field 5010 of the text with the encoded tinse and date in field 5020 of the text, to verify that the text is an auher 230. If the Email from the coupon server on computer 23 . In pren processed message is an autbentic nuessage that has aot bee pritd 5020 berore, program 745 then (step 14005).
into binary couporily, program 445 sends a reset command to eard interface 415 , causing interface 415 to reset the card by card interface 415, causing a card contact 2423. (The card then appling the resel by sending an answer-to-reset data block, including identification data 2467 and authorization data 2468, through card contact 2427. Authorization data 2468 contains a card-type code indicating a customer card.) Program 445 then receives the answer-to-reset data block from card interface 415 (step 14010).
The communication protocol between interface 415 and a customer card is described in more detail in ISOnEC 7816-3: 1989 ( E ), Identification cards--imegrated circuit(s) cards with contacts-Part 3: Electronic signals and 1: 1992 mission protocols; and ISOIEC 7816.3: 1989/Amd.1: 1992 , (E), Part 3: Electronic signals and ransmission , synchronous AMENDMENT 1: Prowcol type lectiquel. Boin of thesc half duplex block transmiss the International Organization standards are promulgated by the distributed by the American for Standardization (ISO) and (ANSI).
National Standards lastitute (ANSI). swer-to-rese block to determinc whether the eard is a customer card that is eligible in reacive elecronic coupons from interface 415 (step 14020 ). CPU 435 deternines that the card is a customer card if be received authorization dala contains a card-lype code indicating a customer card. If the card is a customer card, meaning that the autherization data is authorization data 2468 , CPU 435 determines if the card is eligible to receive clectronic coupons if authorization data 2468 contains certain codes, and the date and time in Email field 5010 is not later than the dale data in authoriz $\mathbf{~ C P U}$ sends
2468. If the casd is an eligible customer a station-lype code, to the custoner card a block and he binary coupon data (slep indicating a PC interface, and the binary anden identification 14040). The binary coupon dam PC 400 (Old World Pasta code for the product received from 122) and the discount currenly customer card (step 14020), uct. If the card is not an eligible
there is an further processing.
there is 15 A shows some the contents list 2435, starting at
FIG. cation 30 menvery 2460 , of customer card 190 , before CPU 433 of PC 400 executes siep 14040. An electronic coupon is represented by three rows in list 2435: a 10 digit UPC producl code in the first row, discount formal data in the second row ("l" signifying cents, "2" signifying ihe second row (iscount quantity data in the third row. In FIG. 15SA, the customer card is storiag two clectronic nit coupoos. After CPU 435 execules step 14040 (thereby anding another electronic coupon to the customer card), CPU 2450 in customer card 190 receives the dala and adds the data to list $\mathbf{2 4 3 5}$, resulting in threc electronic coupons in list 2435 as shown in FIG. 15B. 15B, the memory field In list 2435 in FIGS. 15A and 15B, the memory fesponds in the having the product code 7170312350 corresponds in the products rearaining (step 16042), processing proceeds to step 16010. If there are no products remaining, processing proceeds to step 16044 for display of the total price.
Product data, custemer identification data 2467, authorization data 2468, and the data in list 2435 are each a type of
signal.
In oher words, the preterred retall sysicm, 181, and 191; a product areas $110,120,271,140,284,17,10$, menory, and a plurality of customer cards cach having ation 915 acting as checkout counter $\mathbf{9 0 0}$ having checkout statonaling system a communication device. A method of operalis symem

1000 comprises the sleps of writing a first signal into memory $\mathbf{2 4 6 0}$ of a card in the plurality of cards, in response to a person inserting the card into the interface slot of a PC: card interface, the first signal identifying a product, reading the first signal from memory 2460, in response to a person inserting the card into the interface slot of the checkout station; receiving another signal, from UPC reader 910, identifying a product; and determining a price for the product depending on whether the product identified by the first signal, read in the reading step, corresponds to the product identified by the other signal.
In summary, after UPC barcode reader 910 scans a product, processor $\mathbf{9 5 0}$ determincs eligibility for a discount. If a product qualifes, processor 950 displays the discounted price on display 917.
FIG. 17 shows aspects of the processing of steps 9010 and 9035 of FIG. 9. The processing of FIG. 17 processing is performed by one of the customer cards, such as customer card 190, in the preferred retail system. After the card is resel through contacts 2420 , the customer card sends an "answer to resel" data block in accordance with the ISO standard ISO/ICE 7816-3: 1989(E), cited above. The customer card sends identification data 2467 and authorization data 2468 in the answer-to-reset data block (slep 17010). If the slation then sends a block of data to the customer card, the customer card then receives the block of data tbrough contact 2427 (step 17015). If the block contains a station-type code indicating a PC card interface (step 17020), the customer card then adds product coupon information, from a certain location in the block, to the list 2345 (step 17030).
If the customer card is not eligible, the PC interface will not scnd a block of data, step 17015 therefore does not execute, and processing ceases unlil the customer card is reinserted into an interface slot, at which time the station will resel the card and processing will restart at step 17010.
Altematively, if the block contains a station-type code indicating a Checkout station (step 17070), the customer card then sends list 2345 to the display station (step 17080). In other words, CPU 2450 reads list 2435 from memory 2460, in response to a customer inserting card 190 into checkout station 915, and sends a signal corresponding to the list 2345 to the checkout station (step 17080). If the block does not contain a station-type code indicatiog a Checkout station, there is no additional processing.

FIG. 18 shows a block diagram of a preferred retail system including a clearinghouse 990, and a plurality of checkout stations 900 . Periodically, checkout counter 900 sends redemption data to an electronic clearing house. The rcdemption data sent to the clearing house includes the identification of the siore, identification of the coupons redeemed and of respective quanlities of coupon redemptions. Periodically, checkout counter $\mathbf{9 0 0}$ sends redemption data in a market research center. The redemption data sent to the research center includes the identification of the slore and of the customers who presented electronic coupons for redemption. The checkout stations send the redemption data blocks, over lelephone signal paths 714.

Checkout stations 903 are located within a single company. Checkout stations 903 are similar to checkuul stations 900 , described above, except that checkout stations 903 bave circuilry for communicating over network 912 . Checkout stations $\mathbf{9 0 3}$ send transaction data blocks to central financia! computer 911 located within the company. Central financial computer 911 periodically sends the compiled transaction data to clearing house 990, over tetephone signal paths 714.

Thus, the preferred systerns provides a convenient and stimulating shopping environment. The systems allow the
user to receive electronic coupons at home and then bring the received coupons to a retail store.

Other applications of electronic coupons are the subject of copending application of KEN R. POWELL for RETAIL SYSTEM, Ser. No. 08/468,816, filed on Jun. 6, 1995, the contents of which is herein incorporated by reference; and of application of KEN R. POWELL for DEVICE AND METHOD OF PROGRAMMING A RETAIL SYSTEM, Ser. No. 08/468,820, filed on Jun. 6, 1995, now U.S. Pat. No. 5,727,153 issued Mar. 10, 1998 for RETAIL STORE ILAVING A SYSTEM OF RECEIVING ELECTRONIC COUPON INFORMATION FROM A PORTABLE CARD AND SENDING THE RECEIVED COUPON INFORMATION TO OTHER PORTABLE CARDS, the contents of which is herein incorporated by reference.

Additional advantages and modifications will readily occur to those skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus, and illustrative examples shown and described. Accordingly, departures may be made from such details without departing from the spirit or the scope of Applicants* general inventive concept. The invention is defined in the following claims.
What is claimed is:

1. A system comprising:
a plurality of portable cards;
a first compuler network including a first plurality of computers, each having a respective firsi network address, the plurality of first computers including a first computer having means for sending a first signal including a firsl network address, an inter-network address corresponding to a computer on another network, and a signal corresponding to a product;
a second computer network including a second plurality of compulers, each having a respective second network address;
means, responsive to the inter-network address from the first signal, for sending a second signal including a second network address and the signal corresponding to the product; and
means, responsive to the signal corresponding to the pruduct from the second signat, for sending a card signal, to a portable card in the plurality of cards; and
means, spatially removed from the previous means, for reading the card sigual from the portable card.
2. In a system including a plurality of portable cards, a plurality of homes, a store and a routing system for receiving a sigual and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communcation links, a retail system comprising:
a first computer; and
a second computer, wherein the first computer includes circuitry for sending first signals to the routing system, each first signal including a signal corresponding to a produci, and an inter-network address corresponding to the second compuler, to cause the routing systern to generate a plurality of network addresses, cach of the plurality of network addresses corresponding to a respective computer in a respective compuler network, and wherein the second compuler includes circuitry for receiving first signals, and wherein the system further includes:
a plurality first processors, each located in one of the plurality of homes, responsive to a first signal received
by the second computer, for sending a card signal to a portable card in the plurality of cards, the card signal corresponding to the product; and
a second processor, in the siore, for receiving the card signal from a portable card in the plurality of cards.
3. The retail system of claim 2 wherein each first processor includes a computer spatially removed from the second compuler.
4. The retail system of claim 2 wherein the store includes
a receiver for receiving a purchase signal corresponding to a product; and
a determiner for determining a price for the product depending on whether the card signal, received by the stcond processor, corresponds to the purchase signal.
5. The retail system of claim 4 where in the store further includes
an electromagnetic delector for generating the purchase signal.
6. The retail system of claim 4 wherein the store further includes
a bar code reader for generating the purchase signal.
7. In a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in responsc to an inter-network address in the received signal, the routing system including a plurality of wide area conmmonication links, a method comprising:
sending first signals from a first computer to the roution system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network;
receiving first signals, and
the step, performed in one of the homes, of
sending, responsive to a first signal received in the previous step, a card signal to a portable card in the plurality of cards, the card sigual corresponding to the product, and the step of
subsequently, moving the portable card to the store, and the step, performed in the store, of
recciving the card signal from the portable card.
8 . The method of claim 7 further including the steps, performed in the store, of
receiving a purchase signal corresponding to a produci; and
determining a price for the producl depending on whether the card signal corresponds to the purchase signal.
8. The methed of claim 7 further including the steps, performed in the store, of
generating a purchase signal with an electromagnetic detectur, the purchase signal corresponding to a product;
receiving the purchase signal; and
deternining a price for the product depending on whether the card signal corresponds to the purchase signal.
9. The method of claim 7 further including the steps, performed in the store, of
generating a purchase signal with a bar conde reader, the purchase signal corresponding to a product;
receiving a purchase signal; and
determining a price for the product depending on whether the card signal corresponds to the purchase signal.
10. In a system including a plurality of portable cards, a plurality of homes, a store and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the reccived signal, the routing system including a plurality of wide area communication links, a retail systent comprising:
a first computer; and
a second computer, wherein the first computer includes circuitry for seuding first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second compuler, to cause the routing system to generate a plurality of routing signals, each of the plurality of routing signals corresponding to a respeclive portion of a signal path between the first and second compulers, and wherein the second computer includes circuitry for receiving first signals, and wherein the system further includes:
a plurality first processors, each located in one of the plurality of homes, responsive to a first signal reccived by the second computer, for sending a card signal to a portable card in the plurality of cards, the card sigual corresponding to the product; and
a second processor, in the slore, for receiving the card signal from a portable card in the pluratity of cards.
11. The retail system of claim 11 wherein each first processor includes a computer spatially removed from the second computer.
12. The retail system of claim 11 wherein the store further includes
a receiver for receiving a purchase signal corresponding to a product; and
a determiner for determining a price for the product depending on whether the card signal, received by the second processor, corresponds to the purchase signal.
13. The relail system of claim 13 wherein the store further includes an electromagnetic detector for generaling the purchase signal.
14. The retail system of claim 13 wherein the store further includes
a bar code reader for generating the purchase signal.
15. In a system including a store, a plurality of portable cards, a plurality of homes and a routing system for receiving a signal and generating a routing signal in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a method comprising:
sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing systern to generate a plurality of routing signals, each of the plurality of routing signals conesponding to a respective portion of a signal path between the first and second computers;
receiving first signals, and the step, performed in ooe of the bomes, of
sending, responsive to a first signal received in the previous step, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, and the step of
subsequently, moving the portable card to the store, and the step, performed in the store, of
receiving the card signal from the portable card.
16. The method of claim 16 further including the steps, performed in the store, of
receiving a purchase signal corresponding to a product; and
detcmining a price for the product depending on whether the card signal corresponds to the purchase signal.
17. The method of claim 16 further including the sleps, performed in the store, of
generaling a purchase signal with an electromagnetic detector, the purcbase signal corresponding to a product;
receiving the purchase signal; and
deternining a price for the product depending on whether the card signal corresponds to the purchase signal
18. The method of claim 16 further including the seps, performed in the store, of
generating a purcbase signal with a bar code reader, the purchase signal corresponding to a product;
receiving a purchase signal; and
determining a price for the product depending on whether
the card signal corresponds to the purchase signal.
19. In a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:
means for sending first signals from a first computer to the routing system, each lirst signal including a signal corresponding to a product, and an inter-nelwork address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network;
means for receiving firsı signals;
means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and
means for receiving the card signal from the portable card in the store.
20. The retail system of claim 20 wherein the store includes
means for receiving a purcbase signal corresponding to a product; and
means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.
21. The retail system of elaim 20 wherein the store includes
means for generating a purchase sigual with an electromagnctic detcctor, the purchase signal corresponding to a product;
means for receiving the purchase signal; and
means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.
22. The retail system of claim 20 wherein the store includes
means for generating a purchase signal with a bar code reader, the purchase signal correspooding to a product;
means for receiving a purcbase signal; and
means for determining a price for the product depending on whether the card signal corresponds to the purchase signal.
23. In a system including a store, a plurality of portable cards, a plurality of homes, and a routing system for receiviag a signal and generating network addresses in response to an inter-nctwork address in the received signal, the routing system including a plurality of wide area communication links, a retail systen comprising:
means for sending first signals from a first computer to the routing system, each first signal including a signal conesponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of routing signals, cach of the plurality of routing signals corresponding to a respective portion of a signal path between the first and second computers;
means for receiving first signals:
means for sending, responsive to a first signal received by the previous means, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the homes; and
means for receiving the card signal from the portable card in the store.
24. The relail system of claim 24 wherein the store
means for receiving a purchase signal corresponding to a product; and
ineans for determining a price for the product depending on whether the card signal corresponds to the purchase signal.
25. The retail system of claim 24 wherein the store includes
means for generating a purchase signal with an electromagnetic detector, the purchase signal corresponding to a product;
means for receiving the purchase signal; and
means for determining a price for the product depending on whether the card signal corresponds to the purcbase signal.
26. The retail system of claim 24 wherein the store includes
means for generating a purchase signal with a bar code reader, the purchase signal corresponding to a product; means for receiving a purchase signal; and
means for determining a price for the product depending on whether the card signal correspunds to the purchase signal.
27. In a system including a first computer, a sccond computer, a plurality of poriahle cards, a plurality of homes, a store with a first receiver that receives signals from the plurality of porlable cards, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail syslem comprising:
circuitry, in the first computer, that sends first signals to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to the second computer, to cause the routing system to generate a plurality of oetwork addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals; and
a pluraliny of bome computers, each located in one of the plurality of homes, responsive to a first signal received

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43. The method of claim 40 further including the steps, performed is the store, of
generating a purchase signal with a bar code reader, the purchase signal corresponding to a product;
receiving a purchase signal; and
determining a monetary amount depending on whether the card signal corresponds to the purchase signal.
44. In a system including a plurality of portable cards, a store with a first receiver that receives signals from the plurality of portable cards, a plurality of homes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:
means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-network address corresponding to a second computer, to cause the routing system to generate a plurality of network addresses, each of the plurality of network addresses corresponding to a respective computer in a respective computer network, thereby enabling the second computer to receive first signals; and
means for sending, responsive to a first signal received by the second computer, a card signal lo a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being localed in one of the homes.
45. The retail system of claim 44 wherein the store 30 includes
a second receiver that receives a purchase signal corresponding to a product; and
means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.
46. The retail systern of claim 44 wherein the slore includes
means for generating a purchase signal with an electromagnetic detector, the purchase signal corresponding io a product
a second receiver that receives the purchase signal; and
means for determining a monetary amount depending on whether the card signal corresponds to the purchase 45 signal.
47. The retail system of claim 44 wherein the store includes
means for generaling a purchase signal with a bar code reader, the purchase signal corresponding to a product; 50
a second receiver that receives a purchase signal; and

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means for determining a monelary amount depending on whether the card signal corresponds to the purchase signal.
48. In a system including a plurality of portable cards, a store with a first receiver that receives signals from the plurality of portable cards, a plurality of bomes, and a routing system for receiving a signal and generating network addresses in response to an inter-network address in the received signal, the routing system including a plurality of wide area communication links, a retail system comprising:
means for sending first signals from a first computer to the routing system, each first signal including a signal corresponding to a product, and an inter-nctwork address corresponding to a second computer, to cause the routing system to gederate a plurality of routing signals, each of the plurality of routing signals corresponding to a respective portion of a signal path between the lirst and second computers, thereby enabling the second computer to receive first signals; and
means for sending, responsive to a first signal received by the second computer, a card signal to a portable card in the plurality of cards, the card signal corresponding to the product, the means for sending being located in one of the bomes.
49. The retail system of claim 48 wherein the store includes
a second receiver thal receives a purchase signal corresponding to a product; and
means for determining a monetary anount depending on whether the card signal corresponds to the purchase signal.
50). The retail system of claim 48 wherein the store includes
means for generating a purchase sigoal with an electromagnetic detector, the purchase signal corresponding to a product;
a second recciver that receives the purchase signal; and
means for determining a monetary amount depending on whether the card signal corresponds to the purchase signal.
51. The retail system of claim 48 wherein the store inchudes
means for generating a purchase signal with a bar code reader, the purchasc signal corrcsponding to a product;
a second receiver that receives a purchase signal; and
means for determining a monetary amount depending on whether the card signal cotresponds to the purchase signal.


## EXHIBIT / ATTACHMENT


(To be scanned in place of tab)


Fig. 2


Fig. 4A



Fig. 5


Fig. 6A


Fig. 6B


Fig. 6C



215

Fig. 8

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## 30: 7170312682 <br> 1 <br> 150 <br> 7170312350 <br> 1 <br> 200 <br> 7170312780 <br> 1 <br> 50

Fig. 9
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Fig. 10



## U.S. Patent Mar. 30, $1999 \quad$ Sheet 15 of 34 <br> $\mathbf{5 , 8 9 0 , 1 3 5}$



Fig. 13


Fig. 14A


Fig. 14B


Fig. 15A


Fig. 15B


Fig. 15C


Fig. 15D


## SHOPPING LIST AND STORE DIRECTORY FOR CONTENTS OF CUSTUMER CARD:

ACME AMMONIA IS LOCATED AT AISLE 2, SHELF B

OLD WORLD PASTA IS LOCATED AT AISLE 2, SHELF B

LIGHTHOUSE LICHTBULBS ARE LOCATED AT AISLE 2, SHELF B

Fig. 17
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Fig. 18


Fig. 19


Fig. 20





Fig. 22 C


Fig. 23


Fig. 24A


Fig. 24B


Fig. 25A


Fig. 25B


Fig. 25 C


Fig. 25D


## SYSTEM AND METHOD FOR DISPLAYING PRODUCT INFORMATION IN A RETAIL SYSTEM

## BACKGROUND OF THE INVENTION

## 1. Field of the Invention

This invention relates generally to a retail system and, more particularly, to a systen and method for displaying product information in a relail system.
2. Description of Related Art

Discount coupons are a popular means to stimulate sales of products such as grocery store items. In 1992, approxinately 310 billion coupons were distributed and 7.7 billion coupons were redeerned, saving customers $\$ 4$ billion. It has been estimated that in-store couponing coupled with advertising increasts sales by $544 \%$.

A typical marketing scheme involves placing coupons in a newspaper, by printing the coupons in the newspaper or by inserting coupon inserts into the newspaper, and allowing customers to bring the printed onupons to a store for redemption. One problem with this scheme is that the redemption rate is typically only a few percent of the coupons printed, the unredeemed coupons representing an overhead associated with this scheme. To alleviate this overbead, another marketing scheme involves distributing the coupons in the store, thereby avoiding the cost of printing coupons in a newspaper, and capitalizing on lbe fact that $66 \%$ of buyer decisions are made at the time of product purchase. Both the in-store scheme and the newspaper scheme, bowever, are susceptible to fraud by an unscrupulous retailer that requests reimbursement payments by presenting unredeemed coupons to the clearing house. Other schemes include delivering coupons to customers through the mail, distributing coupons in or on the product package, and distributing coupons at checkout. All of these schemes have an overhead cost of bandling the coupons and of sending the redeemed coupons to a clearing house to enable product manufacturess to reimburse retailers for the reduction in proceeds resulting from coupon redemptions.

## SUMMARY OF THE INVENIION

It is an object of the present iavention to provide a convenient and stimulating shopping environment that allows the customer to acquire discount coupons and to track relationsbips between the acquired coupons and available products.

It is another object of the present invention to display an image of the products corresponding to the acquired coupons.

To achieve these and other objects of the present invention, in a system including a communication device and a plurality of portable cards each baving a memory, a method of operating the system comprises the steps of reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product; generating, responsive to the first signal, a second signal containing an image of the product; and displaying the second signal.

According to another aspect of the present invention, a relail syslem comprises a plurality of portable cards each having a card memory; a communication device; first memory for storing a signal containing an imlage of a product; a reader that reads a first signal from the card memory of a card in the plurality of cards, in response to a

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FIG. 13 is a flow char of a processing performed by the display kiosk.

FIGS. 14A and 14B are a tlow chart showing a portion of the processing of FIG. 13 in more detail.

FIGS. 15A, 15B, 15C, and 15D are diagrams showing data paths within the display kiosk during the execution of the processing shown in FIGS. 14A and 14B.
FTG. 16 is a diagram of a CRT display generated by the display kiosk.

FiG. 17 is a diagram of a paper printout generated by the display kiosk.

FIG. 18 is a How chart of a processing performed by the check-out station.
FIG. 19 is a flow chart of a processing performed by one of the customer cards.

IJG. 20 is a block diagram of a system including a market research center and multiple check-out stations.
FIG. 21 is a block diagram of a display kiosk in accordance with a second preferred embodiment of the present invention.
FIGS. 22A, 22B, and 22C are diagrams of some data structures in the second preferred display kiosk shown in FIG. 21.
FIG. 23 is a flow chart of a processing performed by the second preferred display kiosk.
FIGS. 24A and 24B are a flow chart showing a portion of the processing of FIG. 23 in more detail.
FIGS. 25A, 25B, 25C, and 25D are diagrams showing data paths within the display kiosk during the execution of the processing shown in FIGS. 24A and 24B.

FIG. 26 is a diagram of a CRT display generated by the second preferred display kiosk.
The accompanying drawings which are incorporated in and which constilute a part of this specification, illustrate embodiments of the invention and, logether with the description, explain the principles of the invention, and additional advantages thereof. Throughout the drawings, corresponding parts are labeled with corresponding reference numbers.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

FG. 1 shows a system of distributing discount coupons to retail customers in accordance with a first preferred embodiment of the present invention. The first preferred system includes computer networks 1020, residential homes $\mathbf{1 0 2 5}$, 1035, and 1030 , portable cards $295,315,285$, and store 1000. A coupon-dispensing computer within computer networks 1020 stores electronic coupons and distributes the stored coupons to the bomes via telephone signal paths 180. A computer and special processor in each of homes 1025 , 1030, and 1035 has hardware and software for receiving a coupon from computer networks 1020 and storing the coupon on each of portable cards 295,315 , and 285, respeclively. Customers then bring cards 295,315 , and 285 to store 1000, as shown schematically in FIG. 1.
Store $\mathbf{1 0 0 0}$ includes roof structure $\mathbf{1 0 1 7}$ and display kiosk 1710 under roof structure 1017. Roof structure 1017 includes roof section 1010, window 1015 coupled to roof section 1010, and roof section 1005 coupled to window 1015. Display kiosk 1710 includes circuitry (hardware and software) for reading product identification dala from a portable card and displaying information about the product identified by the data, including an image of the product and a spacial location of the product, as discussed in more detail below.

FIG. 2 shows a part of home 1035 in more detail. Home 1035 includes personal computer 2000 having keyboard 2425, cathode ray tube (CRT) 2420, and mouse 2423. To receive an electronic coupon, the user establishes a telephone connection between computer 2000 and a computer within network 1020 through modem 2410. Subsequently, the user logs onto the computer within network 1020 and reads Electronic mail sent by the coupon-dispensing computer. The customer then prints the mail message to loading device 2415. Device 2415 receives a customer card 315. A device driver program, execuled by PC 2000, and device 2415 act to translate the textual electronic mail message into a bivary electronic coupon and write the coupon onto card 315. In other words, device 2415 writes a product identification signal, corresponding to a selected product, onto the customer card 315.

An invention embodied in this process of sending discount conupons to a customer card is the subject of copending U.S. application Ser. No. 08;603,482 of KEN R. POWELL for SYSTEM AND METHOD FOR DISTRIBUTING COUPONS THROUGH A SYSTEM OF COMPUTER NETWORKS, filed Feb. 20, 1996, the contents of which is herein incorporated by reference.

FIG. 3 is a plan view of store 1000 , including shelves 11 , $12,21,22,31$, and 32 and product areas 111, 121, 110, 120, $130,141,151,161,140,150,160,171,181,170,180$, and 190. Customers shop in store 1000 , by removing products from the shelves and bringing the products to checkout counter 900 . When a customer visits store 1000 , a custorner can insert their customer card to display kiusk 1710 to view information about information about the products identified on the card, including the appearance and location of the product.
In FIG. 3, shelf assembly 10 includes shelf $\mathbf{1 1}$, which is designated as "SIICLF A" by a poster within store 1000 , and shelf 12, designated "SHELF B" by a poster within store 1000. Shelf assembly 20 includes shelf 21 , designated "SIIELF C" by a poster with store 1000, and sbelf 22 , designated "SIIELF D" by a poster within store 1000. Shelf assembly 30 includes shelf 31 , designated "SHELF E" by a poster within store 1000, and shelf 32, designated "SIIELF F" by a poster within store 1000 .
Shelf assembly 10 and wall 14 define an aisle 15 . Aisle 15 is designated "AISLE 1 " by a poster within store $\mathbf{1 0 0 0}$. Shelf assembly 10 and shelf assembly 20 define aisle 16. Aisle 16 is designated "AISLE 2" by a poster within store $\mathbf{1 0 0 0}$. Shelf assembly 20 and shelf assembly $\mathbf{3 0}$ define an aisle 24. Aisle 24 is designated "AISLE 3" by a poster within slore 1000. Shelf assembly $\mathbf{3 0}$ and checkout counter 900 define an aisle 34. Aisle 34 is designated "AISLE 4" by a poster within store 1000.

FIGS. 4A and 4B show another view of store 1000 in accordance with a first preferred embodiment of the present invention. FIGS. 4A and FIG. 4B are each a partial view of store 1000 Customers $210, \mathbf{2 2 0}, \mathbf{2 3 0}, 240,250,270,280$, and 290, sbop in store $\mathbf{1 0 0 0}$.
Store 1000 includes shelve assemblies $\mathbf{1 0}, \mathbf{2 0}$, and $\mathbf{3 0}$, defining aisles belween the shelves. Store 1000 bas a plurality of product areas, each corresponding in a resplective product. Product Area 110 has Acme brand ammonia. Product Area 120 has Old World brand pasta. Product Area 130 has Lighthouse brand light bulbs.

In FIGS. 4A and 4B, poster 9 contains the text SHELF B, allowing the customers to identify the stelf containing product areas 110,160 , and 130 as shelf B. Poster 19 contains the text SHELF D, allowing the customers to
identify the shelf containing the product areas $\mathbf{1 4 0}, \mathbf{1 5 0}$, and 120 as shelf D. Poster 29 coatains the text SHELF F, allowing the eustomers to identify the shelf containing product areas 170, 180, and 190 as shelf $F$. Similarly, other posters (not showa) identify other shelves and aisles within slore 1000.
Because of the large number of coupons that may be available to a customer, from either in the store or outside the store, a customer such as customer 310 may wish to present their card $\mathbf{3 1 5}$ to display kiosk $\mathbf{1 7 1 0}$. Kiosk 1710 bas circuitry for displaying information about the coupons loaded onto the card, including the product and discount amount of the coupon. Kiosk 1710 also bas circuitry for displaying information about the products corresponding to the coupons loaded onto the card, including a verbal description of the product, an image of the product, and a spacial Incation of the product. Kiosk 1710 has circuitry to display information on paper 1719, using printer 1718, or on cathode ray tuhe (CRT) 1717.

FIG. 5 shows a section of display kiosk 1710 in more detail. Interface slot 1715 has a width sutticient to accommodate the width of one of the customer cards. When a customer card is in interface slot 1715, conductive coutact 1777 inside interface slot 1715 touches contact 7427 (shown in FIG. 7C) on a customer card. Interface slot 1715 bas other contacts (not shown) for touching the other card contacts 7420 (shown in FIG. 7C). The operation of station 1710 will be discussed in more detail below.

FlG. 6 $\Lambda$ shows an enlarged view of some of the botles of ammonia 112. Each bottle of ammonia has a common Universal Product Code (UPC) label 114, which is a group of paraliel lines that encodes a number ( 7170312780 ) that uniquely identifies acme ammonia. In other words, label 114 is different than labels of units of other products. Each botle of ammonia 112 also has a common character label 113 that verbally describes the product. Character label 113 is "ACME AMMONIA." Label 113 is different than labels of units of other products.

Product Area 120 bas boxes of pasta 122 grouped together on multiple shelves. Boxes of pasta 120 are contiguously grouped, meaning that no other product is between any two boxes of pasta 120 . No other product is between product station 125 and boxes of pasta 122. Product Station 125 is on a shelf under some of the boxes 122 . In other words, station $\mathbf{1 2 5}$ is adjacent to boxes $\mathbf{1 2 2}$ and supported by a shelf in vertical alignment with some of the boxes 122.

FIG. 6B shows an enlarged view of surne of the boxes ol pasta 122. Each box of pasia 122 bas a common Universal Product Code (UPC) label 124, which is a group of parallel lines that encodes a number ( 7170312682 ) that uniquely identifies Old World pasia. In uther wurds, label 124 is different than labels of units of other products. Each box of pasta 122 also has a common character label 123 that verbally describes the product. Character label 123 is "OLD WORLD PASTA." Label 123 is different than labels of units of other products.

Product Area 130 has boxes of light bulbs 132 grouped together on multiple shelves. Boxes of light bulbs 132 are contiguously grouped, meaning that no other product is between two hoxes of light butbs 132. No other product is between product station 135 and boxes of light bulbs 132 . Product Station 135 is on a shelf under some of the boxes 132. In other words, station 135 is adjacent to boxes 132 and supported by a shelf in vertical aligoment with some of the boxes 132 .
FIG. 6C shows an enlarged view of some of the boxes of light bulbs 132. Each box of light bulbs 132 has a common describes the product. Character label 133 is "LIGHTHOUSE LIGHT BULBS." Label 133 is different than labels of other products.
Similarly, other product area in the store each have a sel ${ }^{10}$ of respective products contiguously grouped together. The respective units of a certain product have a common label, different than labels on units of other products, that uniquely identifies the certain product. Product area $\mathbf{1 4 0}$ has botlles of ketchup 142 contiguously grouped together. Product area 160 has loaves of bread 162 contiguously grouped together. Product area 170 has cartons of milk 172 contiguously grouped logether. Product area 180 has packages of bacon 182. Product area of $\mathbf{1 9 0}$ has packages of butter 192 conliguously grouped together. Product area 111 (FIG. 3) bas boxes of paper towels contiguously grouped together. Product area 121 bas rolls of paper towel contiguously grouped togetber. Product area 141 has boxes of crackers contiguously grouped together. Product area 151 has canned fruit contiguously grouped together. Product area 161 has canned vegetables contiguously grouped together. Product area 171 has cans of meat contiguously grouped together. Product area 181 has boxes of flour contiguously grouped together.

An overview of processing performed by the customers and hardware will now he described. Before shopping in the store, each of these customers obtained a customer card. For example, customer 230 ohtained customer card 235 from a bank, by completing an application for the bank. The application contained questions to collect demographic data, including birth date, income level, past buying patterns, gengraphic Incation, size of family, level of education, and job-related data. The bank subsequently wrote customer identification data for customer $\mathbf{2 3 0}$ onto customer card 235, and issued customer card 235 to customer 230, and sent the customer's demographic data to a marketing research center which then slored the demographic data on disk. Each of customers 210, 220, 240, 250, 270, 280, and 290 oblains a respective customer card in a similar manner. In other words, for each customer the preferred method writes demographic data for the customer onto a disk in markel research center, and writes personal identification data for the customer onto a respective card for the customer.
After redemption dala, including customer identification data from a plurality of cards, is compiled and sent to a marketing research center, as described below, the customer idenlification data is used to access the corresponding demographic data, thereby providing the manufacturer with valuable marketing data on coupon program effectiveness and customer demographics.
A customer may start shopping with a card already loaded with electronic coupons. For example, the store may preload new cards as an incentive for completing and submilting a check cashing application. Further, the customer may bave a device al home, such as computer $\mathbf{2 0 0 0}$ shown in FIG. 2, for depositing coupons onto the card. Thus, a customer may arrive at slore 1000 with coupons already on the card.

While shopping in store 1000 , each of customers $\mathbf{2 1 0}$, 220, 230, 240, 250, 270, 280, and 290 carries his or ber respective custoruer card. Cuslomer 210 carries card 215 , custoner 220 carries card 225, customer 230 carries card 235, customer 240 carries card 245 , customer 250 carries card 255, customer 270 carries card 275 , customer 280
carries card 285, and customer 290 carries card 295. Each customer tows a shopping cart to bold selected products. Customer 210 tows cart 212, customer 220 tows cart 222, cuslomer 230 tow cart 232, customer 240 tows cart 242, customer 250 tows catt 252, customer 270 tows cart 272, customer 280 tows cart 282, and customer 290 tows care 292. Each customer removes one or more desired products from a shelf and places the removed product into her carl.

Upon completion of shopping, the customer brings selected products from shelves 10, 20, and $\mathbf{3 0}$ to checkout counter 900 . The customer redeems the electronic coupons at the checkout area, by inserting ber customer card into checkout station 915. For example, a customer such as customer 290 in FIG. 4B completes the purchase of her selected products 293 by Iransferring products 293 from her cart 292 to counter 900 , and by inserting card 295 into checkout station 915. Subsequently, a checkout clerk (not shown) scans each selected product past UPC bar code reader 910 Bar code reader 910 is an optical detector. In other words, bar code reader 910 detects an electromagnetic signal. A processor coupled to station 915 and reader 910 determines whether the most recently scanned product is on a discount list stored in card 295. If the most recently scanned product is identified in this discount list, a price for the product is determined using the discount data corresponding to the product, and the resulting price is displayed on display 917. Checkout counter 900 scans and processes each product 293 in a similar manner.
Similarly customer 280 in FlG. 4B will complete the purchase of her selected products 283 by transferring products 283 from her cart 282 to counter 900 , and by inserting card 285 into checkout station 915; and the checkout clerk (not shown) will scan each selected product 283 past UPC bar code reader 910. Customer 270 will complete the purchase of her selected products 273 by transferring products $\mathbf{2 7 3}$ from her car 272 to counter 900 , and by inserting card 275 into checkout station 915; and the checkout clerk (not shown) will scan each selected product 273 past UPC bar code reader 910 .
Periodically, checkoul counter $\mathbf{9 0 0}$ sends redemption dala to an electronic clearing bouse. The redemption data sent to the clearing house includes the identification of the store, identification of the coupons redeemed and of respective quantities of coupon redermptions. Periodically, checkout counter 900 sends redemption data to a market research center. The redemption data sent to the research center includes the identification of the store and of the customers who presented elecironic coupons for redemption.

The preferred system and method will now be described in more delail.

FIG. 7A shows a plan view of customer card 215 carried by customers 210, and FIG. 7B shows a side view of card 215. Card 215 is 8.5 cm by 5.4 cm , the length and width of a typical financial credit card. Card 215 is slightly thicker than a typical financial credit card. Card 215 includes a magnetic stripe 7410, interface contacts $\mathbf{7 4 2 0}$ for communication with the product stations and the checkout station. and embossed area 7430 for displaying the card owner's name. Magnetic stripe 7410 allows a conventional credit card stripe reader to read basic data from the card. Magnetic stripe 7410 is not necessary to the operation of the preferred embodiment of the invention, described in more detail below.

FIG. 7C shows interface contacts 7420 in more detail. Interlace contacts 7420 are configured in accordance with ISO7816-2: 1988(E), Identification cards-Integrated
circuit(s) cards with contact-Part 2: Dimensions and locations of the contacts, promulgated by the International Organization for Standardization (ISO), and availahle from the American National Standards Institute (ANSI), 11 West 42nd Street, New York, N.Y. 1 (1036. According to ISO $7816-2$, contact 7421 is assigned to VCC (supply voltage), contact 7422 is assigned to RST (reset signal), contact 7423 is assigned to CLK (clock signal), contact 7424 is reserved for future use, contact 7425 is assigned to GND (ground), contact 7426 is assigned to VPP (program and voltage), contact 7427 is assigned to I/O (data input/output), and conlact 7428 is reserved for fulure use. Card 215 communicates with the product stations and the checkout stations through contact 7427 using a balf duplex scheme, meaning that contact 7427 is for communicating data signals either to or from the card.

FIG. 8 is a block diagram of customer card 215, including central processing unit 8450, memory 8460 , and batlery 8470 for supplying power to interface 8425 , processor 8450 , and memory 8460. Memory 8460 is a random access, addressable device. Station interface 8425 includes a serial to paraltel converter for transferring data signals between contaci 8427 and CPU 8450 over parallel bus 8452 . Memory 8460 stores a program 8465 executed by processor 8450 , customer identification data 8467, and authorization data 8468. Custumer identification data 8467 includes a sequence of digits that uniquely identifies the holder of the card. Customer idenification data 8467 includes the card bolder's social security number. For example, identification data 8467 in customer card 235 uniquely idenlifies customer 230. Authorization data 8468 includes a sequence of digits that includes a cerde identifying the sture or stures in which the card may be used to ubtain a paperless coupon. Authorization data 8468 also includes date data indicatiog an expiration date for the card. Depending on the card holder's contractual relationship with the card issuer, the card issuer may periodically update this date data to renew the card when the current date data indicales the card is expired. Store authorization data 8468 also contains a field identifying that the card is a customer card (rather than a prugramming card, which is described below).
Memory 8460 also stores product data received from one or more coupon dispensing devices. This product data includes a tist of product discounts 8435. When a customer inserts a customer card into a coupon dispensing device, processor 8450 receives an identification code for the product from the device and adds the code to the list.

FIG. 9 shows some the contents list 8435 starting at location 30 of memory 8460 of customer card 215. An electronic coupon is represented by three rows in list 8435 : a 10 digit UPC product code in the first row, discount format data in the second row (" 1 " signifying cents, " 2 " signifying percentage), and discount quantity data in the third row. In FIG. 9 , the customer card is storing three electronic coupons, reflecting the fact that customer 210 has received electronic coupons from devices either before or during her current visit to store 1000 In list 8435, the memory field having the product code 7170312682 corresponds to the UPC code on boxes of Old World Pasta 124. The next memory field stores the format of the discount quantity data, with " 1 " signifying cents and "2" signifying percentage in tenths of a percent. The next memory field stores the discount quality data, 150 , signifying that the discount being offered tor Old World Pasta 124 is $\$ 1.50$. The memory field having the product code 7170312350 corresponds to the UPC code on boxes of Lighthouse Light Bulbs 134. The next memory field stores the format of the discount quantity data, with " 1 " signifying
cents. The oext memory field stores the discount quantity data, 200, signifying that the discount being offered for Lighihouse Light Bullss 134 is $\$ 2.00$. The memory field having the product code 7170312780 corresponds to the UPC code on ammonia botles 112 . The next memory field stores the format of the discount quantity data, with " 1 " signifying cents. The next memory field stores the discount quantity data, 50, signifying that the discount being offered for ammonia botles 112 is 50 cents.

Each customer cards bas the same bardware structure as customer card 215.
Programming card 55 has the same hardware structurc as customer card 215. An invention embodied in programming card 55 is the subject of copending application of KEN $R$. POWELL for DEVICE AND METHOD OF PROGRAMMING A RETAIL SYSTEM, Ser. No. $08 / 468,820$, filed on Jun. 6, 1995, the contents of which is berein incorporated by reference. The product stations are the subject of copending application of KEN R. POWELL for RE'IAIL SYSTEM, Ser. No. $08 / 468,816$, tiled on Jun. 6, 1995 , now U.S. Pal. No. 5,727,153 for RETAIL STORE HAVING A SYSTEM OF RECEIVING ELECTRONIC COUPON INFORMATION FROM A PORTABLE CARD AND SENDING THE RECEIVED COUPON INFORMATION TO OTHER PORTABLE CARDS, the contents of which is berein incorporated by reference.
FTG. 10 is a block diagram of display kiosk 1710 sbown in FIGS. 1, 3, and 4^. Magnetic disk drive 1725 provides storage of programs and of product data. The product data stored on disk 1725 includes product name data and product location dala. Optical disk drive 1735 contains a CD-ROM (Compact Disk-Read Only Memory) disk that stores product image data. The contents of CD-ROM 1737 tend to remain current for at least several months, siace the packaging of a product corresponding to a certain UPC code tends to remain constant over lime. Preferably, CD-ROM 1737 can be obtained from a national supplier.

CRT display 1717 is 1024 pixel rows by 1280 pixel columns. Video ram 1735 bas $1024 \times 1280$ locations, a locaLion for each pixel on display 1717. CRT controller 1737 has circuitry to read video ram 1735 to generate and send signals to CRT 1717. Thus, the address of a pixel in video ram 1735 delermines the location of the pixcl on display 1717.

CPU 1750 execules program 1722, in random access, addressable memury 1720, to display information reflecting the contents of a customer card. CPU 1750 displays the information un CRT display 1717, by writing pixel dala into video RAM 1735. CRT coniroller 1737 reads the pixel dala from RAM 1737 to send video signals to CRT 1717.

FIGS. 11A and 11B show some data structures within display kiosk 1710. Siructure 11100 includes image data for displaying an image of products corresponding to coupons on a customer card. Struclure 11100 normally resides on CD-ROM 1737. Structure 11100 includes UPC table 11110 , which is a list of entries soried by UPC code. Each entry in table $\mathbf{1 1 1 1 0}$ includes three fields. A first field is a UPC code; a second field is an action code, described in more detail below; and a third field is a pointer to video data 11120 for the product identified by the UPC code. Video data 11120 is a group of records each conlaining pixel data for a respective product. CPU 1750 uses the pointer, in the third field of an entry in table 11100, to access a selected record of pixel data 11120.

During processing by CPU 1750, various parts of data structure 11100 may be automatically brought into memory 1720 with a virtual memory mapping, as is well known in the art.

Dala structure $\mathbf{1 1 2 0 0}$ stores product location information. In contrast to data structure 11100 , data structure 11200 tends to coutain product information that is specific to store 1000. Data structure 11200 normally resides on disk 1725. Data struclure 11200 includes table 11210 , which is a list of entries sorted by UPC code. Structure 11200 also includes spacial location dala 11200 , which is a group of records each containing ASCII (American Standard Code for Information Interchange) lext identifying the spatial location of a respective product. Each entry in table 11210 includes a UPC code in a firsl field, an action code in a second field, and a pointer to a selected location data record $\mathbf{1 1 2 2 0}$ in a third field. C.PU 1750 uses the pointer to access a selected record of location information.
Thus, memory 1720, magnetic disk 1725, and optical disk drive 1735, together act to store product image and product location information.

CPU 1750 brings various parts of data slructure 11200 into memory 1720, using a virtual memory mapping scheme.

Data structure 11300 includes table 11310 and supplementary product data 11320 . Data structure 11300 normally resides on disk 1725. Supplemenary pruduct data contains ASCII text providing additional information about products in the store. As stown in data struclure 11300, supplementary product record 11325 provides information sbout a product different from the product identified in the correspondiog entry in table 11310.
FIG. 12 is a block diagram of checkout counter 900 shown in FIG. 4B. Disk 925 provides long term storage. CPU 950 executes instructions in random access, addressable memory 920.

CPU 950 and program 922 act to delect a product scanned by UPC reader 910 , determine a reference price for the product, search for the product's identification in the memory of a customer card, and deduct a discount from the reference price if the product is identified in the customer card memory. CPU 950 then displays the price of the product on display 917. CPU 950 writes coupon redemption data onto disk 925. Periodically, CPU 950 sends marketing redemption data to a markel research center through modern 930. Periodically, CPU 950 also sends clearing house redemption data to a clearing house through modem 930 .

FIG. 13 shows a processing performed by CPU 1750 and program 1722 in display kiosk 1710, when a cuslomer inserts a card into card imerface 1715. When a customer, such as customer 310 , inserts customer card 315 into interface slot 1715, a switch (not shown) in interface slot 1715 alerts CPU $\mathbf{1 7 5 0}$ that a card has beea inserted into the slot. When a customer card is in interface slot 1715, conductive contacts (not shown) inside interface slot 1715 touch each card contact 7420. Subsequently, CPU 1750 causes card interface $\mathbf{1 7 2 5}$ to reset the card by applying a clock signal to card contaci 7423. The customer card then answers the reset by sending a block of data, including identification data 8467 and authorization data 8468, through card contact 7427. CPU 1750 then receives the answer-to-resel from the card ( $\operatorname{sicp}$ 13002). CPU 1750 then sends a data block containing a station-lype code indicating a display kiosk (step 13004). (PU 1750 then receives the contents of table 8435 in memory 8460 of the customer card, and temporarily stores these table contents in memory 1720 of the display kiosk (step 13005). CPU 1750 selects the first entry in lable 8435 (step 13010). CPU 1750 displays product and price information for the presently selected entry on display 1717. (Step 13040). If there are entries remaining (step 13042),

CPU 1750 selecis the 11
and prowessing proceceds entry in lable 8435
enitites remaining (step 130 step 13040 If (step 13045) ing shown in FIG. (step 13042), there is no fis there are no here is so further process. withoul manual inter and 13045
pause for 10 secontervention. For example, slep 13 peatedly Alternatively, slep 13040 beore coutrol passes slo the the noxt may buthon entilled DISPI AY may pausci until the user next step. Slation 1710. The commuaication pron (nol shown) an 7816 a customer card is described be ifeen display kiosk 1710 cards :1989 (E). Idemification cards-l in detail in ISO/EC mission protonacts-Past 3: Electronic sieyrated circuif(s) (E). Parr 3. C cus; and ISO/IEC 7816-3: simals and transAMENDMENT 1: Pruignals and transmission Amd.1:1992 duplex bleck tranti: Proulocol type Tansmission protocols, are promulgated by the in protucol. Bolla of oftebronous half dardization (ISO) by the International O O of Ife:se sladards Slaadards Institule (ANStributed by the Anvierican for Stan-
 CPU 1750 scarches for the display an entry in table 8435, index 1110 (step 14005). If CPU UPC Code in image data wherher the secondex (step 14030), CPU finds the UPC colde 14040). If the send field of the found CPU 1750 determines third field as a poond field is equal to $1, C$ rev is cqual in 1 step sends this selecterd record to in image data record inses the if CPU 1750 doces nol ford to video RAM 1735 (stel 140 and (step 14030) or determind the UPC code in ins (step 14050). entry is not equal to 1 (step tane the second field of the index 14050.

CPU 1750 skips stcp customer card, translates discount information 8435 from the count data into charactes the binary- ncoded numerical disiolo graphics data, and senda, translates the character dista Next, CPy 1750 sep). 14055 the graphics data to video 11210 (step 14060) and if the UP produel tocation index location indcx (step 14065), and the code is found in the
foundedertry is 1 (t) of the found is 1 (step 14070), CPU 1750 second field of the text 11220. CPDU 1750 point to a selected record ibird ficle data and seads the pixel dalates this location text location 14075). If the UPC puel dala to viden Ran text to pixe] (step 14065) or the cotce is not found in the 1735. (step equal to 1 (step 14070), CPU field of the found enaion index CPU 1750 then 1070), CPU 1750 skips step 140 Ity is not product index unine searches for the UPG step 14075. found (step 14085), (sPep 14080) and if cecede io related found entry (step l4000) 1750 reals the secon UPC code is 1. CPU 1750 uses 14090) and if the second fend field of the describing the uses the third held as a pointer equal to dala and sends the proded proci, translates a poinlere to text 14095). If the UPC Coaxtel data to video RAM rexi to pixel of the found earry is code is mol found or it RAM 1735 (step skips step 14095 s. CRT controller 1737 (step 14090). CPU 1750 and send display signals teads video RAM 1735 to generate In other words, data structure 11717 (step 14100 ). of product inform, data struclure 1100 (step 14100 ). verhal 1200 Stores two olther tyuct image data), and data certy type produci). CPCription of the types of product informationa a produci). CPU 1750 reads a coupron and a tocation of the

## $5,890,135$

card, io response io 12
1715, ardsponse to a person sigoal. Cpe gencrates, responsive to the the card into slot UPC code in the generates the display coupon, a display and by using the cead coupon to accesss signal by using the structure 11200 . FIGS. 15 A , display kiosk 15B, 15C, and $15 D$ show sthown in FlGS, 170 during the pmocessinala flow's within during the proc. 14 A and 14 B . FIG. 15A shot the method 1722 read a cecessing of slep I40150. CPA shows a data flow sends dala a selected record of product imaged and program CPU 1750 and proto data pors 1742 of videt dala 11120 and port 1740 , to delermin 1722 also send an addrest 1735 . display 1717. As shmine whore pixels will he dess to address the address signal spow in FIG. 15A, the firce displayed on last four digisn spal specify the row on display four digits on image data 11120 is the coturnn on display 1717 and the column (2250. 1120 is displayed beginning al 1717. Pmduct FIG. 15B shows a da bining al row Ozort, when CPU 1750 execules sle within display kiosk 1710 program 1722 read binary-tncodep 14055. CPU 175010 a customer card transy-encodel discoume dat 1750 sind Send the pixel data to ta the discoung data to dake 8435 fromn CPU 1750 and protara dar 1742 of video 0 el data, and 01000100 to addregsam 1722 alss send adeo RAM 1735 . beginniag al ruw 100 , tol 1740 , to display the ddress signal FIG. ISC shows, column 100 . when CPC shows a data flow
prygram 1722 read execules step 14075 display kiosk 1710 11220, translate 17 a selected record of ASCPU 1750 and pixel data porit 1742 ASCuI data to pixel datl location data program 1722 1742 of video RAM 1735 data, and send the address pon 1740 , so dise an address signal CPU 1750 and row 100, column 640 .
Fig. 15D shon 640 .
when CPE shows a data flow with
program 1722 read exules step 14095 . cplay kiosk 1710
a product data 11320 read a selected record CPU 1750 and and send the pixel data translate the record of ASCII related 1750 and program ata port 1742 of video Ram to pixel data, 0700640 to address port 1722 send an address 1735 . CPU product data begianss port 1740, to display acess signal FIG. 16 shows aning at row 750 , column 640 dispe related 1750 performows a view of the CRT Dilumn 640 .
16005 has coor the prokessing of FIGS ispy 1717 after CPU is in the mow 200 inates ( 2000,250 ), me. 14A and 14B. Pixel 16005 is the upper colurn 250 of CRT display pixel 16005 so data. Pixel upper left of a display region display 1717. Pixes upper left of a disishaving cuordinates for product image tion. Pixel 16015 , upper lefi of à display ragy coordinates ( 100 , ount information. Pixel 16020 aplay region for product ( 100 , (6.40), is the s5 upper leff of a dis, having coordinates (7so lition information. 1 of a display region for relatested prod (440), is the Because the processin product informainaje of the prouluces lo of FIGS. 14 A and 14
other data, the other data video rata 1735 first, and writes the data io videc ramer data will overwrite ss, and then writes superimposed over the . Thus, the outher dala the image FIG. 17 shows the prouluci image, as shaw will appear display kiosk shows the result of anoge, as shown in FIG. 16 print a shopping list oplay kiosk 1710 uses prssiag mode of FIG. 18 shows a pnla paper 1754 uses priater 1752 to program 922 a a processing perf
checks out of in checkout counter 900 by CPU 950 and ceeks out of slore $\mathbf{1 0 0 0}$. When a 900 , when a custond customer, such as cus.
tomer 290, inserts customer card 295 into interface slot 914, a switch (not shown) in interface slot 914 alerts CPU 950 that a card has been imserted into the slot. When a customer card is in interface slot 914, conductive contacts (not shown) inside interface slot 914 touch each card contact 7420 . Subsequently, CPU 950 causes card interface 925 to reset the card by applying a clock signal to card contact 7423 . (If the card is a customer card, the card then answers the reset by sending a block of data, including identification data 8467 and authorization data 8468, through card contact 7427.) CPU 950 then receives the answer-to-reset from the card (step 18002). CPU 950 then sends a data block containing a station-type code indicating a checkout station (slep 18004). CPU 950 then receives the contents of table 8435 in memory 8460 of the customer card, and temporarily stores these table contents in memory 920 of the checkout station (step 18005). During step 18005, CPU 950 also causes customer card 295 to remove all entries from list 8435, so that the electronic coupons in the list cannot be redeemed again. When the checkout clerk (nol shown) moves a product past UPC reader 910, UPC reader 910 detects the UPC code on the product and sends the UPC code to CPU 750 (slep 18010). CPU 950 searches the received lable contents to determine whether the product scanned is identified in the table (step 18020). If the product is in the received table, CYU 950 subtracts the discount, as determined by the discount data stored in the received table, from a product reference price read from disk 925 (step 18030), and displays the resulting price of the product on display 917 (step 18040). If the product is not in the received table (step 18020), CPU 950 skips step 18030. If there are products remaining (step 18042), processing proceeds to step 18010. If there are no products remaining (step 18042), the total price is displayed (step 18044).
Product data, customer identification data 8467, authorization data 8468, and the data in list 8435 are each a type of signal.

In summary, after UPC barcode reader 910 scans a product, processor 950 determines eligibility for a discount. If a produci qualifies, pmeessor $\mathbf{9 5 0}$ displays the discounted price on display 917.
FTG. 19 shows a processing performed by one of the customer cards, such as customer card 215, in the preferred retail system. After the card is reset through contacts $\mathbf{2 4 2 0}$, the customer card sends an "answer to reset" data block in aceordance with the ISO standard ISO/ICE 7816-3: 1989 (E), cited above. The customer card sends identification data 8467 and authorization data 8468 in the answer-to-resel data block (step 19010). If the station then sends a block of data to the customer card, the customer card then receives the block of data through contact 7427 (step 19015). If the block contains a station-type code indicating a product station (step 19020), the customer card then adds product coupon information, from a certain location in the block, to the list 8435 (step 19030). If the block does not contain a stationlype code indicating a product station (slep 19020), processing proceeds to step 19070.
If the customer card is oot eligible, the station will not send a block of data, step 19015 therefore does not execule, and processing ceases until the customer card is reinserted intu a station, at which time the station will reser the card and processing will restart at slep 19010.
Alternatively, if the block contains a station-type code indicating a display kiosk (slep 19070), the customer card then sends list 8435 to the display kiosk (step 19080). In other words, CPU reads list 8435 from memory $\mathbf{8 4 6 0}$, in
response to a customer iuserting card 215 into display kiosk 710 , and sends a signal corresponding to the list 8435 to the display kiosk (step 19080).

Alternatively, if the block contains a station-type ende indicaling a Checkout station (step 19090), the customer card then sends list 8435 to the display kiosk (step 19010). In other words, CPU 2450 reads lisi 8435 from memory 8460 , in response to a customer inserting card 215 inio checkout station 915, and sends a signal corresponding to the list 8435 to the checkout station (step 19100).

FIG. 20 shows a block diagram of a preferred relail system including marketing research center 990 , with disk
995, CPU 950, and memury 920. FIG. 20 also shows a plurality of checkout stations 900 . Periodically, each checkout station 900 sends a block of data surmarizing the redemption transactions. The checkout stations send the data blucks, uver telephone lines 941, to research center 990 . Checkout stations 903 are located within a single company. Checkout stations 903 are similar to checkoul stations 900 , described abuve, except that checkout stations 903 have circuitry for communicating over network 912. Checkout stations $\mathbf{9 0 3}$ send Iransaction data blocks to cenlral financial computer 911 located within the company. Central financia! computer 911 periodically sends the compiled transaction data to market restarch center 990 , over telephone lioes 941 . Central financial computer 911 also periodically sends clearing bouse redemption data to an electronic clearing bouse (not shown), over telephone lines 941 .

FIG. 21-26 show a second preferred embodiment of the present invention. The second preferred system has features sirmilar to those of the first preferred system, with additional fealures described below. In the follow description, elements of the second preferred system corresponding to elements of the first preferred system are labelled with corresponding reference numbers.
FIG. 21 is a block diagram of display kiosk 21710. CPU 1750 executes program 21722, in random access, addressable memory $\mathbf{1 7 2 0}$, to display product information reflecting the contents of a customer card. CPU 1750 displays the product information on CRT display 1717, by writing pixel data into video RAM 1735. CRT controller 1737 reads the pixel data from RAM 1737 to send video signals to CRT 1717.

FIGS. 22A, 22B, and 22C show some data structures within the second preferred display kiosk 21710. Structures 11100 and 11200 in FIG. 22A and 11300 in FIG. 22B are described above in connection with the first preferred display kiosk.
In FIG. 22B Structure 22400 contains image data for displaying a map for indicating the spacial location of products corresponding to coupons on a customer card. Structure 22400 normally resides on disk 1725. Structure 22400 includes UPC table 22410, which is a list of entries sorted by UPC code. Each entry in table 22410 includes three fields. A first field is a UPC conde; a second field is an action code, described in more detail below; and a third field is a pointer to pixel data for a certain map.
Structure $\mathbf{2 2 4 0 0}$ also includes video data $\mathbf{2 2 4 2 0}$, which is a group of records each containing pixel data for a respective map. CPU 1750 uses the pointer, in the third field of an entry in table 22410, to access a selected record of pixel data 22420. In FIG. 22B, multiple pointers point to a common map, the otap for the ground floor of store $\mathbf{1 0 0 0}$, because the location of multiple products can be indicated on this common map. Another pointer points to a map for the basement floor of store $\mathbf{1 0 0 0}$, because the product corre-

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sponding to this poimter is located in the basenent of store 1000. Another pointer points to a road map indicaling the location of a store 1500 (bot shown), because the product corresponding to this other pointer is located in store 1500 .
In FIG. 22C, table 22510 stores coordinate for displaying a map location of products corresponding to coupons on a eustomer card. Table 22510 normally resides on disk 1725. Each entry in table 22410 includes four memory fields. A first field is a UPC code, a second field is an action code, a third field is a $Y$ coordinate in the form of a pixel row number for displaying the location of a product, and a fourth tield is an X coordinate in the form of a pixel column number for displaying the location of the producl.

FIG. 23 shows a processing performed by CPU 1750 and program 1722 in display kiosk 1710, when a customer inserts a card into card interface 1715. When a customer, such as customer 310 , inserts customer card 315 into interface slot 1715, a switch (not shown) in interface slot 1715 alerts CPU 1750 that a card has been inserted into the slot. When a customer card is in interface slot 1715, conductive contacts (nol shown) inside interface slot 1715 touch each card contact 7420. Subsequently, CPU 1750 causes card interface 1725 to rese the card hy applying a clock signal to card contact 7423. The customer card then answers the reset by sending a block of data, iocluding identification data 8467 and authorization data 8468, through card contact 7427. CPU 1750 then receives the answer-to-reset from the card (step 23002). CPU 1750 then sends a data block containing a station-type code indicating a display kiosk (step 23004). CPU 1750 then receives the contents of table 8435 in memory $\mathbf{8 4 6 0}$ of the customer card, and temporarily stores these table contents in memory 1720 of the display kinsk (step 23005). CPU 1750 selects the first entry in lable 8435 (step 23010). CPU 1750 displays producl and price information for the presenily selected entry on display 1717. (Step 23040). If there are entries remaining (step 23042), CPU 1750 selects the next entry in table 8435 (step 23045) and processing proceeds to step 23040. If there are no entries remaining (slep 23042), there is no further processing shown in FiG. 23.

Steps 23040, 23042, and 23045 may execule repeatedly withuut manual intervention. For example, slep 23040 may pause for 10 seconds before control passes to the next step. Allernatively, slep $\mathbf{2 3 0 4 0}$ may pause unlil the user presses a button entitled DISPLAY NEXT COUPON ( oot shown) on station 21710.

FIGS. 24A and 24B show the processing of slep 23040 of FIG. 23 in more delail. To display information for an entry in table 8435, CPU 1750 searches for the entry's UPC code in map image index 22410. (step 24005). If CPU 1750 tinds the UPC code in map image index 22410 (step 24030), CPU 1750 dctermines whether the sccond ficld of the found eniry is equal to 1 (step 24040). If the second field is equal to 1 , CPU 1750 uses the third field as a pointer to a map image record 22420 and sends this selected record to video RAM 1735 (step 24050). If CPU 1750 does not find the UPC code in map image index 22410 (step 24030) or determines that the second field of the found entry is not equal to 1 (step 24040), CPU 1750 skips step 24050.

CPU 1750 then reads discount information $\mathbf{8 4 3 5}$ from the customer card, translates the binary-encoded numerical discount data into character data, translates the character data into graphics data, and sends the graphics data to video RAM 1735 (step 24055).
Next, CPU 1750 searches the product location index 11210 (step 24060) and if the UPC code is found in the
location index (slep 24065), and the second field of the found entry is ( 1 (step 24070), CPU 1750 uses the third field of the found eatry to point to a selected record of location text 11220 . CPU 1750 translates this location text to pixel data and sends the pixel data to video RAM 1735. (step 24075). If the UPC code is nol found in the location iudex (step 24065) or the second field of the found entry is not 1 (step 24070), CPU 1750 skips step 24075.
NexI, CPU 1750 scarches the product coordinate table 22510 (step 24080) and if the UPC conde is found in the location index (step 24085), and the second field of the found entry is 1 (step 24090), CPU 1750 uses the third and fourth fields in generate an address signal for video ram 1735. CPU 1750 gencrates a data signal for viden ram 1735 In display a block cursor at a location on CRT 1717 corresponding to the location of the product (step 24095). If the UPC code is not found in the location index (step 24085) or the second field of the found entry is not 1 (step 24090), CPU $\mathbf{1 7 5 0}$ skips step 24095.
CRT controller 1737 reads video RAM 1735 to generate and send display signals to CRT 1717 (step 24100).

FIGS. 25A, 25B, 25C, and 25D show data flows within display kiosk 1710 during the processing of the method shown in FIGS. 24A and 24B. FIG. 25A shows a data flow during the processing of step $\mathbf{2 4 0 5 0}$. CPU 1750 and program 21722 read a selected record of map image data 22420 and sends data 22420 to data port 1742 of video RAM 1735. CPU 1750 and program 21722 also send an address io address port 1740, to determine where pixels will be displayed on display 1717. As shown in FIG. 25A, the first four digits of the address signal specify the row on display 1717 and the last four digits specify the column on display 1717. Map image data 22420 is displayed beginning at row 0100 , columa 0100 .
FIG. 25B shows a dala How within display kiosk 21710 when CPU 1750 execules slep 24055. CPU 1750 and program 21722 read binary encoded discount data $\mathbf{8 4 3 5}$ from a customer card, translate the discount data to pixel data, and send the pixel data to data port 1742 of video RAM 1735. CPU 1750 and program 21722 also sead an address signal 09000100 to address port 1740 , to display the discount data beginning at row 900 , column 100 .

FIG. 25C shows a data flow within display kiosk 21710 when CPU 1750 exccutes step 24075. CPU 21750 and program 21722 read a selected record of ASCll location data 11220, translate the ASCII data to pixel data, and send the pixel data port 1742 of video RAM 1735. CPU 1750 and program 21722 also send an address signal 09500100 to address port 1740, to display the location lext beginning at row 950, column 100.
FIG. 25D shows a data flow within display kiosk 1710 when CPU 1750 execules step 24095. CPU 1750 and program 21722 read a the third and fourth fields of an entry in coordinate table 22510 to generate an address signal for address port 1740. CPU 1750 and program 21722 generate a data signal for data port 1742 to generale a block cursor al a CRT display location corresponding to the address signal.
FIG. 26 shows a view of the CRT display 1717 after CPU 1750 performs the processing of FIGS. 24A and 24B. Pixel 26005 has coordinates ( 100,100 ), meaning that pixel 26005 is in the row 100 , column 100 of CR'I display 1717. Pixel 26005 is the upper left of a display region for map image data. Pixel 26010, baving coordinates $(900,100)$, is the upper left of a display region for coupon discount information. Pixel 26015, having coordinates ( 950,100 ), is the upper left of a display region for product location informa-

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tion. Pixel 26025, having coordinates $(400,950)$, is the upper left of a display region for the block cursor when the block cursor is identifying the spacial location of Old World Pasta.

Thus, the preferred systems provide a convenient and stimulating shopping environment that allows the user to conveniently review the coupons stored on a customer card.

Additional advantages and modifications will readily uecur to thuse skilled in the art. The invention in its broader aspects is therefore not limited to the specific details, representative apparatus, and illustrative examples shown and described. Accurdingly, departures may be made from such details without departing from the spirit or the scope of Applicants' general inventive concepl. The invention is defined in the following claims.

What is claimed is:

1. In a system including a communication device and a plurality of portable cards each having a memory, a method of operating the system comprising the steps of:
reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product;
generating, responsive to the first signal, a second signal containing an image of the product; and
displaying the second signal.
2. The method of claim 1 further including
receiving a third signal corresponding to a product; and determining a price for the product depending on whether the first signal corresponds to the third signal.
3. The method of claim 1 wherein the system includes a cathude ray tube (CRT), and displaying step includes
displaying the second signal on the CRT.
4. The method of claim 1 wherein the system includes a printer for printing on a substrate, and wherein the displaying slep includes
printing, using the printer, the second signal on the substrate.
5. The method of claim 1 wherein the reading slep includes reading a first signal corresponding to pricing information for a product.
6. The method of claim 1 wherein the system further includes an electronic display, and the displaying step includes
displaying the second signal on the electronic display.
7. The method of claim 1 wherein the displaying step includes displaying other information about the product with the image of the product.
8. The method of claim 1 wherein the displaying step includes displaying a verbal description of the product with the image of the product.
9. The method of claim 1 wherein the displaying step includes displaying a location of the product with the image of the product.
10. The method of claim 1 wherein the displaying step includes displaying pricing information for the product with the image of the product.
11. A retail system comprising:
a plurality of portable cards each having a card memory; a communication device;
first memory for storing a signal containing an image of a product;
a reader that reads a first signal from the card memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first sigual corresponding to a product;
a generator for accessing the first memory, using the first signal, to generate a second signal; and
a display for displaying the second signal.
12. The system of claim 11 wherein each portable card includes a card memory for storing a first signal corresponding 10 pricing information for a product.
13. The system of claim 11 further including
a receiver means for receiving a third signal corresponding to a product; and
a determiner means for determining a price for the product depending on whether the first signal corresponds to the third signal.
14. The system of claim 11 wherein the display includes an electronic display.
15. The system of claim $\mathbf{1 1}$ wherein the display includes a cathode ray lube.
16. The sysiem of claim 11 wherein the display includes a printer.
17. The system of claim 11 wherein the geaerator includes circuitry that generates a second sigual containing the image of the product and other information about the product.
18. The system of claim 11 wherein the generator includes circuitry that generates a second signal containing the image of the product and a verbal description of the product.
19. The system of claim 11 wherein the generator includes circuitry that generates a second signal containing the image of the product and a bocation of the product.
20. The system of claim 11 wherein the generator includes circuitry that generates a second signal containing the inage of the product and pricing information for the product.
21. In a system including a plurality of portable cards each having a memory, a first communication device, and a checkout area having a second communication device, a method of operating the system comprising the steps of:
a first reading step of reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card at the communication device, the first signal corresponding to a product;
generating, responsive to the first signal, a second signal containing an image of the product;
displaying the second signal;
a second reading step of reading the first signal from the memory of the card, in response to a person presenting the card at the second communication device;
receiving a third signal corresponding to a product; and
determining a price for the product dcpending on whether the first signal, read in the second reading step, corresponds to the third signal.
22. The method of claim 21 wherein the systern includes a cathode ray tube (CRT), and displaying step includes displaying the second signal on the CRT.
23. The method of claim 21 wherein the system includes a printer for printing on a substrate, and wherein the method includes
printing, using the printer, the second signal on the substrate.
24. The method of claim 21 wherein the second reading step includes reading a first signal corresponding to pricing information for a product.
25. The method of claim 21 wherein the system further includes an electronic display, and the displaying step includes
displaying the second signal on the electronic display.
26. Tbe method of claim 21 wherein the displaying step includes displaying other information about the product with the image of the product.
27. The method of claim 21 wherein the displaying step includes displaying a verbal description of the product with the image of the product.
28. The method of claim 21 wherein the displaying step includes displaying a location of the product with the image of the product.
29. The method of claim 21 wherein the displaying step includes displaying pricing information for the product with the image of the product.
30. In a system including a plurality of product areas, a plurality of pontable cards each baving a memory, a first communication device, and a checkout area having a second communication device, a method of operating the system comprising the steps of:
reading a first signal from the memory of a card in the plurality of cards, in response to a person presenting the card al the first communication device, the first signal corresponding to a product in one of the product areas;
displaying, responsive to the first signal, an image of the product;
removing the product from one of the product areas; and
reading the first signal from the memory of the card, in response to a person presenting the card at the second communication device.
31. The method of claim 30 wherein the reading step includes reading a first sigoal corresponding to pricing information for a product.
32. The method of claim $\mathbf{3 0}$ wherein the system furthes includes an electronic display, and the displaying step includes
displaying on the electronic display.
33. The method of claim $\mathbf{3 0}$ wherein the system further includes a cathode ray tuhe (CRT), and displaying step includes
displaying on the CRT.
34. The method of claim 30 wherein the system further includes a printer for printing on a subsirate. and wherein the displaying step includes
using the printer to display on the substrate.
35. The method of claim 30 whercin the displaying step includes displaying other information about the product with the image of the product.
36. The method of claim 30 whercin the displaying step includes displaying a verbal description of the product with the image of the product.
37. The method of claim $\mathbf{3 0}$ whercin the displaying step includes displaying a lecation of the produci with the image of the product.
38. The method of claim 30 wherein the displaying step ${ }_{25}$ includes displaying pricing information for the product with the image of the product.

## UNITED STATES DISTRICT COUORIGINAL

## GEORGIA

## SUMMONS IN A CIVIL CASE

SOFTCARD SYSTEMS, INC.
$v$.
CASE NUMBER:

TARGET CORPORATION and VISA U.S.A., INC.

TO C.T. Corporation System
Registered agent for TARGET CORPORATION 1201 West Peachtree Street, NE Atlanta, Georgia 30361

YOU ARE HEREBY SUMMONED and required to serve upon PLAINTIFF'S ATTORNEY (name and address)

John L. North<br>Malvern U. Griffin, III<br>William R. Silverio<br>John D. Hamann<br>Sutherland Asbill \& Brennan LLP<br>999 Peachtree Street, N.E.<br>Atlanta, Georgia 30309-3996

an answer to the complaint which is herewith served upon you, within $\qquad$ 20 days after service of this summons upon you, exclusive of the day of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint. You must also file your answer with the Clerk of this Court within a reasonable period of time after service.


DATE HOY: : 2ms
eaAO 440 (Rev. 10/93) Summons in a Civil Action


I declare under penalty of perjury under the laws of the United States of America that the foregoing information contained in the Return of Service and Statement of Service Fees is true and correct.

Executed on $\qquad$
Signature of Server

Address of Server
(1) As to who may serve a summons see Rule 4 of the Federal Rules of Ci vil Procedure.

PO 440 (Rev. 10/93) Summons in a Civil Action

## GEORGIA

## SUMMONS IN A CIVIL CASE

SOFTCARD SYSTEMS, INC.
v.

TARGET CORPORATION and VISA U.S.A., INC.

## CASE NUMBER: <br> 103 CV 3585

TO C.T. Corporation System
Registered agent for VISA U.S.A., INC.
1201 West Peachtree Street, NE
Atlanta, Georgia 30361

YOU ARE HEREBY SUMMONED and required to serve upon PLAINTIFF'S ATTORNEY (name and address)
John L. North
Malvern U. Griffin, III
William R. Silverio
John D. Haman
Sutherland Asbill \& Brennan LLP
999 Peachtree Street, N.E.
Atlanta, Georgia 30309-3996
an answer to the complaint which is herewith served upon you, within $\qquad$ days after service of this summons upon you, exclusive of the day of service. If you fail to do so, judgment by default will be taken against you for the relief demanded in the complaint. You must also file your answer with the Clerk of this Court within a reasonable period of time after service.

| RETURN OF SERVICE |  |  |  |
| :---: | :---: | :---: | :---: |
| Service of the Summons and complaint was made by me ${ }^{(1)}$ |  | DATE |  |
| NAME OF SERVER (PRINT) -. |  | TITLE |  |
| Check one bos betow to indicate spproprimie method of service |  |  |  |
| $\square$ Served personally upon the third-party defendant. Place where served: |  |  |  |
| Left copies thereof at the defendant's dwelling house or usual place of abode with a person of suitable age and discretion then residing therein. |  |  |  |
| Name of person with whom the summons and complaint were left: |  |  |  |
| $\square$ Returned unexecuted: |  |  |  |
| $\square$ Other (specify): |  |  |  |
| STATEMENT OF SERVICE FEES |  |  |  |
|  |  |  | TOTAL |
| DECLARATION OF SERVER |  |  |  |

I declare under penalty of perjury under the laws of the United States of America that the foregoing information contained in the Return of Service and Statement of Service Fees is true and correct.

Executed on $\qquad$
Signature of Server

Address of ServeI
(1) As to who may serve a summons see Rule 4 of the Federal Rules of Civil Procedure.


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