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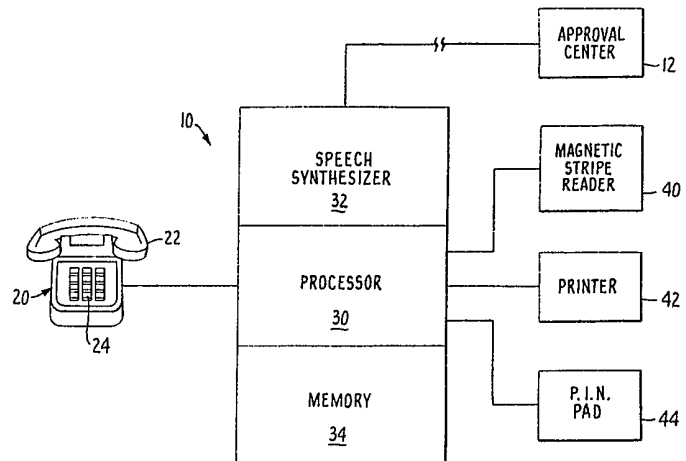
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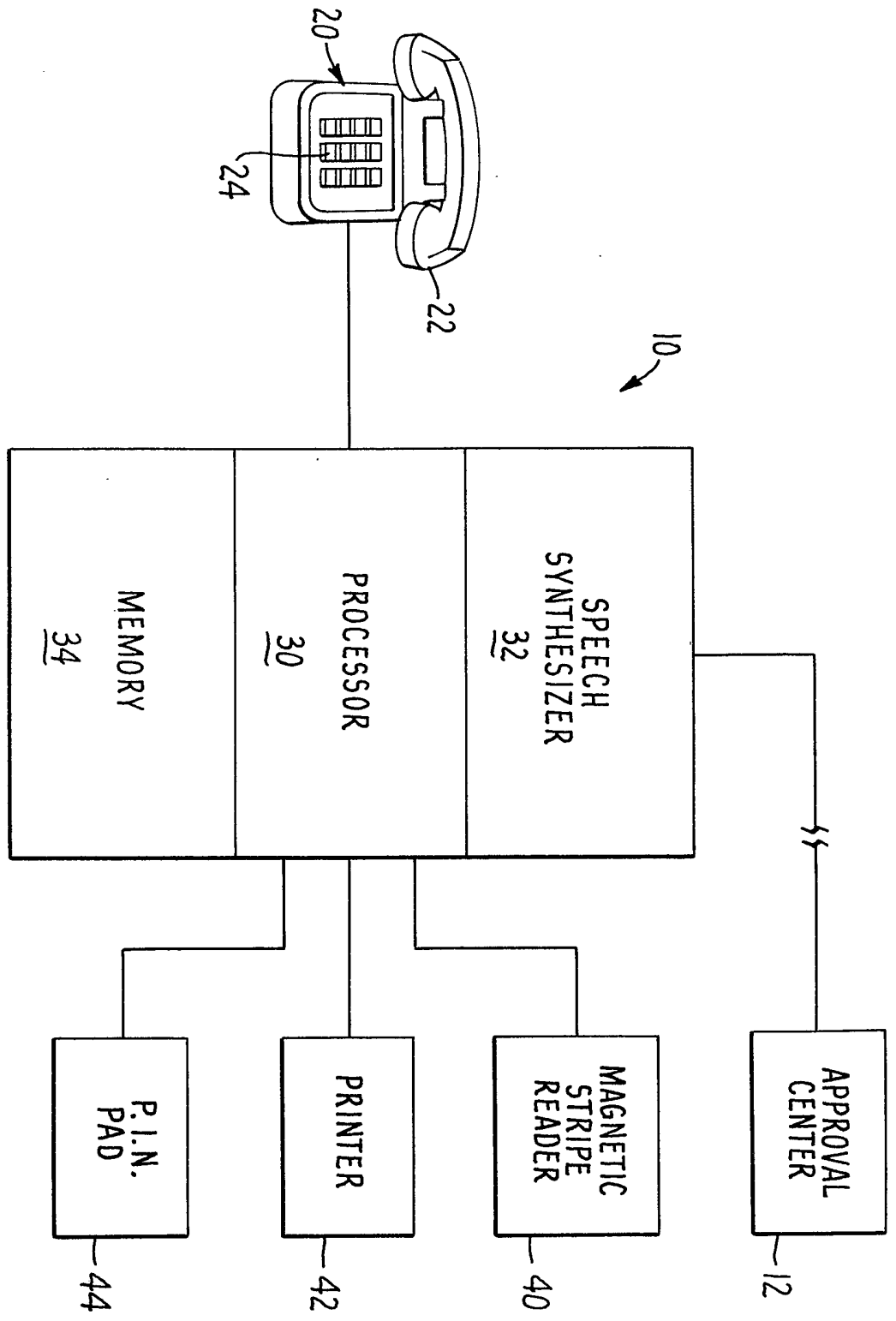
(58) Field of search
**H4K
G4H**

(54) Interactive Audio Transaction Terminal

(57) An interactive audio transaction terminal 10 is disclosed for transmitting data along a communication link to an approval center 12. A telephone 20 is connected to a terminal 10 which includes a processor 30 for controlling a speech synthesizer 32 and a storage memory 34. In operation, transaction data is generated using the dialer 24 of the telephone 20 and is entered into memory 34. The sequence of data entry is controlled through audio requests generated by the speech synthesizer 32 and supplied to the telephone 20. After the entry of the transaction data is complete, the processor 30 activates the communication link with the approval center 12 and transmits the data thereto.



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SPECIFICATION

Interactive Audio Transaction Terminal

Technical Field

5 The subject invention relates to a transaction terminal for use in an electronic financial interchange system. The terminal generates audio requests for transaction information thereby simplifying the data entry procedure for the operator.

10 Background Art

In the financial community, there is a clear trend towards carrying out a wide variety of transactions electronically. Electronic transactions are typically faster, less expensive and generally more efficient. Accordingly, there is great interest in developing equipment which can be used and even improve the electronic exchange of financial information. The subject invention is directed towards just such an improvement.

20 In developing electronic interchange equipment, it is important to consider the identity of the typical operator. Where the user can be fully trained in the operating procedure of the device, design features which simplify human interactions are less critical. For example, where the transaction device is to be used continuously by a bank teller during the work day, data entry and retrieval methods can be geared most effectively for bank use rather than operator use. 25 In contrast, where an unsophisticated and untrained person operates the equipment, greater thought must be given to developing a device which is "user friendly". This approach can be seen in the automatic teller machines deployed by banks that include a video screen for displaying instructions to aid the unsophisticated and infrequent account holder. Thus, when developing devices for use by untrained personnel, it is highly desirable to simplify their operation and make them "user friendly."

30 Present day bankcard systems rely heavily on the electronic communication of transaction information. In a typical bankcard system, a customer is given a credit or debit card from his bank or issuer. The customer can then present the card to a merchant as payment for goods or services. The record of the transaction is supplied to the bank which had issued the card. If the customer was issued a debit card, a deposit account established in the bank will be debited the amount of the purchase transaction. In contrast, if the customer was granted a credit card, the issuing bank will bill the customer for the amount of the transaction. The transfer of the transaction record to the issuer can take a number of forms, either physical or electronic. In the preferred embodiment of the subject invention, the disclosed device will assist in the electronic transmission of the transaction data to the issuer.

60 In most bankcard networks, a number of systems have been developed to reduce potential credit and fraud losses. For example, a weekly bulletin may be distributed to merchants

65 containing card numbers that have been reported lost or stolen or where an assigned credit limit has been exceeded. Before approving the transaction, the merchant will check to see if the customer's account number appears on the list. If the account number appears on the list, the transaction should be denied. Obviously, there are many shortcomings to this approach. For example, the bulletin is only updated weekly and cannot include the most recent information. Furthermore, this method is quite inconvenient and time consuming and therefore is often disregarded.

70 Another approach used to reduce credit and fraud losses is to store the most recent customer information at a central location. The merchant is then asked to contact that central location for authorization to complete the transaction. In the prior art systems, contact with the approval center can be made in a few different ways. For example, the merchant can simply telephone the approval center where a human operator will enter the transaction data into a computer which contains the necessary information to determine if the transaction should be authorized. The result is then verbally communicated back to the merchant. The latter approach is clearly "user friendly" and would not frighten any merchant. However, it has serious drawbacks. More particularly, since the method requires contact with a human operator, response time will typically be slowed during peak purchasing periods. Furthermore, the use of the human operator is inefficient and costly. Finally, because the requests are made in real time over the telephone, significant communication costs are incurred.

100 In order to overcome these shortcomings, two improved systems have been developed. In the first system, the human operator at the approval center has been replaced with an electronic speech generating device. In operation, the merchant contacts the computer at the approval center. The computer then generates audio requests for the desired transaction information. The information is then transmitted by the merchant using the dialer of the telephone. 105 Preferably, a Touch Tone pad generating electronic tones is used. As can be appreciated, by eliminating a human operator, the system will run more efficiently. However, because the transaction information is input in real time to the computer over telephone lines, communication costs are still high.

115 In order to overcome the latter shortcoming, terminals have been developed wherein transaction data can be entered and stored prior to a communication link being established with the approval center. In these transaction terminals, the operator will enter the transaction information in a specific sequence. When the entry of the transaction information is completed, the terminal activates the communication link with the approval center and the information is transmitted.

The latter approach is the most efficient of the

three. However, it suffers from one major drawback. More specifically, the data must be entered in a particular, prescribed sequence requiring the operator to either follow instructions or memorize that sequence. In many cases, the clerk or sales person will not be familiar with the approval process such as in establishments where credit cards are infrequently used. The sales clerk may then find it difficult to obtain authorization of the transaction. In the latter situation, customer delays will arise which can result in the clerk abandoning the approval process altogether. Thus, it would be desirable to provide an input terminal which is both user friendly and minimizes communication costs.

Accordingly, it is an object of the subject invention to provide a new and improved interactive terminal for use in transmitting transaction information.

It is another object of the subject invention to provide a new and improved transaction terminal which is user friendly.

It is a further object of the subject invention to provide a new and improved transaction terminal which reduces communication costs.

It is still another object of the subject invention to provide a new and improved transaction terminal which audibly requests information to facilitate data entry.

It is still a further object of the subject invention to provide a new and improved transaction terminal which activates a communication link to the approval center only after all the necessary transaction data has been entered.

It is still another object of the subject invention to provide a new and improved transaction terminal which can provide an audio translation of the output received from the approval center.

40 Disclosure of Invention

In accordance with these and many other objects, the subject invention is defined by an interactive audio terminal which is capable of receiving transaction data and transmitting the data along a communication link to an approval center. As used herein, the approval center is defined in a broad sense and is intended to cover the location in the transaction network where a response to an authorization request is generated.

More particularly, in a typical system, the location where an authorization request is processed is dependent upon a number of factors, for example, the size of the transaction, the location of the issuer and the location of the merchant. In some situations, the authorization request is handled at a centralized location while in others, the request will be routed directly to the issuer of the card. A complete discussion of one form of an approval network can be found in copending patent application no. 8307319, serial no 2118341A.

The subject terminal is intended to establish a link with the authorization network that will process the request and return a response.

The subject terminal consists of a telephone

65 having an audio transmitter, such as the transmitter in a handset. In addition, the telephone should have a dial, such as a Touch Tone pad, which can generate electronic input signals. The telephone is connected to a speech synthesizer capable of creating audio output signals in response to electrical input signals. The input signals are supplied by a processor which is also connected to an electronic memory. The memory is provided to store all of the information necessary to the approval process.

In operation, transaction data is entered into memory through the telephone dialer in response to audio requests generated by the speech synthesizer. More specifically, the speech synthesizer audibly instructs the operator as to the proper data entry sequence. For example, the operator will be instructed to enter the customer's account number and expiration date of the bankcard. In addition, the amount of the transaction will be requested. When the sequence is completed, the processor activates the communication link with the approval center and the data is transmitted thereto. As can be appreciated, the subject device satisfies the requirement of ease in operation for an unsophisticated user. In addition, because the communication link is not established until all the data is entered, communication costs are reduced.

95 In a preferred embodiment, an authorization response is returned to the terminal and accumulated in the memory. The response is then audibly transmitted to the operator under control of the processor. Preferably, the response is stored in memory until the next transaction is begun such that if the operator desires, it can be recalled.

It is intended that the subject terminal be capable of connection to additional input and output devices. For example, it would be desirable to include a device for reading the magnetic stripe on a credit card to save the operator the need for entering the customer's account number with the dial pad. A hard copy printer may be attached to provide a physical record of the transaction. In addition, it is contemplated that a separate data input pad be provided for entering a customer's personal identification number or PIN.

115 Further objects and advantages of the subject invention will become apparent from the following detailed description taken in conjunction with the following drawing in which:

Brief Description of Drawings

120 Figure 1 is a block diagram illustrating the new and improved interactive terminal of the subject invention.

Best Mode for Carrying Out the Invention

125 Referring to Figure 1, there is illustrated, in block form, the terminal 10 of the subject invention. Terminal 10 is particularly adapted for use in generating authorization requests in bankcard transactions. However, it is to be

understood that the subject terminal may be used in other financial applications.

As discussed above, in a bankcard system, a customer will present a card to a merchant as payment for goods or services. Prior to completing the transaction, the merchant will contact an approval center 12 to secure authorization for the transaction. By obtaining authorization for each transaction, credit and fraud losses can be minimized.

In order to process an authorization request, the approval center 12 must be provided with all the information relating to the transaction, such as the customer's account number, card expiration date, amount of transaction, etc. The subject terminal 10 is intended to permit the merchant to easily transmit this data to the approval center 12. In accordance with the subject invention, terminal 10 is used in combination with a standard telephone 20. The telephone 20 will have a means for generating audio signals, typically a transmitter 22 located in the handset of the telephone. Telephone 20 is also provided with a dial means for generating electrical input signals. Preferably, a Touch Tone dial pad 24 is utilized.

The telephone 20 is connected to a processor 30 in the terminal. Processor 30 is intended to control the input/output functions of the terminal, as well as any data formatting and manipulation. Processor 30 also controls a speech synthesizer module 32 and an internal memory 34 as discussed more fully hereinbelow. A suitable processor for carrying out these functions is manufactured by Texas Instruments Corp. under the Serial No. TMS—7120. The latter device includes an eight-bit microprocessor and 12K byte read only memory (ROM). The operating instructions for the processor are stored in the ROM.

In order to generate the audio requests, a speech synthesizer 32 is provided which is connected to the processor. Speech synthesizer 32 includes a memory for storing, in digital form, all the vocabulary necessary to generate the desired requests or prompts. When the processor determines that a certain audio prompt is required, it will signal the synthesizer to call up that prompt from its memory. The synthesizer then generates an analog electrical output signal which is supplied to the transmitter 22 of the telephone 20. The transmitter converts the analog electrical signal into an audio output. A speech synthesizer capable of performing these functions is manufactured by Texas Instruments under the Serial No. TMS—5220A. The latter device contains an eight-bit speech microprocessor which is connectable to 128K bit ROM such as a Texas Instrument Speech ROM TMS—6100. It is envisioned that the necessary vocabulary to be stored consists of about 100 words. This vocabulary can be combined in various ways to generate approximately 50 audio phrases.

A separate, programmable memory 34 is also connected to the processor 30. Memory 34 is

intended to store all the information peculiar to the specific terminal location. For example, the memory will hold a terminal identification, as well as any merchant information that would be printed on a scales draft. Storage space is also provided for a table containing information which permits the processor to determine the appropriate bank card network to be contacted based on the cardholder account number. In addition, the telephone numbers associated with each bank card network are included.

Memory 34 is also utilized to store both the transaction data entered by the operator and the response received from the approval center. In the preferred embodiment, enough memory area should be provided for storing a record of all of the transactions which occurred during the work day. By this arrangement, a compilation of the day's transactions can be built up and transmitted to a central processing area when the business day is complete. Because of the importance of all this transaction information, the memory must be nonvolatile, that is, will not be lost due to a power failure. One type of memory suitable for this purpose is an electronically erasable, programmable, read only memory (EEPROM) which is modifiable only while power is available. Suitable EEPROM's for this application are manufactured by Xicor, Inc., X2816A and by Seeq Inc., No. 5213. Each of the latter devices has a storage capacity of 2K bytes. It is envisioned that approximately 6K bytes of storage will be required. Another method of safeguarding the system is to provide a capacitor which is charged during normal operations. If power is lost, the capacitor can supply the power to operate the system and preserve the data in memory.

In the preferred embodiment, the terminal 10 will also include a dialer (not shown) for automatically establishing a communication link with the approval center 12. A suitable dialer is manufactured by Texas Instruments, Corp., No. TMS—99531. The data is passed through a modem and transmitted at 300 bits per second. A suitable modem is manufactured by Texas Instruments, No. TMS—99532.

In operation, the merchant can initiate the authorization procedure by lifting the handset from the telephone 20 and entering a start code on the dialer. The start code activates processor 30 which signals the synthesizer to generate transaction data requests. For example, processor 30 will access speech synthesizer 32 and cause the generation of the electrical analog signal corresponding to the message "PLEASE ENTER ACCOUNT NUMBER". This analog signal is then converted into audible form by transmitter 22 of the telephone. Using the Touch Tone pad 24, the operator can enter the account number of the customer. When the entry is complete, the processor will then signal the speech synthesizer to generate the phrase "PLEASE ENTER EXPIRATION DATE". The operator then enters the expiration date of the card. This process will

continue until all the necessary transaction data has been entered into memory 34.

After the data is entered, the processor evaluates the cardholder number against the table of numbers stored in the memory. By this arrangement, the particular bankcard network is identified enabling the proper telephone number to be located. The processor then activates the dialer to establish a communication link with the proper approval center 12. The transaction data is then transmitted.

After evaluating the transaction, the approval center will return a message. The returned message will consist of an approval or some form of denial. If the return message is an approval, the processor will generate the appropriate audio message, such as "YOUR APPROVAL NUMBER IS 12345". The merchant will then write that number onto a sales draft and complete the transaction. Where a denial response is supplied, the operator might be asked to call another number for additional information. The operator may then be told to confiscate the card or even detain the user.

In the preferred embodiment, the message which has been returned from the approval center is stored in memory 34 until the next transaction is begun. By this arrangement, should the operator have forgotten the message or fail to record it properly, the message can be recalled from memory without having to perform the entire approval process another time.

In order to reduce the costs of the authorization process without compromising the protection against the credit and fraud losses, the subject invention may be provided with a means to reduce the number of transactions actually transmitted for authorization. More particularly, it is envisioned that a dollar threshold level will be selected such that if the transaction amount is less than this threshold level, the data will not be transmitted to the approval center for authorization. By this arrangement, the costs of communication and the expense associated with the authorization request is eliminated. Further, because the transactions are relatively small, credit and fraud losses are still minimized. The particular dollar threshold level is determined based on factors such as the usual customer base, location of the merchant and past history of losses.

In order to achieve the latter result, a means is provided for comparing the entered transaction amount with the predetermined dollar threshold level. If the transaction amount falls below the threshold level, the processor 30 of the terminal will generate an automatic authorization. If the transaction exceeds the threshold, the data will be transmitted to the approval center for authorization.

In order to add further security to the system, the terminal may further include a means for randomly selecting transactions which fall below the threshold level and transmitting them to the approval center. The percentage of transactions

forwarded can be relatively small, such that the cost savings associated with the threshold selection process are maintained. As can be appreciated, by forwarding a random selection of transactions to the approval center, a fraudulent user could not rely on the fact that a purchase below a certain level will not be subject to scrutiny.

In accordance with the subject invention, a number of additional input/output devices can be interfaced with the terminal 10 to facilitate operation. One of the more desirable devices would be a magnetic stripe reader 40. A magnetic stripe reader 40 is capable of decoding the magnetically encoded information on a bankcard. In operation, the merchant will swipe the bankcard through the reader 40 which detects the customer's account number and expiration date encoded on his card. This information is supplied directly to processor 30, relieving the merchant from having to manually enter that information.

In a preferred embodiment, a printer 42 is also connected to the processor. Printer 42 can be used to automatically generate a hard copy receipt for the customer, displaying all the relevant information relating to the transaction. For example, printer 40 will register the merchant's name, the date of the transaction and the amount of the transaction.

The terminal may also be used in conjunction with a separate input pad 44. Pad 44 is provided to facilitate the entry of the customer's personal identification number or PIN. One method of enhancing security in a bankcard system is to supply each customer with his own secret identification number. This identification number is encoded on the magnetic stripe on the card. In operation, the merchant reads the information encoded on the magnetic stripe into the memory via the reader 40. The customer, using the pad 40, which is separate from the telephone, can enter his identification number out of view of the merchant. Processor 30 then compares the secret number read from the card with the number entered by the customer. The transaction will not be authorized unless these numbers match. The input keys of the PIN pad can be similar to the electrical Touch Tone signals generated by the telephone 20.

Various other attachments could be provided to the terminal to enhance its operation. For example, the terminal may be provided with an inlet port for connection to an electronic cash register. In the latter situation, the transaction totals and other information generated by the electronic cash register can be input directly into the terminal.

In summary, there has been provided a new and improved interactive terminal 10 for use in transmitting transaction data. The terminal is connected to a telephone and includes a processor 30 for controlling a speech synthesizer 32 and a storage memory 34. In operation, transaction data is generated by the dial 24 of the telephone and placed into the memory in

response to audio requests generated by the speech synthesizer. When the data entry is complete, the processor activates a communication link to the approval center 12 and transmits the data thereto. The subject terminal reduces transmission costs and is user friendly.

While the subject invention has been described with reference to a preferred embodiment, it is to be understood that various other changes and modifications could be made therein, by one skilled in the art, without varying from the scope and spirit of the subject invention as defined by the appended claims.

CLAIMS

1. An interactive audio terminal for receiving transaction data and transmitting the data along a communication link to an approval center comprising in combination:

a telephone having an audio transmitter means and a dial means capable of generating electrical signals;

speech synthesizer means capable of generating audio output signals;

processor means connected to said telephone and said speech synthesizer means; and

memory means connected to said processor means for accumulating data whereby in operation, transaction data is generated by said dial means and entered into said memory means in response to audio requests generated by said speech synthesizer means and supplied to said audio transmitter means under control of said processor means, such that when the entry of the transaction data is complete, said processor means activates the communication link with the approval center and transmits the data thereto.

2. A terminal as recited in claim 1 wherein said memory means is capable of storing data returned to said terminal from said approval center enabling said returned data to be audibly sent through said transmitter means of said

telephone under control of said processor means.

3. A terminal as recited in claim 2 wherein said data returned from the approval center data remains in said memory means until a new transaction is begun such that said returned data can be recalled by said dial means.

4. A terminal as recited in claim 1 further including a means connected to said processor means for reading in encoded magnetic stripe and transmitting the data on said stripe to said memory means.

5. A terminal as recited in claim 1 wherein said dial means is a Touch Tone dialer.

6. A terminal as recited in claim 1 wherein said audio transmitter means is contained in the handset of the telephone.

7. A terminal as recited in claim 1 further including a means, connected to said processor means and separate from said telephone, for generating electrical signals for entry into said memory.

8. A terminal as recited in claim 1 further including a means connected to said processor means for printing a hard copy record of each transaction.

9. A terminal as recited in claim 1 further including an electrical storage means, connected to said memory means, to provide an alternate source of power to ensure the data in said memory means is not lost due to a power failure.

10. A terminal as recited in claim 1 further including a means for comparing the amount of the entered transaction to a dollar threshold level, such that if said transaction amount falls below the threshold level, said processing means will generate a response without transmitting the data to the approval center.

11. A terminal as recited in claim 10 including a means for randomly selecting transaction entries which fall below the dollar threshold level and transmitting the selected data to the approval center for authorization.