Title: TELEPHONIC TRANSACTION SYSTEM

Abstract: A telephonic transaction system is comprised of a transaction device (10) and a telephone interface (11). The transaction device is comprised of a memory means wherein transactional information is stored. The transaction device also has a means for selecting what stored transaction information are to be transmitted to the telephonic interface, and a transmission means, for transmitting selected transactional information. The transactional device converts the transaction information into an appropriate dialing string which instructs the telephonic interface of the sequence and duration of a signal to be sent. The dialing string is to be transmitted to the telephonic interface where it is acted upon. The telephonic interface is comprised of a receiver (12) for receiving signals from the transaction device, a processing means (13) connected in circuit to the receiver converts the remotely generated dialing string into a signal compatible with a phone.
TELEPHONIC TRANSACTION SYSTEM

BACKGROUND OF THE INVENTION

PRIOR HISTORY

This application is an International Application claiming priority of U.S. Application No. 09/549,838 filed on 04/14/00, which is a Continuation-In-Part Application of U.S. Patent Application No 09/296,321 filed on 04/22/99.

FIELD OF THE INVENTION

The present invention relates to a telephonic transaction system for wirelessly transmitting transactional information contained in a portable electronic storage device to a telephony or Internet Protocol (IP) system access device.

DESCRIPTION OF THE PRIOR ART

As a result of the advances achieved in the field of telecommunications, more and more transactions are being carried out across telephone systems and IP systems. Many of these transactions require the manual inputting of transaction parameters into an access device such as a telephone, keypad, or a computer. The access device then generates a corresponding Dual-Tone-Multi-Frequency (DTMF) signal or other signals such as voltage, light or current pulses which are recognizable by the telephony or IP system.
DTMF is a standard used by the telephone industry in the United States for analog phone systems and is commonly used in several other countries.

With the growing complexity in the type of transactions which occur across these telephony and IP systems and the prevailing need to secure these transactions, the number of parameters which need to be inputted into the telephony and IP system is typically substantial and correctly inputting these parameters manually through an access device such as a telephone or a computer can be quite onerous. Consequently, a task such as using a calling card to pay for a telephone call requiring the precise input of long strings of number can quickly prove to be quite a challenge.

Furthermore, the need to know account numbers, telephone numbers, personal identification numbers, and other transaction parameters typically needed when performing a transaction on the telephone, requires most users to carry cards with these numbers and parameters attached thereto. These cards can be lost or stolen or the account numbers thereon exposed during a transaction creating potential security risks to the users account.

Microprocessor based electronic organizers are well known in the prior art and are widely used by the public to perform a variety of tasks such as storing information, developing schedules and organizing information. The compact size and light weight of these electronic organizers allow them to be quite portable and easy to carry. These electronic organizers come in a variety of configurations many of which allow the electronic organizer to transmit data via a variety of wireless modalities, one of the most popular of which is infrared light.
The ability of these electronic organizers to store large quantities of information and the ability to protect the contents of the organizers through the use of encryption and passwords make them an ideal and relatively secure repository of transaction parameters. However, there is currently no suitable devices which enables these electronic organizers to interface to a telephone or other access device without directly connecting the organizer in circuit to that access device.

Accordingly, there is a need for a system and a method for automatically inputting transaction parameters into a telephonic and IP system access devices.

Accordingly, there is also a further need to be able to securely carry transaction parameters and securely input transaction parameters into a telephone or IP system.

The present invention is a telephonic transaction system for wirelessly transmitting transactional information contained in a portable electronic storage device to a telephonic access device for transmission through a telephone line or an IP network interfaced to a telephone line. As will be described in greater detail hereinafter, the present invention solves the aforementioned and employs a number of novel features that render it highly advantageous over the prior art.

SUMMARY OF THE INVENTION

Accordingly, it is an object of this invention to provide a system and a method for automatically inputting transaction parameters into a telephone or IP system.

Accordingly, it is a further object of this invention to provide a means for securely carrying transaction parameters and securely inputting transaction parameters into a telephone or IP system.
To achieve this objective, and in accordance with the purposes of the present invention a telephonic transaction system for wirelessly transmitting transactional information contained in a portable electronic storage device through a telephone line is provided.

The telephonic transaction system is comprised of a transaction device and a telephonic interface. The transaction device is preferably portable, having a compact size and lightweight. The transaction device is comprised of a memory means wherein transactional information is stored. The transaction device also has a means for selecting what stored transaction information are to be transmitted to the telephonic interface, and a transmission means, for transmitting selected transactional information. The transaction device is typically an electronic organizer or a palm type computer with an infrared transceiver for transmitting transaction information.

The transaction device has stored therein a plurality of transaction information such as account numbers, access codes, personal identification numbers, and phone numbers eliminating the need to carry this information on cards or on paper. It is also contemplated that access to the transaction information is secured within the transaction device, requiring the use of passwords or other security means to gain access to the transaction information.

The transaction device converts the transaction information into an appropriate dialing or transaction string which instructs the telephonic interface as to the sequence and duration of the DTMF signals or as to the appropriate digital signals which are to be sent through a phone line or IP system. The dialing string is then transmitted to the telephonic interface where it is acted upon.
The telephonic interface can be housed as a separate entity which can be connected to a phone or it can be integrated within the phone housing. The telephonic interface unit is comprised of a receiver for receiving signals from the transaction device. A processing means connected in circuit to the receiver converts the remotely generated dialing string into an appropriate signal. The signal is then transmitted across the phone line or IP system where they are recognized by the phone system or a computer.

**Brief Description of the Drawings**

Figure 1 is a block diagram of my telephonic transaction system.

Figure 2 is a perspective view of my keypad-free telephone incorporating my telephonic interface.

Figure 3 is a schematic diagram of my telephonic interface.

Figure 4 is a flowchart of the main steps involved in sending a signal from an electronic organizer to my telephonic interface.

Figure 5 is a flowchart of the main steps utilized by my telephonic interface in receiving a signal from an electronic organizer and generating a tone.

**Description of the Preferred Embodiment**

Referring to Figure 1, the present invention is a telephonic transaction system for securely carrying out transactions over a telephone line. The telephonic transaction system is comprised of a transaction device 10 and a telephonic interface 11.
The transaction device 10 is preferably portable, having a compact size and lightweight. The transaction device is comprised of a memory means wherein transactional information is stored, a means for selecting what stored transaction information are to be transmitted to the telephonic interface, and a transmission means, preferably an infrared transmission means, for transmitting selected transactional information. In the preferred embodiment, the transaction device 10 is an electronic organizer or a palmtop computer with an infrared transceiver for transmitting transaction information.

The transaction device 10 has stored therein a plurality of transaction information such as account numbers, access codes, personal identification numbers, and phone numbers eliminating the need to carry this information on cards or on paper. It is also contemplated that access to the transaction information is secured within the transaction device requiring the use of passwords to gain access.

The transaction device 10 converts the transaction information into an appropriate dialing string which instructs the telephonic interface 11 of the sequence and duration of signals which are to be sent through a phone line or IP system. The dialing string is then transmitted to the telephonic interface 11 where it is acted upon.

The telephonic interface 11 unit is comprised of a receiver 12, preferably an infrared sensor, for receiving signals from the transaction device 10. In the preferred embodiment, a processing means 13 is connected in circuit to the receiver. The processing means 13 converts the remotely generated dialing string into an appropriate signal which is then transmitted across a phone line or IP system.
Referring to Figure 1 and 2, the telephonic interface can be housed as a separate entity or can be integrated into the design of an access device for a telephone line or IP system. One such access device would be a telephone, Figure 2 is a model of a telephone 20 having the telephonic interface 11 incorporated therein. The infrared sensor 21 is positioned so that it is easily accessible to a transaction device placed on top of the telephone 20. It is also contemplated that the telephonic interface be integrated into other access devices which transmit transaction information over telephone lines or IP networks such as sales registers and computers.

When used to interface with computers, the telephonic interface would have the capability to simulate keyboard keystrokes instead of DTMF tones. When used with sales registers, the telephonic interface can be integrated with the sales register itself or integrated with a credit card swipe machine. In either application, information received by the telephonic interface 11 can be combined with information from the sales register or computer and sent to an appropriate entity through the access device over a telephone line or IP network.

Referring to Figure 3, in the preferred embodiment the telephonic interface is housed separate from the phone. The telephonic interface is activated when the telephone handle is taken of the hook and transistors Q1 or Q2 detect a bias voltage across a telephone's microphone lines. If either Q1 or Q2 sense a bias voltage, then power is supplied to the rest of the circuit. The crystal oscillator circuit (XLT1, C3,C4) supplies a stable clock signal to the microprocessor U1 thereby activating U1. U1 functions to coordinate the actions of the telephonic interface.
In the preferred embodiment, the telephonic interface taps into the microphone line of a telephone by means of a T-tap which plugs into the handset jack of a telephone. The T-tap has a second jack in which the handset of the telephone can be plugged in allowing the handset to be used simultaneously with the telephonic interface.

The transaction device transmits a signal containing the transaction information to the telephonic interface. For security, it is preferable that the signal be a series of infrared light pulses. The distance and angle limitations of an infrared light pulse and an infrared light sensor makes it more difficult to intercept an infrared signal providing greater security. The use of a radio frequency signal poses a greater security threat than infrared because radio frequency signals are more omni-directional providing more opportunity to be intercepted.

Referring to Figure 4, in the preferred embodiment, the transaction device waits for a command 30 from the user (referred to as A) to transmit information located therein. Once this command is received, the transaction device converts the command into a dial string 31 having a start of text character (STX) and an end of text character (ETX) 32. This dial string is then sent to the infrared transceiver 33 where the dial string is transmitted as a series of infrared light pulses.

Referring to Figure 3, the telephonic interface has an infrared light sensor IRD1 which converts the infrared light pulses into electrical pulses. The circuit section containing U2:A, C9,R7,R9,R10,D4,C5, C16, and U2 transforms the electrical pulses from IRD1 into a square wave which is sent to RA0.

Referring to Figures 3 and 5, U1 checks RA0 to see if it has received a character 50 to see if a STX is present at RA0 51. If the STX is present then U1 continues to
receive and save each following character at RA0 until a ETX is received 52. Every character which is not a STX or ETX is checked by U1 to see if it is a checksum 53. If the character is a checksum then it is stored at a special location 54. Once the ETX is received U1 calculates a checksum based on the characters it stored. If the calculated checksum and the received checksum match then the received dial string is valid and is acted upon 56. If the calculated checksum and the received checksum do not match the dial string is ignored and U1 is reinitialized to receive another dial string 57.

Once a valid dial string has been received by U1, each character in the dial string is evaluated to determine if it is a control command or if it is data to be sent to the system access device. In the preferred embodiment, the data is converted into DTMF tone signals. Control commands in the preferred embodiment change the default settings for the period of time between DTMF tones, or control commands can change both the timing and duration of tones thereby creating pauses in the dialing sequences which imitate the timing of hand dialing. In the preferred embodiment, characters which represent DTMF tone signals cause U1 to generate a signal to U3 which then generates a DTMF tone for a controlled duration and then no tone for another controlled duration 58, 59, 60, 61.

The actual DTMF tones used for dialing are generated by U3. In an alternative method U1 can simulate the tones by outputting a repeating pattern of digital signals to a resistor ladder network which would convert the digital signals into the appropriate analog wave pattern of the DTMF tone being sent out. The generated DTMF tones need to be transferred to the telephone with adequate amplitude and quality that they meet telephone industry standards. C14, R28, U2: B, C15, R31, Pot 1, C17, R27, C13, T1,
C12, R24, and R26 are utilized in order to ensure that the generated DTMF tones have adequate amplitude and quality.

The generated DTMF tones are received by the phone line through the microphone line of a telephone. Once the DTMF tones have been sent into the phone line the phone system or a receiving telephone system switch or a computer or an interface to an IP network will receive the DTMF tones and act upon them.

The foregoing descriptions of the preferred embodiment of the invention have been presented for purposes of illustration and description, and are not intended to be exhaustive or to limit the invention to the precise forms disclosed. The descriptions were selected to best explain the principles of the invention and their practical application to enable others skilled in the art to best utilize the invention in various embodiments and various modifications as are suited to be particular use contemplated. It is not intended that the novel device be limited thereby. The preferred embodiment may be susceptible to modifications and variations that are within the scope and fair meaning of the accompanying claims and drawings.
I claim:

1. An infrared telephonic interface for receiving dialing instructions via an infrared signal and performing dialing instructions on a telephone, the telephonic interface comprising:
an infrared sensor, the infrared sensor capable of receiving infrared dialing instructions;
and
a processing means, the processing means connected in circuit to the infrared sensor and to a telephone microphone line, the processing means having means for converting the infrared dialing instructions into DTMF tones and means for transmitting the DTMF tones across the telephone microphone line enabling the phone to carry out the infrared dialing instruction.

2. The infrared telephonic interface in claim 1 wherein the processing means is connected to the telephone microphone line via a T-tap, the T-tap inserted into a handset jack on the telephone, the T-tap also having a handset jack providing a means for operatively connecting a handset to the telephone.

3. The infrared telephonic interface in claim 1 wherein the infrared telephonic interface is incorporated within a telephone housing, the telephone housing having an opening therethrough positioned to allow an infrared signal to be received by the infrared sensor.
4. The infrared telephonic interface in claim 1 wherein the infrared telephonic interface is activated by sensing a bias voltage across the telephone’s microphone line.

5. The infrared telephonic interface in claim 1 wherein the processing means is capable of inserting pauses of varying lengths in between DTMF tones in order to simulate the timing of hand dialing.

6. A telephonic interface unit for remotely generating DTMF tones, the telephonic interface unit comprising:

means for receiving a remotely generated signal containing dialing instructions; and a processing means, the processing means connected in circuit to the means for receiving and having means for converting the remotely generated signal into DTMF tone generating signals

a DTMF tone generator, the DTMF tone generator connected in circuit to the processing means, the DTMF tone generator receiving DTMF tone generating signals and generating DTMF tones which are transmitted across the telephone microphone line.

7. The telephonic interface unit in claim 6 wherein the means for receiving a remotely generated signal is an infrared sensor capable of receiving infrared signals.

8. The telephonic interface unit in claim 7 wherein the DTMF tone generator is connected to the telephone microphone line via a T-tap, the T-tap inserted into a handset jack on the telephone, the T-tap also having a handset jack providing a means for operatively connecting a handset to the telephone.
9. The telephonic interface unit in claim 8 wherein the infrared telephonic interface is activated by sensing a bias voltage across the telephone's microphone line.

10. The telephonic interface unit in claim 9 wherein the telephonic interface unit is capable of inserting pauses of varying lengths in between DTMF tones in order to simulate the timing of hand dialing.

11. The telephonic interface unit in claim 8 wherein the telephonic interface is incorporated within a telephone housing.

12. A telephonic transaction system for securely carrying out transactions over a telephone line, the telephonic transaction system comprising:

a transaction device, the transaction device being portable, lightweight and comprising a memory means wherein transactional information is stored and an infrared transmission means for transmitting selected transactional information;

a telephonic interface unit comprising an infrared sensor, a processing means connected in circuit to the infrared sensor and having means for converting the remotely generated signal into DTMF tone generating signals, a DTMF tone generating means connected in circuit to the processing means, the DTMF tone generating means receiving the DTMF tone generating signals from the processing means and transmitting DTMF tones across a telephone line.
13. The telephonic transaction system in claim 12 wherein the telephonic interface unit is connected in circuit to a telephone microphone line via a T-tap, the DTMF tone generating means transmitting DTMF tones across telephone microphone line, the T-tap inserted into a handset jack on the telephone.

14. The telephonic transaction system in claim 12 wherein the telephonic interface is incorporated within a telephone housing, the telephone housing having an opening therethrough positioned to allow an infrared signal to be received by the infrared sensor.

15. The telephonic transaction system in claim 12 wherein the infrared telephonic interface is operatively integrated to a computer.

16. The telephonic transaction system in claim 12 wherein the infrared telephonic interface is operatively integrated to a sales register.

17. A telephonic transaction system for securely carrying out transactions, the telephonic transaction system comprising:
a transaction device, the transaction device being portable, lightweight and comprising a memory means wherein transactional information is stored and a transmission means, the transaction device converting selected transactional information into a dialing string and transmitting the dialing string;
a telephonic interface comprising a receiver, a processing means connected in circuit to the receiver, and a signaling means connected in circuit to the processing means, the
telephonic interface receiving the transmitted dialing string and converting the received dialing string into a signal compatible with a telephone system.

18. The telephonic transaction system in claim 17 wherein the transmission means is an infrared transceiver and the receiver is an infrared sensor.

19. The telephonic transaction system in claim 17 wherein the telephonic interface unit is connected in circuit to a telephone microphone line via a T-tap inserted into a handset jack on the telephone, the signaling means is a DTMF tone generating means, the DTMF tone generating means transmitting DTMF tones to a telephone line across the telephone microphone line.

20. The telephonic transaction system in claim 17 wherein the telephonic interface is incorporated within a telephone housing.
Figure 3
Start

Initialize

Waiting For a Command

Is a Dial Command?

No

Setup Command?

No

Exit Command?

No

Yes

Baud Rate, Stop Bit, Byte Length, Parity Check Setup

STOP

Preference Setup

Prompt Error Message

Are Preferences Setup?

No

Are Text Selected?

Yes

Translate any Alpha text to numeric. Purge Non-dialable Text

Open Infrared Port with defined Parameter

Package Dial String with STX and ETX

Send Packaged Dial String to Infrared Port

Figure 4
# INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER

<table>
<thead>
<tr>
<th>IPC(7)</th>
<th>US CL</th>
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<td>HOAM 1/00, 11/00; G06F 13/00, 19/00; H04Q 7/20</td>
<td>379/355, 361, 254, 418, 93, 95.5.1; 395/893, 156; 455/462, 74.1, 74.2, 464</td>
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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S.: 379/355,361,254,418,93,95,5.1; 395/893,156;455/462,74.1,74.2,464

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Continuation Sheet

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>X</td>
<td>US 5,522,089 A (KIKINIS et al) 28 MAY 1996, Figs. 10, 13, 17, 28; col. 14, lines 9-67; col. 15, lines 1-67; col. 16, lines 1-67; col. 17, lines 4-11; col. 18, lines 12-44; col. 19, lines 40-67; col. 20 to col. 24; col. 25, lines 15-31; col. 26, lines 1-48].</td>
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<td>Y</td>
<td>US 4,485,668 A (HUDSON et al) 04 DECEMBER 1984, Figs. 1, 2(element 14); col. 2, lines 24-67; col. 3, lines 50-67; col. 4, lines 1-67; col. 5, lines 1-11</td>
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<td>US 5,644,727 A (ATKINS) 01 JULY 1997, Figs. 22A-22D; COL. 66, lines 6-41</td>
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<td>Y</td>
<td>US 6,002,937 A (YOUNG et al) 14 DECEMBER 1999; Figs. 1-6; col. 2, lines 1-67; col. 6, lines 1-67; col. 7, lines 1-61; col. 10, lines 14-67.</td>
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<td>Y</td>
<td>US 5,583,933 A (MARK) 10 DECEMBER 1996; Figs. 2-5, 10, 14; col. 5, lines 25-67; col. 6, lines 1-36; col. 8, lines 10-67; col. 9 to col. 13; col. 14, lines 1-19; col. 28, lines 22-67; col. 29 to col. 43; col. 44, lines 1-67; col. 64, lines 14-67; col. 65; col. 66, lines 1-27.</td>
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<td>US 5,485,513 A (GOEDKEN et al) 16 JANUARY 1996; Figs. 1-4; col. 1, lines 5-63; col. 2, lines 5-63; col. 3, lines 15-67; col. 3 to col. 6; col. 7, lines 14-23; col. 8, lines 12-32</td>
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<td>A</td>
<td>US 5,524,141 A (BRAUN et al) 04 JUNE 1996 ALL</td>
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- Further documents are listed in the continuation of Box C.
- See patent family annex.

* Special categories of cited documents:
  - "A" document defining the general state of the art which is not considered to be of particular relevance
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Date of the actual completion of the international search: 05 June 2001

Date of mailing of the international search report: 24 AUG 2001

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Form PCT/ISA/210 (second sheet) (July 1998)
Continuation of B. FIELDS SEARCHED Item3: US Patents Full-Text Database; JPO Abstracts Database; EPO Abstracts Database; Derwent World Patents index; IBM Technical Disclosure Bulletins; Telephonic transaction system, telephone interface, infrared transmission, infrared receiver