

**METHOD AND APPARATUS FOR EMULATING A MAGNETIC STRIPE  
READABLE CARD**

**BACKGROUND OF INVENTION**

**1. Field of Invention**

The invention relates generally to systems and methods for obtaining information from and/or transmitting information to a user device and, in particular, to systems, methods, and apparatus that provide for contactless information transmission.

**2. Background**

Today, both commercial (e.g., banking networks) and non-commercial (e.g., security systems) information systems often rely on magnetic card readers to collect information specific to a user (e.g., a security code, a credit card number, etc.) from a user device (e.g., a transaction card). Credit card purchases made in person provide an example of the most common transaction-type that relies on a user device, the credit or debit card, which is read by a magnetic card reader. User devices that rely on magnetic-stripe based technology magnetically store information (e.g., binary information) in the magnetic stripe. The magnetic stripe reader provides an interface to a larger computerized network that receives the user's information to determine, for example, whether to authorize a transaction, to allow the user access to a secure area, etc.

Recently, such devices have seen technological advances that increase their capabilities and improve their security. For example, such devices may now include embedded processors, integral biometric sensors that sense one or more biometric feature (e.g., a fingerprint) of the user, and magnetic stripe emulators. As one result, today's user devices may provide greater security by dynamically generating the necessary information, for example, generating the credit card number at the time of a transaction. Improved security can also be provided by such devices because more sophisticated authentication schemes can be implemented with the devices.

In addition, user devices such as transaction cards may now also provide for one or more modes of information transmission other than transmission via a magnetic stripe/card reader combination. For example, user devices that may transmit information optically or via radio frequency (“RF”) signal transmission to a compatible system interface are now available. Further, the architecture of a user device that includes a processor is generally compatible with both the improved security features described above and the contactless transmission modes such as optical and RF signal transmission. As a result of the improved security and greater functionality of some current user devices, there is a desire to replace magnetic-stripe based user devices with devices that include forms of information transmission other than the reading of a magnetic-stripe.

There is, however, a substantial installed base of interfaces (for example, at points of sale, at automatic teller machines (“ATM”), and the like) that include magnetic card readers which are not equipped to receive information from a user device in any other format other than from a magnetic stripe. As a result of the cost to replace or retrofit the installed base, efforts to more-widely introduce user devices that do not employ magnetic stripe devices have not been developed. Because of the potential to substantially reduce fraud, however, the further implementation of such devices is of great interest to financial institutions among others. RF devices that transmit information wirelessly are expected to become much more prevalent and at some point, the predominant form of information transmission for user authentication based on a hand-held device, for example, credit card, debit card, drivers license, passport, social security card, personal identification, etc. Thus, new and improved methods for transitioning from a purely magnetic based form of communication to a wireless form of communication are desired.

One current approach that is intended to “transform” a smart card for use with a magnetic stripe card reader employs a “bridge” device. The bridge device requires that the smart card be inserted within it. The bridge device includes a slot for receiving the smart card, a key pad whereby the user may enter information (e.g., a PIN number), and a credit card sized extension member. Operation of the bridge device requires that the smart card be inserted within it and that an electrical contact

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surface of the smart card engage a similar surface within the bridge device before the bridge device (i.e., the extension member) can be used with a magnetic card reader. Thus, the contactless nature of more advanced information transmission systems is lost with the bridge device because it does not support wireless signal transmission.

#### SUMMARY OF INVENTION

In one aspect of the invention, a device converts a wireless transaction device to a magnetic-stripe emulator device. In one embodiment, the device includes a wireless signal receiver that is configured to receive a wireless signal and provide information from the wireless signal. In addition, the device may include a magnetic-stripe emulator which is communicatively coupled to the wireless signal receiver and adapted to provide a time-varying signal which emulates data provided by a magnetic-stripe card to a magnetic card reader in response to receiving the information from the wireless signal. In one embodiment, the device includes a processor communicatively coupled to the wireless signal receiver and to the magnetic-stripe emulator. The device may also include an LED. In a version of this embodiment, the processor is configured to control the LED to indicate that the device is properly aligned with the magnetic card reader. In another embodiment, the device includes an output device that can provide information to a network or to a network device. In a version of this embodiment, the output device is a wireless transmitter device.

Further embodiments of the invention may include additional features, for example, in one embodiment the output device is a data port to which the device can provide data to a network or to a network device. In a version of this embodiment, the data port is also configured to receive data from the network or the network's device. In a further embodiment, the device is configured to communicate with the magnetic card reader via the data port.

In a further embodiment, the wireless receiver and/or processors configure, decrypt and encrypt the wireless signal. In a further embodiment, the processor is configured to determine whether a user is authorized to provide the information contained within the wireless signal from data within the wireless signal. In a version of this embodiment, the data contained within the wireless signal includes user ID

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information. In yet another embodiment, the data contained within the wireless signal includes biometric information of the user.

#### BRIEF DESCRIPTION OF DRAWINGS

The accompanying drawings, are not intended to be drawn to scale. In the drawings, each identical or nearly identical component that is illustrated in various figures is represented by a like numeral. For purposes of clarity, not every component may be labeled in every drawing. In the drawings:

FIG. 1 illustrates a system in accordance with one embodiment of the invention;

FIG. 2 illustrates a process in accordance with an embodiment of the invention; and

FIGS. 3A-3D illustrate a converter device in accordance with one embodiment of the invention.

#### DETAILED DESCRIPTION

This invention is not limited in its application to the details of construction and the arrangement of components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced or of being carried out in various ways. Also, the phraseology and terminology used herein is for the purpose of description and should not be regarded as limiting. The use of "including," "comprising," or "having," "containing", "involving", and variations thereof herein, is meant to encompass the items listed thereafter and equivalents thereof as well as additional items.

FIG. 1 illustrates an embodiment of a system 100 that employs a converter device 102 to provide an interface between a user device 104 (e.g., a transaction card) and a system interface 106 where, for example, the system interface 106 employs a magnetic card reader and the user device 104 is not equipped with a magnetic stripe. That is, in one embodiment, the converter device 102 provides a mode of information transmission between the user device 102 and the system interface 106 which would otherwise be unavailable to the user device 102. The converter device 102 provides a

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modified system 100 that provides compatibility with a greater variety of user devices, for example, user devices such as transaction cards that are not equipped with a magnetic stripe. For example, in one embodiment, the converter device 102 includes a magnetic stripe emulator 137 communicatively coupled to a wireless signal receiver 140 and adapted to provide a time-varying signal emulating data provided by a magnetic stripe card to a magnetic card reader 152.

The user device need not be a “card” and may, for example, take the form of a fob used as a key ring, a cell phone, a watch, a personal digital assistant or any device that can include a wireless transmitter, or a magnetic stripe emulator.

In general, the system interface 106 provides an interface to a larger information system (e.g., a financial system, an access control system, a medical records system, and the like) that in one embodiment includes a system processor or controller 110, a database 112, a network 114, other systems 116, such as a universal secure registry 118 as will be described further herein. Each of the preceding system elements may be placed in communication with any one or any combination of the system elements, for example, over communication links 120A, 120B, 120C, 120D. It should be recognized that the communication links 120 need not provide the communication paths shown in FIG. 1 and that other communication paths may be employed. For example, the database 112 may be connected to the network 114 via the communication link 120A and to the system processor 110 via the communication link 120B instead of being connected as shown in FIG. 1.

The communication link may be a wireless communication link, a hardwired communication link, a fiber optic communication link, any communication link used in the art, as well as a combination of any of the preceding or any other any communication link capable of transmitting signals between the elements of the system 100. The system processor 110 allows information transfer of both data and instructions, for example, between the interface 106 and one or more databases which may be connected to the system or other network elements.

In general, the operation of the converter device 102 allows a user in possession of a transaction card 104 to wirelessly communicate information to the device so that the device can be employed to interface with a network system. For

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