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(54) **COLLECTABLE CARD READER**

(57)

ABSTRACT

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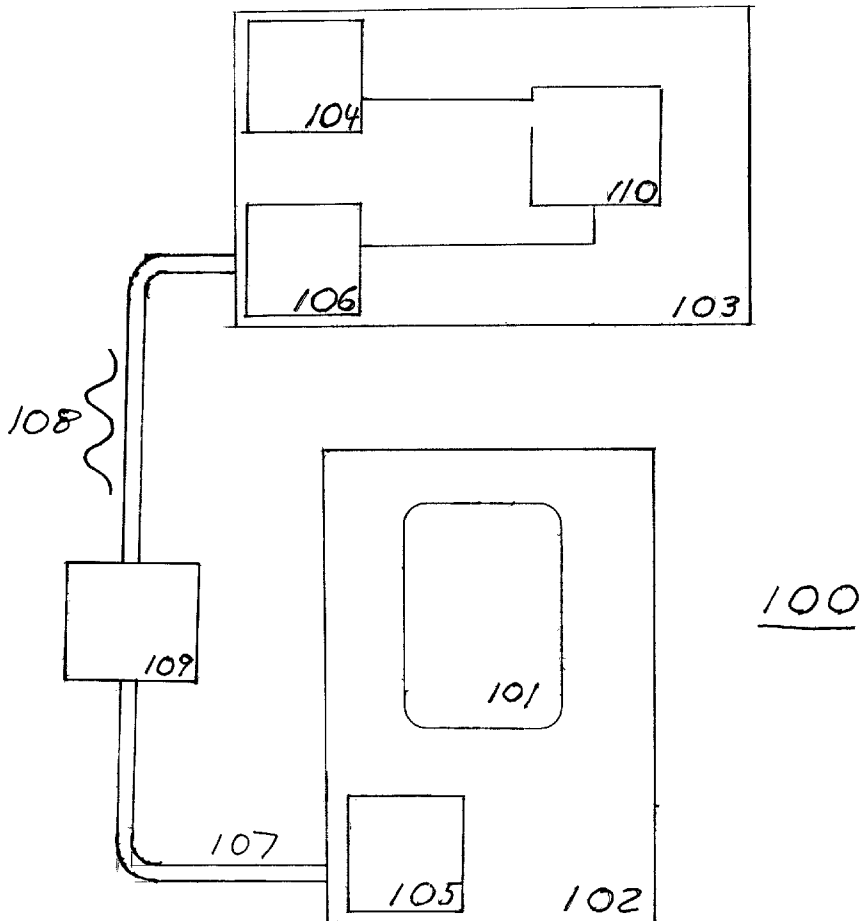
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A machine readable game card is provided which has a display surface and a readable surface, at least two terminals, and at least one path arranged on the readable surface between the two terminals, the path having an attribute of a predetermined value measured between the two terminals, and an image arranged on the display surface to which the predetermined value is associated. A reader for reading the machine readable game card is also provided which has a board with a surface, a plurality of pairs of terminals arranged on the surface, a connector, a plurality of circuits connecting each of said pairs of terminals to said connector, in which a pair of terminals on a machine readable game card contacts a pair of terminals on the reader when the machine readable game card is placed on the surface. A system for playing a game is also provided including a plurality of machine readable game cards, a reader for reading the machine readable game cards, and a computer containing a game connected to the reader, in which the game is played by placing at least one of the machine readable game cards in the reader and identifying it with the computer.



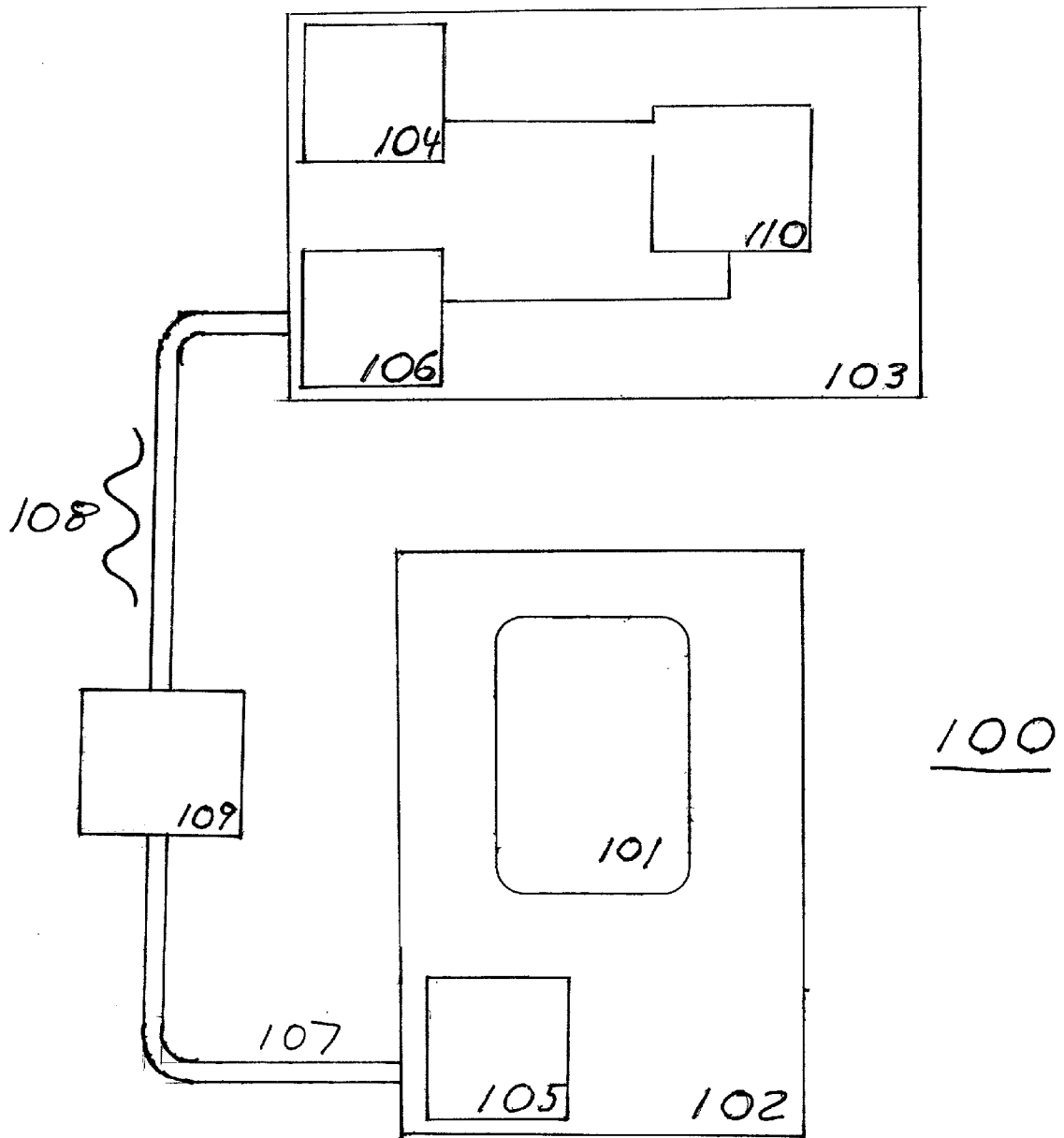
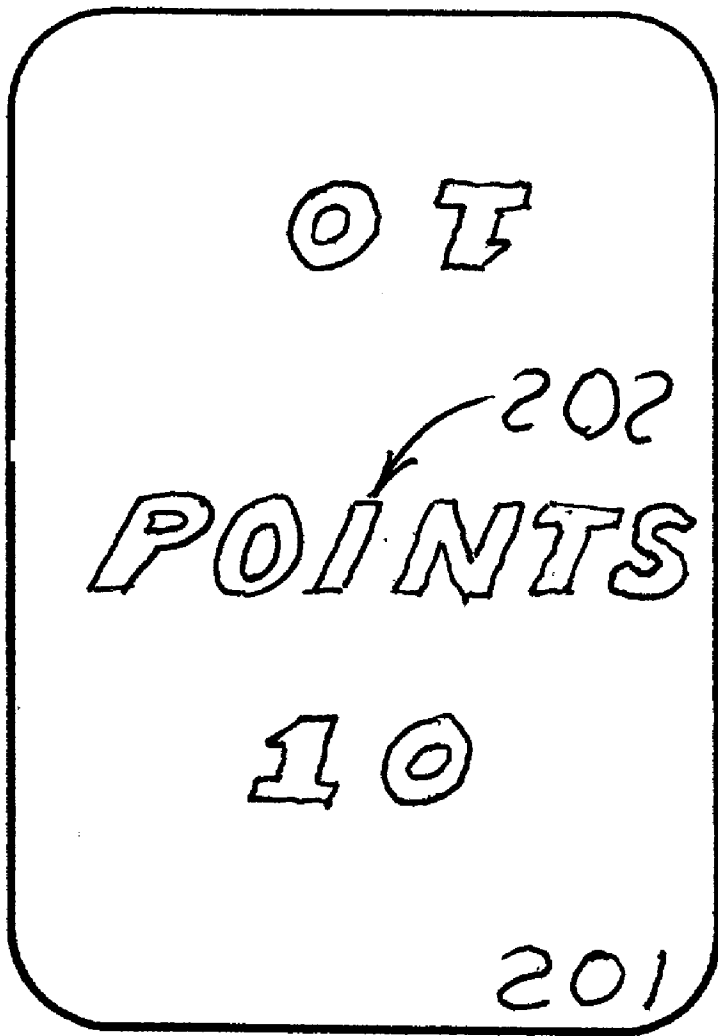


FIG. 1



101

FIG. 2

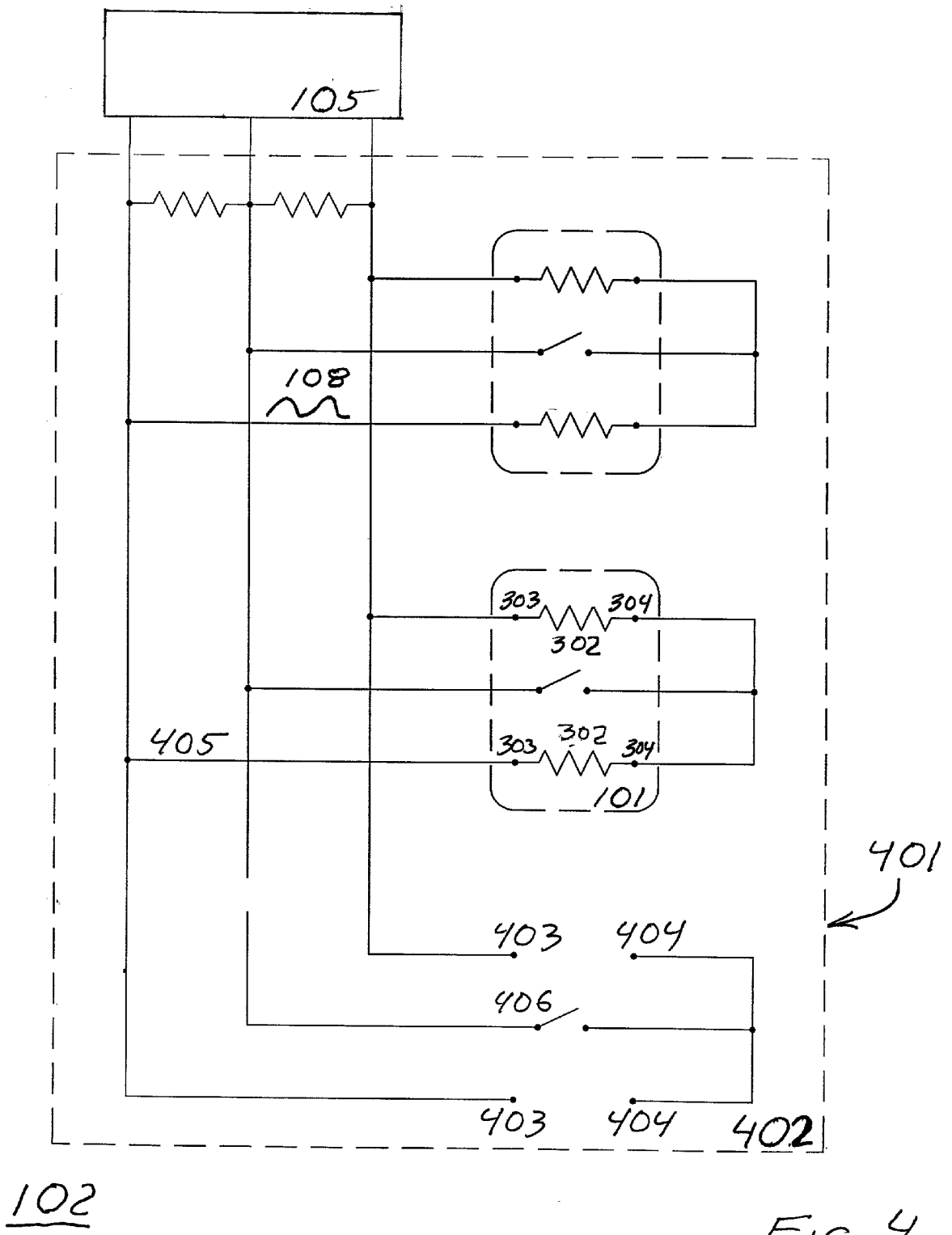


FIG. 4

COLLECTABLE CARD READER

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates generally to the automated identification of collectable or playing cards for the purposes of game playing and amusement.

[0003] 2. Background and Related Art

[0004] It has long been desirable to have a card reader that can reliably identify an individual collectable or playing card from a plurality of cards. Previous card reader technology was based on mechanical, magnetic, or optical readers. Such card readers were relatively expensive and complicated, and were thus unsuitable as consumer items or for use as toys.

[0005] A related technology is exemplified by U.S. Pat. No. 5,088,928 to Chan. Chan describes an Educational/Board Game Apparatus in which an interchangeable game card has symbols associated with the locations of underlying sensors. The game participant presses the symbols in response to prompts from an attached computer. The game card of Chan is associated with particular game. The game cards of Chan are thus not suitable for playing a collectible card game.

[0006] Another related technology is exemplified by U.S. Pat. No. 5,190,285 to Levy et al. Levy describes an Electronic Game having Intelligent Game Pieces in which game pieces mate with a game board which contains means for coupling electronic signals to and from each piece. The game pieces of Levy are 'intelligent' in that they include programmable circuitry such as a semi-conductor based device. The game pieces of Levy are thus not amenable to inexpensive production or disposable use.

[0007] A third related technology is exemplified by U.S. Pat. No. 5,997,044 to Behm et al. Behm describes a Document Structure with Circuit Elements in which a lottery ticket includes an electronic circuit for use as a means of verification. The device of Behm seeks to thwart alteration or discovery of a lottery ticket's value. The device of Behm does not, however, associate the electronic circuit with the image on the lottery ticket. Indeed, to do so would negate the uncertainty aspect of a lottery by making the value of the lottery ticket predictable.

SUMMARY OF THE INVENTION

[0008] The present invention is based on conductive ink, printed on the cards, combined with a simple card reader board which plugs into a computer, video game console, or handheld electronic unit. Because the card reader board needs only inexpensive electrical contacts and switches, and the cards are made of an inexpensive material such as cardboard, this card identification technology would lend itself to inexpensive applications, almost to the point of being disposable. In addition, this technology could be used for any conceivable multiple card application where it would be useful for a computer to be able to identify the particular cards. For example, a role playing card game could be supplemented with specific graphics and sound through a personal computer, while still maintaining the original look and feel of a card game.

[0009] In particular, an object of the present invention is to provide a machine readable game card which has a display surface and a readable surface, at least two terminals, and at least one path arranged on the readable surface between the two terminals, the path having an attribute of a predetermined value measured between the two terminals, and an image arranged on the display surface to which the predetermined value is associated. A further object of the present invention is to provide a reader for identifying a machine readable game card which has a board with a surface, a plurality of pairs of terminals arranged on the surface, a connector, a plurality of circuits connecting each of said pairs of terminals to said connector, wherein a pair of terminals on a machine readable game card contacts a pair of terminals on the reader when the machine readable game card is placed on the surface. A further object of the present invention is to provide a system for playing a game including a plurality of machine readable game cards, a reader for identifying the machine readable game cards, and a computer, video game console, or handheld electronic unit containing a game connected to the reader, wherein the game is played by placing at least one of the machine readable game cards in the reader and identifying it with the computer, video game console, or handheld electronic unit. A further object of the present invention is to provide a method for identifying a game card, comprising the steps of installing a game on a computer, video game console, or handheld electronic unit having a joystick port or any similar device that is capable of reading resistance values, connecting a game card reader to the joystick port, placing a game card with an image and an attribute of a predetermined value associated with that image in the reader, receiving a signal at the joystick port associated with the predetermined value, and storing an identification associated with said signal accessible to said computer.

DESCRIPTION OF THE DRAWINGS

[0010] The invention will be described in detail with reference to the following drawings, in which:

[0011] **FIG. 1** is a block diagram of a system for playing a card game according to an embodiment of the present invention;

[0012] **FIG. 2** is a view of a display surface of an embodiment of a game card used in connection with the present invention;

[0013] **FIG. 3** is a view of a readable surface of an embodiment of a game card used in connection with the present invention;

[0014] **FIG. 4** is a schematic diagram of a game card reader used in connection with the present invention.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0015] In **FIG. 1** is shown a block diagram of a system **100** for playing a card game according to an embodiment of the present invention. The system **100** includes a machine readable game card **101**, a reader **102** for reading the machine readable game card **101**, and a computer **103** connected to the reader **102**. Game card **101** is made of an inexpensive material. In a preferred embodiment, game card **101** is made of cardboard, but game card **101** could also be

made of, for example, paper, plastic, Styrofoam, particle board, organic material, fiber board, or any equivalent material. Reader **102** is equipped with connector **105**, and computer **103** has access to port **106**. In a preferred embodiment, port **106** is a component of computer **103**. In a preferred embodiment connector **105** is a joystick connector, and port **106** is a joystick port, but connector **105** or port **106** could also be, for example, a serial port, a SCSI port, an optical port, an RS232 adaptor, or any equivalent means of connection, or a device that is capable of reading resistance values. In a preferred embodiment computer **103** is a personal computer, but computer **103** could also be, for example, a laptop computer, a notebook computer, a handheld electronic device, a palmtop computer, a video game console, a mainframe computer, a mini-computer, a micro-computer, a digital computer, an analog computer, an organic computer, an emulator, a thin client, or any equivalent device. A game **104** is accessible to computer **103**. In a preferred embodiment, game **104** is stored on computer **103**, but game **104** may also be stored elsewhere, on another device, for example, as long as computer **103** is able to access game **104**. In one embodiment, computer **103** is connected to the Internet, and access to game **104** could be acquired over an Internet connection. Computer **103** could also access game **104** over an intranet or other equivalent network. In a preferred embodiment, game **104** is a card game, but game **104** could also be, for example, a role-playing game, an adventure game, a fantasy game, a video game, a virtual reality game, a competition game, an educational game, a board game, or any equivalent game. Connector **105** and port **106** are connected with cable **107**. In a preferred embodiment, cable **107** is a coaxial cable, but cable **107** could also be, for example, a flat cable, a wireless connection, an infrared connection, an RF connection, an optical fiber, twisted pair, telco cable, or any equivalent means of connecting connector **105** and port **106**. Cable **107** is further shown carrying signal **108**. In a preferred embodiment, signal **108** is an electrical signal, but signal **108** could also be, for example, an infrared signal, an ultraviolet signal, an RF signal, a microwave signal, an optical signal, radiated baseband, an audio signal, or any equivalent means of transmitting information. In addition, transducer **109** is shown between connector **105** and port **106**. Transducer **109** is optional. Transducer **109** would only be necessary if, for example, the output of connector **105** were incompatible with port **106**. If the output of connector **105** were incompatible with port **106**, for example, transducer **109** could be used to convert the output of connector **105** to a form that is compatible with port **106**, as would be known to one skilled in the art. Transducer **109** could, for example, convert the output of connector **105** into audio tones, if port **106** were an audio port. Transducer **109** could also be, for example, an active filter, a passive filter such as a ferrite, or an amplifier. The placement of transducer **109** is not limited to the location shown in FIG. 1. Transducer **109** could be, for example, placed anywhere along cable **107**, or in parallel with cable **107**. Transducer **109** could also be, for example, incorporated within reader **102** or computer **103**. The exact location of transducer **109** is not critical to the principles of the invention. Computer **103** further includes identification means **110**. In a preferred embodiment, identification means **110** identifies game card **101** based on signal **108** as discussed further below, and supplies the identity of game card

101 to computer **103**, which causes game **104** to act based on the identity of game card **101**.

[0016] In FIG. 2 is shown the display surface **201** of an embodiment of game card **101**. An image **202** may be seen to be arranged on display surface **201**. In a preferred embodiment, image **202** is a photograph, but image **202** could also be, for example, a painting, a hologram, a drawing, a lithograph, an offset, a bas-relief, an etching, a pictogram, a print, a mirror, a light-emitting diode, a luminescent coating, a reflective coating, a phosphorescent coating, a glow-in-the-dark coating, a magnetic coating, an optical filter or any equivalent medium. Image **202** could also be a means of tactile stimulation, such as a message in the Braille alphabet, if the game were to be played by the sight-impaired. In a preferred embodiment, image **202** denotes a particular aspect of a computer game. Image **202** may depict or suggest, for example, a character such as a joker, an action such as 'Go Directly to Jail', or a value such as a monetary amount or a quantity of points. In a preferred embodiment, game card **101** is one of a plurality of game cards. Different game cards **101** could bear identical images **202**, but in a preferred embodiment, image **202** is unique to a particular game card **101**. In a preferred embodiment there will thus be as many images **202** as there are game cards **101**, and there will further be a one-to-one mapping of the set of images **202** to the set of game cards **101**.

[0017] In FIG. 3 is shown the readable surface **301** of an embodiment of game card **101**. In a preferred embodiment, readable surface **301** and display surface **201** shown in FIG. 2 are on opposite sides of game card **101**, but they could be on the same side as well. Path **302** is arranged on readable surface **301** between terminals **303** and **304**. In a preferred embodiment path **302** is an electrical conductor, but path **302** could also be, for example, a wave guide, a transmission line, or any equivalent medium. In a preferred embodiment path **302** is formed of conductive ink, but path **302** could also be, for example, formed of a metal such as copper or aluminum, an amorphous, polymorphous or crystalline semiconductor, an insulator, a polymer, an optical fiber, a suspension, or any equivalent substance. One skilled in the art will know that conductive ink is also known as conductive paint or coating; resistive ink, paint, or coating; electrical ink, paint, or coating; or metal or metallized ink, paint, or coating. Conductive ink may be formulated to produce a specific electrical resistance value when printed as a path of a given thickness, width, and length on a suitable substrate. A given ink formulation will have a certain resistivity. The resistance of a path made of conductive ink of a given formulation will vary with the length of the path and inversely with the width and the thickness. To obtain varying resistance values the path pattern can be varied in length, thickness, and width. In the alternative, the chemical formulation of the conductive ink can be varied to obtain different values of resistivity. An electrical multi-meter or similar device can be used to measure the resistance value of a conductive ink path. In particular, the joystick port on a personal computer can be used to indirectly measure the resistance, producing a value which is relative to the resistance value.

[0018] An attribute **305** is associated with path **302**. Attribute **305** has a predetermined value. The predetermined value of attribute **305** of path **302** on the readable surface **301** of a particular game card **101** is associated with image

202 on the display surface **201** of the same game card **101** as shown in **FIG. 2**. In a preferred embodiment the predetermined value of attribute **305** of path **302** on the readable surface **301** of a particular game card **101** is unique to image **202** on the display surface **201** shown in **FIG. 2**. Since game card **101** may be one of a plurality of game cards **101**, in a preferred embodiment there will exist a one-to-one mapping between the predetermined value of attribute **305** on a particular game card **101** and the image **202** on the same game card **101**. In a preferred embodiment, attribute **305** is a resistance, but attribute **305** could also be, for example, an impedance, an inductance, a capacitance, an electrical length, a delay, a phase shift, a resonant mode, a transmissivity, an attenuation, a voltage drop, a frequency response, or any equivalent attribute. In a preferred embodiment attribute **305** is measured between terminals **303** and **304**. If attribute **305** were a resistance, for example, then the predetermined value might be measured between terminals **303** and **304** in units such as ohms or Siemens. Any suitable system of units will do, however, since one skilled in the art will know that a system of units is simply an arbitrary scale factor. Measuring a proxy for resistance, such as the voltage drop across terminals **303** and **304**, or current flow in a circuit in parallel with path **302**, would also be within the scope of the principles of the invention.

[0019] In **FIG. 4** is shown a schematic diagram of an embodiment of a game card reader **102** used in connection with the present invention. Card reader **102** includes a board **401** having a reader surface **402**. Terminals **403** and **404** are arranged on reader surface **402**. A connector **105** is shown installed on game card reader **102**. A circuit **405** connects terminals **403** and **404** to connector **105**. A game card **101** as shown in **FIG. 1** is read by placing game card **101** on reader surface **402** so that readable surface **301** shown in **FIG. 3** is proximate to reader surface **402**, and terminals **303** and **304** shown in **FIG. 3** are in contact with terminals **403** and **404**. When terminals **303** and **304** are in contact with terminals **403** and **404**, path **302** arranged on readable surface **301** between terminals **303** and **304** shown in **FIG. 3** completes circuit **405**, allowing signal **108** to be transmitted over path **302**. In the alternative, a switch **406** can be placed in series with terminals **403** and **404** to complete circuit **405** when switch **406** is asserted. In a preferred embodiment, signal **108** is related to the predetermined value of attribute **305**. Since there is a one-to-one mapping between the predetermined value of attribute **305** and the image **202** on a particular card, identification means **110** in computer **103** identifies game card **101** by measuring signal **108** through port **106**. Several cards could be measured simultaneously or sequentially by providing further circuits connected in parallel with circuit **405**.

[0020] One skilled in the art will know that there many are equivalent means of identifying game card **101** by determining the predetermined value of attribute **305** within the principles of the invention. If, for example, signal **108** were a direct current (DC) electrical signal and attribute **305** were a resistance, then the predetermined value of attribute **305** could be measured by measuring the voltage drop across terminals **303** and **304**, or the current through a circuit in parallel with path **302**, in the manner of a current divider. If, for example, signal **108** were an alternating current (AC) electrical signal and attribute **305** were the impedance of path **302**, then the predetermined value of attribute **305** could be measured by measuring the voltage drop across

terminals **303** and **304**, the current through a circuit in parallel with path **302** in the manner of a current divider, the charge accumulated in an active device such as a capacitor that is in series with path **302**, or the flux linkage in an active device such as an inductor that is in parallel with path **302**. If, for example, signal **108** were an AC electrical signal and attribute **305** were the electrical length of path **302**, then the predetermined value of attribute **305** could be measured by measuring the phase shift or the delay experienced by AC signal **108** as it traversed path **302**. If, for example, signal **108** were an RF signal of one frequency, such as a clock signal, or of several different frequencies, such as band-limited white noise, and attribute **305** were the frequency response of path **302**, then the predetermined value of attribute **305** could be measured by measuring the attenuation or phase shift or delay of AC signal **108** after it had traversed path **302**. If, for example, signal **108** were an optical signal of a given wavelength and attribute **305** were the refractive index or the transmissivity of path **302**, then the predetermined value of attribute **305** could be measured by measuring the amount of light passing through path **302**, for example, by measuring the light incident on one of terminals **304** or **304**.

[0021] The invention having been thus described, it will be apparent to those skilled in the art that the same may be varied in many ways without departing from the spirit and scope of the inventions. All such modifications are intended to be encompassed by the following claims.

What is claimed is:

1. A machine readable game card comprising:
 - a card with a display surface and a readable surface;
 - at least one path arranged on the readable surface, said path having two terminals;
 - said path having an attribute of a predetermined value measured between said two terminals;
 - an image arranged on the display surface;
 - wherein said predetermined value is associated with said image.
2. The machine readable game card of claim 1, wherein: said path is a conductor.
3. The machine readable game card of claim 1, wherein: said path is a wave guide.
4. The machine readable game card of claim 1, wherein: said path is a transmission line.
5. The machine readable game card of claim 1, wherein said predetermined value is selected from the group consisting of:
 - a resistance;
 - an impedance;
 - an inductance;
 - a capacitance;
 - an electrical length;
 - a delay;
 - a phase shift;
 - a resonant mode;

- a transmissivity;
 an attenuation;
 a frequency response.
- 6.** The machine readable game card of claim 1, wherein:
 said display surface and said readable surface are the same surface.
- 7.** The machine readable game card of claim 1, wherein:
 said display surface and said readable surface are different surfaces.
- 8.** The machine readable game card of claim 1, wherein:
 said path is formed of conductive ink.
- 9.** The machine readable game card of claim 1, wherein:
 said two terminals are formed of conductive ink.
- 10.** The machine readable game card of claim 1, wherein:
 said card is formed of a material selected from the group consisting of:
 cardboard;
 paper;
 plastic;
 Styrofoam;
 particle board;
 organic material;
 fiber board.
- 11.** The machine readable game card of claim 1, wherein:
 said image is formed in a medium selected from the group consisting of:
 a photograph;
 a painting;
 a hologram;
 a drawing;
 a lithograph;
 an offset;
 a bas-relief;
 an etching;
 a pictogram;
 a print;
 a mirror;
 a light-emitting diode;
 a luminescent coating;
 a reflective coating;
 a phosphorescent coating;
 a glow-in-the-dark coating;
 a magnetic coating;
 an optical filter.
- 12.** A reader for reading the machine readable game card of claim 1, comprising:
 a board having a reader;
 a pair of terminals arranged on said reader;
 a connector;
 a circuit connecting said pair of terminals to said connector;
 wherein said path terminals on said machine readable game card contact said pair of terminals on said reader when said machine readable game card is placed on said reader, completing said circuit.
- 13.** The reader of claim 12, wherein said connector is a joystick connector.
- 14.** The reader of claim 12, further comprising a transducer connected to said joystick connector, for converting said signal to a form suitable for a joystick port.
- 15.** A system for playing a game, comprising:
 a machine readable game card;
 a reader for reading said machine readable game card;
 a computer connected to said reader;
 wherein said game is accessible to said computer;
 wherein said game is played by placing said machine readable game card on said reader and identifying it with said computer.
- 16.** The system for playing a game of claim 15, wherein said computer is selected from the group consisting of:
 a personal computer;
 a laptop computer;
 a notebook computer;
 a handheld computer;
 a palmtop computer;
 a game console;
 a mainframe computer;
 a mini-computer;
 a micro-computer;
 a digital computer;
 an analog computer;
 an organic computer;
 an emulator;
 a thin client.
- 17.** The system for playing a game of claim 15, wherein said game is selected from the group consisting of:
 a role-playing game;
 an adventure game;
 a fantasy game;
 a video game;
 a virtual reality game;
 a competition game;
 an educational game;

a board game;

a card game.

18. The system for playing a game of claim 15, wherein said computer is connected to the Internet.

19. The system for playing a game of claim 15, wherein said machine readable game card further comprises:

a display surface and a readable surface;

a path arranged on said readable surface, said path having two terminals;

said path having an attribute of a predetermined value measured between said two terminals;

an image arranged on the display surface;

wherein said predetermined value is associated with said image.

20. The system for playing a game of claim 19, wherein said path is a conductor.

21. The system for playing a game of claim 19, wherein said path is a wave guide.

22. The system for playing a game of claim 19, wherein said path is a transmission line.

23. The system for playing a game of claim 19, wherein said predetermined value is selected from the group consisting of:

a resistance;

an impedance;

an inductance;

a capacitance;

an electrical length;

a delay;

a phase shift;

a resonant mode;

a transmissivity;

an attenuation;

a frequency response.

24. The system for playing a game of claim 19, wherein said path is formed of conductive ink.

25. The machine readable game card of claim 19, wherein:

said image is formed in a medium selected from the group consisting of:

a photograph;

a painting;

a hologram;

a drawing;

a lithograph;

an offset;

a bas-relief;

an etching;

a pictogram;

a print;

a mirror;

a light-emitting diode;

a luminescent coating;

a reflective coating;

a phosphorescent coating;

a glow-in-the-dark coating;

a magnetic coating;

an optical filter.

26. The system for playing a game of claim 19, wherein said reader further comprises:

a board having a reader;

a pair of terminals arranged on said reader;

a connector;

a circuit connecting said pair of terminals to said connector for carrying a signal;

wherein said path terminals on said machine readable game card contact said pair of terminals on said reader when said machine readable game card is placed on said reader, completing said circuit.

27. The system for playing a game of claim 26, wherein:

said signal is associated with said predetermined value.

28. The system for playing a game of claim 26, wherein:

said connector is a joystick connector.

29. The system for playing a game of claim 26, wherein:

said computer further comprises a joystick port.

30. The system for playing a game of claim 28, further comprising:

a transducer connected to said joystick connector, for converting said signal to a form suitable for said joystick port.

31. A method for identifying a game card, comprising the steps of:

1) installing a game on a computer having a joystick port;

2) connecting a game card reader to the joystick port;

3) placing the game card in the game card reader, said game card having an image and an attribute of a predetermined value associated with said image;

4) receiving a signal at said joystick port associated with said predetermined value;

5) storing an identification associated with said signal accessible to said computer.

* * * * *