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(54) **Title:** A LIGHT SIGNALLING SYSTEM
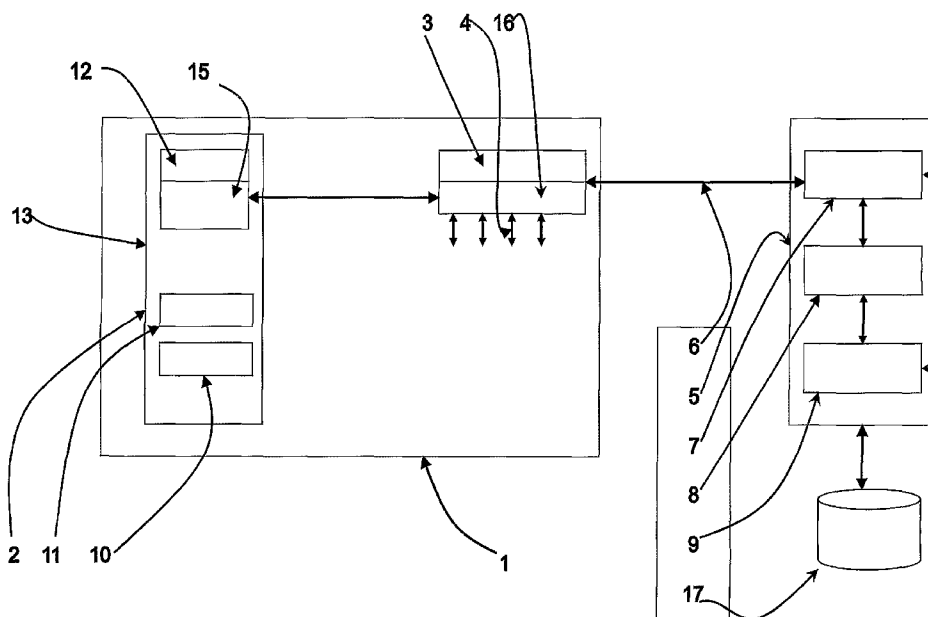
(57) **Abstract:** A light signalling system is used in an amusement machine (1). The light signalling system comprises a control means (3), which receives signals generated by various events in the amusement machine (1). The control means (3) uses these signals to control the brightness and colour of a light emitting device(12), which is housed in a card reader (2) on the amusement machine (1), so as to produce a plurality of patterns and animations. The patterns and animations thus act as a visual stimulus to alert the user of the amusement machine (1) of the occurrence of significant events generated by the amusement machine (1).

## "A Light Signalling System"

## Field of the Invention

This invention relates to the field of debit card payment systems, especially those used in entertainment and amusement centres. In particular it is related to the method of giving information to a human user by means of visual LED based indicators which are housed in the debit card reader.

## Background Art

In amusement and entertainment centres, the use of debit cards with amusement machines is well known. Debit cards are used to store information used for playing the machines, particularly the number of 'points' that the debit card holder has earned or paid for, and which are used to pay for using the machines.

Traditionally in amusement and entertainment centres where a debit card system is installed, each amusement machine has a debit card reader installed on it, which is responsible for reading and/or writing to the debit card. If details read from the card are analysed by the debit card system and deemed valid to operate the amusement machine, then the debit card system will apply a credit signal to the machine and allow the user to play or operate the machine. General operation of a server based debit card system for use in arcade gaming applications is covered and described in a now expired US patent # 4,575,622.

Some amusement machines do not give an easy to recognise indication that they have successfully been given a credit. At times the user is not aware that their card has been debited and that they can now operate the machine. Card readers can incorporate an alphanumeric display, which displays text conveying the success or failure of the credit signal, but unless the user is reading the display (and is capable of understanding the language of the text) then this text can often go unseen.

Alternatively the card reader can incorporate an audible transducer, which will alert the user to the success or failure of the credit signal. In many locations, the background noise originating from other machines in the location is at such levels that sound from the card reader audible transducer cannot be heard by the user.

5    In a debit card system, the card reader is a crucial point in the system. It must remain functional for as much time as possible. If it has failed for any reason, then this failure needs to be recognised as soon as possible for a technician to repair the device. A failure can be recognised by viewing the alphanumeric display, which can show an error message. It can also be recognised by

10   attempting to apply the debit card to the reader and to look for the expected response. Unfortunately both of these methods require an experienced user to be using or in close proximity to the reader. In an amusement centre which may have many readers installed, it becomes inefficient and difficult for a technician to quickly and easily identify a faulty reader.

15   If a machine is faulty and the card reader has been intentionally disabled, then a method for the service technician to view machines currently requiring work involves reading a log sheet. Error messages may be displayed on the card reader display but this requires the technician to read the display of each machine. The technician cannot easily recognise from a distance if the machine

20   is faulty.

Special promotions that are run in the centre can only be applicable to certain machines in the centre. Typically the machines available during the promotion are listed on a flyer or signage around the location. This is often impractical as the operator may wish to add or remove machines from the promotion without having

25   to print new signage. The user cannot immediately tell by looking at a machine if that particular machine is part of the promotion. This can lead to reduced promotion product sales since the user can easily be confused as to which machines are available for the duration of the promotion. For a timed promotion which is only available during a certain period, more confusion can arise as to

30   exactly when the promotion has started and stopped. Again, information can be

shown on the card reader display but the effectiveness of this relies on the user viewing and reading the display.

## Disclosure of the Invention

Accordingly, the invention resides in a light signalling system comprising a light 5 emitting means and control means coupled thereto, the control means being responsive to an identification means associated with the light emitting means, the identification means adapted to provide an indication in response to the detection of an identity, the control means being arranged to receive a signal from an external source in response to the indication, the light emitting means being 10 operable in response to the signal provided to the control means to emit light in a predetermined sequence, the predetermined sequence being indicative of the identity.

According to a preferred feature of the invention, the control means comprises a microprocessor controlled unit or a local computer.

15 According to a preferred feature if the invention, the signal provided to the control means from the external source is selected from a list of predefined signals in response to the indication.

According to a preferred feature if the invention, the external source comprises host computer comprising a database holding information related to a plurality of 20 identities and wherein the database is interrogated upon the generation of an indication to identify the identity and thereby determine the signal provided to the control means.

According to a preferred embodiment, the database is associated with an amusement arcade comprising a plurality of amusement machines and the 25 identity comprises a player tracking device wherein the database accumulates information related to a player's playing activities during the currency of the identity and the signal is determined in response to the level of playing activity.

According to a preferred feature if the invention, the host computer is coupled to the light emitting means via a network arrangement.

According to a preferred embodiment, the predetermined sequence is a colour pattern or animation.

According to an embodiment, the a light emitting means is an array of light

5  emitting diodes having control circuitry coupled thereto, the control circuitry being arranged to receive the provided signal from the control means and to control the light emitting diodes in the predetermined sequence in response thereto.

According to a preferred embodiment, the light emitting diodes are arranged to emit light in a sequence of varying colours and/ or brightness in response to the

10  provided signal.

According to a preferred embodiment, the identification means comprises a card reader adapted to read a card having a magnetic stripe or a barcode or ID chip, wherein the light emitting diodes are arranged in an array around the card reading area and are illuminated when a card is read.

15  Preferably, the light emitting diode array is provided in a translucent housing.

Preferably, the light emitting diode array is illuminated in a pattern.

Preferably, the computer may be coupled to the light emitting means via a network arrangement.

This has the advantage that this system, by displaying an exciting colour pattern

20  or animation in response to their interaction directly with the debit card system or indirectly through amusement machines connected to the debit card system.

The visual indicator also minimises confusion by the customer related to purchased promotional products. A product in the debit card system can be constructed such that when it is applicable, all machines usable with the product

25  give the same visual indication that is distinguishable from machines not usable with the product. The user does not need to refer to different signage to determine if the particular machine is covered in their purchased product.

In addition each user may belong to a different card status group which may entitle them to different pricing and play privileges on each machine based on their status group. The reader on each machine is able to give the user a different visual indication following activation with their card depending on the card status group that the user belongs to.

Machine service technicians are also able to instruct the system to identify all machines that require immediate maintenance. Once done, the LED array in the card readers connected to machines will show the same colours that are distinguishable from others. The technician can easily see which machines require assistance.

The invention will be more fully understood in the light of the following description of several preferred embodiments.

**Brief Description of the Drawings**

The description is made with reference to the accompanying drawings, of which:

Figure 1 is a schematic illustration of the components of the system according to a first embodiment;

Figure 2 is a schematic exploded perspective view of a debit card unit according to the first embodiment, showing the housing and LED arrangement;

Figure 3 is a circuit diagram illustrating the connections of the LED array to the driver circuitry in the debit card unit according to the first embodiment;

Figure 4 is a flow chart illustrating the algorithm for the embedded firmware of the microcontroller unit according to the first embodiment; and

Figure 5 is a schematic illustration of the components of the system according to a third embodiment;

- 6 -

## Best Mode(s) for Carrying Out the Invention

In general terms, the light signalling system according to the first embodiment comprises a light emitting means and control means coupled to the light emitting means so that the light emitting means is operable in response to the signal
5      provided to the control means to emit light in a predetermined sequence. The control means is responsive to an identification means associated with the light emitting means. The identification means is adapted to provide an indication in response to the detection of an identity while the control means is arranged to receive a signal from an external source in response to the indication. The
10     predetermined sequence is indicative of the identity.

More specifically, the first embodiment comprises a hardware interface, software control in the form of embedded firmware, and software control provided on a computer such as a personal computer. In the embodiment, an amusement or gaming machine 1 incorporates an identification means in the form of a debit card
15     unit 2 coupled to a control means in the form of a microprocessor controlled unit (MCU) 3. The MCU 3 is provided with appropriate connections 4 to the amusement machine 1. The MCU 3 is also coupled to a network computer arrangement 5 through a network connection 6, such as a local area network (LAN). The MCU 3 can be any suitable microprocessor controlled unit able to
20     process the signals input to it as will be described in more detail below.

In the first embodiment described herein, the network computer arrangement 5 comprises a communications computer 7, a server 8, and a point of sale computer 9. The network computer arrangement 5 is coupled to database 17 for storing information regarding animation sequences which will be described in
25     further detail below.

The communications computer 7 provides a connection to the LAN 6 and thus a communications pathway between the debit card unit 2, and more specifically the MCU 3, and the network computer arrangement 5.

The debit card unit 2 includes a liquid crystal display (LCD) 10, a debit card reader 11, and an array 12 of light emitting diodes (LED's).

The LCD 10 is used for displaying information to a user.   Typically, the information is in alphanumeric form and may include, but is not limited to machine

5    pricing, machine availability, credit status and user card balance information.

The debit card reader 11 is any suitable single-track magnetic card reader conforming to ISO7811 standards, or a barcode reader or an ID card reader adapted to read an appropriate identity in the form of a debit card.

The debit card unit 2 comprises a housing 13 made of a translucent material,

10   such as ABS plastic.  The housing 13 has the LCD display provided thereon, and also includes a card reader slot 18, through which a debit card can be swiped – as is well known to persons skilled in the art. The LED array 12 comprises three or more LED's 14 geometrically arranged inside the housing 13.   Light from the LED's 14 can shine through the translucent housing 13 so as to be visible by

15   users of the system.  The debit card unit 2 is therefore located externally of the housing of the amusement machine 1 for access by the user and for visibility. The actual number and arrangement of the LED's 14 is chosen to provide an optimum light distribution when viewed from all angles.   In the preferred embodiment, no single LED is seen, but rather a 'glowing' effect is achieved by

20   the arrangement of the LED's 14.  The use of the translucent material adds to this 'glowing' effect as it helps diffuse the light and reduces the evidence of single point light sources while still allowing light to pass through.  An example of this arrangement is shown in Figure 2.

These LED's can provide a range of colours by applying different currents to the

25   LED's 14 through suitable driver circuitry 15.

The LED array 12 of the present invention comprises eight RGB (red, green, blue) LED packages 19 where each package comprises one red, one green and one blue LED – as shown in Figure 2.  Alternatively, three separate LED's in individual packages could be used.

As shown in Figure 2, the LED packages can be located within the housing 13 in a suitable pattern which will achieve the desired visual effects referred to above.

The LED's are driven by the individually adjustable current driver circuitry 15 provided in the debit card unit 2. Such circuitry is well known to persons skilled
5   in the art, and need not be described in any further detail herein, except as is relevant to the present invention. This driver circuitry 15 is coupled to the MCU 3. Each LED 14 is one colour – i.e. red, green or blue, but the brightness of each LED can be adjusted by controlling the current to the LED 14. Since each package 19 (or group of three packages) contains a red, a green and a blue LED,
10  by adjusting the brightness of the individual LED's 14, the colour of the package 19 can be changed.

Figure 3 is a schematic circuit diagram showing the coupling of the LED's 14 to the driver circuitry 15. Figure 3 shows two packages 19 of three LED's 14. Power is supplied from a suitable power supply (not shown) through an input 20.
15  The driver circuitry 15 is coupled to the MCU 3. A power supply monitor 21 controls the power supply to the driver circuit 15.

The driver circuitry 15 is operable, under control of the MCU 3, to set the current to each of the LED's 14 to one of sixteen values, which, for the RGB LED's 14 of the present embodiment means that they can produce up to 4096 different
20  colours of the package 19. The controlling of these LED's 14 to produce different colours is already known to persons skilled in the art. This arrangement also allows the LED's to have their brightness controlled by the MCU 3.

The MCU 3 is therefore operable to send signals to the driver circuitry 15 to control the appropriate brightness of the individual LED's 14 in the array 12. By
25  varying the LED's that are addressed, and the current levels set to each LED, selected LED's can be illuminated in a predetermined sequence over time to produce a variety of patterns and animations.

The signals from the MCU 3 that vary the patterns and animations can be under control of either the embedded firmware inside the MCU 3, or from software commands from applications running on the network computer arrangement 5 on the LAN 6 and input to the MCU 3.

5   The control of the LED's 14 will now be described in more detail below:

Figure 4 illustrates the algorithm for the embedded firmware on the MCU 3.

Firmware loaded into the MCU 3 is configured to read and apply voltage signals from and to various circuits (not shown) inside the amusement machine 1 via the connections 4, as well as connections to the debit card unit 2. The firmware will
10  monitor the state of and recognise events related to these signals and then consult a lookup table 16 embedded in firmware to determine which colour animation to apply to the LED driver circuitry 15. Hardware signals can come from any electronic circuit inside the amusement machine 1 existing at or after installation of the debit card unit 2 and MCU 3.

15  Data relating to the animation applied to the LED driver circuitry 15 is stored in the look up table is stored as frames. A frame is all the data which defines, calculates, or has the ability to calculate based on user selectable parameters, the brightness of each LED 14 in the array at the time during which a frame is 'active'. This is Frame Data. One frame relates to either one instance of LED
20  current for every LED 14 in the array, or a calculation algorithm for determining the current for each LED 14 in the array.

Animation details are stored in the lookup table include but are not limited to the following fields/ parameters:

➢ Event ID: a unique identifier for each animation sequence.

25  ➢ Frame Descriptor: this indicates the type of data stored in the look up table and any other information required to describe the information stored in the Frame Data field discussed below. For example, the Frame Descriptor field will indicate whether the data relates to a single static

value entry for the current value for any LED 14, or whether it relates to a dynamic algorithm for calculating the current value for an LED 14, as discussed above.

➤ Number of Frames: the number of frames stored for each animation entry. It can be a single frame or many frames

➤ Event Priority: used to specify which events can override others, in case multiple events occur simultaneously.

➤ Frame Time: specifies how long to wait before displaying the next frame in the animation sequence. This value is ignored if the Number of Frames = 1

➤ Display Time: specifies how long to display this animation before reverting to the previously shown Event ID.

➤ Frame Data: contains LED current information for the frame, such as required colour and brightness as discussed above. Data contained in this section can be compressed or not, depending on the application.

So the MCU 3 may receive a signal from the internal circuitry of the amusement machine 1 via the connections 4, indicating, for example, that a user has just won a predetermined number of 'points' in the game he is playing on the amusement machine 1.

The MCU 3 processes the signal from the amusement machine 1 and is operable to determine if the signal is the same as the previous signal or if it is different. The signal will include information and data regarding the event that the signal is indicating – for example that a user has just won 'points'. If the event is different, then the MCU 3 determines that a new event has occurred (e.g. that points have been won) and is then operable to determine the event ID from the signal by comparing relevant information in the look up table 16.

Once the event is determined then the MCU 3 determines the State ID. The state ID is a unique identifier which defines the voltages for specific machine connections, and is used to define the voltage levels (and therefore the state) of

operation at any time when signals are being received. If input signals are received which are the same as previous inputs, then the state has not changed, and no event ID is determined. If a received input signal does change, then – as mentioned above – the event ID is determined and the State ID will change and will be determined from a combination of the new input signal and the previous signal.

State ID's are stored in a separate look up table. This table would have two fields – the State ID and Machine Connection States. Embedded firmware in the MCU 3 would read the machine connection voltages and then read the look up table for this set of Machine Connection States to find the corresponding State ID.

The MCU 3 determines – in the case of signals arriving simultaneously at the MCU 3 – which event has the highest priority, and will determine which animation to apply to the LED array 12 in response to the event. For example, in response to a points win, the package 19 is to flash a sequence of colours in a particular pattern.

Once the MCU 3 has determined which animation is to be applied to the LED array 12, then the MCU 3 will look up the animation sequence details in the look up table 16 and apply the animation to the driver circuitry 15. The LED's 14 will then light up in accordance with the selected sequence.

A user is then able to see the animation sequence and, from that, can determine what event has happened – for example, that he has won a certain number of 'points'. At the same time, the MCU 3 will load these points onto a debit card account, via the debit card reader 11 or via the network 6, LAN 5 and database 17 depending upon the application and card type.

In another example, a user can use his debit card – which is 'loaded' with 'points' that have been previously purchased or won – to play a game on the amusement machine 1. The user swipes his card through the card reader 11, and the MCU 3 reads this data and determines in the known manner that user is eligible to play the game and deducts the correct number of points from his card account – again as is well known to person skilled in the art. Typically, the card reader 11 is

operable to send a signal to the MCU 3 which will determine that the read from the card is error-free and of a valid format. The magnetic strip on the debit card contains a user account identifier and this is included in the data sent from the card reader 11 to the MCU 3. The MCU 3 then translates the signal to a form that can be used by the server 8. The server 8 receives the signal from the MCU 3, determines the card account information and processes the information to deduct the required 'points' from the card account – details of which are all stored in the database 17. This is all well known to persons skilled in the art. The server 8 is then operable to send a response back to the MCU 3, and from there the MCU 3 sends the appropriate signal to the amusement machine 1 and so on.

In another embodiment, debit cards can be used which have the data stored on the cards themselves. In this case, the MCU 3 will be operable to deduct the requisite number of points and write this back to the card, and send details of the transaction to the server 8, where a record of the transaction is kept in database 17. Again, this is well known to person skilled in the art.

Embedded firmware is also responsible for receiving instructions from network computer arrangement 5 related to display and control of animations. These instructions can be classified as hardware events, in the same way as events detected from the amusement machine connections 4. They are also treated as special high priority events which may override states and events defined in the embedded firmware.

Network commands that are coupled between the network computer arrangement 5 and the MCU 3 include, but are not limited to:

Machine start command: here the card account is deemed as valid to start the machine. This command may include all specifics required to apply the start signal to the amusement machine 1, text details that are to be sent to the LCD 10 for display, and details about which animation is to be played and for how long.

Animation Command: this provides details for the debit card unit 2 about which animation to display. This may be sent when a certain promotion starts – for example at a time of the day where all pricing on certain games has changed. In

this example, when the time of day arrives when this promotion is active, the server 8 will send a command to the MCU 3 instructing the debit card unit 2 to display the animation. In another example, when a technician wishes to view all machines that require maintenance, the server 8 will scan the system database

5    17 for those games and then will send each of those games an Animation Command resulting in all games requiring maintenance to have their debit card unit 2 playing a "maintenance required" animation.

Animation Setup: this will provide details that override or append to the animations stored in the MCU 3 firmware, in this case the Animation lookup table.

10   In this way, if a particular animation is not currently stored in the MCU 3 lookup table, then an entry can be sent to the MCU 3 for storage in the look up table from the server 8.

Enable/Disable: this is a command sent from the server 8 which enables or disables the card reader. This command may also include text to show on the

15   LCD 10, and animation details to show on the debit card unit 2. Effectively this command will allow or deny people use of the amusement machine 1.

Software running on any of the computers 7, 8, 9 that make up the network computer arrangement 5 can be operable to configure and trigger software events which can cause a change in the animation displayed on the debit card

20   unit 2 using the LED array 12. All configuration and animation information is stored in a central database 17 coupled to the network computer arrangement 5.

Configuration is set to trigger software animation events based on settings input by the user. Software animation events can be configured to be related to any combination of the following:

25       1. Point of sale (POS) products - Each product available for sale can have one or more animation IDs associated with it. An animation event can be triggered when the product is sold, used, available, changed, or by any other event related to the product definition.

2. Amusement machine category - Similar amusement machines in the amusement centre can be grouped into a category, and animation events applied can be applied to the all amusement machines in that category.

3. Individual amusement machine ID - Animation events can be related to a single machine, regardless of any category definitions.

4. User card status - Animation events can be related to the status of card that is applied to the card reader as defined in the debit card system database.

5. Date and time of day - Animation events can be triggered by monitoring the state of the system real-time clock.

6. Amusement machine usage - Events can be triggered based on frequency of use of the machine.

7. Staff user requests. Staff interaction with different software processes in the applications can trigger software animation events.

8. Any other software state or event detectable by the software.

Once a software animation event has been triggered from the computer network arrangement 5, details related to the event are read from the central database 17. Such details include but are not limited to:

Event ID: a unique identifier which may or may not match the event ID stored in embedded firmware.

Related machines: defines which machine or machines to send the animation event to.

Animation details: specifics of the animation. This may be a reference to animation data stored in the embedded firmware in MCU 3, or it may be a new animation definition consisting of: number of frames, priority, frame time, display time, frame data – and as described above in relation to the animations triggered by the MCU 3 directly.

Any software animation event sent from software applications to the MCU 3can considered as a special high priority event. Based on priority information defined in the configuration, the software animation event can override the highest priority event defined in the embedded firmware of the MCU 3.

5    In the embodiments described herein, the use of the term 'points' has been used to denote information regarding a user's account that can be used as 'currency' for using the amusement machine 1.  It will be understood that the information stored and read with regard to a user's account is not limited to points, but could refer to any information, including actual monetary values.

10    In a second embodiment, tools exist in the system which allow the system administrator/operator to create LED array command/animation data. The animation/command data contains information on LED light intensities, time details on when to apply these intensities to the LEDs 14 and how long to run this animation before reverting to the previous animation. This animation data is

15    stored in the database 17 and sent to the MCU 3 by the communications computer 7. The MCU 3 can interpret this information and use it to control driver circuitry 15 such that LED packages 19 generate the colour desired by the operator.

20    Examples of possible animations and names may be (but are not limited to) –

1. Static single colour: LED's 14 are set such that all LED packages 19 generate the same colour and are held in this state until a new event causes a change or until the time specified in the animation data has expired.

25    2. Static multiple colour: LED's 14 are set such that LED packages 19 generate differing colours and are held in this state until a new event causes a change or until the time specified in the animation data has expired.

3. Flashing single colour: LED's 14 are turned on and off with time such

30    that all LED packages 19 generate a flashing effect of the same colour. This flashing effect will until a new event causes a change or until the time specified in the animation data has expired.

4. Flashing multiple colours: LED's 14 are turned on and off with time such that all LED packages (19) generate a flashing effect of different colours. This flashing effect will until a new event causes a change or until the time specified in the animation data has expired.

5. Rotate animation: LED's 14 are turned on and off with time such that all LED packages 19 generate a rotating colour pattern in the translucent housing. This rotating effect will until a new event causes a change or until the time specified in the animation data has expired.

6. Morph animation: the light intensity of LED's 14 is changed with time such that all LED packages 19 generate a fading effect between colours. Eg. Adjusting the brightness of the red LEDs from maximum to minimum brightness over time while simultaneously adjusting the brightness of the blue LEDs from minimum to maximum brightness may result in the translucent housing changing gradually from red through to violet to blue colours. This morph effect will until a new event causes a change or until the time specified in the animation data has expired.

The operator can then create their own set of animation information for any event. As an example: an event resulting from a user moving a card through the debit card reader 11 may be defined and named "Static Green 3 Seconds". Animation information would result in the LEDs (14) have light intensities set such that all LED packages 19 cause the translucent housing 13 to glow a green colour, which is maintained for 3 seconds after which time the LED intensities are changed according to the information being applied prior to the event.

As another example: an event resulting by reading the state and/or detecting a change in this state on one or more of the machine connections may be named "Morph Red Blue" in which case the LED intensities are adjusted over time such that the translucent housing appears to change colour gradually from red to blue and back again. This animation may have no time limit and will continue until another event causes it to be overwritten with new information.

In accordance with a third embodiment, the light signalling system comprises one or more amusement machines which are each provided with a plurality of light

emitting source devices, all controlled by the central MCU 3. The system of the third embodiment is described with reference to Figure 5. The third embodiment is similar to that of the first embodiment and so, in the drawings, like numerals are used to depict like parts.

5      Instead of a single LED array 12 housed in a single translucent enclosure 13, there can be multiple LED arrays 22 installed on the amusement machine. These additional LED arrays 22, operated and controlled in the same means as the single LED array 12 may be of similar appearance, or alternatively may be of varying shape and size, and housed in enclosures of varying size and shape. The

10     additional enclosures 23 may each have their own display 24 capable of showing alphanumeric characters.

Commands received by the MCU 3 from the communications computer 7 or from the MCU 3 utilising lookup table 16 after detecting a state or event on machine connections 4 may specify to which of the arrays the animation data should be

15     applied. Animation information can be limited to a single array or may operate on multiple arrays, whether they are connected on the single amusement machine or multiple machines on the network 6.

Events which may trigger an animation may be a card swipe through the debit card reader 11 or through amusement machine connections 4 as previously

20     described. In addition, events may come from other user interaction with custom installed hardware. As an example a pushbutton may be installed on the amusement machine which can be connected to the MCU 3 through machine connections 4. The user can press the button which in turn triggers an event.

Variations are possible within the scope of the present invention. For example,

25     different housing shapes and sizes can be provided. The LED number and packages can vary, as can the geometric arrangements. Other suitable card reader types could be used, and it could be anticipated that wireless systems could be used. Any suitable network arrangement could be used, or the invention could be used without any network involvement.

Throughout the specification, unless the context requires otherwise, the word "comprise" or variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

**The Claims Defining the Invention are as Follows:**

1.    A light signalling system comprising:

a light emitting means and control means coupled thereto, the control means being responsive to an identification means associated with the light emitting means, the identification means adapted to provide an indication in response to the detection of an identity, the control means being arranged to receive a signal from an external source in response to the indication, the light emitting means being operable in response to the signal provided to the control means to emit light in a predetermined sequence, the predetermined sequence being indicative of the identity.

2.    A light signalling system as claimed at claim 1 wherein the control means comprises a microprocessor controlled unit or a local computer.

3.    A light signalling system as claimed in claim 1 or claim 2 wherein the signal provided to the control means from the external source is selected from a list of predefined signals in response to the indication.

4.    A light signalling system as claimed in any one of claims 1 to 3 wherein the external source comprises a server computer comprising a database holding information related to a plurality of identities and wherein the database is interrogated upon the generation of an indication to identify the identity and thereby determine the signal provided to the control means.

5.    A light signalling system as claimed either of claims 4 wherein the server computer is coupled to the light emitting means via a network arrangement.

6.    A light signalling system as claimed in claim 4 or claim 5 wherein the database is associated with an amusement arcade comprising a plurality of amusement machines and the identity comprises a player identification device wherein the database accumulates information related to a player's playing activities during the currency of the identity whereby a status is allocated to said player and the signal is determined in response to the status of the player.

7. A light signalling system as claimed in claim 6 wherein the status of the player is determined by the light signalling system in response to the level of playing activity of the player.

8. A light signalling system as claimed at either of claims 6 or 7 wherein each identity is associated with one of a plurality of status groups and the predetermined sequence is selected to distinguish the status group to which the identity is associated.

9. A light signalling system as claimed at any one of claims 1 to 8 wherein the predetermined sequence is a colour pattern or animation.

10. A light signalling system as claimed at any one of claims 1 to 9 wherein the a light emitting means is an array of light emitting diodes having control circuitry coupled thereto, the control circuitry being arranged to receive the provided signal from the control means and to control the light emitting diodes in the predetermined sequence in response thereto.

11. A light signalling system as claimed at claim 10 wherein the light emitting diodes are arranged to emit light in a sequence of varying colours and/ or brightness in response to the provided signal.

12. A light signalling system as claimed at claim 10 or claim 11 wherein the light emitting diode array is provided in a translucent housing.

13. A light signalling system as claimed at any one of claims 1 to 12 wherein the identification means comprises an identity reader adapted to read an identity.

14. A light signalling system as claimed at claims 13 wherein the identity comprises a card having a magnetic stripe and wherein the light emitting diodes are arranged in an array around the card reading area and are caused to illuminate when a card is read.

15. A light signalling system as claimed at claims 13 wherein the identity comprises a barcode applied to an appropriate item and wherein the light emitting

diodes are arranged in an array around the barcode reader and are caused to illuminate when a card is read.

16. A light signalling system as claimed at claims 13 wherein the identity comprises an integrated circuit housed within an identity holder.

17. A light signalling system adapted for operation in association with an amusement machine, the light signalling system comprising:

a light emitting means and control means coupled thereto, the control means being arranged to receive signals from an external source generated in response to an event, and operable, in response to the received signal, to provide a signal for coupling to the light emitting means, the light emitting means being operable in response to the provided signal from the control means, to emit light in a predetermined sequence, the predetermined sequence being indicative of the event.

18. A light signalling system as claimed at claim 17 wherein the light emitting means comprises an array of light emitting diodes having control circuitry coupled thereto, the control circuitry being arranged to receive the provided signal from the control means and to control the light emitting diodes in the predetermined sequence in response thereto.

19. A light signalling system as claimed at claim 18 wherein the light emitting diodes are arranged to emit light in a sequence of varying colours and/or brightness in response to the provided signal.

20. A light signalling system as claimed at claim 18 or 19 wherein the light emitting diode array is provided in a translucent housing.

21. A light signalling system as claimed at any one of claims 17 to 20 wherein the predetermined sequence may be a colour, pattern or animation.

22. A light signalling system as claimed at any one of claims 17 to 21 wherein the control means comprises a microprocessor controlled unit and/ or computer.

23.  A light signalling system as claimed at claim 22 wherein the computer may be coupled to the light emitting means via a network arrangement.

24.  A light signalling system as claimed in any one of claims 17 to 23 wherein the external source comprises a server computer comprising a database holding information related to a plurality of events and wherein the database is interrogated upon the generation of an event to thereby determine the signal provided to the control means.

25.  A light signalling system as claimed at claims 24 wherein the database is associated with an amusement arcade comprising a plurality of amusement machines and wherein an event is associated with an action of a player identified by identification means.

26.  A light signalling system as claimed at claims 24 wherein the identification means comprises an identity reader adapted to read an identity to thereby identify a player.

27.  A light signalling system as claimed at claims 26 wherein the identity comprises a card having a magnetic stripe and wherein the light emitting diodes are arranged in an array around the card reading area and are caused to illuminate when a card is read.

28.  A light signalling system as claimed at claims 26 wherein the identity comprises a barcode applied to an appropriate item and wherein the light emitting diodes are arranged in an array around the barcode reader and are caused to illuminate when a card is read.

29.  A light signalling system as claimed at claims 26 wherein the identity comprises an integrated circuit housed within an identity holder.

30.  A light signalling system as claimed in any one of claims 26 to 29 wherein the database accumulates information related to a player's playing activities during the currency of the identity whereby a status is allocated to said player and the signal is determined in response to the status of the player.

31.    A light signalling system as claimed in claim 6 wherein the status of the player is determined by the light signalling system in response to the level of playing activity of the player.

32.    A light signalling system as claimed at either of claims 6 or 7 wherein each identity is associated with one of a plurality of status groups and the predetermined sequence is selected to distinguish the status group to which the identity is associated.
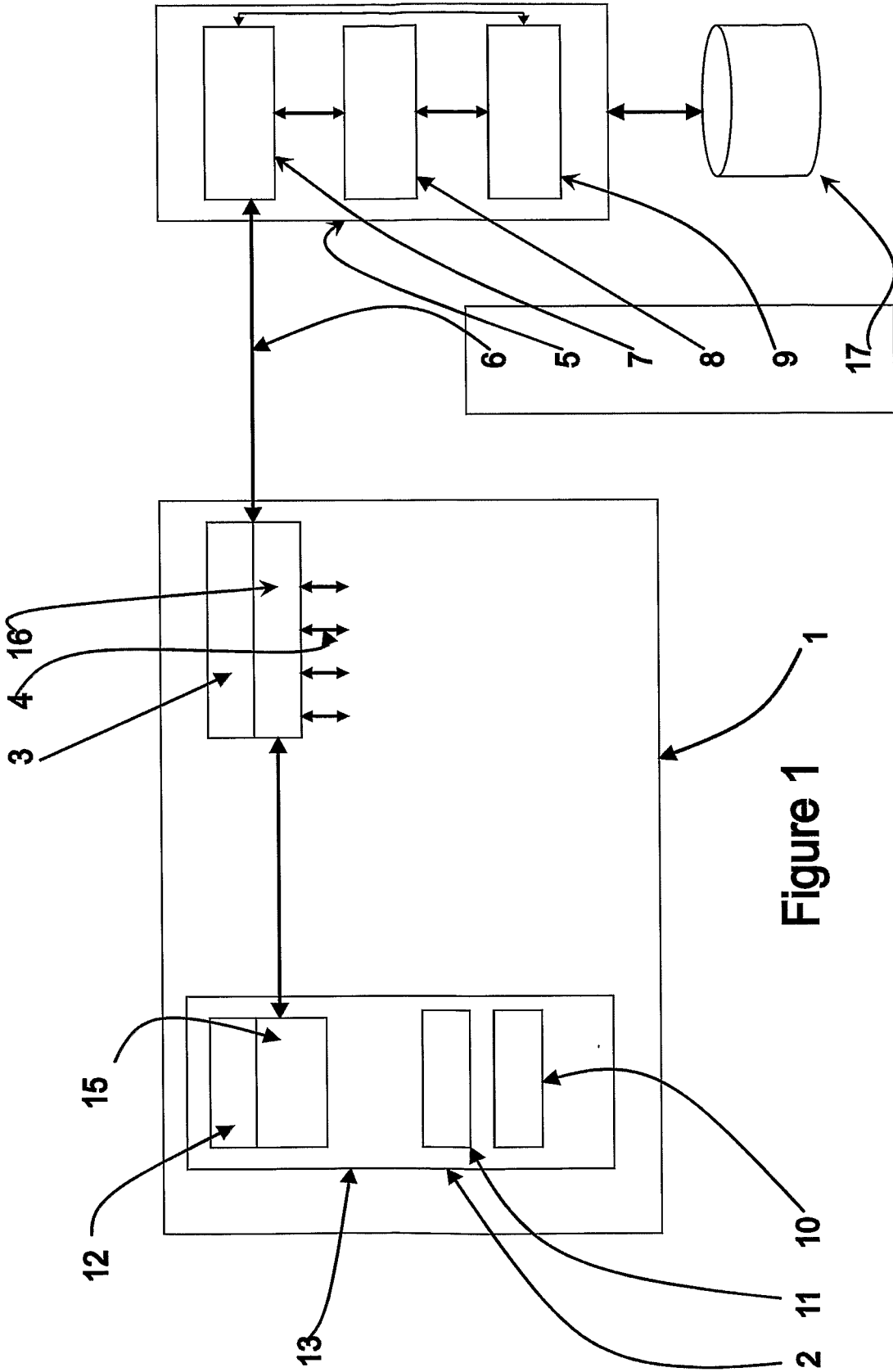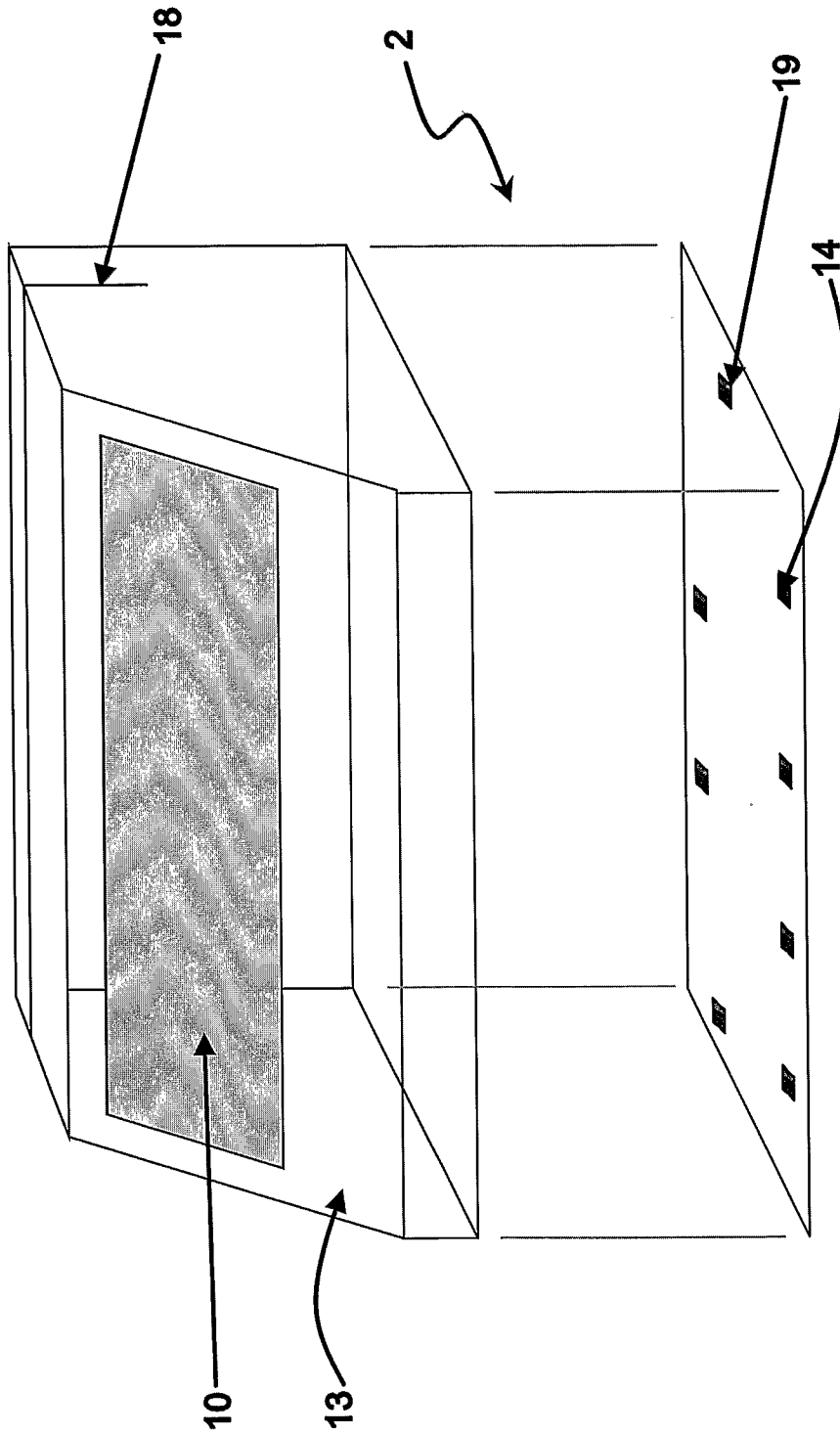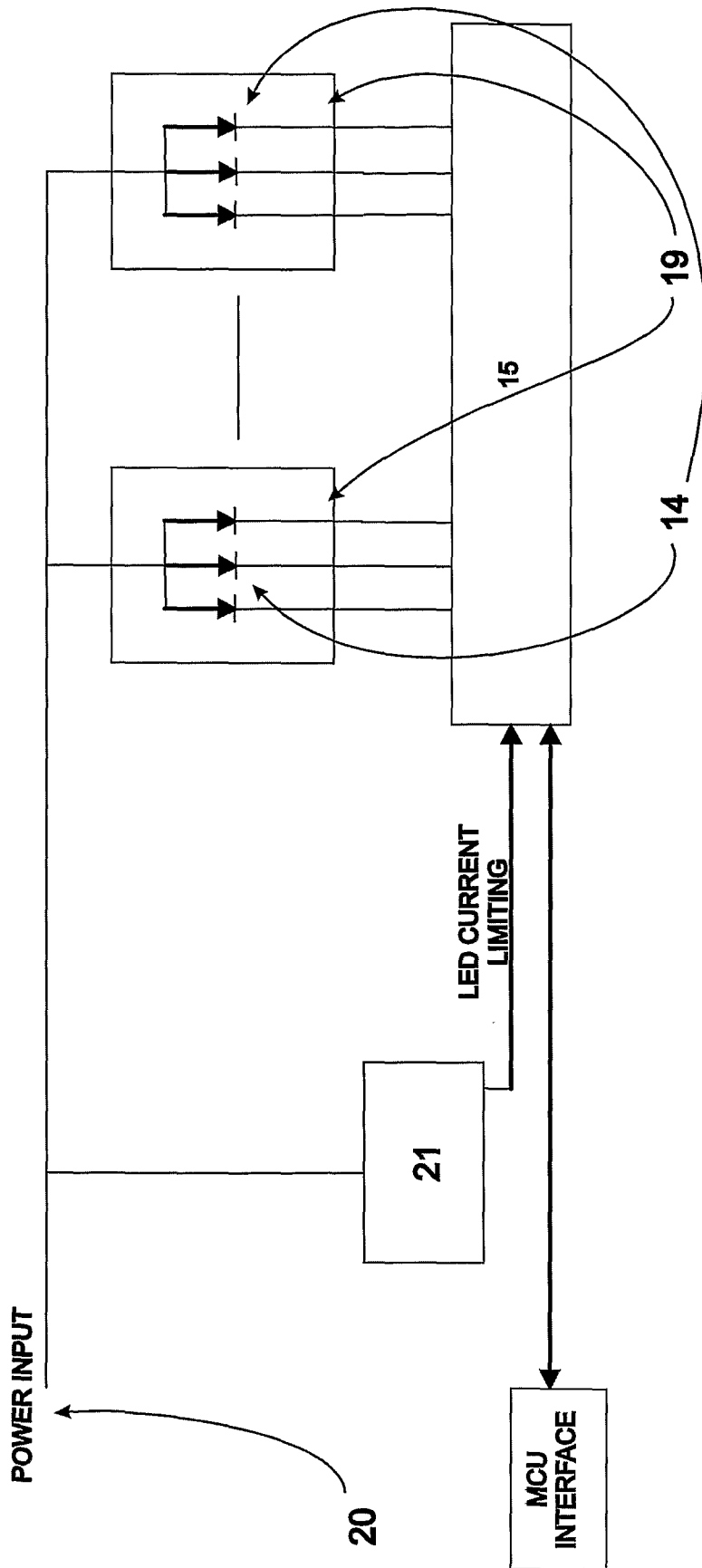
Figure 1
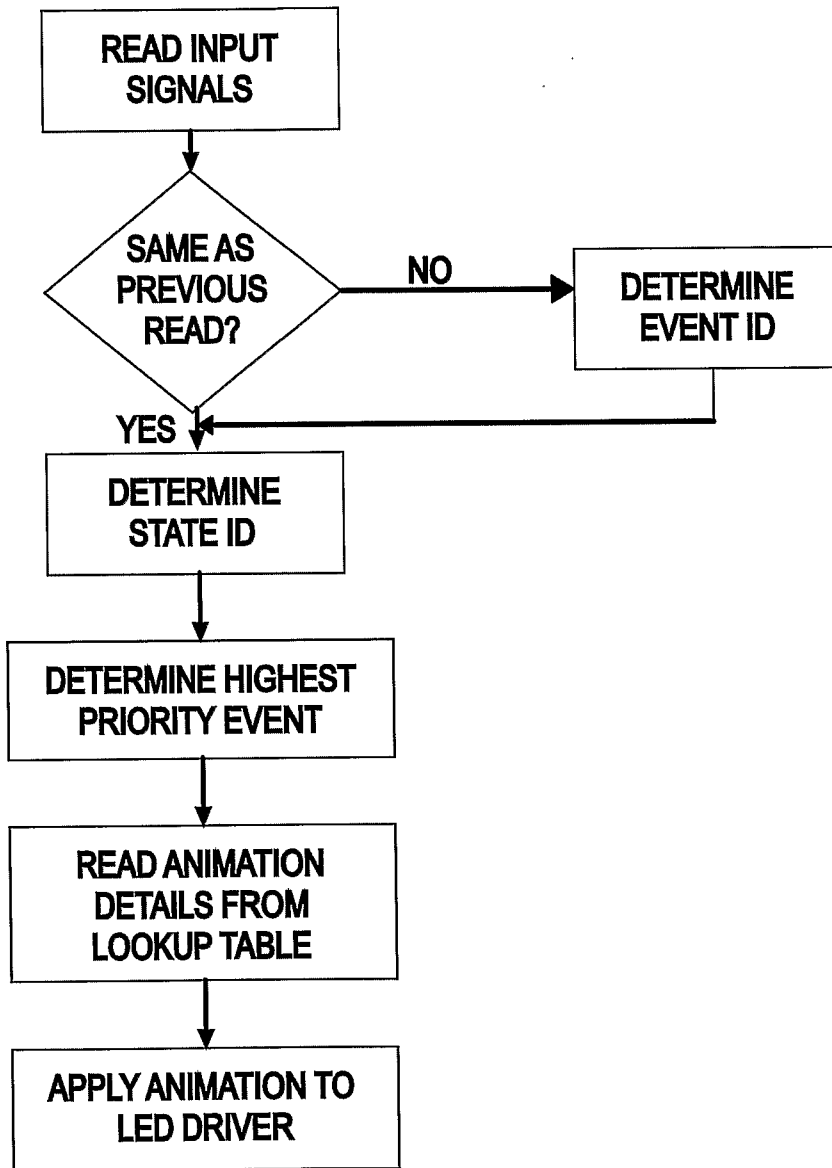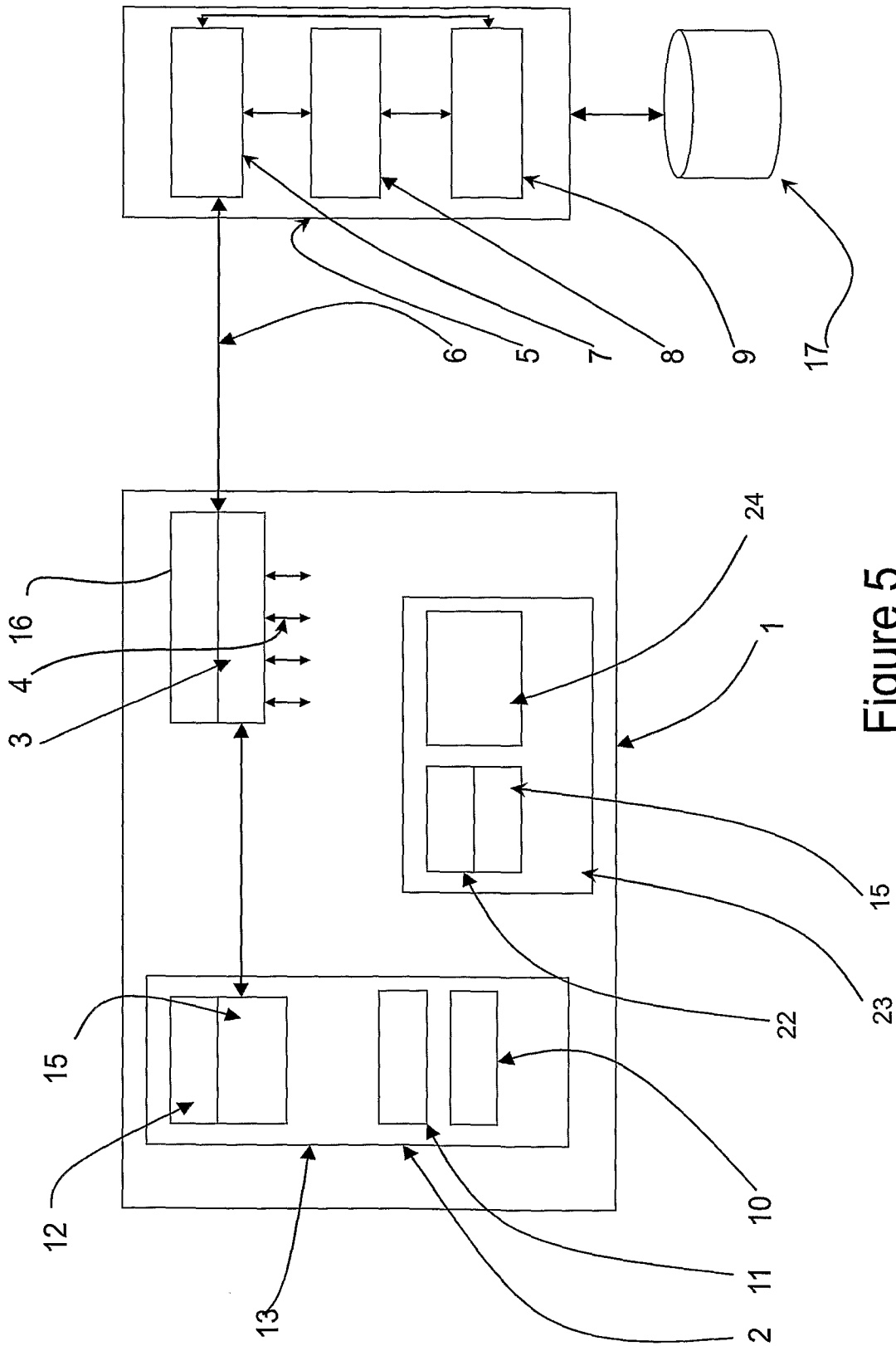
Figure 2

Figure 3

4 / 5



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│    SIGNALS      │
└─────────────────┘
         │
         ▼
      ╱─────────╲              ┌──────────────┐
     ╱  SAME AS  ╲     NO       │  DETERMINE   │
    ╱  PREVIOUS   ╲────────────▶│   EVENT ID   │
     ╲   READ?   ╱              └──────────────┘
      ╲─────────╱                      │
         │                             │
        YES ◀──────────────────────────┘
         ▼
┌─────────────────┐
│   DETERMINE     │
│    STATE ID     │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ DETERMINE HIGHEST│
│ PRIORITY EVENT  │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│  READ ANIMATION │
│  DETAILS FROM   │
│  LOOKUP TABLE   │
└─────────────────┘
         │
         ▼
┌─────────────────┐
│ APPLY ANIMATION TO│
│   LED DRIVER    │
└─────────────────┘
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Figure 4

Figure 5

| A. | CLASSIFICATION OF SUBJECT MATTER |
|---|---|

*G07F 7/12* (2006.01)   *G07F 9/02* (2006.01)   *G07F 17/34* (2006.01)

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)

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)
DWPI, using keywords: Light, LED, amusement, arcade, gaming, "card reader", animate, pattern, sequence

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | JP 2003340132 A (SANKYO CO LTD) 2 December 2003, PAJ Translation<br>See whole document, in particular: Abstract, Drawing 1 & 3, Para 0011 - 0018 | 1 – 32 |
| X | JP 2002200283 A (TAKASAGO DENKI SANGYO KK) 16 July 2002, PAJ Translation<br>See whole document, in particular: Abstract, Para 0031 – 0033 | 1 – 32 |
| X | US 5836818 A (JONES et al) 17 November 1998<br>See whole document, in particular: Abstract, Column 2, Lines 35 – 55, Column 6, Lines 23 – 50, Figures 5 & 6 | 1 – 32 |
| X | US 5635696 A (DABROWSKI) 3 June 1997<br>See whole document, in particular: Abstract, Column 4, Lines 2 - 27 | 1 – 32 |

| ☐ 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 | "T" | later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention |
| "E" | earlier application or patent but published on or after the international filing date | "X" | document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone |
| "L" | document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) | "Y" | document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art |
| "O" | document referring to an oral disclosure, use, exhibition or other means | "&" | document member of the same patent family |
| "P" | document published prior to the international filing date but later than the priority date claimed | | |

| Date of the actual completion of the international search | Date of mailing of the international search report |
|---|---|
| 26 July 2006 | - 4 AUG 2006 |

| Name and mailing address of the ISA/AU | Authorized officer |
|---|---|
| AUSTRALIAN PATENT OFFICE<br>PO BOX 200, WODEN ACT 2606, AUSTRALIA<br>E-mail address: pct@ipaustralia.gov.au<br>Facsimile No. (02) 6285 3929 | **J.W. THOMSON**<br>Telephone No : (02) 6283 2214 |

Form PCT/ISA/210 (second sheet) (April 2005)

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

| Patent Document Cited in Search Report | | | Patent Family Member | | | | |
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| | | AU | 32220/93 | AU | 33124/89 | AU | 33125/89 |
| | | AU | 33126/89 | AU | 53879/94 | AU | 68056/98 |
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| | | US | 5374067 | US | 5377973 | US | 5380012 |
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| | | US | 5626341 | US | 5794964 | US | 5795225 |
| | | US | 5913726 | US | 6045130 | US | 6070878 |
| | | US | 6073930 | US | 6234895 | US | 6312330 |
| | | US | 6336859 | US | 6475088 | US | 6485368 |
| | | US | 2001024969 | US | 2002077168 | WO | 9310869 |
| | | WO | 9521665 | | | | |
| US | 5635696 | | | | | | |

Due to data integration issues this family listing may not include 10 digit Australian applications filed since May 2001.

END OF ANNEX