

A METHOD AND ARRANGEMENT FOR DISPLAYING AN EGM BONUS FEATURE

Field of the invention

[001] This invention relates to a gaming machine having a bonus feature.

[002] The invention is applicable to gaming machines in which a bonus symbol is added to a normal game feature by the inclusion of one or more bonus trigger symbols.

Background of the invention

[003] In this specification unless the contrary is expressly stated, where a document, act or item of knowledge is referred to or discussed, this reference or discussion is not an admission that the document, act or item of knowledge or any combination thereof was at the priority date, publicly available, known to the public, part of common general knowledge; or known to be relevant to an attempt to solve any problem with which this specification is concerned.

[004] There is an ongoing demand for new games and variations of games to maintain player interest. The provision of bonus features provides a method for maintaining player interest.

[005] Reel type gaming machines have an electronic simulation of a plurality of spinning reels. The individual reels stop in a position relative to a display to show one or more rows of symbols from adjacent reels in a window or in a virtual display and a matrix of rows and columns of symbols is displayed for analysis of winning or losing events. A common window configuration is 3 rows and 5 columns, but other combinations are also known. One or more paylines are defined in the window, for example, the centre row, the top row, the bottom row, and possibly one or more meander lines. Non-linear paylines and "scatter" pays are also known. The player may select (by wagering) one or more paylines per game. The paylines are normally selected in a fixed sequence, for example, if the player selects one payline, this will normally be the central horizontal line. Similarly, selecting two paylines will activate the centre payline and the top horizontal payline. The player may also select the

amount wagered per line. A payline is active if the player has wagered sufficient paylines to include that payline or specifically selected individual paylines or groups of paylines. Paylines which are not active are inactive.

[006] In a standard video format of such games on electronic gaming machines (hereinafter defined as “EGM” or “EGMs”), the virtual reels are made to appear to spin, each virtual symbol being made to appear to traverse its column in the window in a fixed sequence in relation to its adjacent symbols. When the virtual reels cease to spin, the virtual symbols displayed in the window on each active payline are compared with a payable to determine if a prize has been won.

[007] Bonus awards can be triggered when a bonus trigger symbol or bonus trigger event (e.g., specific multiple symbols or a random bonus event) is displayed in the window. The game has rules or algorithms or programs for determining the probability of a bonus trigger symbol being included on a reel.

[008] In known systems, when it is desired to add a bonus trigger symbol to a reel, an additional symbol is added to the reel, virtual reel or into software providing virtual images. Thus, for a reel having L symbols in a standard game (physical reel or virtual reel), the reel with the bonus trigger symbol will have $L + 1$ symbols. This, of course, alters the probabilities of the game. Accordingly, it is necessary to revise the payouts and odds with respect to the new probabilities to achieve the intended payout ratio or percentages.

[009] Electronic gaming machines are capable of implementing different games on the same machine. Some of these games can have differing numbers of symbols on their reels. The inclusion of additional bonus trigger symbols in such machines may require the recalculation of probabilities for each different game.

[010] Some slot machines include bonus features that are activated randomly or pseudo-randomly and the bonus features are normally independent of the results of the underlying or primary game. The result of the primary slot game is determined by the resulting symbols on the reels and the paylines being wagered on by the player whereas bonus features are generally triggered independently of the result of the primary game. In some cases the bonus features are triggered randomly by the EGM with no visual indicator shown, unless the bonus feature is actually triggered by specific visual or displayed events. In other cases the bonus feature is triggered by the

appearance of a bonus symbol in one of the active and sometimes inactive paylines. This is called a symbol driven method of triggering a feature and the bonus symbols, or some other indicia, are added to the reel strip or strips or are identified by software as being part of a bonus triggering event. For example, in video poker games, the conventional symbols forming four-of-a-kind or a straight flush may be used to trigger a bonus event without having to add any additional symbols.

[011] If the bonus feature is triggered by a symbol that is part of the reel strip (i.e., the bonus feature symbol occupies one of the positions on the reel strip, then the probability of the bonus or triggering symbol appearing (known as the feature hit rate) is based on the length of the reel (or total number of symbols in a virtual reel) and the number of triggering symbols that appear on the reel.

[012] Any attempt to add common bonus features to a plurality of different games presents difficulties because different games have different reel lengths, different numbers of virtual symbols per different reels, different probabilities for different symbols in virtual reels for different games, and to keep the hit rate of the bonus feature approximately constant would require that the game mathematics be modified for every different game. This adds additional expense and development time to game design and is therefore undesirable.

[013] Therefore it is desirable to have a bonus feature and a method of triggering a bonus feature that operates independently of the underlying game and its particular features and mathematics.

[014] US2007077986 discloses a spinning reel slot machine comprising a plurality of mechanical rotatable reels and a video display. In response to a wager, the reels are rotated and stopped to randomly place symbols on the reels in visual association with a display area. The video display provides a video image superimposed upon the reels. The video image may be interactive with the reels and include such graphics as payout values, a pay table, pay lines, bonus game features, special effects, thematic scenery, and instructional information.

[015] US2005159208 discloses a slot-type gaming machine using an expandable symbol array to create a series of sequentially larger symbol arrays with the potential for additional or enhanced awards. The generation of the larger arrays can be performed through a variety of different mechanisms, such as the addition of a

reel to the base array. The secondary arrays may be generated only under specific sets of circumstances that occur in the base array including, a winning pay line, the occurrence of a bonus triggering symbol, etc. To increase player interest in the game, some embodiments include allowing the player to determine where the additional symbols to create the larger array are placed in the base array.

[016] EP1544811 discloses a gaming machine having an enhanced game play scheme where, in response to receipt of a second wager to select an option, a player is provided with enhanced game play which may include, among other features, providing an extra wild symbol capable of repositioning.

[017] U.S. Patent No. 5,980,384 (Barrie) discloses a gaming apparatus and method in which there is a primary game and a secondary game that are dynamically linked, and the primary game can be won independently of the secondary game. The primary game may be won on each play of the game, and the secondary game may be won over a plurality of plays of the primary game. Primary game symbols appearing during plays of the primary game may cause: (i) movement of primary game symbols to secondary game display positions; (ii) primary game symbols directing play options of secondary game symbols; (iii) changing the options open to the player in his or her attempt to win the secondary game; (iv) symbols in the primary game being used as soft buttons to affect movement of game symbols from the primary game to the secondary game, and between symbol display positions in the secondary game; and (v) secondary game symbols persisting to subsequent plays of the primary game to help the player to win at the secondary game.

[018] It is desirable to provide an electronic gaming machine with the ability to incorporate bonus trigger symbols without affecting the standard game probabilities.

SUMMARY OF THE INVENTION

[019] A method of incorporating a bonus symbol into a plurality of standard symbols to be displayed in an EGM display adapted to display at least a selected portion of a plurality of standard symbols is disclosed. The method includes the steps of:

determining the number of bonus symbols to be displayed during a round of play of an underlying game; and for each bonus symbol to be displayed:

- a) determining the location at which the bonus symbol is to be displayed within the plurality of symbols; and
- b) incorporating a bonus symbol or bonus symbol overlay with the corresponding standard symbol for the chosen location,

whereby the bonus symbol is incorporated into the plurality of symbols without affecting the standard game probabilities. In effect, an independent determination for the placement and frequency of bonus symbol events is defined in software or algorithms, and that independent determination is overlaid onto the natural or predetermined frequency of appearance of individual symbols in the underlying game.

[020] The number of bonus symbols can be defined, established, programmed or determined according a predetermined probability of a bonus symbol being selected in a game.

[021] The location of at least one bonus symbol can be determined on a predetermined or pseudo-random basis.

[022] The location of each and/or every (e.g., by selecting a template of bonus symbol locations rather than individual bonus symbol locations) bonus symbol can be determined on a pseudo-random basis.

[023] The bonus symbols can be evenly or unevenly distributed through a subset of the standard symbols.

[024] The display can be a simulation of a plurality of reels (e.g., virtual reels) each having a corresponding plurality of simulated (virtual) standard symbols.

[025] Where the number of standard symbols on a reel is not an integer multiple of the bonus symbol probability, the number of bonus symbols added per game may be calculated (e.g., probabilities added or associated with each symbol) to provide an average number of bonus symbols resulting in the desired or required probability over two or more games. For example, as the individual symbols on the reels, including blank spaces, are selected by a random number generator, each individual symbol may be assigned a probability, including probabilities other than its absolute mathematic probability based on the total number of symbols. Thus, assuming twenty symbols, each symbol would ordinarily have a probability of 1/20 or 5%. The designer of the game can assign arbitrary or designed probabilities to the

individual symbols so that one symbol is 4.5% and another is 5.5%, balancing each other out so that the total probability remains at 100% for available symbols. One symbol may be converted to 4.33% and two others to 5.33% and 5.34%, again retaining the 100% total. The important element to note is that to assure the desired probability, without being restricted to whole numbers in assignment of probabilities, the random number generator may be provided with symbols having assigned probabilities other than whole numbers.

[026] The number of games to obtain the average number of symbols can be minimized so that the average number of symbols is obtained with the minimum number of games. By using probabilities that include only 0.5% increments, the number can be minimized to two games, with increments of 0.33, three games and with increments of 0.25, to four games.

[027] The bonus trigger symbol can be displayed in a semi-transparent form (e.g., transparently or translucently overlaying the standard symbol) so the underlying standard symbol can be identified by the player.

[028] Another aspect of the invention is an electronic gaming machine adapted to display a selected number of rows of a plurality of reel simulations having a predetermined number of standard symbols per reel (or virtual reel), and to display, on average, a predetermined number of bonus symbols per game, wherein the EGM is adapted to display each bonus symbol as a combined virtual symbol having a virtual bonus symbol superimposed on a virtual standard symbol.

[029] Each combined symbol can be substituted for a corresponding standard symbol.

[030] Each combined symbol can be formed by adding an overlay to a standard symbol.

[031] For each reel in which one or more bonus symbols is to be incorporated, a substitute reel including the combined symbol or symbols can be created.

[032] Another aspect of the invention is a method of incorporating a bonus symbol into an electronic reel having a plurality of standard virtual symbols, each one of the plurality of standard virtual symbols being located at a unique location on the virtual reel, the virtual reel to be displayed on an Electronic Gaming Machine (EGM)

display adapted to display at least a selected portion of the virtual reel, the method including the steps of:

determining the location at which the bonus virtual symbol is to be incorporated within the plurality of standard symbols;

incorporating the bonus symbol with the corresponding standard symbol for the determined location.

Preferably, a plurality of bonus symbols are incorporated into the reel and the method includes the steps of:

determining the number of bonus symbols to be incorporated into the reel; and for each bonus symbol to be incorporated;

a) determining the location at which the bonus symbol is to be incorporated within the plurality of standard symbols; and

b) incorporating the bonus symbol with the corresponding standard symbol for the determined location.

[033] Preferably the reel is used in a standard game having predetermined probabilities (for outcomes and symbol appearance) and whereby the bonus symbol is incorporated into the plurality of standard symbols without affecting the standard game probabilities. Preferably, the reel has a reel length (or number or symbols on the reel or number of virtual symbols on the virtual reel) and the incorporating of the bonus symbol into the reel (or virtual reel) does not affect the reel length or total number of symbols.

[034] Preferably the bonus symbol is incorporated with the corresponding standard symbol by superimposing the bonus symbol on the standard symbol such that both the standard symbol and the bonus symbol are visible in physical format or virtual reel format. More preferably the bonus symbol is incorporated with the standard symbol with transparency or translucency of one or more of the symbols.

[035] Another aspect of the invention is an electronic gaming machine (EGM) for providing a spinning reel game having a standard game and a bonus feature, the EGM including:

a processor for determining the outcome of the standard game;
a display for displaying the outcome of the standard game;
the standard game including at least one electronic reel having a plurality of standard symbols, each one of the plurality of standard symbols being located at a unique location on the reel, a portion of the reel to be displayed on the display as the outcome of the standard game;

the processor further adapted to:

- a) determine the location at which a bonus symbol is to be incorporated within the plurality of standard symbols;
- b) incorporate the bonus symbol with the corresponding standard symbol for the determined location; and
- c) provide the bonus game when the bonus symbol is displayed in the outcome of the standard game.

[036] Preferably, a plurality of bonus symbols are incorporated into the reel or virtual reel and the processor is adapted to:

- a) determine the number of bonus symbols to be incorporated into the reel; and for each bonus symbol to be incorporated:
 - i) determine the location at which the bonus symbol is to be incorporated within the plurality of standard symbols; and
 - ii) incorporate the bonus symbol with the corresponding standard symbol for the determined location.

[037] The bonus game may be triggered by the display of one bonus symbol or multiple bonus symbols. Preferably the standard game has predetermined probabilities and the bonus symbol is incorporated into the plurality of standard symbols without affecting the standard game probabilities. Preferably, the reel has a reel length and number of symbols per reel (physical or virtual) and the incorporating of the bonus symbol into the reel does not affect the reel length or number of total symbol positions on the virtual reel.

[038] Preferably the bonus symbol is incorporated with the corresponding standard symbol by superimposing the bonus symbol on the standard symbol such

that both the standard symbol and the bonus symbol are visible. More preferably the bonus symbol is incorporated with the standard symbol with transparency or translucency.

[039] The invention also provides a display arrangement for a terminal, the arrangement including a first display screen and a second display screen overlaid on the first screen, or virtual screen display that are electronically integrated and simultaneously displayed on a single monitor as a single screen display.

[040] The second screen can be transparent, semi-transparent, translucent, discontinuously translucent or transparent, or partially transparent.

[041] The second screen can be adapted to display an image overlaid on a first image displayed on the first screen.

[042] The second image can be non-transparent, partially transparent, or semi-transparent. In one example, the standard symbol and bonus symbol are both displayed adjacent to each other in symbol area.

[043] The screen arrangement can be incorporated in an electronic gaming machine.

BRIEF DESCRIPTION OF THE FIGURES

[044] An embodiment or embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

[045] Figure 1 is a diagram illustrative of an electronic gaming machine.

[046] Figure 2 is a functional block schematic diagram of functional elements of an Electronic Gaming Machine.

[047] Figure 3 represents a five reel array.

[048] Figure 4 shows a reel arrangement with the addition of a pair of bonus trigger symbols.

[049] Figure 5 is a flow diagram illustrating the selection of a bonus trigger symbol.

[050] Figure 6 illustrates the window display of an EMG.

[051] Figure 7 illustrates the window display of an EMG with a bonus trigger symbol.

[052] Figure 8 is a functional block diagram of a terminal having a double screen.

[053] Figure 9 is a flow diagram illustrating an embodiment of the invention using a dual screen display.

[054] Figure 10 illustrates dual screen displays.

[055] Figure 11 illustrates a side view of a dual screen arrangement.

DETAILED DESCRIPTION OF THE INVENTION

[056] The invention will be described with reference to an electronic gaming machine (EGM) being programmable to implement one or more different wagering games.

[057] Figure 1 is a diagram illustrative of an electronic gaming machine 100, including a display screen 102, player input buttons 104, and credit or currency input 108. When a player has entered sufficient credits from credit input 108, the player can select a game using the player input via buttons 104 or touch screen buttons (not shown) displayed on the screen 102, or a game can automatically be selected. The player can also select the paylines and credits per line again using the player input.

[058] Figure 2 is a block schematic diagram of functional elements of an EGM including a processor 202 shown for illustrative purposes only as connected via bus 220 to a plurality of functional elements. The EGM can include a display 212 with associated video driver 210 and touch screen interface 214, various storage devices such as RAM 204, ROM 206 and hard drive 208, a user interface 222, credit interface 224, and communication interface 226. The EGM can be a stand-alone machine, or it can be connected to a network via the communication interface 226, to enable the machine to participate in multi-game jackpots. In addition, the EGM may be programmed via the communication network from a central control and management processor, so that, for example, new games can be programmed and downloaded into the EGM.

[059] In an EGM producing a reel display, each reel has a plurality of symbols L , and their relative position on the reel is usually fixed, so the player sees a window displaying a number of rows in which a sequence of symbols scroll down the column in which the reel is displayed. The symbols of the reel can thus be defined in terms of the particular reel, the specific symbol, and the place of the symbol in the sequence of symbols. Figure 3 represents a five reel array 300, having reels A, B, C, D, E, each reel having L symbols. The symbols are displayed in a repeating sequence, so that 1 follows L (or alternatively L follows 1) in a loop until the reel stops. A window 302 spanning 3 rows and the 5 columns is shown to indicate a pay window on the screen. Thus a symbol can be represented by the column identifier (A, B...) and the row number, where one symbol is notionally assigned as the start symbol 1. An image is displayed as the symbol, and the images and or combinations of images on a payline are allocated different values in the associated paytable. When the EGM is programmed, the program thus includes the parameters of each symbol including the reel, the symbol position, and the image details (the symbol type). The probability of a particular symbol being displayed on a reel or a virtual reel is determined by the number of that type of symbol in a reel divided by the number of symbols in the reel (L). Thus, where there is only one of a particular symbol in a reel, its probability of appearing in a specific position, such as the centre line of the window, is $1/L$. In playing a game, the program can use a pseudo-random number generator to determine which symbols will be displayed in the window 302 for each reel by selecting a number between 1 and L for each reel to appear, for example, on the centre line. Thus a particular symbol and its neighbouring symbols (each symbol typically being independently selected randomly or pseudo-randomly) will appear in the window where three lines are displayed. It will be understood that in different embodiments of the invention each reel A, B, C, D and E is a different length and that the lengths of each reel are independent of one another. That is, there is no requirement that the reel lengths be equal, multiples of each other, or have any other dependency on one another. Accordingly the probability of a particular symbol appearing in a specific position in the window 302 is dependent on the number of that particular symbol contained on that particular reel and the length of that reel.

[060] In Figure 3, three consecutive symbols A, X, P are shown in reel A at positions 2, 3, and 4, and a further three consecutive symbols W, A, D are shown in

reel D at positions $L - 3$, $L - 2$, and $L - 1$. Figure 3 illustrates the position of the reels at the beginning of a game. For the sake of explanation, row 1 is shown at the top of the matrix. In practice, the symbol corresponding to row 1 will be in a position determined by the result of the previous game.

[061] Figure 6 shows the window 600 after a game spin. As shown at Figure 6, during the playing of a game, the symbol A3, which is shown as the letter X, is randomly chosen as the symbol to be displayed on the middle line of the window 600, so the symbols A2 (the letter A) and the symbol A4 (the letter P) are shown in the first column in the window on either side of the X. Similarly, for reel D, the symbol A corresponding to the position $L - 2$ in Figure 3 has been randomly selected to be displayed on the centre row of the window.

[062] Also shown in Figure 6 are 5 A symbols, one on each reel. The five A's are located on the fourth payline which is illustrated by the dotted lines. Thus, if the player has selected four or more paylines, this will result in the awarding of a corresponding payout.

[063] Figure 4 shows a reel arrangement similar to that of Figure 3 with the addition of a pair of bonus trigger symbols 404, 406 which have been added to randomly selected reel positions as determined by the game program. The bonus trigger symbols are shown as stars, but other symbols can be used. The bonus trigger symbols are superimposed on the standard game symbols. Preferably, the bonus trigger symbols are semi-transparent so the underlying standard symbol can be recognized by the player. The bonus trigger symbol 404 has been added to the reel position A3, which carries the standard symbol X. A second bonus trigger symbol 406 has been added to reel D. As shown in Figure 7, when the game spin has concluded, the same symbols are displayed in the window as for Figure 6, but the middle symbol on reel A has the bonus trigger star 707 superimposed on it. Because the second bonus trigger 406 was not in a reel position selected to be displayed, this bonus trigger symbol is not displayed on the three symbols of reel D shown in Figure 7. While in this example bonus trigger symbols have been added to reel A and reel D in other embodiments bonus trigger symbols are added to other reels. For example, bonus symbols could be added to reels A and B, A and C, B and C and the like. In some embodiments only one reel is chosen to contain one or more bonus symbols. In other embodiments consecutive reels are chosen to each contain one or more bonus

symbols. In further embodiments all reels contain one or more bonus symbols. Some embodiments may randomly select one or more reels for containing one or more bonus symbols. In this embodiment described the bonus game is triggered if both trigger symbols are present in an active payline. Other embodiments require one or in some embodiments both of the trigger symbols to appear anywhere in the window 402 and not necessarily in an active payline.

[064] As discussed above, the addition of an additional symbol having a bonus trigger image will alter the probabilities. Thus, in accordance with an embodiment of the invention, when a bonus trigger is to be displayed, and the program has determined the location in which it is to be in the reel sequence, a new symbol having the original symbol plus a superimposed bonus trigger are substituted in the chosen location without altering the total number of symbols (L) in the reel.

[065] This can be done in several ways.

[066] A first option is to substitute a complete set of replacement reels (physical or virtual reels) having the bonus trigger superimposed or otherwise added on the selected symbols.

[067] In a second option, only those reels in which the bonus trigger is to be inserted can be substituted by a reel (physical or virtual) having the bonus trigger superimposed on the selected symbols.

[068] A third option is to substitute the combined symbol for the original symbol in the reel in the selected location. This can be done for example, by providing a library with two versions of each symbol, a standard version and a combined version with the semi-transparent bonus trigger overlay. Then, when a location for a bonus trigger is selected, the combined symbol can be called for that location. For the other locations, the standard version can be called. In effect, these procedures accomplish the following results:

- 1) An underlying symbol game is provided with established probabilities and odds for symbols and outcomes;
- 2) A bonus event is added to the underlying symbol game;
- 3) The original probabilities for at least symbols is retained;

- 4) Bonus triggering events are added to the underlying game by the addition of one or more bonus symbols or bonus indicators (e.g., highlighting, color changing, flashing, brightening, dimming, framing of pre-existing symbols for the underlying game);
- 5) These bonus triggering events or symbols do not alter the underlying game symbol distribution or mapping or probabilities, but are, in effect, overlaid on the existing underlying game symbol distribution or mapping, in physical reels or virtual reels.

[069] In a further variation, one or more symbol locations on each reel can be programmed to have a standard symbol or a standard symbol plus one or more of the bonus triggers or symbols superimposed thereon. In other words, the symbol images can be programmed to have the standard symbol displayed with the processor making a determination, randomly providing or effecting a mathematical option of superimposing the trigger symbol thereon as an overlay. In this embodiment, each image of a standard symbol in the software can include an optional feature which calls for the bonus trigger image overlay when a symbol location is selected as the location of a bonus trigger symbol. To make this system more generally applicable, each symbol location can have this option, so the game program can be executed on software to select any position in which to include a bonus trigger.

[070] In yet a further and preferred variation, the underlying standard symbols do not change and the bonus symbol is superimposed with transparency over the standard symbol. That is, the standard symbol and the bonus symbol are separate graphics that are stored on the EGM. When the reels come to rest and if the location on which the bonus symbol was to be placed is in view, the EGM superimposes the bonus symbol on the standard symbol with transparency. That is, from the player perspective the graphics are combined such that both the standard symbol and the bonus or trigger symbol are viewable.

[071] Figure 5 is a flow diagram illustrating the selection of a bonus trigger symbol. At the start of a game, the program determines at 504 how many trigger symbols are to be added. Where trigger symbols are to be added, the program then determines at 506 the location of each trigger symbol. This can be done by random or pseudo random selection of a symbol position. The symbol at each selected position is

then changed to a symbol having the standard symbol for that location with the addition of the trigger symbol overlayed on the standard symbol. The reels are then spun 510 and the stop symbol (the symbol to be displayed on the centre line of the window) is selected 512 for each reel and the reels stopped at the appropriate position. The symbols displayed are then compared with the paylines chosen by the player and then analysed against a payable to determine if a prize has been won at 514. Where a prize is won, the appropriate number of credits are added to the player's credits at 516.

[072] Where the credits have been paid, or where no prize has been won, a second analysis of the displayed symbols is carried out at 518 to determine if a bonus trigger has been displayed. The bonus trigger can comprise the display of one bonus symbol or plural bonus symbols. Where a bonus has been triggered, the bonus game is played at 520 until a bonus termination event 522 occurs. Examples of bonus games include the player choosing from a number of display symbols to display a hidden prize, a random selection of prizes from those displayed on the EGM display, a calculation that is hidden from the player and is displayed only if won, and any other game as would be suitable. Bonus awards won during the playing of the bonus game can include the award of credits, the winning of a jackpot, free spins, a physical prize, a linked prize or jackpot, a prize or jackpot local to the specific EGM or other prize. The player can then decide whether to continue play at 524, or to collect the credits 526 and end the game, 528, or to reserve the machine for the permitted reservation period at 530.

[073] In an embodiment of the present invention, a bonus feature is triggered by bonus or triggering symbols that are superimposed on the standard reel symbols. If a symbol containing a bonus symbol appears in one of the active paylines, the bonus feature is triggered. As the bonus symbols are superimposed on the existing reel symbols, the bonus symbols do not affect the length of the reel to which they are added. The number of bonus symbols superimposed on the reels and the reel length therefore determine the hit rate.

[074] For example, if a particular bonus feature has a desired hit rate of 1 in 75 then superimposing 1 bonus symbol onto one of the symbols on the reel length consisting of 75 symbols will result in a hit rate of 1 in 75. However, the hit rate and

the reel length are rarely the same and further calculations are required in instances where the reel length is different to the hit rate.

[075] An alternative description for the present technology can be presented as a method of displaying a bonus symbol on a virtual reel during play of an underlying electronic wagering game. That underlying game has a plurality of standard symbols used in the underlying electronic wagering game. Each one of the plurality of standard symbols is either located at a unique location on the virtual reel or is pseudo-randomly provided from a set of virtual symbols available for display at displayed positions on the virtual reel. The virtual reels are to be displayed on an electronic gaming machine display adapted to display at least a selected portion of the virtual reel (e.g., three rows and 5 columns) or other selected portions (e.g., three rows and three columns). The method may include the steps of:

determining the location at which or probability of which the bonus symbol is to be incorporated within the plurality of standard symbols; and

incorporating the bonus symbol with the corresponding standard symbol for the determined location or at a probability-determined occasion. In performing this method, probabilities for selection of individual bonus symbols are provided and those probabilities for selection of individual bonus symbols are dependent upon probabilities for any underlying standard symbol. That is, the underlying standard symbols have their own probability distribution and the bonus symbols have their own independent probability distribution. Even if it is desired to have a specific bonus symbol (such as the casino name) associated with a particular symbol (such as a BLUE SEVEN), the BLUE SEVEN may have a probability of 1/100 and the Casino name may have a probability of 1/3 with respect to the appearance of the BLUE SEVEN so that the combination of the BLUE SEVEN and Casino name would occur only 1/300 times. If the Bonus symbol always appears with designated symbol, then the probability of the Casino Name appearing is 1/300, which is independent of the individual probabilities of the individual standard symbols.

[076] The following methods described below are examples of the methods which can be used to determine how many bonus symbols should be superimposed on symbols on the reel on each spin. Importantly, the number of bonus symbols

superimposed on the reels is variable from spin to spin in some embodiments and may change every spin in order to achieve the required hit rate.

[077] In a first method, let the reel length of the given reel be L . If there are n bonus symbols superimposed on the regular reel symbols, then the chance of a particular bonus symbol landing in a single viewable position of the stopped reel is n in L or 1 in L/n .

[078] Assume the desired hit rate for landing the symbol in a desired position is precisely 1 in X . If $X = L$ then n would need to be 1 . Equivalently, n times X must equal L . When L is not an integer multiple of X , then n will not be a whole number. n cannot be a non-whole number since there cannot be a fraction of a bonus symbol superimposed (it must either be superimposed or not). In these situations there must be a variable number of bonus symbols appearing in each spin although the average number of bonus symbols superimposed may include a fraction.

[079] Take, for example, a hit rate of 1 in 75 with a reel length of 100 . If 1 symbol is superimposed then the hit rate is 1 in 100 that is too low. If two symbols are superimposed then the hit rate is 2 in 100 or 1 in 50 that is too high. Therefore to ensure the desired hit rate of 1 in 75 , sometimes 1 symbol is superimposed and sometimes 2 symbols are superimposed.

[080] Assume $L/2 < X < L$, and before the beginning of each game a decision is made as to whether $n = 1$ or $n = 2$. In this example this relates to adding either 1 or 2 bonus symbols to random reel positions.

[081] If $v = L/X$ and with a probability $2-v$ of the time 1 symbol is added else 2 symbols are added.

[082] 1 symbol is added $2 - v = 2 - (100/75) = 2/3 = 66.6\%$ of the time.

[083] 2 symbols are added $v - 1 = (100/75) - 1 = 1/3 = 33.3\%$ of the time.

[084] Then the average number of symbols added is

$$n_{av} = 1 * (2-v) + 2 * (v-1) = v$$

$$n_{av} = 1 * (2-100/75) + 2 * (100/75 - 1) = v = 1.33$$

[085] Now, n_{av} times X is

$$v * X = (L/X) * X = L$$

as desired. Therefore, on average we add 1.33 bonus symbols (or assign probabilities to the selection of individual bonus symbols) to each spin which gives a hit rate of 1 in 75.

[086] For $2L < X < 3L$ we would have

$$n_{av} = 2 * (3-v) + 3 * (v-2) = v$$

and so on.

[087] A sub-table representing some probabilities in this class of scenarios is shown in table 1 below.

TABLE 1				
	$0 < v \leq 1$	$1 < v \leq 2$	$2 < v \leq 3$	$3 < v \leq 4$
0	$1-v$	0	0	0
1	v	$2-v$	0	0
2	0	$v-1$	$3-v$	0
3	0	0	$v-2$	$4-v$
4	0	0	0	$v-3$

[088] A further method according to the technology disclosed and claimed herein may include the following:

[089] If a maximum number of symbols that can be added is set to 5 for example, then regardless of the reel length, if the desired hit rate was again 1 in X we could have,

p_0 being the probability of 0 being added to the reel;

p_1 being the probability of 1 being added to the reel;

p_2 being the probability of 2 being added to the reel;

p_3 being the probability of 3 being added to the reel;

p_4 being the probability of 4 being added to the reel;

p_5 being the probability of the maximum of 5 being added to the reel;

[090] (Note. $p_0 + p_1 + p_2 + p_3 + p_4 + p_5 = 1$)

[091] Hence,

$$n_{av} = 0 * p_0 + 1 * p_1 + 2 * p_2 + 3 * p_3 + 4 * p_4 + 5 * p_5$$

[092] The p values could be chosen so as to ensure $n_{av} = L/X$.

[093] For example,

$$p_0 = 0.20; p_1 = 0.10; p_2 = 0.20; p_3 = 0.20; p_4 = 0.10; p_5 = 0.20$$

or,

$$p_0 = 0.40; p_1 = 0.00; p_2 = 0.00; p_3 = 0.15; p_4 = 0.20; p_5 = 0.25$$

[094] In both these examples $n_{av} = 2.5$, which would be appropriate when, for example, $L = 50$ and $X = 20$.

[095] Using the methods described above a specific structure can be put in place. The particular structure chosen can ensure that for any value of L , the probability of matching the added special symbol is always 1 in X over a number of spins or multiple numbers of games. In another example of the invention, the overall desired probability of a bonus event occurring is maintained by adjusting the probability of games played over a defined period of time, or over a defined number of games.

[096] The trigger symbols can be added in a number of ways. For example, the symbols may be located at randomly chosen positions on the reel, or the trigger symbols can be added at equally spaced locations on the reel.

[097] For example, if the reel length is $L = 50$ then a random position from 1 to 50 inclusive is chosen.

[098] Suppose, $r = 14$.

[099] This is the position at which we could place the first such symbol.

[0100] Then the second symbol, rather than being selected from a further random selection of remaining positions, would be placed at position $r + \text{half of } 50$. That is, position 39.

[0101] It is preferred that if the first chosen position is r then the second symbol will be placed at

$$(r + 24) \bmod 50 + 1.$$

[0102] E.g. if $r = 34$ then 5 is the other position selected.

[0103] So for any even reel length L the two positions would be

1st chosen position = r; and

2nd chosen position = $(r + L/2 - 1) \bmod L + 1$.

[0104] Further, for general reel length L and n symbols to be allocated in order to equally space them (as best as possible) the following formula can be used:

nth chosen position = $(r + \text{ROUND}[(n-1)*L/n] - 1) \bmod L + 1$,

where r is just the random position arrived at by a random number generator.

[0105] There are numerous available computer languages that may be used to implement embodiments of the invention, among the more common being Ada; Algol; APL; awk; Basic; C; C++; Cobol; Delphi; Eiffel; Euphoria; Forth; Fortran; HTML; Icon; Java; Javascript; Lisp; Logo; Mathematica; MatLab; Miranda; Modula-2; Oberon; Pascal; Perl; PL/I; Prolog; Python; Rexx; SAS; Scheme; sed; Simula; Smalltalk; Snobol; SQL; Visual Basic; Visual C++; Linux and XML.

[0106] Any commercial processor may be used to implement the embodiments of the invention either as a single processor, serial or parallel set of processors in the system. Examples of commercial processors include, but are not limited to Merced™, Pentium™, Pentium II™, Xeon™, Celeron™, Pentium Pro™, Efficeon™, Athlon, AMD and the like.

[0107] Display screens may be segment display screen, analogue display screens, digital display screens, CRTs, LED screens, Plasma screens, liquid crystal diode screens, and the like.

[0108] Figure 8 is a functional block illustration of a dual screen terminal or EGM including a processor 802 shown for illustrative purposes only as connected via bus 820 to a plurality of functional elements. The EGM can include a display 812 with associated video driver 810, various storage devices such as RAM 804, ROM 806, and hard drive 808, a user interface 822, credit interface 824, and communication interface 826. The EGM can be a stand-alone single player machine, or it can be connected to a network via the communication interface 826, to enable the machine to participate in multi-game jackpots. In addition, the EGM may be programmed via the communication network from a central control and management processor, so that, for example, new games can be programmed into the EGM. This machine has been

modified by the addition of a second screen 882 with associated screen driver 880 and optional touch screen interface 884.

[0109] In one embodiment, the screen 882 is semi-transparent or transparent and physically overlies the first screen 812 as shown in side elevation in Figure 11. The arrangement of Figure 11 includes a first LCD screen 1102 with associated transparent control conductors 1104, 1106 on either surface. The conductors can be of tin oxide or other suitable transparent conductor material. The control conductors can be formed into row and column arrays, or into specific shapes or parts of shapes from which other shapes can be built up. Additional transparent insulating layers 1108, 1110 can be applied to insulate the conductive layers.

[0110] A second LCD display having an LC layer 1112 with associated transparent control conductor layers 1114, 1116 is provided in this embodiment. Again the conductor layers can be of any desired pattern. For example, where they are intended to superimpose a bonus trigger symbol such as a star, they can be formed to produce the required shape. Additional transparent insulating layers 1118, 1120 can be provided to insulate the conductor layers. A conductive shielding layer 1122, also of transparent conducting material can also be provided to prevent interference between the control signals for the first and second LCDs. When the second LCD is not displaying the bonus signal, it can be semi-transparent or substantially transparent. The image displayed by the second LCD can be non-transparent, partly transparent, or semi-transparent.

[0111] Figure 10 is illustrative of a game result for a five reel (A, B, C, D, E), 4 row reel set with a window 1002 showing a 3 row result. In column A, the symbols A, X, P, corresponding to rows 2, 3, 4 of column A, are displayed in the window 1002. In addition, the symbols W, A, D are shown for illustrative purposes in column D. Note that the column D symbols will normally have different row numbers from the row numbers of column A (see discussion of Figure 5).

[0112] The window 1002 corresponds to the first LCD screen 1102. A second window 1010 corresponds to the second LCD screen 1112 of Figure 11. This second window 1010 is in practice physically overlaid on the first window 1002, but is shown in Figure 10 to the side for purposes of illustration. Thus, in practice, the bonus

symbol 1004 in the middle row of the second window 1010 would appear overlaid on the symbol X in column A of window 1002.

[0113] Figure 9 is a flow diagram illustrative of the operation of a dual display EGM. When a game is initiated at 902, a decision is made as to the nature of the bonus display to be made at 904, the locations of the bonus symbols is determined at 906, and the position on the stopped reel is determined at 907, which determines whether or not the bonus symbol will be shown in the window.

[0114] The normal reel spin occurs using the first window (1002 in Figure 10). If the bonus symbol is to be shown in the window, the second display (1010) is operated to display the bonus symbol 1004 when the reels stop spinning. Subsequently the prize and bonus determination occurs in a similar manner to that described with reference to Figure 5.

[0115] An advantage of the present invention is that the player is provided with a feeling that the trigger is more random than a usual reel stop combination but less random than a totally mystery trigger.

[0116] In this specification, the terms “bonus trigger symbol”, “bonus symbol” and “trigger symbol” are used interchangeably.

[0117] In this specification, reference to a document, disclosure, or other publication or use is not an admission that the document, disclosure, publication or use forms part of the common general knowledge of the skilled worker in the field of this invention at the priority date of this specification, unless otherwise stated.

[0118] Where ever it is used, the word “comprising” is to be understood in its “open” sense, that is, in the sense of “including”, and thus not limited to its “closed” sense, that is the sense of “consisting only of”. A corresponding meaning is to be attributed to the corresponding words “comprise”, “comprised” and “comprises” where they appear.

[0119] The term “pseudo-random” is used herein to mean that a selection is made on a random basis from within a limited range.

[0120] It will be understood that the invention disclosed and defined herein extends to all alternative combinations of two or more of the individual features

mentioned or evident from the text. All of these different combinations constitute various alternative aspects of the invention.

[0121] While particular embodiments of this invention have been described, it will be evident to those skilled in the art that the present invention may be embodied in other specific forms without departing from the essential characteristics thereof. The present embodiments and examples are therefore to be considered in all respects as illustrative and not restrictive, and all modifications which would be obvious to those skilled in the art are therefore intended to be embraced therein.

Claims

1. A method of playing an underlying symbol display game having standard game probabilities including incorporating a bonus symbol into a plurality of standard symbols to be displayed in an electronic gaming machine display adapted to display less than all standard symbols of a plurality of standard symbols, the method including the steps of:

determining a number of bonus symbols that are to be displayed, and for each bonus symbol to be displayed:

a) determining the location at which the bonus symbol is to be displayed within the plurality of symbols; and

b) incorporating a bonus symbol with the corresponding standard symbol for the determined location,

whereby the bonus symbol is incorporated into the plurality of symbols without affecting the standard game probabilities.

2. A method as claimed in claim 1, wherein the number of bonus symbols is determined according to a predetermined probability of a bonus symbol being selected in a game.

3. A method as claimed in claim 1 or 2, wherein the location of at least one bonus symbol is determined on a pseudo-random basis.

4. A method as claimed in claim 3, wherein a location for each bonus symbol is determined on a pseudo-random basis.

5. A method as claimed in any one of the preceding claims, wherein probabilities for display of the bonus symbol is distributed through a subset of the standard symbols.

6. A method according to any one of the preceding claims, wherein the display is a simulation of a plurality of reels each having a corresponding plurality of standard symbols.
7. A method according to any one of the preceding claims, wherein, in a case where the number of standard symbols on a reel is not an integer multiple of the bonus symbol probability, the number of bonus symbols added per game is calculated to provide an average number of bonus symbols resulting in the required probability over two or more games.
8. A method according to any one of the preceding claims, wherein the bonus symbol is displayed in a transparent, translucent or semi-transparent form so that an underlying standard symbol can be identified.
9. The method according to any one of the preceding claims, wherein probabilities for selection of individual bonus symbols are provided and those probabilities for selection of individual bonus symbols are dependent upon probabilities for any underlying standard symbol.
10. An electronic gaming machine comprising a processor, a monitor for display of images, and user input functionality, the processor causing display of a selected number of columns and/or rows of a plurality of reel simulations having a predetermined number of standard symbols per reel, and the gaming machine containing programming that enables display of a number of bonus symbols per game, wherein the EGM is adapted to display each bonus symbol as a combined symbol having a bonus symbol superimposed on a standard symbol.
11. An electronic gaming machine as claimed in claim 10, wherein the number of bonus symbols per game is pseudo-randomly determined.

12. An electronic gaming machine as claimed in claim 10 or 11, wherein each combined symbol is formed by virtually adding an overlay to a standard symbol.

13. An electronic gaming machine as claimed in claim 10 or 11, wherein, for each virtual reel in which one or more bonus symbols is to be incorporated, a substitute virtual reel including the combined symbol or symbols is created.

14. A method of displaying a bonus symbol on a virtual reel during play of an underlying electronic wagering game having a plurality of standard symbols used in the underlying electronic wagering game, each one of the plurality of standard symbols being either located at a unique location on the virtual reel or being pseudo-randomly provided from a set of virtual symbols available on the virtual reel, the virtual reel to be displayed on an electronic gaming machine display adapted to display at least a selected portion of the virtual reel or less than all virtual symbols available for the virtual reel, the method including the steps of:-

determining the location at which or probability of which the bonus symbol is to be incorporated within the plurality of standard symbols; and

incorporating the bonus symbol with the corresponding standard symbol for the determined location or at a probability-determined occasion.

15. A method according to claim 14 wherein a plurality of bonus symbols are incorporated into the virtual reel and the method includes the steps of:

determining the number of bonus symbols to be provided on the virtual reel in a single round of underlying game play; and for each trigger symbol to be provided:

determining a location at which the bonus symbol is to be displayed within the plurality of standard symbols; and

displaying the bonus symbol with a corresponding standard symbol for the determined location.

16. A method according to claim 15 wherein the bonus symbol is displayed with the corresponding standard symbol by superimposing the bonus symbol on the standard symbol such that both the standard symbol and the bonus symbol are visible.

17. The method of claim 15 or 16 wherein the determining of the location at which or probability of which the bonus symbol is to be incorporated within the plurality of standard symbols is done independently of selection of symbols in the underlying game.

18. A method according to any one of claims 14 to 17 wherein the virtual reel is used in a standard game having predetermined probabilities and whereby the bonus symbol is displayed on the plurality of standard symbols without changing standard game probabilities for display of standard symbols.

19. The method of any one of claims 14 to 18 wherein a bonus symbol may be associated with any standard symbol.