STANDARD SERIES

GLI-11:
Gaming Devices in Casinos

Version: 1.3
Release Date: November 10, 2000

Gaming Laboratories International, LLC

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ABOUT THIS STANDARD

This Standard has been produced by **Gaming Laboratories International, LLC** for the purpose of providing independent certifications to suppliers under this Standard and complies with the requirements set forth herein.

A supplier should submit equipment with a request that it be certified in accordance with this Standard. Upon certification, Gaming Laboratories International, LLC will provide a certificate of compliance along with an appropriate *Gaming Labs Certified*® mark evidencing the certification to this Standard.

GAMING DEVICES

In Casinos

GLI-11 Revision 1.3

Date Released: 11/10/00

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REVISION HISTORY

Rev 1.3

2.7.1 Note. Added a note to the submission of the program which indicates the label must cover the UV window for EPROM submissions to avoid erasing or alterations to the program.

2.12 Added 'Joint Venture' Submission requirements for devices that two or more manufacturers are involved with the same platform.

3.4.1(a) Microprocessor Controlled. This rule was changed to accommodate the new Mechanical RNG Section 4.3.

3.13.2 RAM clear. The rule was changed to allow for partial RAM clears, as long as the methodology in doing so is accurate and the game validates the un-cleared portions of RAM.

3.13.4 Configuration Setting. This section was modified to only require a RAM clear, when configuration settings that would cause an obstruction to the accounting meters are altered.

3.22.1(b) Switches and Jumpers. This section was modified to allow for dipswitches to control any feature of the game but must be housed in a logic area and conform to the 'configuration settings' rule within the document (RAM clear if any changes).

3.26.2(a) Bill Acceptor Software Requirements. Removed the requirement that the game display the direction of bills (orientation or with a particular side facing up) since this information is not a technical requirement.

3.28.1 Bill Acceptor Error Conditions. The rule states that "the device and/or bill acceptor shall have the capability of detecting and displaying…." Clarified that for the bill acceptor, displaying may be accomplished by disabling or flashing a light(s).

3.28.1(a) Bill Acceptor Error Conditions – Stacker Full. This rule was changed to allow for the bill acceptor to disable itself when the stacker is full rather than requiring the game to generate an error condition.

3.28.1(b) Bill Acceptor Error Conditions – Bill Jam. This rule was changed to allow for the bill acceptor to disable itself or to allow for some other method of displaying the error condition.

3.31 Renamed from 'Hoppers, Ticket Printers, and Other Methods of Receiving Value from the Machine' to 'Credit Redemption' since the Hoppers/Printers sections were separated.

3.32 Hoppers. Separated from Section 3.31 to remain consistent and added Section 3.32.

3.33.1 Printers. THIS RULE WAS 3.32.1 IN V1.2. This rule was modified to indicate that any single win, when using printers, shall not allow the ticket to be redeemed at any place other than through human interaction. This will allow monitoring of the taxation requirements for single wins.

3.33.1(c) Printed Ticket Information. THIS RULE WAS 3.32.1(c) IN V1.2. Changed the 'Time of day' rule to indicate that this information is not required, provided that storage of this information is in the database.

3.33.3 Error Conditions. THIS RULE WAS 3.32.3 IN V1.2. Changed the title of this section to 'Printer Error Conditions' to avoid confusion.

3.33.1(b) Payment by Ticket Printer. This rule was changed to allow for use of an approved alternative method that includes the ability to identify duplicate tickets to prevent fraud by reprinting and redeeming a ticket that was previously issued by the gaming device.

4.2.3(b) Multi-Line Games. Clarified that the flashing of symbols does not apply to reel games.

4.3 Renamed the title of the section to 'Mechanical and Electro-Mechanical Random Number Generators (RNG) Requirements' and incorporated Mechanical RNG requirements into this section.

4.3.1(b) Near Miss. Removed the reference to award symbol ratio occurrence of 9:1 since the rule inhibited one type of technology disproportionately to all the others.

4.3.10 Moved the percentage requirements from here to Section 4.4. Added mechanical based RNG game requirements.

4.3.12 Multiple Percentage. This regulation was modified to reference the 'Configuration Setting' regulation since changing percentages would obstruct the accounting meters.

4.4 Created a new section that includes: Minimum Payout percentages, Odds & Non-Cash Awards. These sections were moved from Section 4.3.

4.9.1(g) Multiple Games. This rule has been changed to refer to the 'Configuration Setting' regulation and not require a RAM clear for games that retain the previous paytable (paytable disabled) information.

4.10.8 Software Meter Information Access. Removed the reference to 'audit mode' and replaced with 'software meter information' to avoid confusion.

4.10.9 Electronic Meters. This section was modified to specify that the accounting meters must meet the eight digit requirement and the occurrence meters must be at least three digits. Also, the accounting meters within this section were designated with an asterisk to distinguish between an accounting meter and an occurrence meter. In addition, the rule was changed to roll over when the meter reaches eight digits or higher and after 99,999,999 has been reached or some other logical value. This was changed because some meters can only maintain 7FFFFFFFh due to the technology of some hardware.

4.10.9(c) Drop Meter. Revised to allow for separate 'drop' meters for coins, bills, tickets, and coupons.

4.10.9(i) Cancelled Credits. Revised the rule to not require this meter for printer games unless there is a printer limit option in the game.

4.10.10 Multi-Game Meters. This section was modified to refer to the double-up requirements in Section 4.10.11.

4.10.11 Double Up or Gamble Meters. This section was modified to require the double-up option to be disabled in the event the game cannot account for the double-up information.

4.12 Communication Protocol. Changed the rule to not require an on-line system; however, if the jurisdiction/tribe requires games to communicate with an on-line data monitoring system, then refer to *GLI-13*.

4.13.1 Added a comment that requires the Error Conditions be communicated to an on-line monitoring and control system, if applicable:

4.13.1 NOTE. Added the Printer Error Conditions section to the note that indicates where the 'Error Conditions' rules apply.

4.17.1 Test Mode. Changed the rule to allow for 'test meters' as long as they indicate they are 'test meters.'

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2.3.3 Changed the RNG requirements to collect the data from a gaming device or other medium to allow for system type games.

2.3.3.ii.D Changed the RNG requirements for spinning reel slots or video slots to provide the stops/symbols since some RNGs may call symbols and not stops.

2.5.1.h Was changed to supply the overview of the system only if required.

2.6.1.b Removed the version number requirement for all source code or related modules.

2.6.4 Removed the requirement to describe and define the use of variables for all declared variables.

3.0.1 Added an introduction to the chapter. A gaming device at a minimum will contain embodiment of randomness in determination of prizes, contain some form of activation to initiate the selection process, and a methodology for delivery of the determined outcome. The gaming device may be separated in parts, where some of which may be within or outside the player terminal (e.g., gaming devices that function with a system).

3.5.1 Removed the reference to logic area access detection since we removed the requirement to monitor the logic area.

3.6.1 Clarified that the id badge shall not be easily removable without leaving evidence of tampering.

3.9.1 Clarified that the diverter requirement is for games that accept coins or tokens. Also removed the word 'continually' from the hopper full detection monitoring.

3.9.2 Grammatical change to coin(s).

3.9.2.c Changed to allow for 'a method' to monitor the drop box area.

3.10.1.d Changed the requirement to allow for a common candle to illuminate for a door open error condition for bar-top style machines.

3.11.2.d Changed to allow for the gaming device or a communications board in the gaming device to provide a communications port to monitor the drop box area.

3.12.2.a Changed the rule to indicate door open/close or stacker removed sensors.

3.13.1 Added 'non-volatile' to RAM requirements heading.

3.13.1.a Changed the battery back-up requirement to thirty (30) days instead of ninety (90).

3.13.1.d Clarified 'non-volatile' memory.

3.13.4 Changed the configuration setting to not allow changes to 'other settings that would have an impact on the validity of the accounting meters or other audit information stored in the gaming device or sent to an on-line system.'

3.15.1 Clarified so the errors can be identified and corrected in most circumstances since not all errors are correctable.

3.15.4 Removed the NOTE in the PSD section because it was causing confusion as to the authentication of programs running from RAM.

3.17.7 Removed the examples of mediums other than ROM-based, since it caused confusion.

3.23.1.b Changed the mechanical assemblies' requirement to have some mechanism that ensures the correct mounting of the reels' artwork. This was changed to accommodate all methods of installation.

3.32.1 The note was changed to require the gaming device to retain the last thirty-five (35) ticket information. Also, added ticket information on the central system shall be retained at least as long as the ticket is valid at that location.

3.26.1.d Changed the reference from 'chip tray' to 'coin tray.'

3.26.2 Reworded to better clarify the acceptance of legal tender or other notes and not require the acceptance of other notes.

3.26.3 Removed the serial communication for bill acceptors.

3.27 Reworded to better clarify the metering of bills as opposed to other notes.

3.30.1.c Added the removal of the stacker to the bill acceptor stacker requirements that require the tower light or alarm to activate.

3.31.2 Clarified the 'total' credit value to the cancel credit.

3.31.3 Removed the 'after extra 5 coins have passed' from the extra coin paid out error.

4.2.1.a Reworded the display requirement to allow for awards that change to possibly be displayed on a sign (such as progressive).

4.2.2 Clarified the information to be displayed so that it may also be displayed on the payglass. Also, corrected the numbering of the subsection to this rule.

4.2.3.a Removed the 'activated as a 'lit' or selected line,' since some manufacturers may use another method.

4.2.3.b Clarified that the winning payline shall be clearly discernable to the player and changed the flashing of winning symbols to be an example for video-only products.

4.3.1.a Changed the rule to allow for games that don't have each combination available at the initiation of each play as long as denoted by the game.

4.3.7 Changed all references from 'pack' to 'deck.'

4.3.12 Changed the multiple percentage games to allow for games that are connected by a network.

4.3.14.a Removed reference to 'non-annuitized' since a lump sum is non-annuitized.

4.4.1.d Removed 'the game shall not be misleading' since that is defined in the 'game display' section.

4.9.1.a Removed since defined in 'game display' section.

4.10.3 Removed Multi-Game current credit limitation rule to allow for monetary amounts or credits anywhere in the game.

4.10.4 Removed the reference to the game select screen since some games do not have one.

4.10.7 Clarified that credits or cash for the collect meter requirement. Also, removed the last sentence because it was confusing and redundant.

4.10.8 Removed the requirement for soft meter access to be accessible only during an idle state.

4.10.9 Changed the accounting meter requirement to use at least eight (8) digits for the dollar amount, not cents. In addition, changed the roll-over requirement to be any other value that's logical.

4.10.9.b Clarified that the meter shall count all amounts won by the player at the end of the game, because there may be double-ups.

4.10.9.h Clarified the cancelled credit meter to be amounts that are in excess of the credit limit or residual credits that are collected.

4.13.1.j Removed reference to reverse currency in, since there is no way to determine a bill pullback.

4.13.1.m Removed since inappropriate coin-in should be returned to the player.

4.13.1.n Removed since defined in GLI-12.

4.13.2 Clarified for games that USE error codes.

4.15.1 Changed to require the doors to be detected AND METERED.

4.15.2 Changed the rule to allow for all types of games, not just video.

4.15.3 Changed the rule to allow for all types of games, not just video.

4.18.3 Added a fifty (50) last game recall minimum requirement for infinite free games.

5.2.1 Changed wording to allow for tournaments to be an option instead of incorrectly requiring it.

5.3 Removed the section reference and minimized by referencing the entire Chapter 3, if applicable.

5.4.1 Incorporated the statements from 5.1.1 to this section that explain the software requirements (no metering).

Rev 1.1

The following is a list of changes made to the GLI-11 Standard after comments were received. GLI wishes to thank all of those who commented. Nearly every comment was addressed. In general, minor grammatical changes were made and references to the GLI-12 standard were also changed. The specific changes were:

1.4.1.a Removed the reference to GLI-nn multi player station terminals and incorporated rules for multi-player stations into the standard.

1.4.1.b Corrected the title for GLI-12 to Progressive Gaming Devices in Casinos.

2.3.3.b.ii.A Commented that regarding the sending of the ten (10) poker cards for an RNG analysis, it is not required to send the first five (5) then the draw cards. It is recommended only.

2.3.3.b.ii.F Added RNG requirements for Craps games.

2.3.3.b.ii.G Added RNG requirements for Roulette games.

2.4.2.a Added a statement to the UL or equivalent certification section that allows this information to be sent to the laboratory at a later date for those companies who are obtaining UL or equivalent certification at the same time as GLI approval.

2.4.2.e Changed the requirement of submitting extension cables or door photo-optic detectors to requiring them upon request in the submission process. GLI realizes that there are other ways of testing a device without the use of these specialty items.

2.5.1.e Changed to reflect 'non-volatile' RAM. Also, changed the requirement of submitting the 'non-volatile' RAM locations and descriptions to be submitted upon request.

2.5.1.i Added 'if required' to the requirement of program block diagrams for submissions.

2.6.1 Changed the source code requirements to appear in all source code or related modules.

2.6.3 Clarified for source code that it is the manufacturer's responsibility to provide the test laboratory with a method to compensate for or resolve the date and time stamp differences for source comparisons.

2.6.4 Eliminated the word 'thorough' in the description of variables section. The descriptions should be defined but not in extreme detail.

2.8.1 Clarified the fact that all modifications require re-testing, examination, and re-certification by the test laboratory.

2.8.4.a Added 'minimum and maximum bet' information to be required as part of the submission documentation for each type of game within this section.

2.8.4.a.v Added submission requirements for Crap games.

2.8.4.a.vi Added submission requirements for Roulette games.

2.11.1 Added the qualifier that the laboratory will calculate the outcome prior to approval if the manufacturer does not submit the player strategy information.

3.3.1.c Changed the severity level of Electro-static Interference to a minimum of 27KV.

3.3.1.f Removed duplicate sentence regarding liquid spills and coin/bill acceptors. Also, added the game can enter an error condition if liquid spills enter the coin or bill acceptor.

3.4.1.b Clarified the section to indicate that the power cannot be disconnected from the outside of the machine 'using the on/off switch.'

3.7.1 Added an exception to the tower light requirement for game styles such as 'bar-top' games that would require an audible alarm.

3.8.1 Removed surge protector requirement from the specification.

3.8.2 Re-written to allow for resets if surges occur.

3.8.3 DELETED since the Fluctuating Power requirement is the same as Surges, which is defined in Section 3.8.2.

3.9.1 Referenced 'drop box' instead of 'cash box' to remain consistent throughout the document. Also, the diverter can now change positions immediately following a hopper full state or within ten (10) games. Previously, it was possible for the diverter to be required to change states constantly.

3.9.2 Corrected a grammatical error from 'coins or coins' to 'coins or tokens' shall contain a separate slot drop bucket ….

3.9.2.c Modified to provide a communications port to monitor the drop box area even if manufactured by a different company. This will alleviate some supplier from having to supply the drop door switch when this is done by the on-line system supplier.

3.10.1.d Changed this rule to allow for a light on the top of the device that is clearly visible that automatically illuminates for door opens. In addition, noted that this requirement may be substituted for an audible alarm for machines such as the 'bar-top' style.

3.10.1.e Changed the requirement for the bar top game to be powered on when the inside of the machine is accessed, and the alarm sounds.

3.10.1.f Was changed to monitor only 'external' doors and added a note waiving and setting requirement for the drop box door open.

3.10.1.h DELETED since this rule required the door access detection, if disconnected, to be interpreted as a door open state. Jumpering a switch is actually easier to conceal than disconnecting the wires.

3.11.3 Removed the entire section relating to the logic area detection system since the logic area is behind the main door that is monitored.

3.12.2 Changed to only require access to the currency storage area instead of the currency and components.

3.13.1.b Changed to reflect the 'shelf' life of the battery.

3.13.3 Changed the default reel position and default game display requirement to not be the 'top award' instead of 'any winning combination.' Also, added 'or game display' to the default reel positions section. In addition, stated that this applies to the base game only and not any secondary bonus devices.

3.13.4 Changed to limit the features (Paytables, Games, Max Bets and Denomination) that require a RAM clear to change instead of the previous rule, which would have required that all configuration setting changes require a RAM clear.

3.14.1 Changed the critical memory required information to include last bill data, RNG outcome, power up, and door open metering.

3.14.1.a Clarified the meters in contents of critical memory section.

3.15.3 Reworded this section for clarity.

3.15.4 Changed the validation requirement of PSDs to occur during power up, the first time the files are loaded, and during a handpay. Also, clarified the term 'the main' processor.

3.15.4.b Removed authentication following a logic door closure since the logic area is not required to be monitored, and this authentication will continually occur as defined in 3.15.3.

3.15.4.d Removed authentication following a handpay condition since this authentication will continually occur as defined in 3.15.3.

3.17.2 Incorporated examples of secured hashing methods.

3.17.3 Reworded to define independent integrity checks. Also, defined field verification methods that must be met.

3.17.6 Reworded the write protection requirement to allow for other means of disabling that will be examined on a case-by-case basis.

3.17.7 Changed the reference to EPROM to ROM-based medium and added examples (for example, CD, Hard disk, DVD, etc.).

3.17.7.a Changed to authenticate all 'critical' game and other files that may affect the game outcome or operation, which reside on the medium.

3.17.7.b Reworded the reference of 512 bit to be less technical for the message digest requirements.

3.17.7.c Removed requirements and indicated the authorization process must meet the rules in Section 3.15.4 (identical). Also, changed to authenticate and defined 'critical' files.

3.17.7.d Changed the wording to address a failed authentication after the game has been powered up, since the authentication is verified during power up. Also, added further error clearing information that would allow the device's memory to be cleared to fix the error.

3.17.7.e Changed to clarify how to display the message digest.

3.18.1 Changed the flash requirement to not allow downloading while the control program is installed in the logic board. Also, changed the note to indicate that any use of a hardware switch to enable the Write Line will be reviewed on a case-by-case basis.

3.19 Removed Mechanical Meter requirements. Added Multi-Station Games and requirements to this section. Mechanical meters and all references to them have been removed, as GLI believes that these meters are no longer needed when the machine is used with an on-line monitoring system.

3.20.1 Removed the track cut and mod requirement since the rule would be too strict for field repairs.

3.20.1.d Removed the requirement for track cuts being consistent across all boards with the same revision level, since there may be field repairs needed.

3.21.1 Added a statement that the rules do not prohibit required repairs in the field to the Documentation of Patch Wires and Track Cuts requirement.

3.22.1.b Added the game denomination to the list of options that cannot be optioned via hardware switches.

3.24.c Changed the hidden button/touch point rule to indicate these hidden touches can be used when they do not affect game play, except as provided for by the game rules.

3.25 Removed the entire section on audible alarms and addressed the use of an audible alarm within the tower light section of the standards. This will allow for the use of a tower light and/or an audible alarm.

3.26.1 Added a note indicating that all errors within the coin acceptor section shall also comply with the Error Conditions, Section 4.13.

3.26.1.c Changed the coin direction detector error condition to be displayed for a minimum of thirty (30) seconds or be cleared by an attendant. Also, changed the wording in the coin acceptor direction detectors to detect a coin traveling at too slow of a speed or improper direction.

3.26.1.f Clarified the credit meter update on coin insertion can include the credit meter for the current game or bet meter.

3.26.1.g Removed the rule pertaining to programmable coin acceptors since the security measures are sufficient.

3.26.2 Incorporated the acceptance of coupons, paper tokens, or other approved notes, in addition to valid bills for Bill Acceptors.

3.26.4.a Incorporated the selection of coupons, paper tokens, or other approved notes in addition to valid bills for field maintenance.

3.26.4.c Reworded the bill acceptor tolerance level rule to **'**adjustment of the tolerance level for accepting bills of varying quality should not be allowed externally to the machine. Adjustments of the tolerance level should only be allowed with adequate levels of security in place. This can be accomplished through lock and key, physical switch settings, or other accepted methods approved by the applicable jurisdiction or its authorized agent.'

3.26.4.d Added 'maintenance, adjustment, and repair per approved factory procedures' for allowable field maintenance.

3.26.4.e Added 'options that set the direction or orientation of acceptance' for allowed field maintenance.

3.26.5 Changed the tokenization requirement for bill acceptors to post the entire amount inserted to the player.

3.27.1 Changed the electronic metering for bill acceptor devices to include all acceptable types of medium.

3.28 Added a note indicating the bill acceptor error conditions must also apply to the error condition requirements in Section 4.13, 'Error Conditions.'

3.28.1 Changed the bill validator error conditions to display the error on the gaming device and/or bill acceptor.

3.28.1.c Removed bill pullback error condition since it would be considered to be an invalid bill.

3.28.1.d Clarified the use of a belly glass door being substituted for a Bill Acceptor Door Open.

3.28.1.e Clarified the 'stacker door open' error message to 'stacker door open or stacker removed.'

3.28.1.f Removed the bill acceptor cable disconnected from the bill validator error conditions.

3.29.1.g Added the game can enter an error condition if liquid spills enter the bill acceptor.

3.31.1.e Clarified that credit redemption is allowed if the entire amount is placed on the meters when the collect button is pressed and not while incrementing.

3.31.2 Rewrote the 'cancelled credits' rule to clarify the intent. Also, clarified a 'handpay' condition in the cancel credit section.

3.31.3 Reworded to combine 3.31.3 and 3.31.4. Also, removed the extra coins to be accounted for since the device should lock up if at least five (5) extra coins pass through the hopper and removed a 'hopper full' error condition from the required Hopper Error Conditions, since it is not an error condition. In addition, removed the requirement for a hopper coin out sensor failed, disconnected, malfunction or locked.

3.31.4 DELETED since the error conditions are now merged with 3.31.3.

3.32.1 Changed to either keep a duplicate copy or print only one (1) copy to the player but have the ability to retain the last thirty-five (35) ticket information to resolve player disputes. In addition, the rule now requires that an approved system be used to validate the payout ticket. Also, changed the 'player may request payment' to 'the gaming device may pay the player.' In addition, added a statement that the information requested to be printed on each payout ticket can be obtained from the gaming device, interface board, the on-line system or by another means.

3.32.1.a DELETED since the game may account for dollar values and not use credits.

3.32.1.f Added a use of a barcode for validation.

3.32.2 Referenced 'drop box' instead of 'cash box' to remain consistent throughout the document.

3.32.3 Changed the printer disconnected error condition so it may only be detected when the software tries to print.

3.32.3 Changed the note from triggering an alarm to triggering an error condition since we are not requiring an audible alarm.

3.33.1 Now requires that provisions be made if communication is lost and validation of the ticket cannot be sent to the system. The manufacturer must have an alternate method of payment. Also, removed the barcode reference in the Payment By Ticket Printer section since it was added to Section 3.32. Also, added a requirement of the validation system to be able to identify duplicate tickets to prevent fraud by reprinting and redeeming a ticket that was previously issued by the gaming device. Also, added validation approval or information shall come from the central system.

4.2.1 Changed to reflect payglass/video displays instead of just 'payglass.' Also, eliminated the method of payment and made the rule more general.

4.2.1.c Removed the word 'pre-determined' and replaced with 'X' to better clarify Fever Mode.

4.2.2.a Clarified that the current credit balance doesn't have to be displayed if the player is not placing a wager.

4.2.2.b Clarified that the current bet amount shall only be displayed during the base game or if the player can add to the bet during the game.

4.3.1.b Reworded the Near Miss rule that requires the game to be arranged so that non-winning symbols on either side of the top award symbol do not occur more than a ratio of 9:1.

4.3.1.c Removed the 'no predetermination of winners and losers' rule to allow for second screen/player interaction games.

4.2.2 *C*hanged the information to be displayed requirements to only have the information available all times the machine is available for player input.

4.3.2 Added the RNG shall be unpredictable.

4.3.5 Added a clarification to the RNG seeding requirement that verifies that the RNG doesn't start at the same value, every time. Also, changed to it's permissible not to use a random seed, however, the manufacturer must ensure that games will not synchronize with others.

4.3.7.a Changed to 'recommend' at the start of each game/hand the first cards are drawn fairly from a randomly shuffled deck - the replacement cards aren't drawn until needed.

4.3.7.c Removed since it's contradicting to Section 4.3.7.a.

4.3.8 Clarified the depiction of balls for ball drawing games that have a feature that requires additional balls to be selected. The additional balls should be chosen from the original selection without duplicating an already chosen ball.

4.3.8.b Removed since the same requirement is specified in Section 4.3.8.d.

4.3.13 Changed to not include games that make it possible for a player to win the highest win multiple times through the use of free games. Also, the rule was changed to apply to each wager that wins the maximum award. Also changed the Odds wording to say 'at least' once in 50,000,000 games.

4.3.14.a.B Added 'the number of coins bet,' to be included in the linked gaming device probability of hitting the combination. Also, defined the Progressive Standards as GLI-12 Progressive Gaming Devices in Casinos.

4.4 Bonus games now include games with features such as a 'game within a game.'

4.4.1.b Eliminated games that occur randomly from the bonus games requirement to display the current status towards the triggering of the next bonus game.

4.5 Removed and a 'game within a game' was added to Section 4.4, Bonus Games.

4.9.1.g Included turning games on and off through video interface in the secure certified method.

4.10.1 Removed, since the method of updating meters is irrelevant as long as accurate.

4.10.7 Added that the collect meter rule now references credits or 'cash' since some gaming devices use cash values not credit.

4.10.8 Changed the audit mode to only be accessible during an idle state, not during error conditions.

4.10.9 Clarified that the eight (8) digits in length applies to the dollar value if used in dollars and cents. Also, reworded the rollover requirement to roll over any time the meter is higher than eight (8) digits and after 99,999,999 has been reached.

4.10.9.a Redefined the coins-in (OR cash in) meter as 'shall cumulatively count the total amounts wagered during game play except credits that are won during the game that are subsequently risked in a double-up mode.'

4.10.9.b Redefined the coins-out (OR credit out) meter as 'shall cumulatively count all amounts won by the player that were not paid by an attendant, including amounts paid by a ticket printer. This meter must not increment for bills inserted and cashed out (used as a change machine).'

4.10.9.c Added a note to the coins-dropped meter that indicates it is acceptable to have both a coins-dropped meter and a bills-dropped meter.

4.10.9.d Added a reference to the GLI-12 Progressive Gaming Devices in Casinos standards in the handpay meter requirements.

4.10.9.h Added the cancelled credit meter.

4.10.9.i Added the progressive occurrence meter.

4.10.10 Changed the multi-game meters requirement to be in either credits or dollars. Also, allow for separate Double-up or Gamble meters as long as the method is understood on the screen.

4.11.1.a DELETED since the handling of canceled credits during a residual credit cashout should not be regulated as long as it is metered properly, and the player can receive their credits.

4.11.1.b Changed the reference to the Coins-In meter to remain consistent.

4.11.1.c Removed the reference to the Coin-Out meter during payment of residual credits since the method of payment may go to the credit meter.

4.11.1.c.ii Changed the reference to the Coins-Out meter to remain consistent.

4.12 Removed entire section since the multi-denomination section is the same as tokenization. Added communication protocol requirement to this section.

4.13.1 Added the use of an audible alarm, as another option, in place of illuminating the tower light for the error conditions. Also, added a note that indicates the error conditions also includes the Bill Acceptor error conditions outlined in Section 3.28.

4.13.1.m Defined 'inappropriate coin in' as a coin accepted but not credited.

4.13.1.n Added a progressive communication link error condition.

4.13.2 Changed the error code description for video-based games that would allow the error conditions to be displayed instead of being affixed inside the gaming device.

4.14.4.b Changed the control program test to allow for checksum but prefer CRC.

4.14.5 Changed the last valid pay result to be displayed, following a program interruption, to only occur if the reel positions have been altered.

4.15.1.a Changed the door metering of the main door to all external doors.

4.15.1.b Referenced 'drop box' instead of 'cash box' to remain consistent throughout the document.

4.15.1.c Removed the monitoring of the logic door.

4.15.2 Changed the door open procedures to either sound the alarm or illuminate the tower light, or both.

4.16.1 Changed to better clarify the intent of the win amount that is required by a taxing jurisdiction.

4.18.2 Added to the last play information required that it is sufficient to indicate the progressive was awarded and not display the value. Also, removed the 'error conditions' from the required information for last play information.

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CHAPTER 1

1.0 OVERVIEW - STANDARDS FOR GAMING DEVICES

1.1 Introduction

1.1.1 ***General Statement***. **Gaming Laboratories International, LLC (GLI)** has been testing gaming devices since 1989. Over the years, we have developed numerous standards for jurisdictions all over the world. In recent years, many jurisdictions have opted to ask for standards tests without creating their own standards documents. In addition, with technology changing almost monthly, new technology is not being incorporated quickly enough into existing standards due to the long process of administrative rulemaking. This document is the first of several that will put forth GLI's Standards for Gaming Equipment. This document, GLI Standard 11, will set forth the technical Standards for Gaming Devices in Casinos. A "Gaming Device" does NOT include, for purposes of this Standard, electronic equipment used in the conduct of TABLE GAMES.

1.1.2 ***Document History***. This document is an essay from many standards documents from around the world. Some GLI has written; some, such as the Australian and New Zealand National Standard, were written by Industry Regulators with input from Test Laboratories and machine manufacturers. We have taken each of the standards' documents, merged each of the unique rules together, eliminating some rules and updating others, in order to reflect both the change in technology and the purpose of maintaining an objective, factual standard. We have listed below, and give credit to, agencies whose documents we reviewed prior to writing this Standard. It is the policy of **Gaming Laboratories International, LLC** to update this document as often as possible to reflect changes in technology, testing methods, or cheating methods.

This document will be distributed FREE OF CHARGE to all those who request it. It may be obtained by downloading it from our website at www.gaminglabs.com or by writing to us at:

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600 Airport Road
Lakewood, NJ 08701
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1.2 Acknowledgment of Other Standards Reviewed

1.2.1 General Statement. These Standards have been developed by reviewing and using portions of the documents from the organizations listed below. We acknowledge the regulators who have assembled these documents and thank them:

a) The ACT Office of Financial Management;
b) The New South Wales Department of Gaming and Racing;
c) The New Zealand Casino Control Authority;
d) The New Zealand Department of Internal Affairs, Gaming Racing & Censorship Division;
e) The Northern Territory Racing and Gaming Authority;
f) The Queensland Office of Gaming Regulation;
g) The South Australian Office of the Liquor and Gaming Commissioner;
h) The Tasmanian Department of Treasury and Finance, Revenue and Gaming Division;
i) The Victorian Casino and Gaming Authority;
j) The Western Australian Office of Racing Gaming and Liquor;
k) US Tribal Compacts from Tribal Governments and State Governments included:
    i. Arizona;
    ii. Connecticut;
    iii. Iowa Indian;
    iv. Kansas;
    v. Louisiana;

vi. Michigan;

vii. Minnesota;

viii. Mississippi;

ix. North Carolina;

x. North Dakota;

xi. Oregon; and

xii. Wisconsin.

l.) Colorado Division on Gaming – Limited Gaming Regulations;

m.) Illinois Gaming Board – Adopted Rules;

n.) Indiana Gaming Commission;

o.) Iowa Racing and Gaming Commission;

p.) Louisiana State Police – Riverboat Gaming Division – Gaming Device;

q.) Missouri Gaming Commission – Department of Public Safety;

r.) Nevada Gaming Commission and State Gaming Control Board;

s.) New Jersey – Regulations on Accounting and Internal Controls; and

t.) South Dakota Commission on Gaming – Rules and Regulations for Limited Gaming.

1.3 Purpose of Technical Standards

1.3.1 ***Purpose***. The Purpose of this Technical Standard is as follows:

a) To eliminate subjective criteria in analyzing and certifying gaming device operation.

b) To only test those criteria that impact the credibility and integrity of gaming device gaming from both the Revenue Collection and Player's play point of view.

c) To create a standard that will insure that gaming devices in Casinos are fair, secure, and able to be audited and operated correctly.

d) To distinguish between local public policy and laboratory criteria. At GLI, we believe that it is up to each local jurisdiction to set their own public policy with respect to gaming.

e) To recognize that non-gaming testing (such as Electrical Testing) should not be incorporated into this standard but left to appropriate test laboratories that specialize in that type of testing.

Except where specifically identified in the standard, testing is not directed at health or safety matters. These matters are the responsibility of the manufacturer, purchaser, and operator of the equipment.

f) To construct a standard that can be easily changed or modified to allow for new technology.

g) To construct a standard that does not specify any particular method or algorithm. The intent is to allow a wide range of methods to be used to conform to the standards, while at the same time, to encourage new methods to be developed.

1.3.2 No Limitation of Technology. One should be cautioned that this document should not be read in such a way that limits the use of future technology. The document should not be interpreted that if the technology is not mentioned, then it is not allowed. Quite to the contrary, as new technology is developed, we will review this standard, make changes and incorporate new minimum standards for the new technology.

1.4 Other Documents That May Apply

1.4.1 Other Standards. This standard covers the actual requirements for single player gaming devices in casinos. The following other standards may apply:

a) RESERVED;

b) Progressive Gaming Devices in Casinos (GLI-12); and

c) Standards for On-line Monitoring Systems in Casinos (GLI-13) *currently not released.*

CHAPTER 2
2.0 SUBMISSION REQUIREMENTS

2.1 Introduction

2.1.1 ***General Statement***. This chapter shall govern the types of information that are, or may be required to be submitted by the submitting party in order to have equipment tested to this Standard. Where the information has not been submitted or is not otherwise in the possession of the test laboratory, the submitting party shall be asked to supply additional information. Failure to supply the information can result in denial in whole or in part of the submission and/or lead to testing delays.

2.1.2 ***Previous Submission***. Where the testing laboratory has been previously supplied with the information on a previous submission, duplicate documentation is NOT required, provided that the previous information is referred to by the submitting party, and those documents are easily located at the testing laboratory. Every effort shall be made to reduce the redundancy of submission information.

Note: This Standard does not address submission requirements information for other gaming components, such as central monitoring systems and their components or linked progressive controllers.

2.2 Prototype (Full Submission) Submissions

2.2.1 ***General Statement***. A Prototype (full submission) submission is a first time submission of a particular piece of hardware or software that has not previously been reviewed by the test laboratory. For Modifications of previous submissions, including required changes to a previously submitted Prototype (full submission) certification, whether certified or pending

certification, see "Submitting Modification Submissions" below. The following items shall be submitted with each Prototype (full submission) submission:

a) Submission Letter. Each submission shall include a request letter, on company letterhead, dated within one (1) week of the date the submission is received by the test laboratory. The letter should include the following:

   i. The jurisdiction(s) for which you are requesting certification;
   ii. The items requested for certification. In the case of software, the submitting party shall include ID numbers and revision levels, if applicable. In the case of hardware, the submitting party shall indicate the manufacturer, supplier, and model number of the associated components of hardware; and
   iii. A contact person who will serve as the main point of contact for engineering questions raised during evaluation of the submission. This may be either the person who signed the letter or another specified contact.

b) Random Number Generator Submission. In some cases, the random number generator shall be submitted with the prototype (full submission) request. Random Number Generators shall be submitted for certification where:

   i. The random number generator code has changed or the implementation of the random number has changed; or
   ii. Where a previously certified random number generator is being implemented on a new hardware platform (i.e. change of microprocessor); or
   iii. Where a previously certified random number generator is generating numbers that are outside the range of numbers previously tested; or
   iv. The random number generator has never been certified before under these standards. In this case, the random number generator will be certified as a part of the overall submission.

2.3 Hardware Requirements for RNG Testing

2.3.1 Hardware Requirements. The manufacturer shall submit the gaming device with all boards and associated hardware for testing.

2.3.2 Cable Requirements. The manufacturer shall submit a cable to connect from the gaming device to a PC-based computer. This cable will utilize serial type communications and easily attach to a standard PC. If any special attachments or converters are necessary, the submitting party shall supply the equipment.

2.3.3 GLI Standard Communications Specifications for RNG Testing. The test laboratory has developed a relatively simple program to collect data from a gaming device or other medium through a serial communications port. Adherence to the specifications below allows the submitting party to use the test laboratory's PC-based RNG gathering program. Use of this protocol is NOT required; however, in that case, the submitting party shall supply the software collection interface software for the test lab's use, which will be reviewed prior to implementation. The following describes the implementation of our remote protocol:

a) The test laboratory's PC-based RNG gathering program uses the following communications protocol. The lab can configure a standard COM1 or COM2 port to the gaming device's settings. The manufacturer shall supply correct settings to interface to their machine;
b) The manufacturer shall supply the test laboratory with a gaming device or other medium test program running on the actual device or other medium that will do the following:

   i. Look for the ASCII letter "R" for Ready, to be sent from the test laboratory collecting computer to the gaming device;
   ii. Upon the gaming device or other medium receiving the "R," the game shall call the RNG for the numbers of the next game. The gaming device or other medium shall return to the collecting computer the following amount of numbers for each game:

A. In Poker, the ten (10) cards (it is recommended, but not required, to send the first five (5) cards dealt; then the five (5) draw cards);
B. In Blackjack, the top eighteen (18) cards following the shuffle;
C. In Keno, the twenty (20) numbers called in the game;
D. For spinning reel slots or video slots, the machine shall provide three (3) stops/symbols for a 3-reel game, five (5) stops/symbols for a 5-reel game, etc. The game should return the virtual stops/symbols selected for each reel;
E. For Bingo games, the seventy-five (75) numbers as they are drawn;
F. For Craps games, the machine shall provide two (2) sets of numbers (one (1) for each die) from 1-6;
G. For Roulette games, the game shall provide one (1) number of the maximum number of possible spots (this may vary depending on the use of the ’00’ spot); and
H. For any other type of game or bonus game, please contact the test laboratory for guidance.

c) The gaming device shall then send the numbers to the collecting computer in the following format:

i. The numbers SHALL be in ASCII format;
ii. The numbers SHALL be separated by a space;
iii. Leading zeros SHALL be inserted (e.g.. if the game is returning ten (10) poker cards from a 52-card deck with the range of numbers being between 0 and 51, the output to the collecting computer will look like the following: 23 25 01 00 10 09 43 51 03 04);
iv. The game should NOT send a space, line feed, or carriage return after the last number (the test laboratory will do that); and
v. After sending the numbers, the game shall look for another "R" and repeat the process.

*2.3.4 **Additional Requirements***.

a) The test program RNG shall be identical to the RNG contained in the game software except for the following changes which may be implemented to speed up the requirements of the test. The test laboratory may not allow any of the following changes where it determines such change might affect the data received from the RNG. It should be noted that production software may have a test mode that contains this imbedded RNG test mode, provided that the machine indicates clearly that it is in said test mode;
b) The RNG test program should NOT require credits on the machine in order to play;
c) The RNG test program should NOT award credits and NOT lock up for award pays;
d) The RNG test program does not have to show the game play. The program can just display a message that states RNG test in progress;
e) The manufacturer shall supply the test laboratory with detailed instructions on how to set-up the gaming device for test; and
f) The manufacturer shall supply the test laboratory with a detailed description of the RNG algorithm that includes a detailed description on the RNG implementation in their device, including how the initial SEED is generated. In addition, it shall provide the algorithm for reseeding or changing of the seed during game play, if applicable.

2.4 Machine or Hardware Submission Requirements – Prototype (Full Submission) Certification

2.4.1 Presentation Of Equipment To The Test Laboratory; Identical Equipment. Each item of gaming equipment supplied by a manufacturer to the field shall be functionally identical to the specimen tested and certified. For example, a gaming device supplied as a certified device shall not have different internal wiring, components, firmware, circuit boards, circuit board track cuts or circuit board patch wires from the certified specimen, unless that change is also certified, see also 'Submissions of Modifications (partial submissions) to a Previously Certified Item,' Section 2.8.'

2.4.2 Accompanying Documentation. All accompanying technical documents, manuals and schematics shall be submitted. In addition, the following items shall be provided:

a) If applicable, all UL, CSA, EC, AS3100, etc. or equivalent certification, see also 'Machine and Player Safety,' Section 3.2. This certification information may be supplied at a later date;
b) Any other equipment that may be used in the field in conjunction with the Submission;
c) Accompanying software, see also 'Software Submission Requirements', Section 2.5;
d) If the submitting party has specialized equipment which is needed by the test laboratory to test submitted device, then the specialized equipment and all appropriate operation manuals for the equipment shall be included with the submission; and
e) If requested, extension cables for door photo-optic detectors and any other hardware should be provided, so that the machine may be tested with doors opened. In addition, where a processor board is oriented in a machine in such a way that it would be difficult to install a plug and cable from an emulator, extension cables should be provided to allow the board to be re-located. The use of such extension cables shall not adversely affect the machine's operation.

2.5 Software Submission Requirements – Prototype (Full Submission) Certification

2.5.1 General Statement. Each submission of software shall contain the following:

a) Two sets of all EPROMs, CD-ROMs, or other storage media which contain identical contents. This includes all video, sound, printer, touchscreen, bill acceptor, RAM Clear, and game software. Where the test laboratory already has tested a software component, resubmission may not be necessary;
b) Percentage calculation sheets;

c) A written Statement of Verification that a previously certified random number generator is used within the submitted software;
d) A legible, color copy of the Payglass (if applicable);
e) Source Code, a Link Map and Symbol Table. In addition, if requested, explanation of all non-volatile RAM on the device with the non-volatile RAM locations described;
f) A manual explaining all diagnostic tests, meters, game configurations, error conditions and how to clear them;
g) RAM Clear procedures;
h) A general overview of the system, describing how the software and hardware are integrated, if required;
i) Program block diagrams and flow charts for the game program, if required; and
j) For all software involved in control of gaming functions, provide an assembler, linker, formatter, or other computing utilities as is necessary to generate the installed gaming software from the source code supplied. This requirement may be waived where program code is written in assembler and the listing file (showing the assembled and link code) is provided. If a non-PC-based platform development system is used, the manufacturer shall supply the test laboratory with the necessary computer equipment and software necessary to compile and verify the final executable program.

NOTE: In some cases, the test laboratory may have the wording on the payglass or game graphics translated to the English language or have the manufacturer supply an independent translator.

2.6 Software Programming Requirements and Compilation

2.6.1 ***General Statement***. The following items shall appear in all source code or related modules:

a) Module Name;
b) RESERVED;

c) Brief description of module function; and
d) Edit History, including who modified it, when and why.

2.6.2 ***Source Code Commented***. All source code submitted shall be commented in an informative and useful manner.

2.6.3 ***Source Code Completeness***. All source code submitted shall be correct, complete and able to be compiled. The result of the compiled object code shall be identical to that in the storage medium submitted for evaluation.

NOTE: The addition of 'Date' and 'Time' stamps may cause additional differences in a compiled version. It is the manufacturers' responsibility to provide the test laboratory with a method to compensate for, or resolve these differences.

2.6.4 **RESERVED**.

2.7 Program Storage Medium Identification

2.7.1 ***General Statement***. On the program medium that is submitted and subsequently placed in the field, each program shall be uniquely identified, displaying:

a) Program ID number;
b) Manufacturer;
c) Version number;
d) Type and size of medium (unless located on the medium as purchased unused from the supplier); and
e) Location of installation in gaming device, if potentially confusing.

Note: For EPROM based games, the identification label shall be placed over the UV window to avoid erasing or alterations of the program.

2.8 Submissions of Modifications (Partial Submissions) to a Previously Certified Item

2.8.1 ***General Statement***. For any update submission (e.g., a revision to an existing hardware or software that is currently under review, certified or has been reviewed and not certified), the following information shall be required to process the submission in addition to the requirements set forth in 'Submission Letter,' Section 2.2.1.a. This process is intended to speed the administrative burden of modification submissions. All modifications require re-testing, examination, and re-certification by the test laboratory.

2.8.2 ***Modification of Hardware***. Each hardware submission shall:

a) Identify the individual items being submitted (including part number);
b) Supply a complete set of schematics, diagrams, data sheets, etc. describing the modification along with the reason for the change(s); and
c) Provide the updated or new device, a description and the method of connection to the original gaming device or hardware.

2.8.3 ***Modification of Main Software Functions or to Correct Software Error***. The submitter should use the same requirements as in the 'Software Submission Requirements – Prototype (Full Submission) Certification' Section listed above, except where the documentation has not changed. In this case, a resubmission of identical documents is not required. (e.g., if the paytable and mathematics of the game are not changed, the submitting party may refer to previous documentation). However, the submission must include a description of the software change(s), modules affected and new source code for the entire program. Source code is required for the entire program to check compile and source code integrity.

2.8.4 Software Submission - Modification to Create New Game Personality. For a game specific submission (e.g., a new game or a new game personality), the following information may be required to process the submission:

a) A complete description of the game, including documents that individually or collectively indicate the following:

   i. For Reel Games:

      A. The number of reels;
      B. The number of lines and description of each line;
      C. The maximum credits per line;
      D. All payglasses which show any game rules or paytable information;
      E. A list of each winning combination along with the pay amount and hits for each prize;
      F. A listing of the logical reel strips, indicating the exact symbols' sequence, if applicable;
      G. A listing of the physical reel strips, and the method of implementation used to obtain the virtual reel strips, if applicable;
      H. A summary of each symbols frequency, if applicable;
      I. A table to cross-reference each symbol type against the abbreviation, if abbreviations are used;
      J. For games that use technologies other than physical mapping or virtual reel mapping, a detailed description of the relationship and steps between the time the RNG value is determined and the symbol is selected and the relative odds of each symbol being selected via the method;
      K. The denomination; and
      L. The minimum and maximum bet.

   ii. For Blackjack Games

A. Dealer rules;
B. Double-down rules;
C. Pair-splitting rules.
D. Insurance/surrender rules;
E. Existence of any side bets;
F. The denomination; and
G. The minimum and maximum bet.

iii. Poker Games

A. Poker style (e.g., Draw, Stud, etc.);
B. Special rules (e.g., Wild Cards, etc.);
C. Auto holding;
D. Existence of any side bets;
E. Any mathematical work indicating the payback return when using optimum play strategy, if applicable;
F. The denomination; and
G. The minimum and maximum bet.

iv. Keno/Bingo Games

A. Number of balls/spots that can be selected;
B. Number of balls drawn;
C. Special rules (e.g., Wild Cards, etc.);
D. The denomination; and
E. The minimum and maximum bet.

v. Craps Games

A. Odds for each spot;
B. Number of player stations utilized with the game;
C. Time frame (if any) for betting; and

D. The minimum and maximum bet.

vi. Roulette Games

A. Number of spots (use of '00' or not);

B. Number of player stations utilized with the game;

C. Time frame (if any) for betting; and

D. The minimum and maximum bet.

2.9 Calculation Sheets

2.9.1 ***General Statement***. For each game submitted, the manufacturer shall supply the calculation sheets that determine the theoretical return to the player (including the base game, double-up options, free games, bonus features, etc.).

2.10 Player Options

2.10.1 ***General Statement***. Where different player options (e.g., number of credits bet) vary the paytable, a separate calculation for each option is required.

2.11 Player Strategy

2.11.1 ***General Statement***. Where a game requires or allows use of a player strategy that can affect the outcome of the game and the continuing actual player return, the manufacturer shall list the assumed player strategy used in the theoretical calculations of the player return and the source of said strategy. If the manufacturer fails to provide this information, the test laboratory will calculate the outcome prior to approval.

2.11.2 Field Results. For games with player strategy, if available, actual game return statistics from development laboratories or field trials of the game in other jurisdictions shall be submitted.

2.12 Joint Venture Submissions

2.12.1 General Statement. A gaming device is considered a joint venture when two or more companies are involved in the manufacturing of one platform. Due to the increasing amount of joint venture submissions (more than one supplier involved in a product submission) and to alleviate any confusion to the suppliers, our regulator clients and our firm, GLI has set forth the following procedures for such submissions.

a) One company will prepare and submit the entire submission, even if they are using parts from other suppliers, and must identify the part numbers of all components. This company will be the primary contact for the submission.

b) The company submitting an approval request should do so on their letterhead. GLI will delegate an internal file number in this company's name and will bill this company for all costs incurred throughout the approval process.

c) The primary contact will be called when questions arise. However, GLI engineers will work with all parties involved in order to complete the review.

d) All suppliers who are part of the submission "group" may need to be licensed in the jurisdiction(s) where the submission is being approved. As a courtesy to the supplier, GLI may inquire as to whom does not need to be licensed from the regulator client. It should be noted that licensing questions should be handled directly with the jurisdiction.

e) Upon completion, it is the primary contact company that will receive the approval letter, provided the submission meets the jurisdictional requirements. The primary contact company may then release copies of the approval letter to the associated manufacturer(s).

CHAPTER 3

3.0 MACHINE REQUIREMENTS – HARDWARE

3.0.1 ***Introduction***. A gaming device at a minimum will contain embodiment of randomness in determination of prizes, contain some form of activation to initiate the selection process, and contain a methodology for delivery of the determined outcome. The gaming device may be separated in parts, where some may be within or outside the player terminal (e.g., gaming devices that function with a system).

3.1 Physical Security

3.1.1 ***General Statement***. A gaming device shall be robust enough to withstand forced illegal entry which would not leave behind evidence of the attempted entry, unless such entry causes a error code or is cleared at the commencement of a new play, and which does not affect the subsequent play or any other play, prize or aspect of the game.

3.2 Machine and Player Safety

3.2.1 ***General Statement***. Electrical and mechanical parts and design principals of the gaming device may not subject a player to any physical hazards. The gaming test laboratory shall NOT make any finding with regard to Safety and EMC testing, as that is the responsibility of the manufacturer of the goods or those that purchase the goods. Such Safety and EMC testing may be required under separate statute, regulation, law, or Act and should be researched accordingly, by those parties who manufacture or purchase said devices. The Gaming Test Laboratory shall not test for, be liable for, nor make a finding relating to these matters.

3.3 Environmental Effects on Game Integrity

3.3.1 Game Integrity Standard. The Laboratory will perform certain tests to determine whether or not outside influences affect game fairness to the player or create cheating opportunities. A gaming device shall be able to withstand the following tests, resuming game play without operator intervention:

a) Random Number Generator. The random number generator and random selection process shall be impervious to influences from outside the device, including, but not limited to, electro-magnetic interference, electro-static interference, and radio frequency interference;

b) Electro-Magnetic Interference. Gaming devices shall not create electronic noise that affect the integrity or fairness of neighboring machines or associated equipment;

c) Electro-Static Interference. Protection against static discharges requires that the machine's conductive cabinets be earthed in such a way that static discharge energy shall not damage, or inhibit the normal operation of the electronics or other components within the gaming device. Gaming devices may exhibit temporary disruption when subjected to a significant electro-static discharge greater than human body discharge, but they shall exhibit a capacity to recover and complete any interrupted play without loss or corruption of any control or data information associated with the gaming device. The tests will be conducted with a severity level of a minimum of 27KV air discharge;

d) Radio Frequency Interference (RFI). Gaming devices shall not divert from normal operation by the application of RFI at a frequency range from twenty-seven (27) to one thousand (1000) MHZ with a field strength of three (3) volts per meter;

e) Magnetic Interference. Gaming devices shall not be adversely affected by magnetic interference. The manufacturer should supply any documentation if the device has had magnetic interference testing against any recognized standard; and

f) Liquid Spills. Liquid spills applied to the outside of a gaming device shall not affect the normal operation of the machine, the integrity of the material or information stored inside the cabinet, or the safety of the players operating the equipment. If liquids are spilled into a coin acceptor or bill acceptor, the only degradation permitted is for the acceptor to reject all inputs or generate an error condition, see also 'Error Conditions,' Section 4.13.

3.4 Hardware Requirements-Other

3.4.1 ***General Statement***. Each gaming device shall meet the following hardware requirements:

a) Microprocessor Controlled. Be controlled by one (1) or more microprocessors or the equivalent in such a manner that the game outcome is completely controlled by the microprocessor or a mechanical device, as approved in Section 4.3, 'Mechanical and Electro-Mechanical Random Number Generators (RNG) Requirements';
b) On/Off Switch. An on/off switch that controls the electrical current shall be located in a place which is readily accessible within the interior of the machine so that power cannot be disconnected from outside of the machine using the on/off switch. The on/off positions of the switch shall be labeled; and
c) Temperature and Humidity. Gaming devices can be expected to operate in a variety of extreme environments. In the event that the designed operational parameters of a gaming device are exceeded, the machine, if incapable of continued proper operation, shall perform an orderly shutdown without loss of game status, accounting, and security event data. The manufacturer should supply any documentation if the device has had temperature and humidity testing against any recognized standard.

3.5 Cabinet Wiring

3.5.1 ***General Statement***. The gaming device shall be designed so that power and data cables into and out of the gaming device can be routed so that they are not accessible to the general public. This is for game integrity reasons only, not for health and safety. Security-related wires and cables that are routed into a logic area shall not be able to be easily removed.

3.6 Machine Identification

3.6.1 ***General Statement***. A gaming device shall have a not easily removable, without leaving evidence of tampering, identification badge, permanently affixed to the exterior of the cabinet by the manufacturer, and this badge shall include the following information:

a) The manufacturer;
b) A unique serial number;
c) The gaming device model number; and
d) The date of manufacture.

3.7 Tower Light

3.7.1 ***General Statement***. The gaming device shall have a light located conspicuously on top of the gaming device that automatically illuminates when a player has won an amount or is redeeming credits that the machine cannot automatically pay, an error condition has occurred (including 'Door Open'), or a 'Call Attendant' condition has been initiated by the player. This requirement may be substituted for an audible alarm for machines such as the 'bar-top' style.

3.8 Manipulation of Power Supply

3.8.1 **RESERVED**

3.8.2 ***Surges***. The machine shall not be adversely affected, other than resets, by surges or dips of ± 20% of the supply voltage.

NOTE: It is acceptable for the equipment to reset provided no damage to the equipment or loss or corruption of data is experienced in the field.

3.8.3 **RESERVED**

3.9 Diverter and Drop Box Requirements

3.9.1 Diverter. For games that accept coins or tokens, the software shall ensure that the diverter directs coins to the hopper, or to the drop box when the hopper is full. The hopper full detector shall be monitored to determine whether a change in diverter status is required. If the state of the detector changes, the diverter shall operate as soon as possible, or within ten (10) games, after the state change, without causing a disruption of coin flow, or creating a coin jam. Hopper-less gaming devices shall always divert coins to the drop box.

3.9.2 Drop Box. If the game is equipped to accept coins or tokens, then the following rules shall be met:

a) Each gaming device equipped to accept coins or tokens shall contain a separate slot drop bucket or slot drop box to collect and retain all such slot coins or tokens that are diverted into the drop box;
b) A slot drop bucket shall be housed in a locked compartment separate from any other compartment of the gaming device; and
c) There must be a method to monitor the drop box area, even if manufactured by a different company.

3.10 External Doors/Compartments Requirements

3.10.1 General Requirements.

a) The interior of the device should not be accessible when all doors are closed and locked;
b) Doors shall be manufactured of materials that are suitable for allowing only legitimate access to the inside of the cabinet (i.e., doors and their associated hinges shall be capable of withstanding determined illegal efforts to gain access to the inside of the gaming device and shall leave evidence of tampering if an illegal entry is made);

c) The seal between the cabinet and the door of a locked area shall be designed to resist the entry of objects;

d) There shall be a light on the top of the device that is clearly visible that automatically illuminates when the door to the gaming device, or doors to any devices connected to the gaming devices which may affect the operation of the gaming device, are opened. This requirement may be substituted for an audible alarm or a common candle for machines such as the 'bar-top' style;

e) Bar-top Game Exception. All bar-top gaming devices shall have a light alarm, or an audio door alarm, installed. The alarm shall be designed to activate when the inside of the machine is accessed, with power on;

f) All external doors shall be locked and monitored by door access sensors, which shall detect and report all external door openings, both to the machine by the way of an error and to an on-line system.

NOTE: the drop box door open does not have to cease game play; however, it must still illuminate the tower light or alarm and notify the on-line system;

g) It shall not be possible to insert a device into the gaming device that will disable a door open sensor when the machine's door is shut without leaving evidence of tampering;

h) RESERVED; and

i) The sensor system shall register a door as being open when the door is moved from its fully closed and locked position.

3.11 The Logic Door and Logic Area

3.11.1 General Statement. The logic area is a locked cabinet area (with its own locked door), which houses electronic components that have the potential to significantly influence the operation of the gaming device. There may be more than one (1) such logic area in a gaming device.

3.11.2 Electronic Components. Electronic component items that are required to be housed in one (1) or more logic areas are:

a) CPUs and other electronic components involved in the operation and calculation of game play (e.g., game controller electronics and components housing the game or system firmware program storage media);
b) Electronics involved in the operation and calculation of game result determination;
c) Electronics involved in the calculation of game display, and components housing display program storage medium (passive display equipment exempted);
d) Communication controller electronics, and components housing the communication program storage media or, the communication board for the on-line system may reside outside the gaming device; and
e) All flash memory devices that affect the game play function of the gaming device.

3.11.3 RESERVED

3.12 Coin and Currency Compartments

3.12.1 General Statement. The coin and currency compartments shall be locked separately from the main cabinet area, except that a separate cash compartment shall not be required for coins necessary to pay prizes in a machine that pays prizes through a drop hopper.

3.12.2 Access to Currency

a) Access to currency storage area is to be secured via separate key locks and shall be fitted with sensors that indicate door open/close or stacker removed.
b) Access to the currency storage area is to be through two (2) levels of locks (the relevant outer door plus one other door or lock) before the receptacle or currency can be removed.

3.13 Program Memory, RAM and Non-Volatile Devices Used to Store Program Memory

3.13.1 Non-Volatile RAM Requirements. The following are the requirements for RAM:

a) Battery Back-up. A battery back-up, or an equivalent, shall be installed on the game for the electronic meters and shall be capable of maintaining the accuracy of all information required for thirty (30) days after power is discontinued from the machine. The back-up device shall be kept within the locked Logic Area;
b) If the battery back-up is used as an 'off chip' battery source, it shall re-charge itself to its full potential in a maximum of twenty-four (24) hours. The shelf life shall be at least five (5) years;
c) Random access memory that uses an off-chip back-up power source to retain its contents when the main's power is switched off shall have a detection system which will provide a method for software to interpret and act upon a low battery condition; and
d) Clearing non-volatile memory shall only be able to be undertaken by accessing the logic area in which it is housed.

3.13.2 Function of RAM Reset. Following the initiation of a RAM reset procedure (utilizing a certified RAM Clear method), the game program shall execute a routine, which initializes each and every bit in RAM to the default state. For games that allow for partial RAM clears, the methodology in doing so must be accurate and the game must validate the un-cleared portions of RAM.

3.13.3 Default Reel Position or Game Display. The default reel position or game display after a RAM reset shall not be the top award on any selectable line. The default game display, upon entering game play mode, shall also not be the top award. This applies to the base game only and not any secondary bonus devices.

3.13.4 Configuration Setting. It shall not be possible to change a configuration setting that causes an obstruction to the electronic accounting meters without a RAM clear, see also, Section 3.13.1(d). Notwithstanding, a change to the denomination must be done by a secure means, which includes access to the locked logic area. The monitoring of denomination changes will assist in preventing bill validator fraud.

3.13.5 Requirements for Program Storage Devices. All program storage devices, including ROMs, EPROMs, FLASH ROMs, DVD, CD-ROM, and any other type of program storage devices shall be clearly marked with sufficient information to identify the software and revision level of the information stored in the devices.

3.14 Contents of Critical Memory

3.14.1 General Statement. Critical memory is used to store all data that is considered vital to the continued operation of the gaming device. This includes, but is not limited to:

a) All electronic meters required in 'Electronic Metering within the Machine,' Section 4.10 including last bill data and power up and door open metering;
b) Current credits;
c) Gaming device/game configuration data;
d) Information pertaining to the last five (5) plays with the RNG outcome (including the current game, if incomplete); and
e) Software state (the last normal state the gaming device software was in before interruption).

3.15 Maintenance of Critical Memory

3.15.1 General Statement. Critical memory storage shall be maintained by a methodology that enables errors to be identified and corrected in most circumstances. This methodology may involve signatures, checksums, partial checksums, multiple copies, timestamps and/or effective use of validity codes.

3.15.2 Comprehensive Checks. Comprehensive checks of critical memory shall be made during each gaming device restart (e.g., power up cycle). Gaming device control programs (software

that operates the gaming device's functions) shall test for possible corruption caused by failure of the program storage medium and all critical game functions. Test methodology shall detect 99.99 percent of all possible failures.

3.15.3 Control Program. The control program (software that operates the gaming device's functions) shall allow for the gaming device to ensure the integrity of all control program components during execution of said components.

3.15.4 PSDs. All PSDs (program storage devices), in the executable address space of a main processor, shall be validated during the following conditions:

a) Any power up;
b) RESERVED;
c) The first time the files are loaded for use (even if only partially loaded); and
d) RESERVED.

3.15.5 RAM and PSD Space. RAM and PSD space that is not critical to machine security (e.g., video or sound ROM) are not required to be validated.

3.16 Unrecoverable Critical Memory

3.16.1 General Statement. An uncorrectable corruption of RAM shall result in a RAM error. The RAM should not be cleared automatically, but shall require a full RAM clear performed by an authorized person.

3.17 Write Once Read Many (WORM) Program Storage

3.17.1 General Statement. A WORM used as a program storage device shall only contain the program files that operate the game.

3.17.2 Utilizing Integrity Check. The control program shall utilize an integrity check, preferably a secured hashing method such as MD5 or SHA (please contact the test laboratory for further information) to authenticate that the program and/or support files have not been corrupted or altered prior to use/loading.

***3.17.3* RESERVED**

3.17.4 CD-ROM "Re-Writeable Disk" In the case of a CD-ROM, a re-writeable disk may not be used.

3.17.5 CD-ROM "Session Closed" In the case of a CD-ROM, "the Session" shall be closed to prevent any further writing.

3.17.6 Write Protection. In the case of a hard disk, a write-protected drive shall be used. SCSI Devices are preferred, as they provide a write protect jumper which can be sealed. Any other type drive will be required to have the write line cut and verified in the field, and any other means of write protection will be examined on a case-by-case basis.

3.17.7 Alternate Storage Medium. The program residing in the gaming device shall be contained in a storage medium, which cannot be altered through use of the circuitry or programming of the gaming device itself. If the program is contained in any other medium, the following rules shall be met:

a) The gaming device shall authenticate all critical game files including, but not limited to, executables, data, and operating system files and other files, which may affect the game outcome or operation, which reside on the medium. This authentication shall employ a hashing algorithm which produces a 'Message Digest' (the mathematical results/signature of the hashing algorithm) output of at least 128 bits (this value will constantly be re-evaluated,

based on technology advancements and new security methods available) at minimum, as certified by the test laboratory and agreed upon by the jurisdiction;

b) The Message Digest(s) for all files as defined in (a) shall reside on a memory device (ROM-based or other medium) within the gaming device. Message Digests which reside on any other medium shall be encrypted, using a public/private key algorithm with a minimum of a 512 bit key (this value will constantly be re-evaluated based on technology advancements and new security methods available), or an equivalent encryption algorithm with similar security certified by the test laboratory and agreed upon by the jurisdiction.

c) The gaming device shall authenticate all critical files** against the stored Message Digest(s). This authentication shall meet the requirements of 'PSDs' Section 3.15.4;
** critical files are those files which affect game play, operation, or outcome

d) In the event of a failed authentication, after the game has been powered up, the gaming device should immediately enter an error condition with the appropriate tower light signal, and record the details, including time and date of the error in a log. This error shall require operator intervention. The game shall display specific error information and shall not clear until either the file authenticates properly, following the operator intervention, or the medium is replaced or corrected, and the device's memory is cleared, the game is restarted, and all files authenticate correctly; and

e) The device shall be capable of displaying the 'Message Digest' of any and all files on demand through the audit mode, see also 'Software Meter Information Access,' Section 4.10.8.

3.18 Flash Memory Devices

3.18.1 General Statement. Flash memory devices that contain the control program are allowed as long as the ability to 're-write' or 'flash' the device, while installed in the logic board, is physically disabled (i.e., write line cut on the logic board). Each use of flash memory devices will be assessed.

NOTE: Use of any hardware switch to enable the Write Line will be reviewed on a case-by-case basis.

3.19 Multi-Station Games

3.19.1 General Statement. A Multi-Station game is a gaming device that incorporates more than one (1) player terminal, and only has one (1) random number generator, which is controlled by the master terminal. The master terminal, containing the games CPU, will house the game display, which is shared among the player terminals. Each station must meet the technical standards outlined throughout this document, including machine identification and metering.
NOTE: There must be a method for each player to know when the next game will begin.

3.20 Printed Circuit Board (PCB)

3.20.1 PCB Identification Requirements. Requirements for PCB identification:

a) Each printed circuit board (PCB) shall be identifiable by some sort of name (or number) and revision level;
b) The top assembly revision level of the PCB shall be identifiable (if track cuts and/or patch wires are added to the PCB, then a new revision number or level shall be assigned to the assembly); and
c) Manufacturers shall ensure that circuit board assemblies, used in their gaming devices, conform functionally to the documentation and the certified versions of those PCBs that were evaluated and certified by the test laboratory.

3.21 Patch Wires

3.21.1 Documentation of Patch Wires & Track Cuts. All patch wires and track cuts shall be documented, in an appropriate manner, in the relevant service manual and/or service bulletin and shall be submitted to the test laboratory. This does not prohibit required repairs in the field.

3.22 Switches and Jumpers

3.22.1 General Statement. If the game contains 'Switches and Jumpers,' the following rules shall be met:

a) All switches or jumpers shall be fully documented for evaluation by the test laboratory;
b) Hardware switches which may alter the paytables, game denomination, or payout percentages in the operation of the gaming device must meet the 'Configuration Settings' section of this document and must be housed within a logic department of the gaming device. This includes top award changes (including progressives), selectable Blackjack settings, or any other option that would affect the payout percentage whether or not that percentage is within legal limits; and
c) RESERVED.

3.23 Mechanical Devices Used for Displaying of Game Outcomes

3.23.1 General Statement. If the game has mechanical or electro-mechanical devices, which are used for displaying game outcomes, the following rules shall be observed:

a) Electro-mechanically controlled display devices (e.g. reels or wheels) shall have a sufficiently closed loop of control so as to enable the software to detect a malfunction, or an attempt to interfere with the correct operation of that device. This requirement is designed to ensure that if a reel or wheel is not in the position it is supposed to be in, an error condition will be generated;
b) Mechanical assemblies (e.g., reels or wheels) shall have some mechanism that ensures the correct mounting of reels' artwork, if applicable;
c) Displays shall be constructed in such a way that winning symbol combinations match up with pay lines or other indicators; and
d) A mechanical assembly shall be so designed that it is not obstructed by any other components.

3.24 Video Monitors/Touch Screens

3.24.1 General Statement. All video games shall meet the following rules:

a) Touch screens (if applicable) shall be accurate and, once calibrated, shall maintain that accuracy for at least the manufacturer's recommended maintenance period;
b) A touch screen (if applicable) should be able to be re-calibrated by venue staff without access to the machine cabinet other than opening the main door; and
c) There shall be no hidden or undocumented buttons/touch points (if applicable) anywhere on the screen, except as provided for by the game rules that affect game play.

3.25 RESERVED

3.26 Coin or Token and Bill Acceptors and Other Methods of Inserting Value into the Machine

3.26.1 Coin Or Token Acceptors. If the gaming device uses a coin acceptor, the acceptor shall accept or reject a coin on the basis of metal composition, mass, composite makeup, or equivalent security. In addition, it shall meet the following rules:

a) Coin Acceptor Security Features/Error Conditions. The coin acceptor shall be designed to prevent the use of cheating methods such as slugging (counterfeit coins), stringing (coin pullback), the insertion of foreign objects and other manipulation;
b) Rapidly Fed Coins. The gaming device shall be capable of handling rapidly-fed coins or piggy backed coins so that occurrences of cheating are eliminated;
c) Direction Detectors. The gaming devices shall have suitable detectors for determining the direction and the speed of coin travel in the receiver. If a coin traveling at too slow of a speed or improper direction is detected, the gaming device shall enter an error condition and display an error condition for at least thirty (30) seconds or be cleared by an attendant;
d) Invalid Coins. Coins deemed invalid by the acceptor shall be rejected to the coin tray and shall not be counted as credits;

e) Coin Acceptance Conditions. Acceptance of coins for crediting to the credit meter shall only be possible when the gaming device is enabled for play. Other states, such as error conditions, including door opens, audit mode and game play, shall cause the disabling of the coin acceptor system;

f) Credit Meter Update on Coin Insertion. Each coin inserted shall register the actual monetary value or a number of credits on the player's credit meter for the current game or bet meter. If registered directly as credits, the conversion rate shall be clearly stated, or be easily ascertainable from the gaming device; and

g) RESERVED.

NOTE: The error conditions within this section shall also comply with 'Error Conditions', Section 4.13 unless otherwise noted.

3.26.2 Bill Acceptors. All acceptance devices shall be able to detect the entry of valid bills, coupons, paper tokens, or other approved notes, if applicable, and provide a method to enable the gaming device software to interpret and act appropriately upon a valid or invalid input. The acceptance device(s) shall be electronically-based and be configured to ensure that they only accept valid bills of legal tender. Bill acceptors may also accept coupons, paper tokens, or other approved notes and reject all others in a highly accurate manner. The bill input system shall be constructed in a manner that protects against vandalism, abuse, or fraudulent activity. In addition, bill acceptance device(s) shall meet the following rules for all acceptable types of medium:

a) RESERVED

b) Credits. Credits shall only be registered when:

i. The bill or other note has passed the point where it is accepted and stacked; and

ii. The acceptor has sent the "irrevocably stacked" message to the machine.

3.26.3 Communications. All bill acceptors shall communicate to the gaming device using a bi-directional protocol.

3.26.4 Factory Set Bill Acceptors. If bill acceptors are designed to be factory set only, it shall not be possible to access or conduct maintenance or adjustments to those bill acceptors in the field, other than:

a) The selection of bills, coupons, paper tokens, or other approved notes and their limits;
b) Changing of certified EPROMs or downloading of certified software;
c) Adjustment of the tolerance level for accepting bills or notes of varying quality should not be allowed externally to the machine. Adjustments of the tolerance level should only be allowed with adequate levels of security in place. This can be accomplished through lock and key, physical switch settings, or other accepted methods approved on a case-by-case basis;
d) Maintenance, adjustment, and repair per approved factory procedures; or
e) Options that set the direction or orientation of acceptance.

3.26.5 Tokenization. For games that allow tokenization, the game shall receive from the bill acceptor and post to the player the entire amount inserted.

3.27 Machine Metering of Bill Acceptor Events

3.27.1 General Statement. A gaming device, which contains a bill acceptor device, shall maintain sufficient electronic metering to be able to report the following:

a) Total monetary value of all items accepted;
b) Total number of all items accepted; and
c) A break down of the bills accepted:

i. For bills, the game shall report the number of bills accepted for each bill denomination;
ii. For all other notes, the game shall have a separate meter that reports the number of notes accepted, not including bills.

3.27.2 Bill Acceptor Recall. A gaming device that uses a bill acceptor shall retain in its memory and display the denomination of the last five (5) bills inserted.

3.28 Bill Acceptor Error Conditions

3.28.1 Error Conditions. Each gaming device and/or bill acceptor shall have the capability of detecting and displaying (for bill acceptors, it is acceptable to disable or flash a light or lights) the following bill acceptor error conditions:

a) Stacker Full – the bill acceptor should disable itself to accept no more bills. The game should not generate an error message when the stacker is full;
b) Bill Jams – it is acceptable for the bill acceptor to indicate there is a bill jam by disabling itself to accept no more bills or by some other method;
c) RESERVED;
d) Bill Acceptor Door Open – where a bill acceptor door is the belly glass door, a door open signal is sufficient;
e) Stacker Door Open or Stacker Removed; and
f) RESERVED.

NOTE: the Error Conditions listed above shall also comply with 'Error Conditions,' Section 4.13.

3.28.2 Power Failure During Bill Acceptance/Validation. If a power failure occurs during acceptance, the bill acceptor shall give proper credits for the bill or return the bill to the player, notwithstanding that there may be a small window of time where power may fail and credit may not be given. In this case, the window shall be less than one (1) second.

3.28.3 Self Test. The bill acceptor device shall perform a self-test at each power up. In the event of a self-test failure, the bill acceptor shall automatically disable itself (i.e., enter bill reject state) until the error state has been cleared.

3.29 Bill Acceptor Requirements

3.29.1 Bill Acceptor Requirements. A bill acceptor shall not be adversely affected by the following:

a) The bill acceptor shall not be adversely affected by electro-static discharge;
b) The bill acceptor shall not be adversely affected by power surges;
c) The bill acceptor shall not be adversely affected by radio frequency interference *;
d) The bill acceptor shall not be adversely affected by electro-magnetic interference *;
e) The bill acceptor shall not be adversely affected by environmental extremes *;
f) Interconnecting cables from the bill acceptor device to the gaming device shall not be exposed external to the gaming device; and
g) If liquids are spilled into a bill acceptor, the only degradation permitted is for the acceptor to reject all bill inputs or generate an error condition, see also 'Error Conditions', Section 4.13.

* The manufacturer should supply any documentation if the bill acceptor has had any of the above tests performed by a recognized standard.

3.30 Bill Acceptor Stacker Requirements

3.30.1 General Statement. Each bill acceptor shall have a secure stacker and all accepted bills shall be deposited into the secure stacker. The secure stacker is to be attached to the gaming

device in such a manner so that it cannot be easily removed by physical force and shall meet the following rules:

a) The bill acceptor device shall have a 'stacker full' sensor;
b) There shall be a separate key to access the stacker area. This key shall be separate from the main door. In addition, a separate key shall be required to remove the bills from the stacker; and
c) A tower light or alarm shall be activated whenever there is access to the bill door or the stacker has been removed.

3.31 Credit Redemption

3.31.1 Credit Redemption. Available credits may be collected from the gaming device by the player pressing the "COLLECT" button at any time other than during:

a) A game being played;
b) Audit mode;
c) Any door open;
d) Test mode;
e) A Credit Meter or Win Meter incrementation, unless the entire amount is placed on the meters when the collect button is pressed; or
f) An error condition.

3.31.2 Cancel Credit. If credits are collected, and the total credit value is greater than or equal to a specific limit (e.g., Hopper Limit for hopper games or Printer Limit for printer games), the game shall lock up until the credits have been paid, and the handpay is cleared by an attendant.

3.32 Hoppers

3.32.1 Hoppers & Hopper Error Conditions. There shall be under no circumstances, an abnormal payout from the hopper (if one exists) when the hopper is exposed to higher levels of electro-static discharge or if power is lost at any time during a payout. The hopper shall be interfaced in such a way as to allow the gaming device control program to monitor the hopper mechanism, in all game states, to identify at least the following events and shall meet the rules in 'Error Conditions,' Section 4.13:

a) Extra coin paid;
b) RESERVED; and
c) Hopper jam or empty.

NOTE: The hopper shall be resistant to manipulation by the insertion of a light source or any foreign object.

3.32.2 RESERVED

3.33 Printers

3.33.1 Payment By Ticket Printers. If the gaming device has a printer that is used to make payments, the gaming device may pay the player by issuing a printed ticket. If the taxation limit is reached on any single play when using a ticket printer, then the ticket must not be able to be redeemed at any place other than through human interaction (not on another machine or at a self-serve kiosk). The printer shall print on a ticket and provide the data to an on-line data system that records the following information regarding each payout ticket printed. The information listed below can be obtained from the gaming device, interface board, the on-line data management system, or another means:

a) RESERVED;
b) Value of credits in local monetary units in numerical form;

c) Time of day the ticket was printed in twenty-four (24) hour format showing hours and minutes – printing of this information is not required, provided that storage of this information is in the database;
d) Date, in any recognized format, indicating the day, month, and year;
e) Gaming device number or machine number; and
f) Unique validation number, or barcode.

NOTE: To meet this standard, the gaming device shall either keep a duplicate copy or print only one (1) copy to the player but have the ability to retain the last thirty-five (35) ticket information to resolve player disputes. In addition, an approved system shall be used to validate the payout ticket, and the ticket information on the central system shall be retained at least as long as the ticket is valid at that location.

3.33.2 Printer Location. If a gaming device is equipped with a printer, it shall be located in a locked area of the gaming device (e.g., require opening of the main door to access), but not in the logic area or the drop box. This requirement ensures that changing the paper does not require access to the drop (cash) or logic areas.

3.33.3 Printer Error Conditions. A printer shall have mechanisms to allow software to interpret and act upon the following conditions:

a) Out of paper/paper low;
b) Printer jam/failure; and
c) Printer disconnected which may only be detected when the software tries to print.

NOTE: These conditions shall trigger an error condition to indicate the error has occurred, see also 'Error Conditions,' Section 4.13

3.34 Ticket Validation

3.34.1 Payment By Ticket Printer. Payment by ticket printer as a method of credit redemption is only permissible when:

a) the gaming device is linked to a computerized system, which allows validation of the printed ticket. Validation approval or information shall come from the central system in order to validate tickets. Tickets may be validated at any location, as long as it meets the standards in this section. Provisions must be made if communication is lost, and validation information cannot be sent to the central system, thereby requiring the manufacturer to have an alternate method of payment. The validation system must be able to identify duplicate tickets to prevent fraud by reprinting and redeeming a ticket that was previously issued by the gaming device; or
b) by use of an approved alternative method that includes the ability to identify duplicate tickets to prevent fraud by reprinting and redeeming a ticket that was previously issued by the gaming device.

CHAPTER 4
4.0 SOFTWARE REQUIREMENTS

4.1 Introduction

This section of the document shall set forth the technical requirements for the Rules of Play of the game.

4.2 Rules of Play

4.2.1 Display.

a) Payglass/Video Display. Payglasses or video displays shall be clearly identified and shall accurately state the rules of the game and the award that will be paid to the player when the player obtains a specific win. The payglasses or video displays shall clearly indicate whether awards are designated in denominational units, currency, or some other unit. The gaming device shall reflect any change in award value, which may occur in the course of play. This may be accomplished with a digital display in a conspicuous location to the gaming device, and the game must clearly indicate such. All paytable information should be able to be accessed by a player, prior to them committing to a bet. Payglasses or video displays shall not be certified if the information is inaccurate or may cause confusion. The "reasonable player" standard shall be used for evaluation;

b) Upcoming wins. The game shall not advertise 'upcoming wins,' for example three (3) times pay coming soon;

c) Fever Mode. Each game which features a "fever" mode (a mode which gives the player an opportunity for the following 'X' number of hands to achieve a certain winning combination with the pay-off being some number of bonus credits) should include the number of hands remaining for the "fever" mode pay-off during each game that fever mode is present. The same shall apply to free games awarded as a result of a previous event; and

d) Multiple Decks of Cards. Any games which utilize multiple decks of cards should alert the player as to the number of card decks in play.

4.2.2 Information to be Displayed. A gaming device shall display, or shall have displayed on the glass, the following information to the player at all times the machine is available for player input:

a) The player's current credit balance;
b) The current bet amount. This is only during the base game or if the player can add to the bet during the game;
c) All possible winning outcomes, or be available as a menu item or on the help menu;
d) Win amounts for each possible winning outcome, or be available as a menu or help screen item;
e) The amount won for the last completed game (until the next game starts or betting options are modified); and
f) The player options selected (e.g., bet amount, lines played) for the last completed game (until the next game starts or a new selection is made).

4.2.3 Multi-Line Games.

a) Each individual line to be played shall be clearly indicated by the gaming device so that the player is in no doubt as to which lines are being bet on; and
b) The winning playline(s) shall be clearly discernable to the player. (e.g., on a video game it may be accomplished by drawing a line over the symbols on the playline(s) and/or the flashing of winning symbols and line selection box. Where there are wins on multiple lines, each winning playline may be indicated in turn. This would not apply to reel slot games).

4.2.4 Game Cycle. A game is considered completed when the final transfer to the player's credit meter takes place (in case of a win), or when all credits wagered or won that have not been

transferred to the credit meter, are lost. The following are all considered to be part of a single game:

a) Games that trigger a free game feature and any subsequent free games;
b) "Second screen" bonus feature(s);
c) Games with player choice (e.g., Draw Poker or Blackjack);
d) Games where the rules permit wagering of additional credits (e.g., Blackjack insurance or the second part of a two-part Keno game); and
e) Double-up/Gamble features.

4.3 Mechanical and Electro-Mechanical Random Number Generator (RNG) Requirements

4.3.1 Game Selection Process.

a) All Combinations and Outcomes Shall Be Available. Each possible permutation or combination of game elements that produces winning or losing game outcomes shall be available for random selection at the initiation of each play, unless otherwise denoted by the game;
b) No Near Miss. After selection of the game outcome, the gaming device shall not make a variable secondary decision, which affects the result shown to the player. For instance, the random number generator chooses an outcome that the game will be a loser. The game shall not substitute a particular type of loser to show to the player. This would eliminate the possibility of simulating a 'Near Miss' scenario where the odds of the top award symbol landing on the payline are limited but frequently appear above or below the payline;
c) RESERVED;
d) No Corruption from Associated Equipment. A gaming device shall use appropriate communication protocols to protect the random number generator and random selection process from influence by associated equipment, which may be communicating with the gaming device.

4.3.2 Random Number Generator Requirements. The use of an RNG results in the selection of game symbols or production of game outcomes. The selection shall:

a) Be statistically independent;
b) Conform to the desired random distribution;
c) Pass various recognized statistical tests; and
d) Be unpredictable.

4.3.3 Applied Tests. The test laboratory may employ the use of various recognized tests to determine whether or not the random values produced by the random number generator pass the desired confidence level of 95%. These tests may include, but are not limited to:

a) Chi-square test;
b) Equi-distribution (frequency) test;
c) Gap test;
d) Overlaps test;
e) Poker test;
f) Coupon collector's test;
g) Permutation test;
h) Kolmogorov-Smirnov test;
i) Adjacency criterion tests;
j) Order statistic test;
k) Runs tests (patterns of occurrences should not be recurrent);
l) Interplay correlation test;
m) Serial correlation test potency and degree of serial correlation (outcomes should be independent of the previous game); and
n) Tests on subsequences.

4.3.4 Background RNG Activity Requirement. The RNG shall be cycled continuously in the background between games and during game play at a speed that cannot be timed by the player. The test laboratory recognizes that some time during the game, the RNG may not be cycled when interrupts may be suspended. The test laboratory recognizes this but shall find that this exception shall be kept to a minimum.

4.3.5 RNG Seeding. The first seed shall be randomly determined by an uncontrolled event. After every game there shall be a random change in the RNG process (new seed, random timer, delay, etc.). This will verify the RNG doesn't start at the same value, every time. It is permissible not to use a random seed; however, the manufacturer must ensure that games will not synchronize.

4.3.6 Live Game Correlation. Unless otherwise denoted on the payglass, where the gaming device plays a game that is recognizable such as Poker, Blackjack, Roulette, etc., the same probabilities associated with the live game shall be evident in the simulated game. For example, the odds of getting any particular number in Roulette where there is a single zero (0) and a double zero (00) on the wheel, shall be 1 in 38; the odds of drawing a specific card or cards in Poker shall be the same as in the live game. For other gaming devices (such as spinning reel games or video spinning reel games), the mathematical probability of a symbol appearing in a position in any game outcome shall be constant.

4.3.7 Card Games. The consequences for games depicting cards being drawn from a deck are the following:

a) At the start of each game/hand, it is recommended that the first hand of cards shall be drawn fairly from a randomly-shuffled deck; the replacement cards aren't drawn until needed;
b) Cards once removed from the deck shall not be returned to the deck except as provided by the rules of the game depicted;
c) RESERVED; and

d) As cards are removed from the deck they shall be immediately used as directed by the Rules of the Game (i.e., the cards are not to be discarded due to adaptive behavior by the gaming device).

4.3.8 Ball Drawing Games. The consequences for games depicting balls being drawn from a barrel (e.g., Keno) are as follows:

a) At the start of each game, only balls applicable to the game are to be depicted. For games with bonus features and additional balls that are selected, they should be chosen from the original selection without duplicating an already chosen ball;
b) RESERVED;
c) The barrel shall not be re-mixed except as provided by the rules of the game depicted; and
d) As balls are drawn from the barrel, they shall be immediately used as directed by the Rules of the Game (i.e., the balls are not to be discarded due to adaptive behavior by the gaming device).

4.3.9 Scaling Algorithms.

a) If a random number with a range shorter than that provided by the RNG is required for some purpose within the gaming device, the method of re-scaling, (i.e., converting the number to the lower range), is to be designed in such a way that all numbers within the lower range are equally probable.
b) If a particular random number selected is outside the range of equal distribution of re-scaling values, it is permissible to discard that random number and select the next in sequence for the purpose of re-scaling.

4.3.10 Mechanical Based RNG Games. Mechanical based RNG games are games that use the laws of physics to generate the outcome of the game. All mechanical based RNG games must meet the requirements of this document with the exception of Sections 4.3.4, 4.3.5, and 4.3.9 that dictate the requirements for electronic random number generators. In addition, mechanical based RNG games must meet the following rules:

a) The test laboratory will test via PC communications multiple iterations to gather enough data to verify the randomness. In addition, the manufacturer may supply live data to assist in this evaluation;
b) The mechanical pieces must be constructed of materials to prevent decomposition of any component over time (e.g., a ball shall not disintegrate);
c) The properties of physical items used to chose the selection shall not be altered; and
d) The player shall not have the ability to physically interact or come into physical contact or manipulate the machine physically with the mechanical portion of the game.

Note: The laboratory reserves the right to require replacement parts after a pre-determined amount of time for the game to comply with Rule 4.3.10(b) above. In addition, the device(s) may require periodic inspections to ensure the integrity of the device. Each mechanical based RNG game shall be reviewed on a case-by-case basis.

4.4 Payout Percentages, Odds and Non-Cash Awards

4.4.1 *Software Requirements for Percentage Payout.* Each game shall theoretically payout a minimum of seventy-five percent (75%) during the expected lifetime of the game, including bonus games, see also 'Bonus Games,' Section 4.5. In addition, the game must meet the following rules:

a) Optimum Play Used for Skill Games. Gaming devices that may be affected by player skill shall meet the requirement of Section 4.4.1 when using a method of play that will provide the greatest return to the player over a period of continuous play.
b) Minimum Percentage Requirement Met at All Times. The minimum percentage requirement shall be met at all times. The minimum percentage requirement shall be met when playing at the lowest end of a non-linear paytable (i.e., if a game is continuously played at a minimum bet level for its total game cycle and the theoretical RTP is lower than the minimum percentage, then the game is unacceptable). This example also extends to games such as

Keno, whereby the continuous playing of any spot combination results in a theoretical return to player lower than the minimum percentage.

c) Double-up or Gamble. The Double-up or Gamble options shall have a theoretical return to the player of one hundred percent (100%).

4.4.2 Progressive Game Calculations. Whenever a progressive handpay is offered as part of the gaming device payout, the base amount (the lowest starting value possible) shall be included in the theoretical payout percentage for purposes of satisfying the minimum percentage requirements. The test laboratory shall provide the base amount in the certification letter as the lowest configuration. This rule shall not supercede the rules in 'Merchandise Prizes In Lieu Of Cash Awards,' Section 4.4.5, and see also, GLI-12 Progressive Gaming Devices in Casinos.

4.4.3 Multiple Percentages. For games that offer multiple percentages, please refer to the 'Configuration Setting' requirements in section 3.13.4 of this document. For games connected by a network, security measures will be reviewed on a case-by-case basis.

4.4.4 Odds. The highest single advertised payout on each gaming device shall occur, statistically, at least once in 50,000,000 games. This does not apply to multiple awards won together on the same game play where the aggregate prize is not advertised. This odds rule shall not apply to games which make it possible for a player to win the highest win multiple times through the use of free games. This rule does apply to each wager that wins the maximum award.

4.4.5 Merchandise Prizes in Lieu of Cash Awards.

a) Payout Percentage. No payout of any merchandise or thing of value shall be included in determining whether a gaming device meets the established minimum payout requirement unless the player is given an option to claim a single, lump sum cash prize. In that case, aforementioned cash prize will be used to compute the payout percentage.

i. Limitations (annuities – lump sum or the payment plan) on the prize amount of Merchandise shall be clearly explained to the player on the game that is offering such a prize.

ii. Gaming devices which are linked to offer the same merchandise handpay shall have the same probability of hitting the combination (adjusted for denomination of play and number of coins bet) that will award that handpay. See also, GLI-12 Progressive Gaming Devices in Casinos.

4.5 Bonus Games

4.5.1 Bonus Games. If the game contains a 'bonus feature' including a game within a game, the following rules shall be met:

a) The game shall display clearly to the player which game rules apply to the current game state;
b) The game, other than those that occur randomly, shall display to the player sufficient information to indicate the current status towards the triggering of the next bonus game (i.e., if the game requires obtaining several events/symbols towards a feature, the number of events/symbols needed to trigger the bonus shall be indicated along with the number of events/symbols collected at any point);
c) The game shall not adjust the likelihood of a bonus occurring, based on the history of prizes obtained in previous games (i.e., games shall not adapt their theoretical return to player based on past payouts);
d) If a game's bonus is triggered after accruing a certain number of events/symbols or combination of events/symbols of a different kind, the probability of obtaining like events/symbols shall not deteriorate as the game progresses (e.g., for identical events/symbols it is not permitted that the last few events/symbols needed are more difficult to obtain than the previous events/symbols of that kind); and

e) The game shall make it clear to the player that they are in this mode to avoid the possibility of the player walking away from the machine not knowing the game is in a bonus mode.

4.6 Extended Play

4.6.1 ***General Statement***. Games that have an award calculated, occurring from game play within the base game's cycle made upon the completion of a series of random occurrences, shall meet the following:

a) Extended play awards are part of the game cycle with predetermined award values. Extended play award contributions to the program payout percentage are calculated consistent with awards of the regular game cycle. Specifically, if the cycle for extended play awards is different from the base game cycle, then the extended play awards, occurring within the base game's cycle, will be calculated as part of the game's payout; and
b) Pursuant to the rules, the game shall display the rules of play for the extended play awards, the rewards associated with each extended play award, and the character combinations that will result in specific payouts. For extended play awards achieved by obtaining specific game results, the progress of the award shall be displayed.

4.7 Extra Credits Wagered during Bonus Games

4.7.1 ***General Statement***. If a bonus or feature game requires extra credits to be wagered and the game accumulates all winnings (from the trigger and the feature) to a temporary "win" meter (rather than directly to the credit meter), the game shall:

a) Provide a means where winnings on the temporary meter can be bet (via the credit meter) to allow for instances where the player has an insufficient credit meter balance to complete the feature;
b) Transfer all credits on the temporary meter to the credit meter upon completion of the feature;

c) Not exceed the max bet limit, if one is set; and

d) Provide the player an opportunity NOT to participate.

4.8 Bonus Game's Return

4.8.1 General Statement. The game's player return over the cycle of both the bonus and non-bonus part of the game shall conform to the minimum theoretical return to player.

4.9 Multiple Games on the Gaming Device

4.9.1 Selection Of Game For Display.

a) RESERVED.

b) The methodology employed by a player to select and discard a particular game for play on a multi-game gaming device shall be clearly explained to the player on the gaming device, and be easily followed.

c) The gaming device shall be able to clearly inform the player of all games, their rules and/or the paytables before the player must commit to playing them.

d) The player shall at all times be made aware of which game has been selected for play and is being played, as applicable.

e) The player shall not be forced to play a game just by selecting that game. The player shall be able to return to the main menu.

f) It should not be possible to start a new game before the current play is completed and all relevant meters have been updated (including features, gamble and other options of the game) unless the action to start a new game terminates the current play in an orderly manner.

g) The set of games offered to the player for selection, or the pay table, can be changed only by a secure certified method which includes turning on and off games available for play through a video screen interface. The rules outlined in 'Configuration Setting' of this document shall govern the RAM clear control requirements for these types of selections. However, games

that keep the previous paytable's (the paytable just turned off) data in memory, a RAM clear is not required.

h) No changes to the set of games offered to the player for selection (or to the paytable) are permitted while there are credits on the player's credit meter or while a game is in progress.

4.10 Electronic Metering within the Gaming Device

4.10.1 **RESERVED**

4.10.2 ***Credit Meter Units and Display***. The credit meter shall be maintained in credits or cash value (i.e. applicable local currency).

4.10.3 **RESERVED**

4.10.4 ***Tokenization.*** If the current local currency amount is not an even multiple of the tokenization factor for a game or the credit amount has a fractional component, the credits displayed for that game may be displayed and played as a truncated amount, (i.e., fractional part removed). However, the fractional credit information shall be made available to the player when the truncated credit balance is zero. The fractional amount is also known as 'Residual Credit,' see also, 'Tokenization–Residual Credits,' Section 4.11.

4.10.5 ***Credit Meter – Incrementing***. The value of every prize (at end of game) shall be added to the player's credit meter, except all handpays or merchandise, see also 'Merchandise Prizes In Lieu Of Cash Awards,' Section 4.4.5.

4.10.6 ***Progressives***. Progressives may be added to the credit meter if either:

a) The credit meter is maintained in the local currency amount; or
b) The progressive meter is incremented to whole credit amounts; or

c) The prize in the local currency amount is converted to credits on transfer to the player's credit meter in a manner that does not mislead the player (i.e., make unqualified statement "wins meter amount" and then rounds down on conversion) or cause accounting imbalances. See also, GLI-12 Progressive Gaming Devices in Casinos.

4.10.7 Collect Meter. There shall be the facility for a collect meter which will show the number of credits or cash collected by the player (the number of credits or cash collected shall be subtracted from the player's credit meter and added to the collect meter).

4.10.8 Software Meter Information Access. The software meter information shall be accessible by an authorized person.

4.10.9 Electronic Accounting and Occurrence Meters. Electronic accounting meters shall be at least eight (8) digits in length. If the meter is being used in dollars and cents, at least eight (8) digits must be used for the dollar amount. The meter must roll over to zero upon the next occurrence, any time the meter is eight (8) digits or higher and after 99,999,999 has been reached or any other value that is logical. Occurrence meters shall be at least three (3) digits in length and roll over to zero upon the next occurrence, any time the meter is higher that the maximum number of digits for that meter. The required electronic meters are as follows (accounting meters are designated with an asterisk '*'):

a) The coins-in* (OR cash in) meter shall cumulatively count the total amounts wagered during game play, except credits that are won during the game that are subsequently risked in a double up mode.
b) The coins-out* (OR credit out) meter shall cumulatively count all amounts won by the player at the end of the game, that were not paid by an attendant, including amounts paid by a ticket printer. This meter must not increment for bills inserted and cashed out (used as a change machine).

c) The drop* meter shall maintain a cumulative count of the number of coins that have been diverted into a drop bucket and credit value of all bills and tickets/coupons inserted into the bill acceptor for play.

   NOTE: It is acceptable to have separate 'drop' meters for coins, bills, tickets and coupons.

d) The handpays* meter shall reflect the cumulative amounts paid by an attendant for progressive and non-progressive handpays.

e) The games-played meter shall display the cumulative number of games played since the last RAM clear.

f) A cabinet door meter shall display the number of times the front cabinet door was opened since the last RAM clear.

g) The drop door meter shall display the number of times the drop door or the bill acceptor door was opened since the last RAM clear.

h) The cancelled credit* meter shall reflect the cumulative amounts paid by an attendant that are in excess of the credit limit and residual credits that are collected.

   NOTE: printer games do not require a cancelled credit meter unless, a 'printer limit' option exists on the game.

i) The progressive occurrence meter shall count the number of times each progressive meter is activated. See also *GLI-12 Progressive Gaming Devices in Casinos*.

4.10.10 Multi-Game Game Specific Meters. In addition to the Electronic Accounting Meters required above, each individual game available for play shall have at least "Credits Bet" and "Credits Won" meters in either credits or dollars. Even if a 'double up or gamble' game is lost, the initial win amount/credits bet amount shall be recorded in the game specific meters. Alternatively, there can be separate meters that accounts for the double-up or gamble information, see also, Section 4.10.11. Either way, the method of metering must be understood on the screen.

4.10.11 Double-Up or Gamble Meters. For each type of Double-up or Gamble offered, there shall be two meters to indicate the amount doubled and the amount won, which should increment

every time a Double-up or Gamble occurs. If the gaming device does not supply accounting for the Double-Up or Gamble information, the feature must not be enabled for use.

4.11 Tokenization – Residual Credits

4.11.1 General Statement. If residual credits exist, the manufacturer may provide a residual credit removal feature or allow a cancel credit or ticket print to remove the residual credits or return the gaming device to normal game play (i.e., leave the residual credits on the player's credit meter for betting). In addition:

a) RESERVED
b) Residual credits bet on the residual credit removal play shall be added to the Coins-In (or Cash In) meter;
c) If the residual credit removal play is won, the value of the win shall either:
    i. Increment the player's credit meter; or
    ii. Be automatically dispensed, and the value of the coin(s) added to the Coins-Out (or Cash Out) meter;
d) All other appropriate gaming device meters (e.g., Hopper Level) shall be appropriately updated;
e) If the residual credit removal play is lost, all residual credits are to be removed from the credit meter;
f) If the residual credits are cancelled rather than wagered, the gaming device shall update the relevant meters (e.g., cancelled credit) and the last play information;
g) The residual credit removal play feature shall return at least seventy-five percent (75%) to the player;
h) The player's current options and/or choices shall be clearly indicated electronically or by video display. These options shall not be misleading;

i) If the residual credit removal play offers the player a choice to complete the game (e.g., select a hidden card), the player shall be also given the option of exiting the residual credit removal mode and returning to the previous mode;
j) It shall not be possible to confuse the residual credit removal play with any other game feature (e.g., Double-up or Gamble);
k) If the residual credit removal play is offered on a multi-game gaming device, the play shall (for meter purposes of each individual game) either be considered to be a part of the game from which the play was invoked, or be treated as a separate game; and
l) The Last Game Recall shall either display the residual credit removal play result or contain sufficient information (e.g., updated meters) to derive the result.

4.12 Communications Protocol.

4.12.1 General Statement. For gaming devices that are required to communicate with an on-line electronic game management system, please refer to the *GLI-13 Standards for On-line Monitoring and Control Systems (MCS) and Validation Systems in Casinos*.

4.13 Error Conditions

4.13.1 General Statement. Gaming devices shall be capable of detecting and displaying the following error conditions and illuminate the tower light for each or sound an audible alarm. They shall be cleared either by an attendant or upon initiation of a new play sequence and be communicated to an on-line monitoring and control system, if applicable:

a) Coin-in jam;
b) Coin-out jam;
c) Hopper empty or timed out;
d) Hopper runaway or extra Coin paid out, see also 'Hoppers,' Section 3.32;
e) RAM error;

f) Low RAM battery, for batteries external to the RAM itself or low power source;
g) Currency-in jam;
h) Program error or authentication mismatch;
i) Door open (including bill acceptor);
j) Reverse coin-in (coin traveling wrong way through acceptor);
k) Reel spin errors, including a mis-index condition for rotating reels, that affects the outcome of the game:
    i. The specific reel number shall be identified in the error code;
    ii. In the final positioning of the reel, if the position error exceeds one-half of the width of the smallest symbol excluding blanks on the reel strip; and
    iii. Microprocessor controlled reels shall be monitored to detect malfunctions such as a reel which is jammed, or is not spinning freely, or any attempt to manipulate their final resting position.
l) Power reset.

NOTE: This rule also applies to the 'Bill Acceptor Error Conditions' listed in Section 3.28 and the 'Printer Error Conditions' listed in Section 3.33.

4.13.2 Error Condition Description. For games that use error codes, a description of gaming device error codes and their meanings shall be affixed inside the gaming device. This does not apply to video-based games; however, video based games shall display meaningful text as to the error conditions.

4.14 Program Interruption & Resumption

4.14.1 Interruption. After a program interruption (e.g., power down), the software shall be able to recover to the state it was in immediately prior to the interruption occurring.

4.14.2. Restoring Power. If a gaming device is powered down while in an error condition, then upon restoring power, the error message shall be displayed and the gaming device shall remain locked-up. This is unless power down is used as part of the error reset procedure, or if on power up or door closure, the gaming device checks for the error condition and detects that the error is no longer in existence.

4.14.3 Simultaneous Inputs. The program shall not be adversely affected by the simultaneous or sequential activation of the various inputs and outputs, such as 'play buttons', which might, whether intentionally or not, cause malfunctions or invalid results.

4.14.4 Resumption. On program resumption, the following procedures shall be performed as a minimum requirement:

a) Any communications to an external device shall not begin until the program resumption routine, including self-tests, is completed successfully;
b) Gaming device control programs shall test themselves for possible corruption due to failure of the program storage media. The authentication may use the checksum; however, it is preferred that the Cyclic Redundancy Check (CRC) calculations are used as a minimum (at least 16 bit). Other test methodologies shall be of a certified type; and
c) The integrity of all critical memory shall be checked.

4.14.5 Microprocessor Controlled Reels. (e.g., stepper motor reels) shall re-spin automatically to the last valid play-mode result when the play mode is re-entered, and the reel positions have been altered (e.g., the main door is closed, power is restored, audit mode is exited, or an error condition cleared).

4.15 Door Open/Close

4.15.1 Required Door Metering. The software shall be able to detect and meter access to the following doors or secure areas:

a) All external doors;
b) Drop box door;
c) RESERVED; and
d) Bill acceptor door.

4.15.2 Door Open Procedures. When the gaming device's main door is opened, the game shall cease play, enter an error condition, display an appropriate error message, disable coin acceptance and bill acceptance, and either sound an alarm or illuminate the tower light or both.

4.15.3 Door Close Procedures. When the gaming device's main door is closed, the game shall return to its original state and display an appropriate error message, until the next game has ended.

4.16 Taxation Reporting Limits

4.16.1 General Statement. The game shall be capable of entering a lock up condition if a win creates a manual handpay that is required by a taxing jurisdiction.

4.17 Test/Diagnostic Mode

4.17.1 General Statement. If in a test mode, any test that incorporates credits entering or leaving the gaming device (e.g., a hopper test) shall be completed on resumption of normal operation. In addition, there shall not be any test mode that increments any of the electronic meters. Any credits on the gaming device that were accrued during the test mode shall be cleared before the test mode is exited. Test meters are permissible provided the meter indicates as such.

4.17.2 Entry To Test/Diagnostics Mode. The main cabinet door of the gaming device may automatically place the gaming device in a service or test-mode. Test/diagnostics mode may also be entered, via an appropriate instruction, from an attendant during an audit mode access.

4.17.3 Exiting From Test/Diagnostic Mode. When exiting from test mode, the game shall return to the original state it was in when the test mode was entered.

4.17.4 Test Games. If the device is in a game test mode, the machine shall clearly indicate that it is in a test mode, not normal play.

4.18 Last Game Recall

4.18.1 Number Of Last Plays Required. Information on at least the last five (5) games is to be always retrievable on the operation of a suitable external key-switch, or another secure method that is not available to the player.

4.18.2 Last Play Information Required. Last play information shall provide all information required to fully reconstruct the last five (5) plays. All values shall be displayed, including the initial credits, credits bet, credits won, and credits paid. If a progressive was awarded, it is sufficient to indicate the progressive was awarded and not display the value. This information should include the final game outcome, including all player choices and bonus features. In addition, the results of Double-up or Gamble (if applicable).

4.18.3 Bonus Rounds. The five (5) game recall shall reflect bonus rounds in their entirety. If a bonus round lasts 'x number of events,' each with separate outcomes, each of the 'x events' shall be displayed with its corresponding outcome, if the outcome results in an award. The recall shall also reflect position dependent events if the outcome results in an award. For games that may have infinite free games, there shall be a minimum of fifty (50) games recallable.

4.19 Software Verification

4.19.1 General Statement. The device shall have the ability to allow for an independent integrity check of the device's software from an outside source. This can be accomplished by the medium being able to be removed and authenticated by a third-party device, or having an interface port for a third-party device to authenticate the media. This integrity check will provide a means for field testing the software to identify and validate the program. The test laboratory, prior to device approval, shall approve the integrity check method.

CHAPTER 5
5.0 SLOT TOURNAMENTS

5.1 Tournament Description

5.1.1 ***General Statement***. A slot tournament is an organized event that permits a player to either purchase or be awarded the opportunity to engage in competitive play against other players.

5.2 Tournament Program

5.2.1 ***General Statement***. Each gaming device may be equipped with a certified program which allows for tournament mode play. If tournament is an option, it shall be enabled by a switch key (reset feature) and/or total replacement of the logic board with a certified tournament board.

5.3 Tournament - Hardware

5.3.1 ***General Statement***. The game shall comply with the requirements set forth in Chapter 3 of this document, if applicable.

5.4 Tournament - Software

5.4.1 ***General Statement***. No machine, while enabled for tournament play, shall accept coins or tokens, nor pay out coins or tokens, but shall utilize credit points only. Tournament credits shall have no cash value. These machines shall not increment any mechanical or electro-mechanical meters, and all machines in the tournament shall be identical. The percentage requirements as addressed in Section 4.4 are waived for tournament games.

5.4.2 ***Machine Settings***. All machines used in a single tournament shall utilize the same electronics and machine settings, including reel speed settings.