STANDARD SERIES

GLI-11:

Gaming Devices in Casinos

Version: 2.0

Release Date: April 20, 2007

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ABOUT THIS STANDARD

This Standard has been produced by **Gaming Laboratories International, Inc.** 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, Inc. will provide a certificate of compliance evidencing the certification to this Standard.

Gaming Devices in Casinos

GLI-11 Revision 2.0

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REVISION HISTORY

Rev 2.0

Rev 1.4 *Final* was renamed to **Rev2.0** *Final* for document control purpose.

Rev 1.4

Rev 1.4 various cosmetic changes (spacing, grammatical, spelling and punctuation) were made throughout the document. References to "Bill Acceptors" were changed to "Bill Validators" throughout the document.

1.4.1 added the reference to other GLI Standards that may apply, if the subject technology is being used.

1.5.1 new section added for the definition of a gaming device. This was previously listed in section 3.0.1.

2.5.1(k) was added to require the supplier to submit the necessary critical memory information needed to perform the critical memory tests**.**

2.5.1(l) was added to require the manufacturer to supply the ability to download RAM and supply a method to upload RAM contents to another logic board for cases of forensic evaluations**.**

2.7.1 changed the requirement for identifying the program where the information is to be supplied on the program medium to clarify the section only applies to the program storage medium types that would apply (e.g., EPROM label vs. a Flash file).

3.0.1 moved the introduction statement that defines a Gaming Device to a newly created section 1.5 since the definition would apply to the entire document, not just chapter 3.

3.1.1 modified the rule to clearly state the gaming device must be able to resist forced illegal entry.

3.2.1 clarified EMC is the acronym for Electromagnetic Compatibility testing.

3.3.1 removed the requirement for Electro-Magnetic Interference, Radio Frequency Interference, Magnetic Interference and Liquid Spills testing to be conducted by GLI since it is disclosed that it is the sole responsibility of the manufacturer to comply with any regulations related to the aforementioned. GLI claims no liability and makes no representation with respect to such non-gaming testing.

3.7.1 clarified that the Tower Light requirement for 'bar-top style' games may be shared among other machines or be substituted by an audible alarm.

3.10.1 restructured this section and moved the requirement for the light on top of the device to illuminate when the door is opened and the reference to bar-top style games due to the change to only be referred to in (f) of this section. Previously there were numerous redundant references that may have been confusing.

3.11.2(a) revised the rule to better clarify the components that may effect the integrity of gaming.

3.11.2(d) modified the rule to remove the statement advising the communication controller program may reside outside the gaming device since the section refers to logic areas but does not specify where the logic area should be located.

3.11.2(f) added a requirement for the backup device to be kept within a locked Logic Area.

3.12 references made to "Coin" are now "Coin/Token"

3.13.1 clarified that memory regulations for thin client gaming devices are outlined within GLI-21 and defined "thin client" herein.

3.13.1(a) removed the reference to the backup being stored within the logic area since the electronic components that are to be housed within the logic area are addressed within 3.11.2, to avoid duplicating the same requirement.

3.13.1(d) was updated to simplify the intent of the rule to require access to the logic area to perform a memory clear.

3.13.4 was updated to allow for other secure methods to change the denomination provided that the method can be controlled by the regulatory body**.**

3.13.5 changed the title of the section from "Requirements for Program Storage Devices" to "Program Identification" and added Compact Flash to the media types specified.

3.14.1 (d) changed requirement from "the last 5 plays" to "the last 10 plays" to be stored in critical memory.

3.14.1 (e) clarified the software state the gaming device software was in before interruption, to include "Last status" OR "tilt status".

3.14.1 Note added clause that all in this section should be checked for corruption and if corrupted defined how this should be handled.

3.15.2 clarified that critical memory integrity should be checked upon processor resets. Added recommendations of methods to be used. Clarified the test methodology is to include but not limited to items defined in section 3.14.1 and at a minimum enable errors to be identified."

3.15.4 changed the title of the section to define a PSD (Program Storage Device) and included "checked for corruption" during the specified conditions.

3.15.4 (a) changed any power up to any processor reset and defined as power up and soft reset

3.16.1 this was previously referenced as uncorrectable corruption and was clarified as unrecoverable corruption. Clarified that a tilt condition, identifying the error and causing the gaming device to cease further functions and that the players credits should be displayed to avoid player disputes is also required for unrecoverable corruption of RAM. Specified that unrecoverable RAM errors require a full RAM clear.

3.17 this section was previous called 'Write Once Read Many (WORM) Program Storage'. The title has been changed to 'Program Storage Device Requirements'. You will find many changes to this section of the standard. The new format is much easier understood and more clearly defines the regulations for Write-able and Non-Write-able Program Storage media.

3.17.1 (c) clarified that alterations on a Player Terminal can only be performed by a secure means, by authorized personnel.

3.17.2 (b) (ii) changed requirement to accommodate gaming devices that do not log authentication errors electronically.

3.18 flash memory section was removed since included within the newly formatted section 3.17 which addresses all program storage media. Section 3.18 is now reserved.

3.19.1 was changed for Multi-Station games to better define the role of the Master Terminal and clarify that each of the player terminals must meet the applicable hardware and software requirements of this document. Also added rule is not applicable to Central Determined type games.

3.19.2 was added for player terminals to conform to hardware and software requirements outlined in this document if applicable and to clarify that the RNG requirements would not apply to Player Terminals but would apply to the Master Terminal.

3.19.3 was added to clarify that the Coin and Bill Validator requirements would not apply to the Master Terminal.

3.20.1(d) recommended that the Manufacturer's name be included as part of the PCB identification.

3.22(b) includes a correction to the reference to the logic "compartment" instead of "department", which was a typo and added clause for hardware switches that may alter "Jurisdictional specific configuration settings".

3.24.1 clarified this section pertains to video game Monitor Touch Screens not video games

3.26.1 (a) The heading for this section was changed from "Coin Acceptance Conditions" to "Credit Acceptance Conditions" and the wording was changed to reflect that credit issuance is not permitted during other states (such as error conditions, including door opens, audit mode and game play, etc…)

3.26.1 (b) Clarified that the monetary value or credits are based on the denomination being used for incrementing the player's credit meter.

3.26.1 (c) clarified cheating methods should not be limited to examples indicated. Added clauses to require appropriate error condition functions and that the acceptor be disabled.

3.26.1 (d) Added clause to require coins traveling too fast and do not register as credits should be returned to the player.

3.26.1 (h) Added Coin Acceptor error conditions to this section where some of the information was previously listed within other sections

3.26.2 the bill acceptor requirements were changed to refer to Ticket/Voucher instead of Paper Tokens, to remain consistent throughout the document and defined Ticket/Voucher and Coupons

3.26.2 (a) Clarified that the monetary value or credits are based on the denomination being used for incrementing the player's credit meter

3.26.2 (c) Added Bill Validator Security Features section where some of the information that was previously listed within other sections

3.26.2(d) was added to reflect that credit issuance was not permitted during other states (such as error conditions, including door opens, audit mode and game play, etc…) Exempted games that allow players to wager on upcoming events such as horse racing games.

3.26.2 (e) Added Bill Validator Error Conditions requirements section with the information that was previously listed within 3.28. The comment that the game should not generate an error message for a stacker full has been added. This was recommended since the display of this information may cause a security issue. However, the recommendation is not a technical specification.

3.26.4 the bill acceptor requirements were changed to refer to Ticket/Voucher instead of Paper Tokens, to remain consistent throughout the document.

3.26.5 was changed to clarify that games with tokenization must maintain the fractional credits on a credit meter and not 'store' the credits, exempting when residuals are exhibited to the player at an appropriate time or the credit meter is in dollars and cents.

3.27.2 changed the requirement for the Bill Acceptor Recall to clarify the 'items accepted' as meaning US currency, Ticket/Vouchers, Coupons. Previously, the rule did not specify the types of notes that are needed to be included within the recall data stored. Added that the recall log may be combined with some requirements or maintained separately.

3.28 Added Acceptable Bill Validator locations section

3.29 is now RESERVED. This section used to contain Bill Validator Requirements which was moved to section 3.26.2

3.30.1 (b) Clarified separate "keyed locks" are required instead of "separate keys" and access to remove the stacker is under 3 levels of locks.

3.32.1 the rules pertaining to Hoppers & Hopper Error Conditions have been renamed to 'Coin Hoppers'. This section only requires the coin hopper have the ability to identify the conditions where the control program would have the responsibility to respond with an Error Condition.

3.32.2 added acceptable hopper location section

3.32.3 added hopper error conditions section

3.33.1 (f) added requirement that the unique validation number appears on the leading edge of the Ticket/Voucher and a Barcode is included. Clarified that the barcode is not required for Ticket/Vouchers that are not redeemable at an EGD.

3.33 Note the requirement for retention of the last thirty-five (35) Ticket/Voucher-out information to resolve player disputes was changed to the last twenty-five (25).

3.33.3(c) re-worded this section to clarify that it is it is permissible for the gaming device to detect a disconnected printer at the time the game tries to print and not immediately.

3.34.1 references to "System" were changed to "Ticket/Voucher Validation System" for clarity.

3.35 added section for "Ticket/Voucher Information" requirements, which was moved from GLI-13 and a note that this section will be re-evaluated and revised once the G2S protocol has been adopted and becomes utilized by the gaming device suppliers
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3.36 added section for "Ticket/Voucher Issuance and Redemption" and a note that this section will be re-evaluated and revised once the G2S protocol has been adopted and becomes utilized by the gaming device suppliers

4.2.1 (c) removed' Fever Mode' section since it is now defined as 'Extended Feature Game Information' since these rules would apply to Free Games, Re-Spins, etc. Also, the rule was modified to read more clearly.

4.2.1 (e) added Player Choices section in its entirety.

4.2.2 added requirement for the payglass to include the denomination being played to be displayed and a disclaimer that malfunctions void all pays.

4.2.3 (a) changed wording to clarify that an indication of the credits bet per line should be displayed to the player.

4.2.4 clarified when a game is considered completed

4.3.3 increased the RNG confidence level from 95% to 99%

4.3.6 clarified that live game correlation rules apply to games that are recognizable to be a simulation of a live casino game

4.4.1 revised the wording to more clearly explain that the theoretical payout percentage is calculated on the base game information (not including bonusing systems, progressives, merchandise, etc.), unless otherwise noted.

4.4.1 created a note in this section (in italic) to better clarify the reporting of the theoretical payout percentage by GLI within our certification documents and future modification to games in the field.

4.4.2 section is now reserved since removed the Progressive game calculations from this section since the theoretical payout percentage rule is now within section 4.4.1 and the Note now addresses this information.

4.4.4 added GLI's new method of calculating the top award odds if the highest advertised award can occur within a bonus or free game feature, the odds calculation shall include the odds of obtaining the bonus round including the odds to achieve the top award.

4.4.5(a) removed the game calculation section where Merchandise is awarded, since the theoretical payout percentage rule within section 4.4.1 and 4.4.1 NOTE now addresses this information.

4.4.5(c) revised the rule to reference merchandise prizes instead of merchandise handpays since the reference to handpay was inaccurate.

4.5.1 changed wording to reflect a "game within a game" refers to "free games"

4.5.1 (b) Added this new clause to require win amounts, multiplier ranges, etc. that are obtainable from bonus play are disclosed to the player.

4.6 is now RESERVED. This was previously the "Extended Play" section where the rules were combined with section 4.5 since they were all applicable to bonus games.

4.9.1 (e) added exception for game play to commence by selected a game title.

4.9.1 (f) Clarified it should not be possible to <u>select</u> or start a new game until the current game completes. Previously it was just stated as <u>start</u> a new game.

4.10.2 Clarified that the credit meter shall at all times indicate all credits or cash available for the player to wager or cashout. This should be displayed to the player with the exception of when the player is viewing an informational screen such as a menu or help screen item or unless a tilt condition or malfunction exists

4.10.5 Clarified that the credit meter shall also increment with the value of all valid coins, tokens, bills, Ticket/Vouchers, coupons or other approved notes accepted.

4.10.6 Wording changes were made to improve clarity for incrementing credit meter on progressive awards.

4.10.7 Clarified that the collect meter shall at all times indicate credits or cash the player has cashed out and that this should be displayed to the player unless a tilt condition or malfunction exists. Also added the meter may or may not include handpays.

4.10.8 clarified meter access must have the ability for on-demand display and only via a secure means.

4.10.9 Restructured this section and changed various metering requirements.

4.10.10 Clarified that for multi-games only one set of master meters are required but, period meters "Credits Bet" and "Credits Won" for each game available are additionally required.

4.12.1 Added a disclaimer to the Communication Protocol section that requires the device to accurately function as indicated by the communication protocol that is implemented.

4.13.1 Clarified that error conditions should cause the gaming device to lock up and require attendant intervention except as noted. Denoted errors deemed as critical, which will require further evaluation. Categorized errors by device so they are all in one central location.

4.13.1 Coin Acceptor Errors – removed Invalid Coin since we require return to the player. Added note to allow reporting of a generic "Coin-In Error" condition.

4.13.1 Printer Errors - it is permissible for the gaming device to **not** lock up for out of paper/paper low however, there should be a means for the attendant to be alerted

4.13.1 Other Error Conditions d) Reel Spin Errors. Clarified the conditions for when the error should be generated and what the error should generate

4.14.1 Clarified that if a power failure occurs during acceptance of a bill or other note, the bill validator shall give proper credits or return the note, 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.

4.14.4 (d) Added clause indicating that the bill validator device shall perform a self-test at each power up. In the event of a self-test failure, the bill validator shall automatically disable itself (i.e., enter bill reject state) until the error state has been cleared.

4.15.1 (a) Clarified the intention of "All External Doors"

4.15.1 (d) clarified Bill validator door is synonymous for stacker door

4.15.1 (e) Added any other currency storage area that have a door

4.16.1 has been changed to clarify that the game shall lock up if a single event is in excess of a limit that is required by a taxing jurisdiction. Previously, there was no reference to 'single event', meaning one game.

4.17 clarified that Diagnostic Mode would also include (Demo mode).

4.17.2 Clarified that Test, Diagnostics or Demo modes should not be accessible to the player.

4.1.8.1 Increased the number of last plays required in game history recall from 5 to 10.

4.1.8.2 Clarified that the payline symbol combination should be included in game recall and the requirement regarding the information to be displayed is not dependent upon a win or loss. Also clarified that the information can be represented in graphical or text format and clarified the requirement for bonus game recall

4.1.8.3 indicated that history is to be retained regardless if the game results in a win or loss.

4.19 modified the software verification rule to allow for the authentication program to be contained within the game software provided, the method of implementation is approved, in writing. Clarified that all controls programs that affect game integrity must be verifiable from an outside source.

5.2.1 Clarified rule to state the Tournament feature if supported should default to disabled.

5.4.1 Changed the tournament statement from referencing coins where the game shall not accept coins or pay out coins since there are other sources of consideration. The rule was changed to indicate that the game shall not accept or payout credits of any source (bills, coins, etc.) In addition, the reference to the games playing in the tournament being identical has been removed since reference later within this section. In its place, a statement was added that precludes the game from communicating any accounting information to the system. This was changed to ensure that games offering both regular and tournament modes accurately communicate to the on-line system where tournament bet credits would offset the accounting for that machine.

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.'

Rev 1.2

2.3.3 Changed the RNG requirements to collect the data from a gaming device or other mediums 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.

3.26.1.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.

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.

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.

3.18.1 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, Ticket Vouchers, or other approved notes, in addition to valid bills for Bill Acceptors.

3.26.4.a Incorporated the selection of coupons, Ticket Vouchers, 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, Inc. (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, Inc.** 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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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) GLI-12 Progressive Gaming Devices in Casinos;
c) GLI-13 On-Line Monitoring and Control Systems (MCS) and Validation Systems in Casinos;
d) GLI-16 Cashless Systems in Casinos;
e) GLI-17 Bonusing Systems in Casinos;
f) GLI-18 Promotional Systems in Casinos;
g) GLI-20 Redemption Terminals; and
h) GLI-21 Game Download System Series Game Download System – LAN.

1.5 Definition of a Gaming Device

1.5.1 ***General Statement***. 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).

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 the 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 validator, 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.

k) The manufacturer shall supply the test laboratory with all critical memory allocation addresses including how critical memory is checked and when it is checked. The methodology for critical memory checks must detect all RAM errors. In the case of a RAM error, the players credits should be displayed to avoid player disputes.

l) The manufacturer shall supply the test laboratory the ability to download RAM in order to review the RAM data contents for cases where a forensic investigation is required. In addition, the manufacturer shall supply a method, which will allow the test laboratory to upload a copy of the RAM to another logic board populated with identical control program components. Upon the completion of this procedure the new logic board should allow the gaming device to reproduce the last known game state that was present on the submitted forensic logic board.

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, where applicable, 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

3.1 Physical Security

3.1.1 ***General Statement***. A gaming device shall be robust enough to resist forced illegal entry.

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 Electromagnetic Compatibility (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. This certification applies exclusively to tests conducted using current and retrospective methodology developed by Gaming Laboratories International, Inc. During the course of testing, Gaming Laboratories International, Inc. inspects for marks or symbols indicating that a device has undergone product safety compliance testing. Gaming Laboratories International, Inc. also performs, where possible, a cursory review of submissions and information contained therein related to Electromagnetic Interference (EMI), Radio Frequency Interference (RFI), Magnetic Interference, Liquid Spills, Power Fluctuations and Environmental

conditions. Electrostatic Discharge Testing is intended only to simulate techniques observed in the field being used to attempt to disrupt the integrity of Electronic Gaming Devices. Compliance to any such regulations related to the aforementioned testing is the sole responsibility of the device manufacturer. Gaming Laboratories International, Inc. claims no liability and makes no representations with respect to such non-gaming testing. The actual data showing the tests performed and the excluded tests are available upon written request.

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-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.

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. For games such as the 'bar-top style', it is permissible for the tower light to be shared among other machines or be substituted by an audible alarm.

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) RESERVED;
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) RESERVED;
e) RESERVED;
f) All external doors shall be locked and monitored by door access sensors, which when opened shall cease game play (with the exception of a Drop box door), disable all acceptance, and enter an error condition, which at a minimum shall illuminate the tower light and send the error condition to the on-line system, if applicable;
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 separately 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 any program storage device that contains software that may affect the integrity of gaming, including but not limited to the game, accounting, system communication, and peripheral firmware devices involved in or which significantly influence the operation and calculation of game play, game display, game result determination, or game accounting, revenue, or security;
b) RESERVED;
c) RESERVED;
d) Communication controller electronics and components housing the communication program storage device
e) RESERVED; and
f) The back-up device shall be kept within a locked Logic Area.

3.11.3 RESERVED

3.12 Coin/Token and Currency Compartments

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

3.12.2 Access to Currency

a) Access to the 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 RAM requirements for Gaming Devices that are not a part of a 'thin client' Game-Download System (A **thin client** is a computer (client) in client-server architecture networks which depends primarily on the central server for processing activities. The word "thin" refers to the small boot image which such clients typically require - perhaps no more than required to connect to a network and start up a dedicated web browser or "Remote Desktop" connection), which are outlined within GLI-21:

a) The Gaming Device shall have the ability to retain data 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.
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 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 require access to the locked logic area.

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 Settings. It shall not be possible to change a configuration setting that causes an obstruction to the electronic accounting meters without a RAM clear. Notwithstanding, a change to the denomination must be performed by a secure means, which includes access to the locked logic area or other secure method provided that the method can be controlled by the regulator. The monitoring of denomination changes will assist in preventing bill validator fraud.

3.13.5 Program Identification. All program storage devices, including ROMs, EPROMs, FLASH ROMs, DVD, CD-ROM, Compact Flash 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. See also Section 2.7.1 for specifics.

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 Gaming Device,' 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 ten (10) plays with the RNG outcome (including the current game, if incomplete); and
e) Software state (the last normal state, last status or tilt status the gaming device software was in before interruption).

Note: All of the above should be checked for corruption. If values are corrupt, game play should cease and at a minimum display an appropriate correlating error.

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., processor reset). Upon resumption, the integrity of all critical memory shall be checked. It is recommended that critical memory is continuously monitored for corruption or comprehensive checks occur at the start of game play. In addition, it is recommended that a triple redundancy check be implemented. Test methodology shall detect 99.99 percent of all possible failures including but not limited to items defined in section 3.14.1 and at a minimum enable errors to be identified.

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 Program Storage Devices (PSDs). All PSDs (program storage devices), in the executable address space of a main processor, shall be validated and checked for corruption during the following conditions:

a) Any processor reset; (e.g. power up and soft reset)
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 unrecoverable corruption of RAM shall result in a RAM error. The RAM should not be cleared automatically, result in a tilt condition, which identifies the error and causes the gaming device to cease further function. It is recommended that the player's credits be displayed to avoid player disputes. An unrecoverable RAM error shall require a full RAM clear performed by an authorized person.

3.17 Program Storage Device Requirements

3.17.1 ***General Statement***. All Program Storage Devices, including EPROMs, ROMs, Flash-ROMs, DVD, CD-ROM, Compact Flash, Hard Drives and any other type of Program Storage Devices shall:

a) Be clearly marked with sufficient information to identify the software and revision level of the information stored in the devices as specified in section 2.7.1 and shall only be accessible with access to the locked logic compartment.
b) Perform an integrity check (authentication) of all Critical Files or Program Code that operate on the Player Terminal during:
    i. Any processor reset (e.g. power up and soft reset); and
    ii. The first time the files or program code are loaded for use (even if only partially loaded).

    NOTE*: RAM and PSD space that is not critical to machine security (e.g., video or sound ROM) are not required to be validated) Although GLI recommends a method be in place for the files to be tested for corruption. If any of the video or sound files contain payout amounts or other information deemed critical that is needed by the player, the files or program storage must have a secure method of verification, also see section 4.19 Software Verification.*
c) The programs residing in the Player Terminal shall be contained in a storage medium, which cannot alter itself autonomously through use of the circuitry or programming of the Player Terminal. Alterations may only be performed via a secure means, by an authorized person; and
d) Are housed within a locked logic compartment

3.17.2 Write Once (Non-Writable) Program Storage. For Program Storage Devices that are written to once (i.e., EPROM, CD), the following rules shall be met:

a) CD-ROM specific based Program Storage shall:
   i. Not be a re-writeable disk; and
   ii. The "Session" shall be closed to prevent any further writing.

b) Non-EPROM specific (including CD-ROM) Program Storage shall meet the following rules:
   i. The Control Program shall authenticate all Critical Files by employing a hashing algorithm which produces a 'Message Digest' output of at least 128 bits at minimum, as certified by the test laboratory and agreed upon by the jurisdiction. The Message Digest(s) shall be stored on a memory device (ROM-based or other medium) within the Player Terminal. 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. However, a 768 bit key is recommended, or an equivalent encryption algorithm with similar security certified by the test laboratory and agreed upon by the jurisdiction.
   NOTE: *For international jurisdictions, the minimum values outlined within this section may be substituted for the minimum values that would be applicable for that location.*

   ii. The Player Terminal shall authenticate all Critical Files against the stored Message Digest(s), as required in (i), above. In the event of a failed authentication, after the game has been powered up, the Player Terminal should immediately enter an error condition with the appropriate tower light signal and display an appropriate error. If the gaming device does not capture the details including date and time of the error in an electronic log, it is recommended that internal controls be established to record this information manually. This error shall require operator intervention to clear. 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.

NOTE: the values in (i) and (ii), above will constantly be re-evaluated based on technology advancements and new security methods available.

3.17.3 Writable Program Storage. The programs residing in the Player Terminal that are capable of being erased and re-programmed without being removed from the Player Terminal, bill changer or other equipment or related device shall meet the below requirements:

a) Re-programmable Program Storage shall only be written to in cases where the media contains only data, files, and programs that are not critical to the basic operation of the game, such as marketing information. Notwithstanding the foregoing, such device may write to media containing critical data, files, and programs provided that the gaming equipment:

   i. Maintain a log of all information that is added, deleted, and modified that is stored on the media;
   ii. Verifies the validity of all data, files, and programs which reside on the media using the methods listed in Section 3.17.2(b), Non-EPROM specific requirements;
   iii. Contains appropriate security to prevent unauthorized modifications; and
   iv. Not allow game play while the media containing the critical data, files, and programs are in a modifiable state.

***NOTE**: If the program storage does not comply with any of the above requirements and is a Hard Disk, the media is permissible provided a write-protected drive is used (SCSI Devices are preferred, as they provide a write-protect jumper which can be sealed in place by the regulating body. Any other type of drive will have the write line cut and verified in the field. Any other means of write protection will be examined on a case-by-case basis) unless the gaming device is used with a Game Download System, which in this case would have to comply with GLI-21 Standard.*

3.18 RESERVED

3.19 Multi-Station Games

3.19.1 General Statement. A Multi-Station game is a gaming device unit that incorporates more than one (1) player terminal, and that only has one (1) random number generator, which is controlled by the master terminal. The master terminal, containing the games Central Processing Unit (CPU), which shall determine the outcome of the game and RNG results. The master terminal will house the game display which is shared among the player terminals. Each station shall meet the applicable technical standards outlined throughout this document including EGD identification and metering. This rule does not apply to "Central Determined" type games.
NOTE: There must be a method for each player to know when the next game will begin.

3.19.2 Player Terminals. If applicable, the player terminals must meet the hardware requirements and software requirements of this document, with the exception of the Random Number Generator, which would apply to the Master Terminal.

3.19.3 Master Terminal. The master terminal, which contains the Random Number Generator, must meet the hardware requirements and software requirements of this document. Please note that the Coin and Bill Validator requirements would not apply to the Master Terminal.

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.
d) The Manufacturers name is recommended

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 jurisdictional specific configuration settings, paytables, game denomination, or payout percentages in the operation of the gaming device must meet 'Configuration Settings' Section 3.13.4 of this document and must be housed within a logic compartment 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, and/or any 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 the assembly's 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 Monitor/Touch Screens

General Statement. All video monitor touch screens 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, Bill Validators and Other Methods of Inserting Monetary Values into the Gaming Device

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

a) Credit Acceptance Conditions. Acceptance of any Coins or Tokens 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;

b) Credit Meter Update on Coin/Token Insertion. Each valid coin/token inserted shall register the actual monetary value or the appropriate number of credits received for the denomination being used 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.

c) Coin/Token Acceptor Security Features/Error Conditions. The coin acceptor shall be designed to prevent the use of cheating methods such as, but not limited to slugging (counterfeit coins), stringing (coin pullback), the insertion of foreign objects and any other manipulation that may be deemed as a cheating technique. Appropriate correlating error conditions should be generated and the coin acceptor should be disabled;

d) Rapidly Fed Coins. The gaming device shall be capable of handling rapidly-fed coins/tokens or piggy backed coins/tokens so that occurrences of cheating are eliminated. Coins traveling too fast that do not register on the players credit meter should be returned to the player;

e) Direction Detectors. The gaming device shall have suitable detectors for determining the direction and the speed of coin/token travel in the receiver. If a coin/token 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;

f) Invalid Coins/Tokens. Coins/tokens deemed invalid by the acceptor shall be rejected to the coin tray and shall not be counted as credits;

g) RESERVED

h) Coin Acceptor Error Conditions. Coin acceptors shall have a mechanism to allow software to interpret and act upon the following conditions:
   i. Coin-In Jam
   ii. Coin-Out Jam
   iii. Reverse Coin-In (coin traveling wrong way through acceptor)
   iv. Coin Too Slow

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

3.26.2 Bill Validators. All paper currency acceptance devices shall be able to detect the entry of valid bills, coupons, Ticket/Vouchers, 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 paper currency acceptance device(s) shall be electronically-based and be configured to ensure that they only accept valid bills of legal tender. Bill validators may also accept coupons, Ticket/Vouchers, or other approved notes and must reject all others in a highly accurate manner. Ticket/Vouchers are paper slips that are treated as a unit of currency, which may be redeemed for cash or exchanged for credits on the gaming device. Coupons are paper slips primarily used for promotional purposes, which may be of a cashable or non-cashable value. 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) Each valid bill, coupon, Ticket/Voucher or other approved note shall register the actual monetary value or the appropriate number of credits received for the denomination being used on the players credit meter.
b) Credit Meter update upon Bill Insertion. 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 gaming device.
c) Bill Validator Security Features. Each bill validator shall be designed to prevent the use of cheating methods such as stringing, the insertion of foreign objects and any other manipulation that may be deemed as a cheating technique. A method for detection of counterfeit bills must be implemented.
d) Credit Acceptance Conditions. Acceptance of any Bills, Ticket/Vouchers, Coupons or other approved notes 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 Bill validator system; with the exception of allowing credit acceptance during game play for devices that allow players to place bets on upcoming events (e.g. horse racing wagering.)
e) Bill Validator Error Conditions: Each gaming device and/or bill validator shall have the capability of detecting and displaying (for bill validators, it is acceptable to disable or flash light(s)) the following bill Validator error conditions:

i. Stacker Full (it is recommended that an implicit "stacker full" error message not be utilized since this may cause a security issue)
ii. Bill Jams
iii. Bill Validator Door Open - where a bill validator door is the belly glass door, a door open signal is sufficient
iv. Stacker Door Open
v. Stacker Removed
vi. Bill Validator Malfunction not specified above.

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

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

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

a) The selection of desired acceptance for bills, coupons, Ticket/Vouchers, 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 monetary value from the bill or coin acceptor and post to the player's credit meter the entire amount inserted and not store fractional credits. It is acceptable for the device to store the fractional credits if:

a) the game maintains the credit meter in dollars and cents or
b) the game informs the player that there are fractional credits stored on the device at an opportune time to avoid the possibility of the player walking away from the machine without knowledge. For specifics on how residual credits should be handled/displayed, please refer to the Tokenization/Residual Credits Sections 4.10.4 and 4.11

3.27 Machine Metering of Bill Validator Events

3.27.1 General Statement. A gaming device, which contains a bill validator 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 breakdown of the bills accepted:
    i. For bills, the game shall report the number of bills accepted for each bill denomination;
d) For all other notes (Ticket/Vouchers and Coupons), the game shall have a separate meter that reports the number of items accepted, not including bills.

3.27.2 Bill Validator Recall. A gaming device that uses a bill validator shall retain in its memory and display the information required in 3.27.1 of the last five (5) items accepted by the bill validator (i.e. Currency, Ticket/Vouchers, Coupons, etc.) The bill validator recall log may be combined or maintained separately by item type. If combined, the type of item accepted shall be recorded with the respective timestamp.

3.28 Acceptable Bill Validator Locations

3.28.1 Bill Validator Location. If a gaming device is equipped with a bill validator, 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. Only the bill, Ticket/Voucher insertion area will be accessible by the player.

3.29 RESERVED

3.30 Bill Validator Stacker Requirements

3.30.1 General Statement. Each bill validator 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 validator device shall have a 'stacker full' sensor; (it is recommended that an implicit "stacker full" error message not be utilized since this may cause a security issue)
b) There shall be a separate keyed lock to access the stacker area. This keyed lock shall be separate from the main door. In addition, a separate keyed lock shall be required to remove the bills from the stacker; and (e.g. 2 levels of locks, plus the main door are 3 levels of locks)
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, Printer Limit for printer games, etc.), the game shall lock up until the credits have been paid, and the handpay is cleared by an attendant.

3.32 Coin Hoppers

3.32.1 General Statement. If coin hoppers are used, they are to be monitored, in all game states, by the gaming device control program. Coin hoppers must have the ability to identify hopper coin jams, hopper empty and extra coin paid conditions. In addition, coin hoppers shall prohibit manipulation by the insertion of a light source or any foreign object and there shall not be an abnormal payout when exposed to higher levels of electro-static discharge or if power is lost at any time during a payout.

3.32.2 Acceptable Hopper Locations. If a gaming device is equipped with a hopper it shall be located in a locked area of the gaming device, but not in the logic area or the drop box. Access to the hopper shall require at a minimum opening of the main door.

3.32.3 Hopper Error Conditions A gaming device that is equipped with a hopper shall have mechanisms to allow software to interpret and act upon the following conditions:

a) Hopper empty or timed out;
b) Hopper Jam
c) Hopper runaway or extra Coin paid out;

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

3.33 Printers

3.33.1 Payment By Ticket/Voucher 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/Voucher. If the taxation limit is reached on any single play when using a Ticket/Voucher printer, then the Ticket/Voucher 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/Voucher and provide the data to an on-line data system that records the following information regarding each payout Ticket/Voucher 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/Voucher 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;
f) Unique validation number (including a copy of the validation number on the leading edge of the Ticket/Voucher), and
g) Barcode (not required for Ticket/Vouchers that are non-redeemable at a gaming machine).

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 twenty-five (25) Ticket/Voucher-out information to resolve player disputes. In addition, an approved system shall be used to validate the payout Ticket/Voucher, and the Ticket/Voucher information on the central system shall be retained at least as long as the Ticket/Voucher 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; - it is permissible for the gaming device to not lock up for these conditions however, there should be a means for the attendant to be allerted.
b) Printer jam/failure; and

c) Printer disconnected – it is permissible for the gaming device to detect this error condition when the game tries to print.

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

3.34 Ticket/Voucher Validation

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

a) the gaming device is linked to a computerized 'Ticket/Voucher Validation System', which allows validation of the printed Ticket/Voucher. Validation approval or information shall come from the Ticket/Voucher Validation System in order to validate Ticket/Vouchers. Ticket/Vouchers 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 Ticket/Vouchers to prevent fraud by reprinting and redeeming a Ticket/Voucher that was previously issued by the gaming device; or
b) by use of an approved alternative method that includes the ability to identify duplicate Ticket/Vouchers to prevent fraud by reprinting and redeeming a Ticket/Voucher that was previously issued by the gaming device.

3.35 Ticket/Voucher Information

3.35.1 General Statement. A Ticket/Voucher shall contain the following printed information at a minimum:

a) Casino Name/Site Identifier;
b) Machine Number (or Cashier/Change Booth location number, if Ticket/Voucher creation, outside the Gaming Device is supported);
c) Date and Time (24hr format which is understood by the local date/time format);
d) Alpha and numeric dollar amount of the Ticket/Voucher;

e) Ticket/Voucher sequence number;
f) Validation number;
g) Bar code or any machine readable code representing the Validation number;
h) Type of transaction or other method or differentiating Ticket/Voucher types; (assuming multiple Ticket/Voucher types are available) and
i) Indication of an expiration period from date of issue, or date and time the Ticket/Voucher will expire (24hr format which is understood by the local date/time format).

NOTE: Some of this information may also be part of the validation number or barcode.

3.35.2 Ticket/Voucher Types. If Gaming Device Ticket/Voucher generation is supported while not connected to the validation system, the Ticket/Voucher system must generate two different types of Ticket/Vouchers at minimum. On-line and off-line types are denoted respectively by Ticket/Voucher generation either when the validation system and gaming device are properly communicating or the validation system and gaming device is not communicating properly. When a patron cashes out of an EGD that has lost communication with the validation system, the EGD may print an off-line Ticket/Voucher or lock up in a handpay condition where a handpay receipt may be generated. The off-line Ticket/Voucher or handpay receipt must be visually distinct from an on-line Ticket/Voucher either in format or content while still maintaining all information requirements.

NOTE: This section will be re-evaluated and revised once the G2S protocol has been adopted and becomes utilized by the gaming device suppliers.

3.36 Ticket/Voucher Issuance and Redemption

3.36.1 Ticket/Voucher Issuance. A Ticket/Voucher can be generated at an EGD through an internal document printer, at a player's request, by redeeming all credits. Ticket/Vouchers that reflect partial credits may be issued automatically from a Gaming Device. Additionally, cashier/change booth issuance is allowed if supported by the validation system.

3.36.2 Online Ticket/Voucher Redemption. Ticket/Vouchers may be inserted in any Gaming Device participating in the validation system providing that no credits are issued to the Gaming

Device prior to confirmation of Ticket/Voucher validity. The patron may also redeem a Ticket/Voucher at a cashier/change booth or other approved validation terminal.

3.36.3 Offline Ticket/Voucher Redemption. The offline Ticket/Voucher redemption may be validated as an Internal Control process at the specific gaming device that issued the Ticket/Voucher. A manual handpay may be conducted for the offline Ticket/Voucher value.

NOTE: This section will be re-evaluated and revised once the G2S protocol has been adopted and becomes utilized by the gaming device suppliers.

CHAPTER 4
4.0 SOFTWARE REQUIREMENTS

4.1 Introduction

4.1.1 General Statement. 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 credits, 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 of the gaming device, and the game must clearly indicate as 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) Extended Feature Information. Each game which offers an extended feature (i.e., Free Games, Re-Spins, Bonus Paytable during the next 'x' games, etc.) must display the number of feature games that are remaining, during each game; 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.
e) Player Choices. When a non-skill game offers the player a choice, the ratio between the pay resulting from the optimal selection and the pay resulting from the worst selection should be less than or equal to 100.5%. For example, if selection A has an expected pay (i.e. the

average expected return from making a selection) of 215.48 credits and selection B has an expected pay of 214.41 credits, the ratio - 215.48/214.41 - results in 1.005 which is equal to 100.5 %. If the ratio is greater than 100.5%, the game must then display additional information so that the player can make an informed decision regarding optimal 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:

f) The player's current credit balance;
g) The current bet amount. This is only during the base game or if the player can add to the bet during the game;
h) All possible winning outcomes, or be available as a menu item or on the help menu;
i) Win amounts for each possible winning outcome, or be available as a menu or help screen item;
j) The amount won for the last completed game (until the next game starts or betting options are modified); and
k) 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).
l) The denomination being played shall be clearly displayed.
m) A disclaimer regarding Malfunctions Void all Pays should also be clearly displayed is recommended.

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; the credits bet per line 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 mechanical 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 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 99%. 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 to be a simulation of a live casino game 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 game types (such as spinning reel games or video spinning reel games), the mathematical probability of a symbol appearing in a position for 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 shall not be 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 base game (e.g., the game percentage without any progressives, bonusing systems, merchandise, etc.)

NOTE: The laboratory will provide the minimum and maximum theoretical payout percentage for the base game within the certification report, unless otherwise noted. Additional awards added to a game will require a re-evaluation of the theoretical payout percentage, considering the value of the award and possibly other factors. The laboratory will re-evaluate a game's theoretical payout percentage when requested.

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 of 75% 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 RESERVED

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. If the highest advertised award can occur within a bonus or free game feature, the odds calculation shall include the odds of obtaining the bonus round including the odds to achieve the top award.

4.4.5 Merchandise Prizes in Lieu of Cash Awards.

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

4.5 Bonus Games

4.5.1 Bonus Games.: 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, (e.g. bonus features, including free games) shall meet the following:

a) The game shall display clearly to the player which game rules apply to the current game state;

b) The game shall clearly display to the player all possible win amounts, multiplier ranges, etc. that can be obtained from bonus play.

c) 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.

d) If the game requires obtaining several events/symbols toward 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.

e) 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);

f) 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

g) 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.

h) Bonus game awards are part of the game cycle with predetermined award values. Bonus play award contributions to the program payout percentage are calculated consistent with awards of the regular game cycle. Specifically, if the cycle for bonus play awards is different from the base game cycle, then the bonus play awards, occurring within the base game's cycle, will be calculated as part of the game's payout; and

i) Pursuant to the rules, the game shall display the rules of play for the bonus game awards, the rewards associated with each bonus play award, and the character combinations that will result in the specific payouts. For bonus play awards achieved by obtaining specific game results, the progress of the award shall be displayed.

4.6 RESERVED

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 Mystery Awards

4.8.1 ***General Statement***. It is acceptable for games to offer a 'Mystery Award' (an award that is not specifically called out on the payglass or game screen) however, the game must indicate the maximum amount the player could potentially win. If the minimum amount that could potentially be awarded is not displayed, it will be assumed to be '0'. In addition, both a minimum and maximum amount must be displayed for any Mystery Award if the method to receive the award involves strategy or skill. This would include methods where the value of the paytable is used in order to make decisions that could increase the return to the player (i.e. Video Poker)

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) When multiple games are offered for play, the player shall not be forced to play a game by just selecting a game title, unless the game screen clearly indicates the game selection is unchangeable. If not disclosed, the player shall be able to return to the main menu.
f) It should not be possible to select or 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 paytable, 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 <u>Credit Meter Units and Display</u>. The credit meter shall be maintained in credits or cash value (i.e. applicable local currency) and shall at all times indicate all credits or cash available for the player to wager or cashout with the exception of when the player is viewing an informational screen such as a menu or help screen item. This should be displayed to the player unless a tilt condition or malfunction exists.

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 value, the credits displayed for that game may be displayed and played as a truncated amount, (i.e., fractional part removed). However, the fractional credit amount 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 a game) shall be added to the player's credit meter, except for handpays or merchandise, see also 'Merchandise Prizes In Lieu Of Cash Awards,' Section 4.4.5. The credit meter shall also increment with the value of all valid coins, tokens, bills, Ticket/Vouchers, coupons or other approved notes accepted.

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

a) The credit meter is maintained in the local currency amount format; or
b) The progressive meter is incremented to whole credit amounts; or
c) The progressive prize in local currency amount format is converted properly to credits upon 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 upon a cashout**.** This should be displayed to the player unless a tilt condition or malfunction exists (the number of credits or cash collected shall be subtracted from the player's credit meter and added to the collect meter). This meter may or may not include handpays.

4.10.8 Software Meter Information Access. The software meter information shall only be accessible by an authorized person and must have the ability to be displayed on demand using a secure means.

4.10.9 Electronic Accounting and Occurrence Meters. Electronic accounting meters shall be at least ten (10) digits in length. These meters shall be maintained in credit units equal to the denomination, or in dollars and cents. If the meter is being used in dollars and cents format, eight (8) digits must be used for the dollar amount and two (2) digits used for the cent amount. Devices configured for multi-denomination play shall display the units in dollars and cents. The meter must roll over to zero upon the next occurrence, any time the meter exceeds ten (10) digits and after 9,999,999,999 has been reached or any other value that is logical. Occurrence meters shall be at least eight (8) digits in length however, are not required to automatically roll over. Meters shall be labeled so they can be clearly understood in accordance with their function. All gaming devices shall be equipped with a device, mechanism or method for retaining the value of all meter information specified in this section (4.10) which must be preserved for a minimum of 72 hours in the event of power loss to the gaming device. The required electronic meters are as follows (accounting meters are designated with an asterisk '*'):

a) Coin In* The machine must have a meter that accumulates the total value of all wagers, whether the wagered amount results from the insertion of coins, tokens, currency, deduction from a credit meter or any other means. This meter shall:
    i. Not include subsequent wagers of intermediate winnings accumulated during game play sequence such as those acquired from "double up" games;
    ii. For multi-game and multi-denomination/multi-game gaming devices, provide the information necessary, on a per paytable basis, to calculate a weighted average theoretical payback percentage; and
    iii. For gaming devices which are considered slot machines and which contain paytables with a difference in theoretical payback percentage which exceeds 4 percent between wager categories, , it is recommended that the device maintain and display coin in meters and the associated theoretical payback percentage, for each wager category with a different theoretical payback percentage, and calculate a

weighted average theoretical payback percentage for that paytable. *NOTE: This rule does not apply to Keno or Skill Games*.

b) Coin Out* The machine must have a meter that accumulates the total value of all amounts directly paid by the machine as a result of winning wagers, whether the payout is made from the hopper, to a credit meter or by any other means. This meter will not record amounts awarded as the result of an external bonusing system or a progressive payout;

c) Coin Drop*. The machine must have a meter that accumulates the total value of coins or tokens diverted to the drop;

d) Attendant Paid Jackpots*. The machine must have a meter that accumulates the total value of credits paid by an attendant resulting from a single winning alignment or combination, the amount of which is not capable of being paid by the machine itself. This does not include progressive amounts or amounts awarded as a result of an external bonusing system. This meter is only to include awards resulting from a specifically identified amount listed in the manufacturer's par sheet;

e) Cancelled Credits*. The machine must have a meter that accumulates the total value paid by an attendant resulting from a player initiated cash-out that exceeds the physical or configured capability of the machine to make the proper payout amount;

f) Physical Coin In*. The machine must have a meter that accumulates the total value of coins or tokens inserted into the machine;

g) Physical Coin Out*. The machine must have a meter that accumulates the value of all coins or tokens physically paid by the machine;

h) Bill In*. The machine must have a meter that accumulates the total value of currency accepted. Additionally, the machine must have a specific meter for each denomination of currency accepted that records the number of bills accepted of each denomination;

i) Ticket/Voucher Voucher In*. The machine must have a meter that accumulates the total value of all slot machine wagering vouchers accepted by the machine; (A.K.A. Ticket-in)

j) Ticket/Voucher Voucher Out*. The machine must have a meter that accumulates the total value of all slot machine wagering vouchers and payout receipts issued by the machine; (A.K.A. Ticket-Out)

k) Electronic Funds Transfer In* (EFT In). The machine must have a meter that accumulates the total value of cashable credits electronically transferred from an MCS to the machine when using EFT commands in the function of bonusing, promotions or cashless wagering.

l) Cashless Account Transfer In* (AFT In). (A.K.A. WAT In-Wagering Account Transfer In) The machine must have a meter that accumulates the total value of cashable credits electronically transferred to the machine from a wagering account by means of an external connection between the machine and a cashless wagering system;

m) Cashless Account Transfer Out* (AFT Out). (A.K.A. WAT Out-Wagering Account Transfer Out) The machine must have a meter that accumulates the total value of cashable credits electronically transferred from the machine to a wagering account by means of an external connection between the machine and a cashless wagering system;

n) Non-Cashable Electronic Promotion In*. The machine must have a meter that accumulates the total value of non-cashable credits electronically transferred to the machine from a promotional account by means of an external connection between the machine and a cashless wagering system;

o) Cashable Electronic Promotion In. The machine must have a meter that accumulates the total value of cashable credits electronically transferred to the machine from a promotional account by means of an external connection between the machine and a cashless wagering system;

p) Non-Cashable Electronic Promotion Out*. The machine must have a meter that accumulates the total value of non-cashable credits electronically transferred from the machine to a promotional account by means of an external connection between the machine and a cashless wagering system;

q) Cashable Electronic Promotion Out*. The machine must have a meter that accumulates the total value of cashable credits electronically transferred from the machine to a promotional account by means of an external connection between the machine and a cashless wagering system;

r) Coupon Promotion In*. The machine must have a meter that accumulates the total value of all slot machine coupons accepted by the machine;

s) Coupon Promotion Out*. The machine must have a meter that accumulates the total value of all slot machine coupons issued by the machine;

t) Machine Paid External Bonus Payout*. The machine must have a meter that accumulates the total value of additional amounts awarded as a result of an external bonusing system and paid by the slot machine;

u) Attendant Paid External Bonus Payout*. The machine must have a meter that accumulates the total value of amounts awarded as a result of an external bonusing system paid by an attendant;

v) Attendant Paid Progressive Payout*. The machine must have a meter that accumulates the total value of credits paid by an attendant as a result of progressive awards that are not capable of being paid by the machine itself;

w) Machine Paid Progressive Payout*. The machine must have a meter that accumulates the total value of credits paid as a result of progressive awards paid directly by the machine. This meter does not include awards paid as a result of an external bonusing system; and

x) Games-played. The machine must have meters that accumulates the number of games played

i. Since power reset;
ii. Since door close; and
iii. Since game initialization (RAM clear).

y) External Doors. The machine must have meters that accumulates the number of times the any external cabinet door that allows access to the logic area or currency compartment which was opened since the last RAM clear.

aa) Bill validator door. (i.e. stacker door) The machine must have a meter that accumulates the number of times the Bill Validator door has been opened since the last RAM Clear

bb) Progressive Occurrence The machine must have a meter that accumulates 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 one set of master Electronic Accounting Meters required above, each individual game available for play shall have the period meters "Credits Bet" and "Credits Won" 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 feature offered, there shall be sufficient meters to determine the feature's actual return percentage, which should increment accurately every time a Double-up or Gamble play concludes. 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/Voucher 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 system, the device must accurately function as indicated by the communication protocol that is implemented. In addition, 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. Error conditions should cause the gaming device to lock up and require attendant intervention except as noted within this section. Error conditions shall be cleared either by an attendant or upon initiation of a new play sequence after the error has cleared except for those denoted by an "*" which will require further evaluation since deemed as a critical error. Error conditions shall be communicated to an on-line monitoring and control system, if applicable:

COIN ACCEPTOR ERRORS:

a) Coin-in jam;
b) Coin-out jam;
c) Reverse Coin-In (coin traveling wrong way through acceptor)
d) Coin Too Slow

*NOTE: The error conditions within this section shall also comply with 'Error Conditions', Section **3.26** unless otherwise noted.*
NOTE: It is acceptable to report Coin-in jam, Reverse Coin-in and Coin Too Slow errors as a generic "Coin-In Error" condition provided the gaming device level requirements specified in 4.13.1 are met.

HOPPER ERRORS

a) Hopper empty or timed out;
b) Hopper Jam

c) Hopper runaway or extra Coin paid out;

*NOTE: The error conditions within this section shall also comply with 'Error Conditions', Section **3.32** unless otherwise noted.*

BILL VALIDATOR ERRORS- It is acceptable to disable the validator or flash light(s) for the following bill Validator error conditions:

a) Stacker Full (it is recommended that an implicit "stacker full" error message not be utilized since this may cause a security issue)
b) Bill Jams
c) Bill Validator Door Open - where a bill validator door is the belly glass door, a door open signal is sufficient
d) Stacker Door Open
e) Stacker Removed
f) Bill Validator Malfunction not specified above

*NOTE: The error conditions within this section shall also comply with 'Error Conditions', Section **3.26** unless otherwise noted.*

PRINTER ERRORS

a) Out of paper/paper low; - it is permissible for the gaming device to **not** lock up for these conditions however, there should be a means for the attendant to be alerted
b) Printer jam/failure; and
c) Printer disconnected – it is permissible for the gaming device to detect this error condition when the game tries to print.

*NOTE: The error conditions within this section shall also comply with 'Error Conditions', Section **3.33** unless otherwise noted.*

DOOR OPEN ERROR CONDITIONS

a) All external doors (i.e. Main, Belly, Top Box);
b) Drop box door;

c) RESERVED;

d) Bill validator door.(i.e. Stacker door)

e) Any other currency storage area that have a door

*NOTE: The error conditions within this section shall also comply with 'Error Conditions', Section **4.15** unless otherwise noted.*

OTHER ERROR CONDITIONS

a) RAM error*; (In the case of this malfunction, the players credits should be displayed to avoid player disputes)

b) Low RAM battery, for batteries external to the RAM itself or low power source;

c) Program error or authentication mismatch*;

d) Reel spin errors. The specific reel number shall be identified in the error code. This should be detected under the following conditions:

   i. A mis-index condition for rotating reels, that affects the outcome of the game:

   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.

e) Power reset.

4.13.2 Error Conditions Defined. 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., processor reset), the software shall be able to recover to the state it was in immediately prior to the interruption occurring. If a power

failure occurs during acceptance of a bill or other note, the bill validator shall give proper credits or return the note, 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.

4.14.2. Restoring Power. If a gaming device is powered down while in an error condition, then upon restoring power, the specific error message shall still 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;
c) The integrity of all critical memory shall be checked; and
d) The bill validator device shall perform a self-test at each power up. In the event of a self-test failure, the bill validator shall automatically disable itself (i.e., enter bill reject state) until the error state has been cleared.

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 possess specific occurrence meters of access as specified in 4.10.9 to the following doors or secures areas:

a) All external doors (i.e. Main, Belly, Top Box);
b) Drop box door;
c) RESERVED; and
d) Bill validator door.(i.e. stacker door)
e) Any other currency storage area that have a 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 single event is in excess of a limit that is required by a taxing jurisdiction.

4.17 Test/Diagnostic Mode (Demo Mode)

4.17.1 General Statement. If the gaming device is in a test, diagnostic or demo 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 mode other than normal operation (ready for play) that increments any of the electronic meters. Any credits on the gaming device that were accrued during the test, diagnostic or demo mode shall be automatically cleared before the mode is exited. Specific meters are permissible for these types of modes provided the meters indicate 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/diagnostic mode. Test/diagnostics mode may also be entered, via an appropriate instruction, from an attendant during an audit mode access. These modes should not be accessible to the player.

4.17.3 Exiting From Test/Diagnostic Mode. When exiting from test-diagnostic 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 Game History Recall

4.18.1 Number Of Last Plays Required. Information on at least the last ten (10) 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 ten (10) plays. All values shall be displayed; including the initial credits, credits bet, and credits won, payline symbol combinations and credits paid whether the outcome resulted in a win or loss. This information can be represented in graphical or text format. 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 ten (10) 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, regardless if the result is a win or loss. The recall shall also reflect position dependent events if the outcome results in an award. Gaming devices offering games with a variable number of intermediate play steps per game may satisfy this requirement by providing the capability to display the last 50 play steps in addition to each base game.

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 and is required for all control programs that may affect the integrity of the game. This must be accomplished by being authenticated by a third-party device, which may be embedded within the game software (see NOTE below) or having an interface port for a third-party device to authenticate the media. This integrity check will provide a means for field verification of the software to identify and validate the program. The test laboratory, prior to device approval, shall approve the integrity check method.

NOTE*: If the authentication program is contained within the game software, the manufacturer must receive written approval from the test laboratory prior to submission.*

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. The tournament option should default to disabled. 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

General Statement. No gaming device, while enabled for tournament play shall accept credits from any source, nor pay out credits in anyway, but shall utilize credit points only. Tournament credits shall have no cash value. These games shall not increment any mechanical or electro-mechanical meters, and shall not communicate any accounting information to the system. The percentage requirements as addressed in Section 4.4 are waived for tournament games.

Gaming Device Settings. All gaming devices used in a single tournament shall utilize the same electronics and machine settings as other gaming devices involved in the tournament, including reel speed settings.