GLI-11 Revision History

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Revision History Outline

Date Released: September 21, 2016 V3.0 *Final*

Date Released: August 29, 2011 V2.1 *Final – corrected errors in selected content and reissued*

Date Released: April, 20, 2007 V2.0 *Final*

Date Released: June 30, 2006 V1.4 *Released for Comment*

Date Released: November 10, 2000 V1.3 *Final*

Date Released: March 15, 2000 V1.2 *Second Commentary Release*

Date Released: March 1, 2000 V1.1 *First Commentary Release*

Date Created: December 13, 1999 V1.0 *Released Internally for Initial Commentary Period*

Revision 3.0

General Notes on Revision

GLI-11 V3.0 should be viewed as a major revision to this technical standard for gaming devices.

General Revision Information

- Reorganized and restructured document into more consumable chapters and sections, providing better distinction among the major technical areas of Machine Requirements (Chapter 2), Random Number Generator Requirements (Chapter 3), Game Requirements (Chapter 4), Accounting/Metering Requirements (Chapter 5), and added a Glossary of Key Terms.
- Re-titled document.
- Re-titled various subsections and content within the various chapters.
- Added changes and clarifications accumulated since release of GLI-11 V2.1, leveraging actual testing and issue evaluations where possible.
- Incorporated various requirements based upon industry best practices.
- Aligned overlapping areas of GLI-11 vs. GLI-19 and GLI-23 to ensure cross-standard consistency, where possible.
- Aligned GLI-11 with certain jurisdictional and international gaming device requirements.
- Added various notes to improve clarity of requirements and to document known conditions or restrictions.
- Made various typographical and grammatical changes throughout the document.

Chapter 1 – Introduction to Gaming Devices

- Minor grammatical and formatting changes throughout this chapter as well as refresh of content for S 1.2.1 for acknowledgement of other standards.
- Revised definition of "Gaming Device" to accommodate elements of skill. (S 1.5.1)

Chapter 2 – Gaming Device / Machine Requirements

- **Machine and Player Safety (S 2.2) and Environmental Effects on Machine and Gaming Device Integrity (S 2.3).**
  - o Clarified that the independent test laboratory only performs limited testing in areas such as player safety and Electro-Static Discharge (ESD), while not evaluating areas such as Electro-Magnetic Compatibility (EMC) or Radio Frequency Interference (RFI) testing. The latter two areas are more appropriately addressed by labs such as Underwriters Laboratory that specialize in electrical and environmental testing.
  - o Maintained ESD requirements to ensure gaming device integrity (S 2.3.1 – 2.3.2).
  - o Made minor wording changes throughout.
- **Printed Circuit Board (PCB) Identification Requirements (S 2.5.2).**
  - o Removed reference to "top assembly revision level" as this is more akin to a schematic diagram versus a PCB.

- o Deleted documentation-related requirement as well as recommendation.
- **Charging Mechanisms (S 2.5.5).**
  - o Added a new section and content to address the advent of various charging mechanisms for gaming devices which allow external access for charging of portable electronic devices at the machine. These mechanisms are becoming more pervasive in the industry.
  - o GLI-11 established basic requirements to ensure that the charging mechanisms are fused properly and to ensure that the mechanisms pose no impact to the integrity of the gaming device, effectively isolating them from any critical control program functions.
- **Displays and Monitors (S 2.5.6).**
  - o Added new section for basic requirements for displays and monitors to ensure proper fitment in the cabinet (as related to machine physical security) and compatible screen resolution for proper display of game play and player information screens.
- **Wired Communication Ports (S 2.5.7).**
  - o Added new section for basic requirements to ensure that wired communication ports are labeled clearly and securely housed.
- **Circuit Protection (S 2.6.2).**
  - o Added new section to address circuit protection and labeling of same, consistent with other industry-accepted standards.
- **Revised Error Condition Layout and Improved Consistency of these Requirements throughout the Standard (various sections).**
  - o Incorporated error conditions within the respective section for improved context and applicability.
  - o See various references as follows: (S 2.7.4 (Door Open/Close Interruptions); 2.9.3 (d) (PSD Program Verification Error); 2.11.3 (Unrecoverable Corruption of Critical NV Memory); 2.13.2 (h) (Bill Validator Error); 2.14.1 (g) (Coin Acceptor Error); 2.15.5 (c) (Integrated Player Identification Component Error); 2.17.5 (Hopper Error); 2.17.7 (Printer Error); 2.22.1 (b) (Mechanical Display Device Error).
- **Logic Area Electronic Components (S 2.8.2).**
  - o Expanded listing of potential devices and/or components to be housed in the gaming device logic area, based on industry norms and best practices.
- **Machine Program Storage Devices (S 2.9).**
  - o Minor layout, formatting and verbiage changes throughout.
- **PSD Identification (S 2.9.2).**
  - o Clarified requirements for PSD Identification and allowed for alternate display of this information via an attendant menu.
- **Contents of Critical Memory (S 2.10.1 h).**

- o Added references to supported logs for gaming devices, as applicable.
- **Machine Significant Event Log (S 2.10.2).**
  - o Added new section to delineate "significant events", commensurate with making the significant event log a hard requirement. The listing of significant events is based on other accepted industry standards as well as gaming device norms.
- **Machine Non-Wager Purchase Log (S 2.10.3).**
  - o Added new section to capture log data for non-wager purchases.
- **Identifier Log (S 2.10.4).**
  - o Added new section to capture log data for use of Identifiers.
- **NV Memory Requirements (S 2.10.5).**
  - o Minor wording changes for improved clarity.
- **Maintenance of Player Interaction Devices (S 2.12.2).**
  - o Added new section and content to address proliferation of newer player interaction technology such as joysticks, controllers, camera systems, etc.
  - o Requirements mandate monitoring of any smart devices that support two-way communications with the gaming device as well as manual operator-supported diagnostics to ensure this technology is functioning properly. These checks are viewed as especially critical for games with skill wherein some portion of return percentage is skill-based and dependent upon the proper operation of these interaction devices.
- **Wireless Player Interaction Devices (S 2.12.3).**
  - o Added new content for cordless and/or wireless player interaction devices to ensure that over-the-air communications is secure and accurate, and that only authorized player interaction devices are allowed/supported for use with the gaming device.
- **Bill Validators and Stackers (S 2.13).**
  - o Revised and reorganized content to improve clarity and readability.
- **Bill Validator Settings (S 2.13.5).**
  - o Revised wording for clarity and to better reflect the intent of the requirements.
  - o Removed references to "factory set" bill validators.
- **Coin Acceptors, Diverters, and Drop Boxes (S 2.14).**
  - o Revised and reorganized content to improve clarity and readability.
- **Drop Box (S 2.14.3 c).**
  - o Clarified that drop box, if equipped, is to be monitored by the gaming device's door access detection system, same as for other "sensitive" doors and compartments.
- **Integrated Player Identification Components (S 2.15).**
  - o Added new section and content to address peripheral components controlled by the gaming device that are used to establish player identity, inclusive of card readers, barcode readers, and biometric scanners.

- o Previously, GLI-11 did not directly contemplate these types of integrated components.
- o Integrated components are not to be confused with non-integrated, SMIB-based components.

- **Machine Payment and Payment Devices (S 2.17).**
  - o Reorganized existing content into a combined section to logically group payment devices together.
  - o Made minor revisions throughout this section.

- **Machine Vouchers (S 2.18).**
  - o Reorganized overall content and revised section to accommodate "virtual" or "paperless" vouchers, while still maintaining requirements for paper-based vouchers.

- **Machine Communication Protocol (S 2.19 / S 2.19.1).**
  - o Added limited new content to address basic requirements for gaming device protocol communications, while not dictating the actual type of protocol to be implemented by the gaming device, as this is left to the discretion of the regulatory body.

- **Machine Connections to the Internet (S 2.20).**
  - o Added new section to address basic requirements for gaming device connectivity with the internet.
  - o Requirements ensure that connections adhere to industry accepted practices for network security (e.g., firewalls and traffic segregation) and support regulator-mandated security methods.

- **Multi-Player Machine (S 2.21).**
  - o Revised this section and related terminology within to clarify attributes and operation of multi-player machines and to better accommodate new genres of machines that utilize skill, while still maintaining these requirements for existing machines that fall into this category.

Chapter 3 - RNG Requirements

- o Changes reflect ITL evaluation procedures and introduce optional cryptographic RNG requirements.
- o A fresh approach was taken to the RNG content in GLI-11 V3.0 to reflect current testing practices and technical trends for randomness in gaming devices.
- o Some existing content was relocated to Chapter 4 for Game Requirements including "Game Selection Process", "Live Game Correlation", "Card Games", and "Ball Drawing Games".
- o Statistical tests are still listed but are abbreviated since these are determined by the independent test laboratory on a case-by-case basis, reflective of the unique RNG submission.

o Focus of chapter remains statistical analysis, independence, unpredictability, and distribution of results, all hallmarks of RNGs and their related testing.

o An effort was made to clarify specific requirements for each given RNG type and to clearly differentiate between the various types.

o Cryptographic RNG content is introduced in V3.0 as optional requirements at this time. Similar requirements have been in place for iGaming markets.

o Cryptographic RNG provides some assurance that gaming device randomness is impervious to typical types of attacks that may otherwise compromise the unpredictability for gaming device applications due to increasingly sophisticated hacking attempts.

Chapter 4 - Game Requirements

- **Player Interface (S 4.2).**
  - o Added new content to define basic requirements for the player interface, to ensure player fairness and proper operation of that interface.
  - o Some of the requirements are familiar ones from GLI-11 V2.1, supplemented by industry best practices, and reflective also of alignment with other accepted technical standards.

- **General Game Requirements (S 4.3).**
  - o Revised and reorganized content within General Game Requirements (S 4.3) based on alignment with other GLI Standards and current best practices.
  - o Maintained concept of traditional game cycle.

- **Information to be Displayed (S 4.3.3).**
  - o Revised and clarified requirements.

- **Display for Multi-Wager Games (S 4.3.4).**
  - o Revised section content slightly and modified some terminology within.

- **Display for Line Games (S 4.3.5).**
  - o Revised section content slightly.

- **Added various content for Game Information and Rules of Play and Separated out into a Unique Section for Ease of Reference based on Alignment with other GLI Standards and Current Best Practices. (S 4.4).**
  - o In Game Information and Rules of Play (S 4.4.1), more detailed and specific requirements were added to support game information, artwork, paytable and helpscreen information.
  - o The requirements were extracted from industry best practices that are currently applied to gaming devices and which also align with other GLI Standards such as GLI-19. These are largely requirements that independent test laboratories presently apply to submissions and testing.
  - o A fundamental assumption is that a game should behave similarly, abide by similar rules of play, and offer roughly equivalent player information and artwork

regardless of whether it is operating on an upright machine cabinet or via a portable electronic device.

- o Added content provides a reasonable set of requirements to better enable gaming device manufacturers to design products that comply with the technical standard and affords consistency in the evaluation of applicable requirements by the independent test laboratory in these areas.

- **Game Fairness (S 4.5).**
  - o Added requirements to address aspects of basic player fairness reflective of key attributes such as odds, the illusion of skill (in contrast to actual skill impacting return), hidden source code that can circumvent the rules or play, and determination and display of final game outcome.

- **Simulation of Physical Objects (S 4.5.2).**
  - o Added new section to address genre of games that simulate common physical objects used in the conduct of gaming such as dice or roulette wheels and which are used to determine outcome.
  - o Requirements help to ensure the unpredictability of the outcomes of video simulations while maintaining consistent game behaviors depicted by the simulations presented to the player.

- **Physics Engine (S 4.5.3).**
  - o Added new content to accommodate physics engines which are becoming increasingly ubiquitous in gaming device design, and to ensure that this software affords a consistent play environment and level playing field. This is viewed as especially important to the newer genre of games with skill.

- **Game Types (S 4.6).**
  - o Added basic content to address game types that were previously not explicitly contemplated by GLI-11 including roulette games, dice games, and racing games.
  - o Content reflects industry best practices and other widely-recognized technical standards.

- **Game Selection Process (S 4.7.2).**
  - o Relocated content from former RNG chapter.
  - o Revised wording and otherwise consolidated applicable requirements into this section.

- **Game Payout Percentages, Odds, and Non-Cash Awards (S 4.8).**
  - o In S 4.8.1, maintained minimum expected payout percentage of 75%, which, for games with skill, continues to apply based on an assumption of optimal strategy, although other alternative strategies are not precluded.
  - o Made minor wording changes to RTP requirement for improved clarity of intent.
  - o Odds (S 4.8.2) – Revised odds requirement specific to any chance-based element of a game to more closely align with Nevada and to reflect 1:100 million for any advertised award. This change better reflects industry trends and norms.

Revision also accommodates odds distinction that is required between the chance and skill elements of a game.

- **Bonus Games (S 4.9).**
    o Minor formatting and other revisions to improve clarity.
- **External Device Bonus Games (S 4.10).**
    o Added new content to more clearly define requirements for bonus games that derive their outcome from an external device containing an independent RNG.
- **Double Up / Gamble feature (S 4.11).**
    o Added new content per alignment with other accepted industry standards.
    o A dedicated section was added for Double-Up given its ubiquitous nature in gaming devices.
    o GLI-11 V2.1 contained mentions of Double-Up, including return percentage and metering. This information is retained in GLI-11 V3.0, but is now consolidated into one dedicated section.
    o Typical artwork requirements for Double-Up were added in V3.0.
- **Game Tokenization and Residual Credits (S 4.14).**
    o Refined and consolidated interrelated requirements for tokenization and residual credits, given their logical interrelationship.
    o Revised wording within this section.
- **Alternative Game Modes (S 4.17).**
    o Expanded types of game modes that can be supported by a gaming device to also include attract mode, free play mode, and autoplay mode.
    o Leveraged industry best practices and other accepted technical standards.
- **Game History Recall (S 4.18).**
    o Refined and clarified game history recall requirements to better reflect intent based on industry norms and trends.
    o Revised and simplified Bonus Game Recall (S 4.18.3) to focus intent on "last 50 events" for games that support an infinite or variable number of events in a given bonus.
- **Tournament Games (S 4.19).**
    o Revised section content to better reflect current practices and designs for tournament game software.
    o Defined tournament display requirements (S 4.19.4) and included coverage for out-of-revenue tournaments (S 4.19.5)(largely existing content carried forward from GLI-11 V2.1), in-revenue tournaments (S 4.19.6), and remote tournaments (S 4.19.7).
- **Games with Skill (S 4.20).**
    o Added optional content and requirements specific to new genre of "games with skill" with the intent of providing initial technical specifications to the industry

for these game types, while still fully accommodating the embedded base of games including traditional slot or chance games as well as card games.

o In Disclosure for Games with Skill (S 4.20.3) added new requirement that any game that potentially cannot satisfy the minimum return percentage of 75% based on any style or method of play must prominently disclose that it is a game with skill. This is intended to address player fairness and player perception, which may be especially critical during the introduction of games with skill. The rule does not apply to traditional casino card games that also happen to employ elements of skill, as they are effectively grandfathered in this context.

o Added new content for Player Versus Player and and Virtual Opponents (S 4.20.4 and 4.20.5) to ensure player fairness and adequate disclosures therein.

o In Outcome for Games with Skill (S 4.20.6) defined basic expectation that game outcome cannot be changed without proper notification to the player. This is an important aspect of player fairness in light of unique considerations for games with skill, as many designs are expected to allow for such changes more or less on the fly, thereby necessitating a suitable form of player notification.

o Return Percentage (S 4.20.7) for games with skill maintains a 75% minimum RTP while assuming optimal strategy. However, since a wide range of return is likely in practice based on various factors surrounding skill, GLI-11 further contemplates the need to perform active data collection and analysis of the actual return percentage, once the game with skill is operating in the field.

o For Odds for Skill-Based Awards (S 4.20.8), GLI-11 assumed a somewhat more moderate approach for awards involving skill, ensuring only that they can be achieved by a player while not stating a specific numerical odds value. This is in contrast to any skill-based award that incorporates an element of chance, which reflects requirements found elsewhere in the standard and which conforms to odds of 1:100 million.

o Added content for Player Advice Features (S 4.20.9), as this is expected to be fairly commonplace for games with skill. Such player advice could potentially involve an additional wager, depending upon game design.

o Reinforced the importance of usage and effect regarding peripheral devices for games with skill (S 4.20.10). This information is critical to a player's understanding of how a peripheral device may be used to support skill and thereby impact the return percentage for the game.

o Defined unique Game Recall for Games with Skill (S 4.20.11) which requires the same types of information as defined elsewhere in GLI-11, but which differs in the expectation for adequate reconstruction, to include only the last 10 "gaming sessions" (versus last 10 games / 50 events). This difference is seen as necessary given the nature of games with skill and what may potentially constitute a game.

- o Added unique requirements for Interruption and Resumption for Games with Skill (S 4.20.12) to allow for some degree of flexibility in resuming an interrupted game with skill.

- **Persistence Games (S 4.21).**
  - o Added new content to capture basic requirements for persistence games and play-from-save based on industry best practices and gaming device design norms seen to-date.

- **Community Bonus Games (S 4.22).**
  - o Added new content to capture basic requirements for community bonus games based on industry best practices and design norms where players compete for communal prizes.

- **Virtual Event Wagering (S 4.23).**
  - o Added new content for virtual event wagering, from a gaming device perspective, to accommodate the growing genre of such games and to ensure a basic set of technical requirements for such gaming devices. Content was gleamed from international jurisdictions where these devices are fairly commonplace.
  - o Clarified the role of randomization and chance in virtual event outcomes.
  - o Defined various display, disclosure, and artwork requirements that are unique to virtual events.

Chapter 5 – Accounting and Metering Requirements

- **Credit Meter Units and Display (S 5.2.1).**
  - o Refined requirements for credit meter display to improve clarity and applicability while allowing for some level of flexibility.

- **Collect Meter (S 5.3.1).**
  - o Refined requirements for collect meter display to improve clarity and applicability while allowing for some level of flexibility.

- **Electronic Accounting and Occurrence Meters (S 5.4).**
  - o Reorganized content for clarity, separating electronic accounting meters from occurrence meters.
  - o Revised four percent rule for coin-in metering to align with Nevada regulations. (S 5.4.1 (a) ii) and to make this a requirement versus a recommendation.
  - o Added new accounting meter for "Non-Wager Purchase" (S 5.4.1 y) to accommodate debits from the credit meter for entertainment-only purchases that do not impact game outcome. This is a potential trend that may be more commonplace for games with skill and/or games where players can opt to customize their gaming experience.
  - o Other minor wording and content changes to improve the clarity of metering requirements.

Glossary of Key Terms

- o Added new content to assist the reader with key terms and acronyms used within the technical standard.

Revision 2.1

General Notes on Revision

Control Program Integrity

This modification of GLI-11 attempts to add generalization and clarity to requirements covering control program integrity checks which have caused an abundance of industry confusion. Furthermore, previous control program regulations were written too specifically to early uses of patented technologies. As stated, this version will serve to generalize those requirements and provide development flexibility for these essential security functions.

Offline Vouchers

Where the previous standard only allowed a single offline voucher to be printed, this version has introduced the latest technological considerations for offline voucher issuance and redemption.

General

Added flexibility to numerous requirements which may have had too narrow a focus in their previous form. Attempted to bring further rationale and reason to a number of requirements. Further clarified that the test lab does not play a role in electrical safety testing. Numerous clarifications and corrections in some instances. Updated language to conform to current industry terminology.

Please note: Section numbers in GLI-11 V2.1 were heavily impacted due to the removal of the entire 'Submission Requirements' content (formerly Chapter 2), which was relocated into a standalone document. This modification altered all the section numbers in GLI-11 V2.1 thereafter in all subsequent chapters. As a result, references to section numbers have been removed in this revision history.

Notable Changes

− Removed discussion of "thin client" regarding Non-Volatile RAM.

− Removed requirement to validate un-cleared portions of RAM resulting from partial RAM clear.

− Added recommendation that log of last 100 events be kept in critical memory.

− Added requirement that unrecoverable corruption of RAM should not be cleared automatically.

− Changed to a recommendation that the integrity of all program components in non-volatile memory be continuously verified. Previously just required that control program components integrity be ensured.

−   Created EPROM specific requirement for authentication for corruption and recommended CRC-16.

−   Reduced Non-EPROM authentication requirements to just having an internal mechanism for detection of corruption. Removed all discussion of "512 bit /recommended 768 bit message digest", storage of message digest on "ROM within gaming device", and private/public key encryption.

−   Renamed "Writable Program Storage" to "Alterable Program Storage".

−   Added note exempting Alterable Program Storage devices that have been rendered "read-only" from "write" regulations.

−   Removed regulation limiting writable program storage to non-critical program components.

−   Removed write protected SCSI hard drive preference to become "all write protection means to be case-by-case examined". Added requirement that Control Program Verification needs to support third party authentication, either embedded in the program or by external means via an interface port. If embedded in the program must be with written approval from the test laboratory.

−   Added note for PCB identification to be readily viewed without removal from the gaming device, where feasible.

−   Added manufacturer's symbol as an alternative to manufacturer's name for PCB identification.

−   Specified that the displayed error message "Bill Validator Malfunction" is recommended rather than "Stacker Full".

−   Added Offline Ticket printing regulations. Requires that all but the last 4 digits of the offline ticket validation number be masked out. Allows that Ticket/Voucher log have both ticket/vouchers and receipts. Allows multiple barcodes.

−   Preference that non-cashable ticket items explicitly express "No Cash Value".

−   Specifies Offline Ticket Issuance regulations when communications with online system are lost. Specifies voucher validation queue to be no larger than Ticket Out log. Sets rules for requesting a new set of validation numbers.

−   Allow for the probability of a symbol appearing in a position to not remain constant as long as the payglass describes this behavior.

‒ Changed the requirement rejecting an entire game for RTP% below the minimum to not allowing the individual paytable to be enabled if below the minimum RTP%.

Additions & Clarifications

‒ Added note allowing multiple independent tickets to be issued as an acceptable alternative to printing a handpay ticket whenever the printer limit is exceeded. (Requires laboratory approval). Does not affect ticket printing when IRS limit is exceeded.

‒ Added document references for Offline Ticketing.

‒ Changed "player terminal" to "Gaming Device" (wherever needed).

‒ Added note that the laboratory not responsible for conformance to local electrical codes.

‒ Added note that the laboratory will make no determination as to tower light performance.

‒ Allow advertising upcoming wins as long as there is a progress indicator toward such an award.

‒ Allow displaying all winning paylines at once as a substitute for display of individual winning paylines as long as game history displays individual winning paylines. (This is done to speed up game play for games with very large (500) numbers of lines)

‒ Added note allowing game reset to return to completion of game rather than the exact previous game screen. The concept here is that of returning to the previous "game state". If you define playable game state as" the moment a wager is committed until the moment the game is completed", then you can consider returning to game completion as returning to the previous game state.

‒ Added recommendation that countdown timer and auto select be added to games reset while awaiting player interaction.

‒ Added note preferring that on-line system be notified by monitor of drop box activity.

‒ Added clarification that default reel positions after RAM clear apply only to those positions immediately after the RAM clear and does not apply to paytables or games selected after the initial game play.

‒ Added clarification allowing the Casino Name/Site Identifier information be contained on the ticket stock itself.

– Added clarification allowing the expiration information (e.g. Expires In One Year) to be contained on the ticket stock itself.

– Added Thumb Drives to list of program storage media.

– -Added clarification that program storage change log needs to be approved by the jurisdiction.

– Added clarification that generic "Coin-In Error" is allowable.

– Added clarification that ticket/vouchers are paper slips AKA "casino script".

– Expanded BV EPROMs to be control program media.

– Added clarification that "Collect" button AKA "Cash Out" button.

– Added clarification that removal and re-insertion of the hopper is not to be considered abnormal as long as an "Extra Coin Paid" error is generated for each activity.

– Clarification that printer re-connection detection is not required to be communicated to the offline system.

– Expanded list of required payglass information to include game features, extended play, free spins, double-up, take-a-risk, autoplay, countdown timers, symbol transformations, and community style bonus awards.

– Added clarification that it is acceptable for the payglass to describe award pays in one-credit terms even though the minimum bet is greater than one credit, as long as the minimum bet results in a line bet greater-than-or-equal-to one credit.

– Allow permanently attached "Malfunction Voids All Pays" badge to the exterior of the gaming device in lieu of being displayed in the payglass, (stickers not allowed).

– Described how backlit physical reels will accomplish winning payline display.

– For card games described how the removal of cards from the deck as presented to the player does not preclude the game program from pre-selecting the replacement card RNG's, as long as they are used in the sequence generated.

– Added note that laboratory not responsible for conformance to tower light regs.

Redundancies, Corrections & Deletions

−   Corrected Inc. to LLC (wherever needed).

−   Removed requirement to meter any exterior door opens if they allow access to currency or logic compartments. This is redundant as other requirements address metering of currency and logic doors themselves.

−   Removed "RESERVED" (wherever needed).

−   Renumbered paragraphs (wherever needed).

−   Removed redundant authentication, marking, and location requirements of PSD's.

−   Removed discussion about linked games with merchandise awards requiring the same top award odds.

−   Changed group listing of required error codes to a reference as this is redundant with the individual listing of the error codes.

−   Removed "stacker full" error discussion where redundant.

−   Removed requirement that tickets printed whenever the IRS limit is exceeded need be redeemed by human interaction as this is obviously the purpose of handpay tickets.

−   Removed program authentication requirement where redundant.

−   Removed third party software verification requirement where redundant.

Revision 2.0

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

Revision 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.

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.

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.

Revision 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.'

Revision 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).

Revision 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 <u>or information</u> 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 <u>coins-in</u> (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 <u>coins-out</u> (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 <u>cancelled credit</u> meter.

4.10.9.i Added the <u>progressive occurrence</u> 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 <u>or</u> 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.