INTEGRITY CERTIFICATION REQUIREMENTS: VIDEO LOTTERY TERMINALS

Saskatchewan
Liquor and Gaming
Authority

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Document History

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Introduction

The Saskatchewan Liquor and Gaming Authority (SLGA) is responsible for the regulation of gaming in Saskatchewan as mandated under *The Alcohol and Gaming Regulation Act*, *1997*.

SLGA may, according to *The Alcohol and Gaming Regulation Act, 1997*, set the terms and conditions of gaming supplier certificates of registration. In the event that SLGA issues a gaming supplier certificate of registration to you, that certificate of registration will include a term that you shall at all times comply with all applicable Gaming Integrity Standards established by SLGA from time to time.

This document outlines the integrity certification requirements for Video Lottery Terminals.

Background

These standards were developed in consultation with Gaming Laboratories Incorporated, North American Gaming Regulators Association, , Western Canada Lottery Corporation, SLGA and discussions with other Canadian and American jurisdictions.

Purpose

These standards are intended to provide regulatory guidance to manufacturers, suppliers and gaming operators about acceptable technical gaming integrity requirements in Saskatchewan. Where practices amongst operators may differ from acceptable standards, SLGA as the regulator, will review to determine acceptable practices.

These standards provide the basis for consistent public policy. They are founded on objectives that meet the test for: fairness, accountability, security, honesty, reliability, and safety.

1.00   General

1.01   Ownership and Control of Technical Gaming Integrity Document
The ownership and control of this document and all subsequent amendments rests with SLGA.

1.01.1 Document Revision
Technological change in the industry may require SLGA to issue corresponding amendments and changes to previously approved standards. Reasonable notice will be given to all manufacturers, suppliers, testing laboratories, and operators, for implementation.

1.02   Parameters of Document

This document is intended to outline those standards that apply to Video Lottery Terminals. Including: specifications, hardware, safety, and testing.

1.03   Technology

SLGA recognizes that game technology changes. New technology will be evaluated, as required, and the standards amended accordingly, as per section [1.01.1 Document Revision](#) of this document.

2.00 Physical Requirements

2.01   Security
A gaming device shall be robust enough to withstand forced illegal entry which would leave behind evidence of the attempted entry, unless such entry causes an error code that must be reset by authorized staff.

2.02   Machine and Player Safety
Electrical and mechanical parts and design principals of the VLT may not subject a player to any physical hazards. It is the responsibility of the manufacturer to ensure that the VLT (and ALL associated hardware) meets CSA and/or ULC standards and complies with Federal regulatory standards. For the province of Saskatchewan, a VLT MUST be certified safe as a complete assembly by SLGA. This includes all hardware (example: hopper, coin mech, etc.) residing and operational within the VLT. Individual hardware may be approved separately by the province of Saskatchewan providing the aforementioned hardware has met the outlined standards described AND the manufacturer provides documentation to SLGA describing the purpose or reason for testing equipment separately from the VLT.

2.03   Game Integrity Standard
Outside influences shall not affect game fairness to the player or create cheating opportunities.

2.04   Environmental Conditions
A VLT shall withstand the unique environmental conditions of Saskatchewan. The VLT shall be designed and manufactured robustly enough to withstand:
a) Dust;
b) Dirt;
c) Extreme ranges of humidity levels (10%RH – 95%RH);
d) Ambient temperatures varying from 0 to + 40 degrees Celsius;
e) Storage at temperatures ranging from –40 to +40 degrees Celsius.

Due to the difficult nature to quantitatively assess environmental conditions on a gaming device, the aforementioned environmental conditions can be viewed as guidelines rather than firm standards. Each gaming device can be assessed on a case by case basis by SLGA, a Saskatchewan casino, SLGA agent or approved gaming lab to determine environmental suitability.

2.05   Machine Identification
A VLT shall have a not easily removable, 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 VLT model number; and
d) The date of manufacture.

2.06   Tower Light
The VLT shall have a light located conspicuously on top of the VLT that automatically illuminates when:
a)   A player has won an amount, or;
b)   An error condition has occurred (including 'Door Open'), or;
c)   A 'Call Attendant' condition has been initiated by the player.

2.07   Power Supply
The machine shall not be adversely affected, other than resets, by surges or dips of $\pm$ 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.

2.08   Control of Electrical Power
a) A surge protector shall be installed on the electrical power supply line to each video lottery terminal. A battery or equivalent power back-up for the electronic meters shall be capable of maintaining accuracy of all accounting records and terminal status reports for a minimum period of ninety days after power is disconnected from the terminal. The power back-up device shall be located within the locked logic board compartment of the video lottery terminal.
b) An on/off switch that controls the electrical current used in the operation of the terminal shall be located in an accessible place within the interior of the video lottery terminal.
c) The operation of each video lottery terminal may not be adversely affected by any static discharge or other electromagnetic interference.

2.09   General External Doors/Compartments Requirements
The VLT must include a minimum of (4) four lockable compartments designed to accept safety cam locks. These compartments are the following:
- Main Door;
- Logic Compartment;
- Coin Box; and
- Bill Stacker.

Specifically:
a) The interior of the device should not be accessible when all doors are closed and locked;
b) Doors shall be manufactured of materials that are suitable for allowing only legitimate access to the inside of the cabinet (i.e., doors and their associated hinges shall be capable of withstanding determined illegal efforts to gain access to the inside of the VLT);
c) The seal between the cabinet and the door of a locked area shall be designed to resist the entry of objects;
d) There shall be a candle on the top of the device that is clearly visible that automatically illuminates when the door to the VLT, or doors to any devices connected to the VLTs which may affect the operation of the VLT, are opened. This requirement may be

substituted for an audible alarm if such a security event is communicated to a central on-line (host) system;

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

f) It shall not be possible to insert a device into the VLT that will disable a door open sensor when the machine's door is shut; and

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

2.10   The Logic Door and Logic Area

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

2.11   Electronic Components

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

a) CPUs and other electronic components involved in the operation and calculation of game play (e.g., game controller electronics and components housing the game or system firmware program storage media);

b) Electronics involved in the operation and calculation of game result determination;

c) Electronics involved in the calculation of game display, and components housing display program storage medium (passive display equipment exempted);

d) Communication controller electronics, and components housing the communication program storage media or communications board. This does not include interface boards that are "dumb" such as splitters and so forth. The only requirement for these boards is that they be housed within the main cabinet of the gaming device in a secure manner; and

e) All flash memory devices that affect the game play function of the VLT.

2.12   Coin and Currency Compartments

The coin and currency compartments shall be locked separately from the main cabinet area, but must reside securely in the main cabinet area. The printer is not included as it must be accessed for service and fills.

2.13   Access to Currency

a) Access to currency storage area is to be secured via separate key locks and shall be fitted with sensors that indicate door open/close or stacker removed.

b) Access to the currency storage area is to be through two (2) levels of locks (the relevant outer door plus one other door or lock) before the receptacle or currency can be removed. See 2.38 Bill Acceptors Section.

2.14   Hard Meters

The VLT must be equipped with back up meters known as 'hard meters' that are:

a) Non-resetable;

b) Operate independently of the software metering system;

c) Located securely within the VLT in such a manner that they cannot be altered from externally to the machine; and

d) Individual meters shall represent the following minimum information: Cash In, Cash Out, Cash Played and Cash Won.

2.15 Program Memory, RAM and Non-Volatile RAM Requirements

The following are the requirements for RAM:

a) Battery Back-up. A battery back-up, or an equivalent, shall be installed on the game for the electronic meters and shall be capable of maintaining the accuracy of all information required for thirty (30) days after power is discontinued from the machine. The back-up device shall be kept within the locked Logic Area;

b) If the battery back-up is used as an 'off chip' battery source, the shelf life shall be at least three (3) years;

c) Random access memory that uses an off-chip back-up power source to retain its contents when the main's power is switched off shall have a detection system which will provide a method for software to interpret and act upon a low battery condition; and

d) Clearing non-volatile memory shall only be able to be undertaken by accessing the logic area in which it is housed.

2.16 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 uncleared portions of RAM.

2.17 Default Game Display

The default 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.

2.18 Configuration Setting

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

2.19 Requirements for Program Storage Devices

All program storage devices, including ROMs, EPROMs, FLASH ROMs, DVD, CD-ROM, 'Hard Drives', 'Disk-On-Chip' and any other type of program storage devices shall identify with sufficient information to identify the software and revision level of the information stored in the devices either on the PSD or viewed electronically within a service menu of the device.

2.20   Contents of Critical Memory
Critical memory is used to store all data that is considered vital to the continued operation of the VLT. This includes, but is not limited to:
a) All electronic meters required in 3.30 Electronic Accounting and Occurrence Meters Section including last bill data and power up and door open metering;
b) Current credits;
c) VLT/game configuration data;
d) Information pertaining to the last five (5) plays with the RNG outcome (including the current game, if incomplete); and
e) Software state (the last normal state the VLT software was in before interruption).

2.21   Logic Board
The CPU board will be designed to ensure that its memory can be preserved if the board is removed from the Logic Area.

2.22   Maintenance of Critical Memory
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.

2.23   Real Time Clock
The VLT must have real time clock capability and must be cognizant of leap years.

2.24   Control Program
The control program (software that operates the VLTs' functions) shall allow for the VLT to ensure the integrity of all control program components during execution of said components. Any VLTs that have control programs residing in critical memory that is not alterable through the use of any circuitry or programming must employ a mechanism that verifies executable program code and data which may affect payouts, data and VLT behaviour. If the program is contained in any other medium, the following rules shall be met:
a) The VLT shall authenticate all critical game files including, but not limited to, executables, data, and operating system files and other files, which may affect the game outcome or operation, which reside on the medium. This authentication shall employ a hashing algorithm which produces a 'Message Digest' (the mathematical results/signature of the hashing algorithm) output of at least 128 bits (this value will constantly be re-evaluated, based on technology advancements and new security methods available).
b) The Message Digest(s) for all files as defined in (a) shall reside on a memory device (ROM-based or other medium) within the VLT. 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 (this value will constantly be re-evaluated based on technology advancements and new security methods available).
c) The VLT shall authenticate all critical files against the stored Message Digest(s). This authentication shall meet the requirements of section 2.25 PSD's.

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

The control program must also have a mechanism to test unused or unallocated areas of any alterable memory for unintended programs or data and tests the structure of the critical memory integrity. The mechanism must prevent further playing of the VLT if unexpected data or programming/structural inconsistencies are discovered.

The control program will also provide a mechanism to record changes or alterations discovered by the program during its internal checking that will record date, time and (if possible) area of code or memory affected.

The control program shall utilize an integrity check, preferably a secured hashing method to authenticate that the program and/or support files have not been corrupted or altered prior to use/loading. Integrity checks of critical memory shall be made during each VLT restart (e.g., power up cycle). VLT control programs (software that operates the VLT's functions) shall test for possible corruption caused by failure of the program storage medium and all critical game functions.

Under no circumstances will the payout percentage of a VLT be vulnerable to manipulation, or change due to circuitry, programming or memory modifications that occur beyond the intended procedures designed by the manufacturer for normal payout percentage changes.

2.25   PSDs
All PSDs (program storage devices), in the executable address space of a main processor, shall be validated during the following conditions:
a) Any power up; and
b) The first time the files are loaded for use (even if only partially loaded).

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

2.27   Unrecoverable Critical Memory
An uncorrectable corruption of RAM shall result in a RAM error. The RAM should not be cleared automatically, but shall require a full RAM clear performed by an authorized person.

2.28   Write Once Read Many (WORM) Program Storage
A WORM used as a program storage device shall only contain the program files that operate the game.

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

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

2.31   Write Protection
In the case of a hard disk, a write-protected drive shall be used. SCSI Devices are preferred, as they provide a write protect jumper which can be sealed. Any other type drive will be required to be designed with a method that prohibits methods known or unknown that may permit software and programming to be altered.

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

2.33   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 VLTs, conform functionally to the documentation and the certified versions of those PCBs that were evaluated and certified by SLGA.

2.34   Patch Wires
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 SLGA and an SLGA recognized, independent testing body. This does not prohibit required repairs in the field. 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 an SLGA recognized, independent testing body; and,
b) Hardware switches which may affect the integrity of the VLT such as pay tables, payout percentages and operations, must meet the 2.18 Configuration Setting section of this document and must be housed within a logic department of the VLT. 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.

2.35   Video Monitors/Touch Screens

All video games shall meet the following rules:
a) Touch screens shall be accurate and, once calibrated, shall maintain that accuracy for at least the manufacturer's recommended maintenance period;
b) A touch screen should be able to be re-calibrated by venue staff without access to the machine cabinet other than opening the main door;
c) Touch screens should be highly resistant to breakage;
d) 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; and,
e) The screen bezel must be installed so as to prevent access to the VLT from an external source.

2.36   Methods of Inserting Value into the Machine

All coin acceptors/comparators must have a readily identifiable model and version number attached to the outer assembly which includes the current version of software installed or in use by the coin acceptor.

2.37   Coin or Token Acceptors

If the VLT uses a coin acceptor, the acceptor shall accept or reject Canadian coin or SLGA approved tokens on the basis of metal composition, mass, composite makeup, or equivalent security. In addition, it shall meet the following rules:
a) Coin Acceptor Security Features/Error Conditions. The coin acceptor shall be designed to prevent the use of cheating methods such as slugging (counterfeit coins), stringing (coin pullback), the insertion of foreign objects and other manipulation;
b) Rapidly Fed Coins. The VLT shall be capable of handling rapidly-fed coins or piggy backed coins so that occurrences of cheating are eliminated;
c) Invalid Coins. Coins deemed invalid by the acceptor shall be rejected to the coin tray and shall not be counted as credits;
d) Coin Acceptance Conditions. Acceptance of coins for crediting to the credit meter shall only be possible when the VLT 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; and,
e) Credit Meter Update on Coin Insertion. Each coin inserted shall register the actual monetary value or a number of credits on the player's credit meter for the current game or bet meter. If registered directly as credits, the conversion rate shall be clearly stated, or be easily ascertainable from the VLT.

2.38   Bill Acceptors

All acceptance devices shall be able to detect the entry of valid Canadian currency, coupons, paper tokens, or other notes approved by SLGA, if applicable, and provide a method to enable the VLT software to interpret and act appropriately upon a valid or invalid input. The acceptance device(s) shall be electronically-based and be configured to ensure that they only accept valid bills of legal tender. Bill acceptors may also accept coupons, paper tokens, or other approved notes and reject all others in a highly accurate

manner. The bill input system shall be constructed in a manner that protects against vandalism, abuse, or fraudulent activity and be designed to ensure that once bills are accepted, they cannot be withdrawn. Credits shall only be registered when:

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

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

2.39   Access to Currency

Access to currency storage area is to be secured via separate key locks and shall be fitted with sensors that indicate door open/close or stacker removed. 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 stacker/cassette can be removed.

2.40   Communications

All bill acceptors shall communicate to the VLT using a bi-directional protocol.

2.41   Factory Set Bill Acceptors

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

a) The selection of bills, coupons, paper tokens, or other approved notes and their limits;

b) Changing of certified EPROMs or downloading of certified software;

c) Adjustment of the tolerance level for accepting bills or notes of varying quality should not be allowed externally to the machine. Adjustments of the tolerance level should only be allowed with adequate levels of security in place. This can be accomplished through lock and key, physical switch settings, or other accepted methods approved on a case-by-case basis;

d) Maintenance, adjustment, and repair per approved factory procedures; or

e) Options that set the direction or orientation of acceptance.

2.42   Tokenization

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

2.43   Machine Metering of Bill Acceptor Events

A VLT, which contains a bill acceptor device, shall maintain sufficient electronic metering to be able to report the following:

a) Total monetary value of all items accepted;

b) Total number of all items accepted; and

c) A breakdown of the items accepted:

      i.   For bills, the game shall report the number of bills accepted for each bill denomination;

     ii.   For all other notes, the game shall have a separate meter that reports the number of notes accepted, not including bills.

2.44   Bill Acceptor Recall

A VLT that uses a bill acceptor shall retain in its memory and display the denomination of the last twenty (20) valid Canadian currency bills, coupons, paper tokens, or other

notes approved by SLGA inserted. SLGA would prefer the history of the last one hundred (100), but twenty (20) shall be the minimum requirement.

2.45   Bill Acceptor Error Conditions
Each VLT and/or bill acceptor shall have the capability of detecting and displaying (for bill acceptors, it is acceptable to disable or flash a light or lights) the following bill acceptor error conditions:
a) Stacker Full – the bill acceptor should disable itself to accept no more bills. The game should generate an error message when the stacker is full;
b) Bill Jams – it is acceptable for the bill acceptor to indicate there is a bill jam by disabling itself to accept no more bills or by some other method;
c) Two or more bills are stacked atop of one another during insertion;
d) Bill Acceptor Door Open – where a bill acceptor door is the belly glass door, a door open signal is sufficient; and
e) Stacker Door Open or Stacker Removed.

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

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

2.48   Bill Acceptor Structural Requirements
A bill acceptor shall not be adversely affected by the following:
a) Electro-static discharge;
b) Power surges;
c) Radio frequency interference;
d) Electro-magnetic interference;
e) Environmental extremes;
f) Interconnecting cables from the bill acceptor device to the VLT shall not be exposed external to the VLT; and
g) If liquids are spilled into a bill acceptor, the only degradation permitted is for the acceptor to reject all bill inputs or generate an error condition.

2.49   Bill Acceptor Stacker Requirements
Each bill acceptor shall have a secure stacker and all accepted bills shall be deposited into the secure stacker. The secure stacker is to be attached to the VLT in such a manner so that it cannot be easily removed by physical force and shall meet the following rules:
a) The bill acceptor device shall have a 'stacker full' sensor;

b) There shall be a separate key to access the stacker area. This key shall be separate from the main door. In addition, a separate key shall be required to remove the bills from the stacker;

c) A tower light or alarm shall be activated whenever there is access to the bill door or the stacker has been removed; and

d) Stacker must be designed to ensure that once bills are accepted, they cannot be withdrawn by any means other than authorized opening with the appropriate key.

2.50   Credit Redemption

Available credits may be collected from the VLT 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.

2.51   Payment By Ticket Printers

The printer shall print on a ticket and provide the data to an on-line data system that records the following information regarding each payout ticket printed. The information listed below can be obtained from the VLT, interface board, the on-line data management system, or another means:

a) Unique validation number, or barcode. To limit the impact of printer failure during the printing process, the VLT (if possible) shall print the unique validation number first in sequence on the ticket;

b) Time of day the ticket was printed in twenty-four (24) hour format showing hours and minutes;

c) Date, in any recognized format, indicating the day, month, and year;

d) VLT number or machine number; and

e) Value of credits in monetary units in numerical form.

Each VLT must contain a mechanism or other means of capturing and retaining an electronic copy or the ticket-out data as approved by SLGA.

2.52   Printer Location

The printer shall be located in a locked area of the VLT (e.g., require opening of the main door to access), but not in the logic area or the coin box door box. This requirement ensures that changing the paper does not require access to the coin box door (cash) or logic areas.

2.53   Printer Error Conditions

There shall be under no circumstances, an abnormal payout slip from the printer when the printer is exposed to higher levels of electro-static discharge or if power is lost at any time during a payout. The printer shall be interfaced in such a way as to allow the VLT

control program to monitor the printer mechanism, in all game states, to identify at least the following events and shall meet the rules in 5.00 Error Conditions. A printer shall have mechanisms to allow software to interpret and act upon the following conditions:
a) Out of paper/paper low;
b) Printer jam/failure; and
c) Printer disconnected which may only be detected when the software tries to print.

If the printer malfunctions or the paper is too low to print a complete payout ticket, the VLT must suspend all game activity, disable the bill acceptor, disable the coin acceptor, suspend printing and display an error message on the screen identifying the potential problem with the printer.

In the event of a printer malfunction, the VLT must maintain communication with the site controller and/or the central system.

3.00 Software Requirements

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

3.02   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) VLT control programs shall test themselves for possible corruption due to failure of the program storage media. The authentication may use the checksum; however, it is preferred that the Cyclic Redundancy Check (CRC) calculations are used as a minimum (at least 16 bit). Other test methodologies shall be of a certified type; and
c) The integrity of all critical memory shall be checked.

3.03   Rules of Play - Display
a) Payglass/Video Display. Payglasses or video displays shall be clearly identified and shall accurately state the rules of the game and the award that will be paid to the player when the player obtains a specific win. The payglasses or video displays shall clearly indicate whether awards are designated in denominational units, currency, or some other unit. The gaming device shall reflect any change in award value, which may occur in the course of play. This may be accomplished with a digital display in a conspicuous location to the VLT, and the game must clearly indicate such. All pay table 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';
c) Fever Mode. Each game which features a "fever" mode (a mode which gives the player an opportunity for the following 'X' number of hands to achieve a certain winning combination with the pay-off being some number of bonus credits) should include the number of hands remaining for the "fever" mode pay-off during each game that fever mode is present. The same shall apply to free games awarded as a result of a previous event; and
d) Multiple Decks of Cards. Any games which utilize multiple decks of cards should alert the player as to the number of card decks in play.

3.04   Information to be Displayed
A VLT shall display, or shall have displayed on the monitor the following information to the player at all times the machine is available for player input:
a) The player's current credit balance;
b) The current bet amount. This is only during the base game or if the player can add to the bet during the game;
c) All possible winning outcomes/combinations, or be available as a menu item or on the help menu;

d) Win amounts for each possible winning outcome, or be available as a menu or help screen item;

e) The amount won for the last completed game (until the next game starts or betting options are modified); and

f) The player options selected (e.g., bet amount, lines played) for the last completed game (until the next game starts or a new selection is made).

3.05   Multi-Line Games

a) Each individual line to be played shall be clearly indicated by the VLT so that the player is in no doubt as to which lines are being bet on; and

b) The winning playline(s) shall be clearly discernable to the player (e.g., this may be accomplished by drawing a line over the symbols on the playline(s) and/or the flashing of winning symbols and line selection box. Where there are wins on multiple lines, each winning playline may be indicated in turn. This would not apply to reel slot games.)

3.06   Game Cycle

A game is considered completed when the final transfer to the player's credit meter takes place (in case of a win), or when all credits wagered or won that have not been transferred to the credit meter, are lost. The following are all considered to be part of a single game:

a) Games that trigger a free game feature and any subsequent free games;

b) "Second screen" bonus feature(s);

c) Games with player choice (e.g., Draw Poker or Blackjack);

d) Games where the rules permit wagering of additional credits (e.g., Blackjack insurance or the second part of a two-part Keno game); and

e) Double-up/Gamble features.

3.07   No "Near Miss"

After selection of the game outcome, the VLT 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.

3.08   No Corruption from Associated Equipment

A VLT 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 VLT.

3.09   Random Number Generator Requirements

The use of an RNG results in the selection of game symbols or production of game outcomes. Each possible permutation or combination of game elements which produce winning or losing game outcomes must be available for random selection at the initiation of each play. The selection shall:

a) Be statistically independent;

b) Conform to the desired random distribution;

c) Pass various recognized statistical tests; and

d) Be unpredictable.

3.10   Applied Tests

SLGA will 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 shall 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);

n) Tests on subsequences; and

o) Any other test deemed applicable by SLGA.

3.11   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. SLGA recognizes that some time during the game, the RNG may not be cycled when interrupts may be suspended. SLGA recognizes this but shall find that this exception shall be kept to a minimum.

3.12   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.

3.13   Scaling Algorithms

a) If a random number with a range shorter than that provided by the RNG is required for some purpose within the VLT, 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.

3.14   Live Game Correlation

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

3.15   Card Games

The consequences for games depicting cards being drawn from a deck are the following:
a) At the start of each game/hand, it is recommended that the first hand of cards shall be drawn fairly from a randomly-shuffled deck; the replacement cards aren't drawn until needed;
b) Cards once removed from the deck shall not be returned to the deck except as provided by the rules of the game depicted;
c) 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 behaviour by the VLT).

3.16   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) The barrel shall not be re-mixed except as provided by the rules of the game depicted; and
c) 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 behaviour by the VLT).

3.17   Payout Percentages, Odds, and Non-Cash Awards

Each game shall theoretically payout a minimum of ninety percent (90%) but not exceed ninety three (93%) during the expected lifetime of the game. The game must meet the following rules:
a) Optimum Play Used for Skill Games. VLTs that may be affected by player skill shall meet the requirement of a minimum payout of 90% and maximum payout of 93% when using a method of play that will provide the greatest return to the player over a period of continuous play;
b) Minimum Percentage Requirement Met at All Times. The minimum percentage requirement shall be met at all times. The minimum percentage requirement shall be met when playing at the lowest end of a non-linear pay table (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; and

c) Double-up or Gamble. The Double-up or Gamble options shall have a theoretical return to the player of one hundred percent (100%) or zero (0%) but will still maintain the theoretical payout minimum ninety percent (90%) but not exceed ninety three (93%) during the expected lifetime of the game.

3.18   Odds

The highest single advertised payout on each VLT 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.

3.19   Bonus Games

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

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

b) The game, other than those that occur randomly, shall display to the player sufficient information to indicate the current status towards the triggering of the next bonus game (i.e., if the game requires obtaining several events/symbols towards a feature, the number of events/symbols needed to trigger the bonus shall be indicated along with the number of events/symbols collected at any point);

c) The game shall not adjust the likelihood of a bonus occurring, based on the history of prizes obtained in previous games (i.e., games shall not adapt their theoretical return to player based on past payouts);

d) If a game's bonus is triggered after accruing a certain number of events/symbols or combination of events/symbols of a different kind, the probability of obtaining like events/symbols shall not deteriorate as the game progresses (e.g., for identical events/symbols it is not permitted that the last few events/symbols needed are more difficult to obtain than the previous events/symbols of that kind); and,

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

3.20   Extended Play

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

a) Extended play awards are part of the game cycle with predetermined award values. Extended play award contributions to the program payout percentage are calculated consistent with awards of the regular game cycle. Specifically, if the cycle for extended play awards is different from the base game cycle, then the extended play awards,

occurring within the base game's cycle, will be calculated as part of the game's payout; and

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

3.21   Extra Credits Wagered During Bonus Games

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.

3.22   Bonus Game's Return

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

3.23   Multiple Games

The software shall accommodate the ability to operate with multiple games embedded onto the software, but be flexible enough to:

a) Allow games to be remotely activated for use to the player; and

b) Allow games to be remotely de-activated for use to the player.

3.24   Multiple Games on the VLT

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

b) The VLT shall be able to clearly inform the player of all games, their rules and/or the pay tables before the player must commit to playing them;

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

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

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

3.25   Electronic Metering Within the VLT Credit Meter Units and Display

The credit meter shall be maintained in credits or cash value.

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

3.27   Credit Meter – Incrementing
The value of every prize (at end of game) shall be added to the player's credit meter.

3.28   Progressives
If progressives are utilized on the video lottery network, they may be added to the credit meter if either:
a) The credit meter is maintained in the currency amount; or
b) The progressive meter is incremented to whole credit amounts; or
c) The prize in the currency amount is converted to credits on transfer to the player's credit meter in a manner that does not mislead the player (i.e., make unqualified statement "wins meter amount" and then rounds down on conversion) or cause accounting imbalances.

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

3.30   Electronic Accounting and Occurrence Meters
Electronic accounting meters shall be at least six (6) digits in length; however, meters eight (8) digits in length are preferred. If the meter is being used in dollars and cents, at least six (6) digits must be used for the dollar amount. The meter must roll over to zero upon the next occurrence, any time the meter is six (6) digits or higher and after 99,999,999 has been reached or any other value that is logical. Occurrence meters shall be at least three (3) digits in length and roll over to zero upon the next occurrence, any time the meter is higher that the maximum number of digits for that meter. The required electronic meters are as follows:
a) **TOTAL IN** (credits-in);
b) **TOTAL OUT** (credits-out);
c) The **AMOUNT WAGERED** meter shall cumulatively count the total amounts wagered during game play, except credits that are won during the game that are subsequently risked in a double up mode;
d) The **AMOUNT WON** meter shall cumulatively count all amounts won by the player at the end of the game,. This meter must not increment for bills inserted and cashed out (used as a change machine);
e) The **GAMES-PLAYED** meter shall display the cumulative number of games played since the last RAM clear;
f) The **CASH PLAYED** meter shall display the cumulative amount of cash played since the last RAM clear;

g)The **CASH WON** meter shall display the cumulative amount of cash won since the last RAM clear;

h) The **GAMES WON** meter shall display the cumulative number of games won since the last RAM clear;

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

j) The coin box door meter shall display the number of times the coin box door or the bill acceptor door was opened since the last RAM clear;

k) The logic door meter shall display the number of times the logic door was opened since the last RAM clear;

l) The bill door meter shall display the number of times the bill door was opened since the last RAM clear; and,

m) Any additional meter(s) as required for compatibility with the central system.

3.31   Multi-Game Specific Meters

In addition to the Electronic Accounting Meters required above, each individual game available for play shall have at least "Credits Bet" and "Credits Won" meters in either credits or dollars. Even if a 'double up or gamble' game is lost, the initial win amount/credits bet amount shall be recorded in the game specific meters. Alternatively, there can be separate meters that accounts for the double-up or gamble information.

3.32   Double-Up or Gamble Meters

For each type of Double-up or Gamble offered, there shall be two meters to indicate the amount doubled and the amount won, which should increment every time a Double-up or Gamble occurs. If the VLT does not supply accounting for the Double-Up or Gamble information, the feature must not be enabled for use.

4.00 Communication with Central System

4.01   Protocol

Communication equipment and devices shall be installed to enable each video lottery terminal to communicate with the SLGA's central computer system. Video lottery terminals are required to communicate with an online video lottery terminal management system. VLT protocol shall be compliant with the requirements set forth in '**Integrity Certification Requirements – Central Systems for Video Lottery Terminals**.'

4.02   Communications Requirements

VLTs are required to communicate with an online electronic game management system. This can either be by "dial up" or continuous:

a) The VLT must be able to store its unique serial number/CPU number and allow the remote central system to be able to ascertain, from a remote location, the exact configuration of the VLT;

b) The technology, architecture and processing capacity must allow for the download of new software in a fast, effective and efficient manner. The Logic must therefore contain sufficient capability to receive, decompress, decode and store data segments into memory while allowing the VLT to continue operating normally without a player noticing;

c) The VLT must encrypt and decipher the information transmitted with a hardware solution. Any form of software encryption will be refused; and

d) All VLTs operate in a controlled manner and are unable to generate revenue in a stand-alone or non-controlled configuration outside of a centrally configured operating hour or if the VLT does not communicate with the central system within a configurable time period.

5.00 Error Conditions

5.01 Errors

VLTs shall be capable of detecting and displaying the following error conditions and illuminate the tower light for each or sound an audible alarm. They shall be cleared either by human attention, or upon initiation of a new play sequence, or by a central system command and be communicated to an on-line monitoring and control system, if applicable:
a) Printer error;
b) RAM error;
c) Low RAM battery, for batteries external to the RAM itself or low power source;
d) Currency-in jam;
e) Program error or authentication mismatch;
f) Door open (including bill acceptor);
g) Meter corruption;
h) Power reset; and
i) Loss of communication with the central system or site controller.

5.02 Restoring Power

If a VLT is powered down while in an error condition, then upon restoring power, the error message shall be displayed and the VLT 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 VLT checks for the error condition and detects that the error is no longer in existence.

5.03 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.

5.04 Door Open Procedures

When the VLT'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.

5.05 Door Close Procedures

When the VLT'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.

5.06 Test/Diagnostic Mode

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

The Test/Diagnostic mode must have a utility to diagnose sub-assemblies and communication problems. This information should be available to the central system if solicited. The VLT must also have the capability to print and display diagnostic results.

The sub-assembly diagnostic must include (but isn't limited to) the following:
a) coin mechanism;
b) bill acceptor (if applicable);
c) switches;
d) touch screen test/calibration;
e) battery voltages;
f) printer;
g) monitor;
h) sound test;
i) device identification with checksums;
j) all lamps;
k) configurable date and time; and
l) self test option for servicing

The VLT diagnostic utility must have an advanced real time communication buss line monitor that will list the status of each VLT being addressed. The line monitor must clearly indicate buss activity of all VLTs connected (and to site controller if applicable).

5.07   Entry To Test/Diagnostics Mode
The main cabinet door of the VLT may automatically place the VLT in a service or test-mode. Test/diagnostics mode may also be entered, via an appropriate key.

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

5.09   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.

6.00 Audit Mode

6.01 Number Of Last Plays Required

Information on at least the last one hundred (100) 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.

6.02 Last Play Information Required

Last play information shall provide all information required to fully reconstruct the last one hundred (100) games. All values shall be displayed, including the initial credits, credits bet, credits won, and credits paid. If a progressive was awarded, it is sufficient to indicate the progressive was awarded and not display the value. This information should include the final game outcome, including all player choices and bonus features. In addition, the results of Double-up or Gamble (if applicable). The VLT will also have the capability to display and print a report of the last twenty (20) outcomes of each individual game enabled on the VLT.

6.03 Bonus Rounds

The one hundred (100) games recall shall reflect bonus rounds in their entirety. This information shall be reported separate from regular play. If a bonus round lasts 'x number of events', each with separate outcomes, each of the 'x events' shall be displayed with its corresponding outcome, if the outcome results in an award. The recall shall also reflect position dependent events if the outcome results in an award. For games that may have infinite free games, there shall be a minimum of one hundred (100) games ability.

6.04 Cash In

The VLT will maintain a reviewable log of the previous twenty (20) (one hundred (100) is preferred) cash in amounts. This includes both coin in and bills in. This information will be available to be printed locally, and reported to the central system. This information will be time stamped to include: date, hour (24 hour clock), minute and second.

6.05 Cash Out

The VLT will maintain a reviewable log of the last twenty (20) (one hundred (100) is preferred) cash out amounts that includes information printed on the cash out ticket. This information will be available to be printed locally, and reported to the central system. This information will be time stamped to include: date, hour (24 hour clock), minute and second.

6.06 Security Events

The VLT will maintain a reveiwable log of the last one hundred (100) security events or flags. This information will be available to be printed locally, and reported to the central system. This information will be time stamped to include: date, hour (24 hour clock), minute and second.

7.00 Verification

7.01   Introduction
The device shall have the ability to allow for an independent integrity check of the device's software from an outside source. This must be accomplished by being able to be authenticated by a third-party device which may be embedded within the game software, or having an interface port for a third-party device to authenticate the media. This integrity check will provide a means for field-testing the software to identify and validate the program. The SLGA approved gaming laboratory shall recommend the method of integrity checking to SLGA for approval for use in Saskatchewan. Other considerations for verifying shall invoke section 7.02 Approval of this document.

7.02   Approval
Due to technological changes permitting manufacturers to take advantage of a variety of different methods of program execution and storage media, SLGA reserves the right to impose requirements for manufacturers to provide a method of verification where traditional verification methods are no longer applicable or reliable. The method of verification is subject to SLGA approval and may be confirmed through third party testing laboratory for confirmation. Designs and concepts implemented by manufacturers will be reviewed on a case by case basis where necessary.

7.03   Bonus Games/Secondary Games
In some instances where the manufacturer uses any of the methods used in the preceding sections to generate a secondary game that is in addition to the base game either within the main cabinet or attached to the gaming device, this bonus game shall be subject to ALL of the criteria outlined within these standards and are subject to the verification process identified in 7.00 Verification section of this document.

7.04   System Verification
Should a central system support the use of "on-line verification" for verifying video lottery terminals, the said VLT shall support system verification and be fully compatible with the central system in this respect.

8.00 Definitions

Cassette – For the purposes of this document, cassette shall refer to the bill acceptor box, or receptacle. "Cassette" is a Casino industry term to describe this. "Stacker" and "cassette" are interchangeable terms.

CD ROM – Compact disc read only memory. A compact disk that is used with a computer (rather than with an audio system); a large amount of digital information can be stored and accessed but it cannot be altered by the user.

Chi-Squared Test – A Test that uses the chi-square statistic (a test statistic that is calculated as the sum of the squares of observed values minus expected values divided by the expected values) to test the fit between a theoretical frequency distribution and a frequency distribution of observed data for which each observation may fall into one of several classes.

Control Program – Software that operates the gaming device's functions.

Corrupt – Technical term to describe computer data, information or code that has been destroyed, manipulated or erroneous.

CPU – Central processing unit. The part of a computer (a microprocessor chip) that does most of the data processing; the CPU and the memory form the central part of a computer to which the peripherals are attached.

Coupons **– "**Coupons" or "paper tokens", are notes approved by SLGA for use as method for players to transfer credits between gaming devices or redemption as a substitute for legal Canadian currency where the gaming device is configured to issue and accept the aforementioned coupons.

Cyclic Redundancy Check (CRC) – CRCs are similar in concept to checksums, but they use polynomial division to determine the value of the CRC, which is usually 16 or 32 bits in length.

Critical Files **–** Files of information or computer code that affect the play, operation or outcome of a gaming device.

EPROM – Erasable, programmable, read only memory. Usually in the form of a computer chip that can have information put onto but only erased if placed under ultra-violet light.

Free Games/Fever Mode – A mode which gives the player an opportunity for the following 'X' number of games to achieve a certain winning combination with the pay-off being some number of bonus credits. Generally refers to a feature where the player has to pay for their spins and some hidden feature is activated for X number of spins.

Flag – For the purposes of this document, the term "flag" shall mean a security event or notification sent to the central system.

Flash – A form of memory for computer code that is typically non-permanent. This can be updated via communications interface.

Flashable – A description of the "style" of memory device, or a verb used to describe the method of changing or updating memory.

Gaming Device – See Section 198 of the *Criminal Code of Canada*. For the purposes of this document, a "gaming device" will refer to a "slot machine" unless otherwise specified.

Hashing Algorithm – Encryption is based on a hash value. This is a value that is computed from a base input number using a hashing algorithm. Essentially, the hash value is a summary of the original value. It is nearly impossible to derive the original input number without knowing the data used to create the hash value.

Interrupt – Computer programming definition used to describe a method by which peripheral devices interacts with the processing routine of a microprocessor, or central processor.

Kolmogorov-Smirnov test – (KS-test) tries to determine if two datasets differ significantly. The KS-test has the advantage of making no assumption about the distribution of data.

Logic – Term used to describe any CPU board and associated circuit boards collectively that can affect the outcome of a game.

Memory – A method for a computer processor to store information to continue with its normal functions.

Message Digest – The mathematical results/signature of the hashing algorithm.

Microprocessor – An integrated circuit semiconductor chip that performs the bulk of the processing and controls the parts of a system; a microprocessor functions as the central processing unit of a microcomputer.

Non-Volatile – A term describing a storage device whose contents are preserved when its power is off. A form of memory that typically has battery back up in the event of power loss.

Payout Percentage – The mathematical value correlating to total credits played vs. total credits won.

PCB – Printed circuit board.

Permutation Tests – The tests are formed by averaging a function of estimated distribution functions that are calculated from independent sampling units.

PSD – Program storage device – a form of memory media.

Private-Key Encryption – A encryption key is known only to your computer.

Public-Key Encryption – A combination of a private key and a public key. The public key is given by your computer to any computer that wants to communicate securely with it. To decode an encrypted message, a computer must use the public key, provided by the originating computer, and its own private key.

RAM – Random Access Memory.

RAM Clear – Technical term for erasing the data or information stored in RAM.

RNG – Random Number Generator. The fundamental basis for gaming device technology.

SAS – An acronym developed by International Gaming Technology used to describe a type of communications protocol.

SLGA – Saskatchewan Liquor and Gaming Authority.

Seeding – For the purpose of this document, the term "seeding" shall be used to describe the method of which random numbers are generated and used by the gaming device. "Seeding" is a technological term used to describe the placement of information.

Stacker – For the purposes of this document, stacker shall refer to the bill acceptor box, or receptacle. "Stacker" is a casino industry term to describe this. "Stacker" and "cassette" are interchangeable terms.

Touch Screen – A form of interface between a user and a computer monitor.

Verification – Casino specific term that describes the process of authenticating critical memory or programming.

WORM – Write only, read many. A method of describing a style of memory.