



DIRECÇÃO DE INSPECÇÃO E COORDENAÇÃO DE JOGOS "DICJ"

MACAO GAMING KIOSKS

TECHNICAL STANDARDS

VERSION 1.0

With effect from 01 December 2023

Copyright © 2023 DIRECÇÃO DE INSPECÇÃO E COORDENAÇÃO DE JOGOS, Macau All Rights Reserved.



EXECUTIVE SUMMARY

This document describes DICJ's minimum technical requirements for gaming kiosks for operation on Macao Gaming Floors.

Gaming kiosk is a device capable of accepting or generating wagering instruments and/or wagering credits and is capable of initiating electronic transfers of money to or from a wagering account.

Gaming kiosks are player service terminals that, as approved by the regulatory body, may be used to perform one or more of the following functions:

- 1. Redeem Ticket-In Ticket-Out for cash.
- 2. Purchase cashable tickets with cash.
- 3. Add cash to card-based gaming accounts.
- 4. Withdraw cash from card-based gaming accounts.
- 5. Dispense funds for manual payments such as cancel credits, jackpot payouts etc.
- 6. Player account management that allows players to manage their account e.g., view the current player point balance, change player pins using a secure method, viewing player activity statements etc.
- 7. Bill breaking where a player can insert a high denomination bill for any combination of change.
- 8. Withdrawing money from an external financial institution.

This standard should be read together with the EGM Technical Standards for Macao.

DICJ accepts no responsibility whatever for errors or omissions within this standard. In particular, it accepts no responsibility for actual or consequential loss which may be claimed by any person to be attributable to compliance with the standard, whether such loss is due to negligence on its part, or not. gaming kiosk manufacturers and approved testing laboratories may seek clarification of any matter contained within the standard, but any such clarification shall be provided by DICJ in writing and shall be subject to the same limitation of liability.

Software change which **materially alters** the operation, fairness, security, reliability or auditability of the affected machine must comply with the requirements specified in this standard. While DICJ will consider any submission made by a gaming kiosks manufacturer regarding the nature of a software change, it will make a binding determination as to whether the software change constitutes a material alteration.

To the extent any inconsistency exists between this standard and a law, regulation, dispatch, executive order or binding instruction concerning gaming kiosks ("other law"), which may be operative in Macao before, or after, the commencement date of this standard (as prescribed in the accompanying Implementation Details of the Technical Standards), the relevant provisions of the other law will prevail.



博彩 監察協調局 Direcção de Inspecção e Coordenação de Jogos

Contents

1		INTRODUCTION	1
	1.1	Purpose	1
	1.2	Objectives	1
	1.3	Certification	1
	1.4	Regularity of Interpretation	1
	1.5	General Requirements	2
	1.6	Operational Requirements	2
2		HARDWARE	4
	2.1	Objective	4
	2.2	Cabinet Identification	4
	2.3	Cabinet Security	4
	2.4	Electrical - Cabinet Wiring	5
	2.5	Interference	5
	2.6	Environmental	5
	2.7	Power Supplies	6
	2.8	Liquid Spills	6
	2.9	Circuit Boards	6
	2.10	Critical Memory	7
	2.11	Monitors	8
	2.12	Audible Alarm	8
	2.13	Printers	8
	2.14	Bill Acceptor Devices	9
	2.15	Communication with Bill Acceptors	9
	2.16	Touch Screens	10
3		SOFTWARE	11
	3.1	Objective	11
	3.2	Source Code Compilation	11
	3.3	Control Program Requirement	11
	3.4	Metering Requirements	11
	3.5	Test/Diagnostic Mode	13
	3.6	Gaming Kiosk Events (Tilt Situation)	13
	3.7	Audit Mode	14
	3.8	Software Verification	15
4		REPORTS AND LOGS;	16
	4.1	Events Reporting	16
	4.2	Transaction Logs	16
	4.3	Significant Event Logs	17
	4.4	Reporting Requirements	17
5		COMMUNICATION REQUIRMENTS	18
	5.1	Objective	18
	5.2	Communication Requirement	18
	5.3	Central Monitoring System (CMS)	19
6		TICKET IN/SHORT PAY TICKET OUT (VOUCHER IN/SHORT PAY VOURCHER OUT)	20



博彩 監察協調局 Direcção de Inspecção e Coordenação de Jogos

6.1	Ticket In	. 20
6.2	Short Pay Ticket Out	. 20
7	GLOSSARY OF TERMS AND ABBREVIATIONS	. 21



博彩 監察協調局 Direcção de Inspecção e Coordenação de Jogos

1 INTRODUCTION

1.1 Purpose

This document describes DICJ's minimum technical requirements for gaming kiosks. This standard should be read in conjunction with Macao legislative requirements.

1.2 Objectives

The intent of this document is to specify sufficient requirements and controls to ensure that operation of the gaming kiosks in a manner that is:

- 1. Secure;
- 2. Reliable;
- 3. Auditable.

It is not the intent of this document to unreasonably:

- 1. Mandate a single solution or method of realizing an objective;
- 2. Limit technology application to gaming equipment;
- 3. Limit creativity or variety of choice;
- 4. Limit marketability;
- 5. Advantage any supplier or manufacturer of equipment; or
- 6. Preclude research and development into new technology, equipment or innovative solutions.

Hence, this document specifies <u>what</u> the minimum technical requirements for gaming kiosks are instead of <u>how</u> the requirements should be met and is not intended to mandate a particular solution or method as the means to realize the requirement.

The DICJ is the regulatory authority that supervises and regulates the activities of casinos in Macao. Concessionaires are required to be licensed by law and their gaming kiosks deployed on the casino floors shall comply with the technical requirements stated in this document before they can be lawfully operated in the Macao jurisdiction.

1.3 Certification

Certification of gaming kiosks and devices submitted for approval by DICJ must be undertaken by approved testing laboratories which shall be required to determine compliance with the technical requirements provided in this technical standard. Scope of any non-compliance shall be reported in the certification report. A copy of all certification reports must be lodged with DICJ at the time of application for approval.

1.4 Regularity of Interpretation

DICJ acknowledges that this technical standard may be subject to different interpretations by gaming kiosk manufacturers, gaming operators and, testing laboratories. Thus, any comment where different interpretations may be applied to this technical standard should be referred to DICJ for clarification.

Macao Gaming Kiosks Technical Standards Version 1.0



1.5 General Requirements

- 1. The construction of the kiosk including any external attachment shall be robust to prevent easy access to the unit. There must be evidence of any forced entry.
- 2. Access to any section of the kiosk shall be detected through door sensors. The door sensors shall alert the software when a door has been opened (at least one sensor per door). Typical doors to be monitored are:
 - a. Top door(s) (BNA, thermal Printer, monitor etc.);
 - b. Security area door(s);
 - c. Drop box door(s);
 - d. Bill acceptor doors (including stacker door);
 - e. Bottom door (note dispenser, PC, power supply unit etc.);
 - f. Any other area housing a critical processor; and

g. Communication boards if accessible without opening any of the above.

When any doors are closed, a message stating that the door(s) has/have closed must be displayed in kiosk back office software and/or CMS.

- 3. Role Based Access Control shall be implemented to allow only authorised personnel to gain access to the kiosk's functions, software and hardware components on the kiosk with respect to the individual's job functions.
- 4. No peripheral components of the system such as USB hub, Ethernet hub shall be accessible without gaining access to a locked area.
- 5. No pluggable sockets/connectors/plugs at the PC of the kiosk should be physically removed without gaining access to a locked area.
- 6. It shall not be possible to disconnect the communication to the host without accessing a locked area.
- 7. The kiosk should be locked up when any of the doors or devices is in a fault condition. Kiosk should still be communicating with the host.
- 8. It is recommended that the kiosk be installed with an UPS.
- 9. The kiosk shall have an on/off switch that controls the mains input to the unit shall be located in a place easily accessible within the interior of the kiosk.
- 10. The kiosk should indicate appropriate information to the player if it cannot dispense cash or tickets for some reason. (E.g. "Unable to validate transaction. Please see attendant" etc.).
- 11. The kiosk shall not allow a single ticket for greater than HKD50,000.

1.6 Operational Requirements

- 1. Terminal should be able to print a short pay ticket for any cash out short pays including the note breaking mechanism.
- 2. The maximum amount that can be redeemed at the kiosk should be either hard-coded in the kiosk or must be stored using a secure method. It must not be possible to change this value by the casino staff in an easy manner.
- 3. All kiosk software versions should be viewable on the audit screen.



- 4. Access to different levels of functions shall be protected using different levels of player passwords. Typical levels of access levels are:
 - a. Administrator level to configure CRT's IP, ports etc;
 - b. Database access;
 - c. Supervisor level to configure CRT's note parameters, GMID etc;
 - d. Attendant level to clear lockups, diagnostic modes etc.
- 5. The kiosk shall monitor and report critical operational events such as 'note stacker empty' etc.
- 6. The kiosk must be able to:
 - a. Uniquely identify each transaction;
 - b. Calculate and pay-out all monetary transactions accurately;
 - c. Record all monetary transactions executed accurately; and
 - d. Retain all transactional records and data accurately and make such records and data available to the permit officer whenever required.
- 7. The kiosk shall only allow its player to carry out cash withdrawal from the player's e-cash wallet maintained and managed by (CMS) that the kiosk is connected to. The kiosk shall not be connected to the Internet when it is connected to the CMS. This is not meant to prohibit a secure, remote connection that does not traverse the open internet.



Direcção de Inspecção e Coordenação de Jogos

2 HARDWARE

2.1 Objective

This section describes the physical features of a gaming kiosk, its components and its inner functions. The goal is to provide Macao specific standards for gaming kiosk manufacturers to ensure that all conforming gaming kiosk platforms can be operated in a reliable, secure and, auditable manner.

2.2 Cabinet Identification

A gaming kiosk machine shall have an identification plate that is permanently affixed to the exterior of the cabinet by the manufacturer and shall include the following information:

- 1. The name of the manufacturer;
- 2. A unique serial number;
- 3. The machine model number/name; and
- 4. The date of manufacture.

The identification plates must be reasonably resistant to scratching, to prevent them being defaced or fraudulently altered.

2.3 Cabinet Security

2.3.1 Locked Areas

- 1. The entirety of a gaming kiosk which does not form part of the player's input interface (e.g. buttons) must be stored within one or more locked areas of the gaming kiosk.
- 2. All locked areas must be equipped with access detection devices / switches, to detect access to all locked areas.
- 3. It must not be possible to disable a door open sensor without first opening the door using the designed manner (e.g. key) or leaving physical evidence of forced entry.
- 4. It must not be possible to reset the door open state by software means, if the door open sensor indicates that the door is still open.

2.3.2 Program or Security Area

- 1. The program or security area is a locked compartment area (with its own independently locked door), within the cabinet, that houses electronic components that have the potential to significantly influence the operation of the gaming kiosk. There may be more than one (1) such security area in a gaming kiosk.
- 2. Provision must be made for a physical seal on the security area door which must be broken on entrance or removal of the security area.



2.4 Electrical - Cabinet Wiring

- 1. The gaming kiosk shall be designed so that power and data cables into and out of the gaming kiosk can be routed so that they are not accessible to the general public.
- 2. Security related wires and cables that are routed into a security area must not be able to be removed without unlocking the security area door.

2.5 Interference

All electrical testing of the gaming kiosks is to be conducted while the devices are fully operational and installed as they would be in the casino. This kind of electrical testing of a kiosk may be conducted by appropriate test labs, such as UL or CE.

2.5.1 Electromagnetic Radiated Emissions

The gaming kiosk machine shall comply with the CISPR 32 Class A or equivalent specifications.

2.5.2 Electrostatic Discharge (ESD)

- Gaming kiosks shall exhibit total immunity to human body model electrostatic discharges on all areas exposed to player contact. The tests shall be conducted according to IEC 61000-4-2 with a severity level of ± 7.5kV contact discharge.
- Gaming kiosks may exhibit temporary disruption when subjected to a more significant electrostatic discharge, but they shall recover and without loss or corruption of any control or data information associated with the gaming kiosk. The tests shall be conducted according to IEC 61000-4-2 with a severity level of ± 20kV air discharge.

2.5.3 Radio Frequency Interference (RFI)

The gaming kiosk shall not be affected in any way by the application of RFI at a frequency range from 27MHz to 1000 MHz with a field strength of 3 volts per meter.

2.5.4 Electrical Safety

The gaming kiosk shall comply with the IEC 60335-2-82 or equivalent specifications.

2.6 Environmental

Gaming kiosk can be expected to operate in a variety of environments. The manufacturer shall specify the environmental conditions under which the gaming kiosk will operate within full specification.

- 1. Performance of the gaming kiosk shall not degrade while operating within manufacturer's specified range of environmental parameters.
- 2. In the event that the operating conditions exceed the environmental parameters specified by the manufacturer, and the gaming kiosk is incapable of continued operation, it shall perform an orderly shutdown without loss of current status, accounting and security event data.



3. Gaming kiosk shall be robust enough to withstand destructive power by human being (a man without destructive tool).

2.7 Power Supplies

- 1. Gaming kiosk must operate from electric mains power of nominally 220V 50Hz.
- 2. Gaming kiosk shall comply with the requirements of IEC 61000-3-2 for harmonic currents when operated at nominal mains voltage.
- Gaming kiosk shall be unaffected by Electrical Fast Transients as defined by IEC 61000-4-4. Criteria shall be 2.5kV both polarities, each conductor, 5ns rise, 50ns duration, 5kHz, one minute.
- 4. Gaming kiosk shall be unaffected by continuous operation when supplied with mains electric power that deviates from the nominal voltage by ±10%.
- 5. Gaming kiosk shall either be unaffected by or shall recover from:
 - a. A surge or dip of $\pm 20\%$ of the supply voltage that lasts for 600 seconds;
 - b. Voltage dips and interruptions as defined in IEC 61000-4-11, 30% dip 500ms;
 - c. Electrical surge as defined in IEC 61000-4-5 2kV line to line and 2kV line to earth;
 - d. Repeated switching on and off of the AC power supply; and
 - e. Jiggling the AC cord at the wall outlet.

In each case, it shall be acceptable for the equipment to reset provided no damage to the equipment or loss or corruption of data is experienced.

2.8 Liquid Spills

Liquid spills applied to the outside of a gaming kiosk must not affect the normal operation of the machine or affect the integrity of the material or information stored inside the cabinet. It is recognized that as a result of a liquid spill some peripheral components such as touch screen, button and bill acceptor may lose normal operation until the surface dries or the component replacement.

2.9 Circuit Boards

- 1. Each Printed Circuit Board (PCB) in a gaming kiosk shall be identifiable by a name (or number) and revision level that is permanently displayed on the board.
- 2. The circuit board assemblies, used in a gaming kiosk, shall conform functionally to the documentation of the PCBs that were submitted to the recognized testing laboratory.
- 3. All patch wires and track cuts shall be documented in the relevant service manual and submitted to the recognized testing laboratory.
- 4. All switches and jumpers shall be fully documented for evaluation by the recognized testing laboratory.
- 5. Switches or jumpers that have the potential to affect the security, stability of the gaming kiosk shall not be permitted.



2.10 Critical Memory

Kiosk that does not perform authentication of all transaction from an associate host shall have the following additional security features:

- 1. All electronic meters, all logs as specified in <u>section 4.3</u> and all last 100 events (minimum) will be treated as '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. The kiosk shall stop all operations when it detects an error in critical memory storage. The procedure to be used to recover from any critical memory storage shall be documented in the submission.
- 3. The kiosk shall not permit the alteration of any Meter or Error Condition log information without supervised access controls. In the event Meter or Error Condition log data is changed, an audit log must be capable of being produced to document:
 - a. Data element altered;
 - b. Data element value prior to alteration;
 - c. Data element value after alteration;
 - d. Time and Date of alteration; and
 - e. Personnel that performed alteration (user login).
- 4. The kiosk shall utilize battery backup, or an equivalent, that is capable of maintaining the accuracy of all Critical Memory for a minimum of thirty (30) days after power is discontinued from the kiosk.

2.10.1 Maintenance of Critical Memory

- 1. All critical data must be stored using a fault tolerant methodology that enables errors to be identified and corrected in most circumstances.
- 2. A proven and reliable mechanism shall be implemented to check for any corruption of critical memory locations used for crucial gaming kiosk functions.
- 3. Critical memory shall maintain all data that is considered vital to the continued operation of a gaming kiosk.

2.10.2 Detection of Corrupted Memory

- 1. Comprehensive checks of the relevant contents of the gaming kiosk's critical memory shall be undertaken at least after every restart of the device;
- 2. After a gaming kiosk restarts (e.g. power off and on), the device must complete its validity check of the entire critical memory storage area and then perform a comparison check of all good logical copies of critical memory.
- 3. Any failure of a validity check is to be considered either:
 - a. A recoverable memory corruption if at least one copy of critical memory is established to be good, or
 - b. An unrecoverable memory corruption.



2.10.3 Critical NV Memory Backup

The operation of the kiosk relies on locally stored critical NV memory, which shall have a backup or archive capacity allowing the recovery when a failure occurs.

2.11 Monitors

If a kiosk is equipped with a monitor, the following requirements apply:

- 1. The monitor along with its surrounding bezel shall fit precisely into the kiosk in a manner that avoids gaps, defends against the entry of external objects;
- 2. The monitor shall be constructed of toughened material to resist player abuse;
- 3. The resolution of the configured monitor shall be compatible with the resolution supported by the software in a manner that ensures the intended function of the display;
- 4. The resolution of the configured monitor shall not fail to display any information critical to the kiosk;
- 5. Where adjustment mechanisms for a monitor unit are provided for use by an attendant (i.e. not service technician), they shall:
 - a. be clearly labelled; and
 - b. be accompanied by detailed instructions in the Operator's Manual.

2.12 Audible Alarm

- 1. A suitable audible alarm in the gaming kiosk shall be provided for effectively signaling any of the error or security features required by this standard.
- 2. There may be a method whereby legal access can be made into the internal area of the gaming kiosk (by authorized personnel via an audit mode or other accountable method) where the audible alarm is not activated.
- 3. A technique may be provided to enable authorized personnel to adjust the volume level (without the need to enter the security area). However, the adjustment of the volume shall not allow the alarm output to be below a threshold level whereby the alarm cannot be heard with the door shut in a typical gaming environment.
- 4. The duration of the alarm when activated shall be at least 3 seconds.

The requirement may be satisfied by a machine (paging) communication system, which communicates real time machine event alerts directly to an attendant.

2.13 Printers

- 1. If a gaming kiosk is equipped with a printer, it must be located inside a locked cabinet of the gaming kiosk.
- 2. Printer should not be housed within the logic area or the drop box.
- 3. A printer must 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. Disconnected.



博彩 監察協調局 Direcção de Inspecção e Coordenação de Jogos

2.14 Bill Acceptor Devices

2.14.1 General

- 1. The bill input system must be constructed in a manner that protects against vandalism, abuse or fraudulent activity.
- 2. The acceptance device(s) must be electronically based and be configured to ensure that it only accepts valid bills of MOP/HKD plus valid coupons, tickets, or other approved casino script and rejects all others.
- 3. All accepted valid bills of legal tender plus valid coupons, tickets, or other approved casino script are to be deposited into the secure bill storage area (stacker).
- 4. All invalid or unauthorized bills are to be rejected and returned to the player.
- 5. Interconnecting cables from the bill acceptor device to the gaming kiosk must not be exposed external to the gaming kiosk or readily accessible to unauthorized staff.

2.14.2 Functional

- 1. States such as door open states, fault conditions and audit mode must cause the disabling of the bill acceptor system (other than in bill acceptor self test mode, if supported).
- 2. The machines shall return the note, notwithstanding that there may be a small window of time where power may fail. In this case, the window shall be less than one (1) second.
- 3. One bill acceptor shall accept only one single currency (i.e. MOP or HKD).

2.14.3 Bill Stacker

- 1. The bill acceptor device shall have a 'stacker full' sensor.
- 2. The stacker shall be locked independently of the main cabinet and security area.
- 3. The stacker must be fitted with sensors that indicate stacker door open/close or stacker removed.
- 4. A separate lock shall be required to remove the bills from the stacker.
- 5. There must be a sensor which detects and reports to the software system whenever there is access to the bill door or the stacker has been removed.
- 6. Access required for correcting operational lockups such as paper jam etc. will not automatically gain access to the stacker area.

2.15 Communication with Bill Acceptors

The bill acceptor device must employ a reliable, bi-directional protocol with error detection for communicating with the gaming kiosk. A message with error must either be corrected or rejected.

2.15.1 Bill Acceptor Self Test

The bill acceptor device must perform a self test at each power up. In the event of a self test failure, the bill acceptor must automatically disable itself until the error state has been cleared.



2.15.2 Bill Acceptor Error Conditions

Each gaming device and/or bill acceptor shall have the capability of detecting and displaying the following bill acceptor error conditions:

- 1. Bill-in Jam;
- 2. Bill Acceptor Door Open;
- 3. Stacker Door Open or Stacker Removed.

2.16 Touch Screens

2.16.1 Accuracy

Touch screens must be accurate so that a player's actions can be interpreted correctly.

2.16.2 Button Icons

Touch screen button icons must be sufficiently separated to reduce chances of the wrong icon being selected due to miscalibration or parallax errors.

2.16.3 Calibration Facility

- 1. A touch screen must have a software re-calibrating facility unless the touch screen is designed never to require re-calibrating;
- 2. Once calibrated, the touch screen must maintain that accuracy for at least the manufacturers recommended maintenance period; and
- 3. A touch screen should be able to be re-calibrated by casino staff without access to the machine cabinet other than opening the main door unless it does not require calibration.

2.16.4 Construction

Touch screens must be resistant to scratching from conditions likely to occur during normal use.



3 SOFTWARE

3.1 Objective

This section describes the software requirements so that the software performs as anticipated and is reliable. It creates the minimum standards of function so that all conforming platforms would be reliable, secure, auditable and, operate in conformance with their specifications.

3.2 Source Code Compilation

- 1. All source code submitted must be correct, complete and able to be compiled.
- 2. The resultant compiled object code must be identical to that in the storage media submitted to test laboratory for evaluation and be verifiable with the media to be operational in sites.

3.3 Control Program Requirement

Any program component of the authentication or initialization mechanism must originate from a secure location that must be capable of being authenticated using commercially available tools.

3.4 Metering Requirements

3.4.1 Electronic Accounting Meters

- 1. All gaming kiosks shall be equipped with soft meters (electronic digital storage meters) of at least 10 numerical digits capable of recording and displaying the required information listed in this section where applicable to the kiosks.
- 2. The meter shall automatically roll over to zero once its maximum logical value has been reached. Meters shall be labeled so they can be clearly understood in accordance with their function.
- 3. These meters, **listed in section 3.4.2**, shall display the following information in dollars and cents.
- 4. The gaming kiosks need to provide only the necessary meters for the authorized functions the devices support.

3.4.2 Meter Definitions

- 1. <u>Handpay:</u> The kiosk software shall have a meter that accumulates the total value of payments made by an attendant when the kiosk is incapable of making the proper payment.
- 2. <u>Bill In:</u> The kiosk software shall have a meter that accumulates the total value of currency accepted.
- 3. <u>Bill Out:</u> The kiosk software shall have a meter that accumulates the total value of currency physically paid by the kiosk.



- 4. <u>Ticket In</u> (Voucher In): The kiosk software shall have a meter that accumulates the total value of all wagering vouchers accepted by the kiosk.
- 5. <u>Ticket Out</u> (Voucher Out): The kiosk software shall have a meter that accumulates the total value of all wagering vouchers issued by the kiosk.
- 6. <u>Short Pay Ticket (Voucher)</u>: The kiosk software shall have a meter that accumulates the total value of short pay which is for a ticket with a value less than the minimum banknote denomination of the MOP/HKD.
- 7. <u>Electronic Funds Transfer In (EFT In)</u>: The kiosk software shall have a meter that accumulates the total value of cashable credits electronically transferred to the kiosk from a financial institution through a host system.
- 8. <u>Player Account Transfer In (WAT In):</u> The kiosk software shall have a meter that accumulates the total value of cashable credits electronically transferred to the kiosk from a player account through a host system.
- Player Account Transfer Out (WAT Out): The kiosk software shall have a meter that accumulates the total value of cashable credits electronically transferred from the kiosk to a player account through a host system.
- 10. <u>Other Meters:</u> The kiosk software that allows for transactions related to regulated operations of the kiosk that would not otherwise be metered under any of the above electronic accounting meters, shall maintain sufficient meters to properly reconcile all such transactions.

3.4.3 Electronic Occurrence Meters

Occurrence meters shall be at least eight (8) numerical digits in length, however, are not required to automatically roll over. Meters shall be labeled so they can be clearly understood in accordance with their functions. The required electronic occurrence meters are as follows:

- 1. <u>External Doors:</u> The kiosk software shall have meters that accumulate the number of times any external door (e.g., main door, security door, etc.) has been opened since the last NV memory clear, provided power is supplied to the kiosk.
- 2. <u>Stacker Door:</u> The kiosk software shall have a meter that accumulates the number of times the stacker door has been opened since the last NV memory clear provided power is supplied to the kiosk.
- 3. <u>Bill Denomination In:</u> The kiosk software shall have a specific occurrence meter for each denomination of currency accepted by the kiosk.
- 4. <u>Bill Denomination Out:</u> The kiosk software shall have a specific occurrence meter for each denomination of currency dispensed by the kiosk.
- 5. <u>Wagering Instruments Accepted:</u> The kiosk software shall have a specific occurrence meter that records the number of all other notes not including bills, such as vouchers and coupons, accepted by the kiosk.
- 6. <u>Wagering Instruments Issued:</u> The kiosk software shall have a specific occurrence meter that records the number of all other notes not including bills, such as vouchers and coupons, issued by the kiosk.
- 7. <u>Short Pay Ticket (Voucher) Issued:</u> The kiosk software shall have a specific occurrence meter that records the number of short pay tickets issued by the kiosk.



3.4.4 Bill In Count Meters

A gaming kiosk which contains a bill acceptor device shall maintain sufficient metering to be able to report the following:

- 1. Total monetary value of all items accepted;
- 2. Total number of all items accepted;
- 3. Total monetary value of all bills accepted;
- 4. Total number of bills accepted;
- 5. Total count of rejected bills;
- 6. The number of bills accepted for each bill denomination;
- 7. The value of the last ten bills accepted with time stamps; and
- 8. For all other notes (tickets and coupons) the gaming kiosk shall have a separate meter that reports the number of items accepted, excluding bills.

3.5 Test/Diagnostic Mode

3.5.1 General

If in a test mode, any test that incorporates cash/ticket entering or leaving the gaming kiosk (e.g. a bill test) shall be completed prior to resumption of normal operation. In addition, there shall not be any test mode that increments any of the electronic meters. Any value of cash/ticket on the gaming kiosk that were built up during the test mode shall be cleared before the test mode is exited. Test meter is acceptable provided the meter indicates as such.

3.5.2 Enter to Test/Diagnostic Mode

The sensor of the main cabinet door of the gaming kiosk may automatically set the machine in a service or test-mode. Test/diagnostic mode may also be entered, via a proper instruction, from an attendant during an audit mode access.

3.5.3 Exit from Test/Diagnostic Mode

When exited from test mode, the kiosk shall return to the original state it was in when the test mode was entered.

3.6 Gaming Kiosk Events (Tilt Situation)

A description of tilt shall be displayed in a self-explanatory way.

3.6.1 Self Clearing Events

Gaming kiosk shall detect and display the following conditions and may be automatically cleared when the fault is cleared by the gaming kiosk upon commencement of a new operational mode and also communicated to an on-line monitoring and control system if applicable:

- 1. Power reset;
- 2. Any door open (including bill acceptor & stacker);



- 3. Any door just closed;
- 4. Inappropriate bill in or ticket in if it is returned to the player; and
- 5. Stacker removed/inserted.

3.6.2 Events Cleared by Attendant Intervention

Gaming kiosks shall be capable of detecting and displaying the following error conditions that shall disable the operation and shall only be cleared by an attendant and also communicated to an online monitoring and control system if applicable:

- 1. Bill in jam;
- 2. Low RAM battery for batteries external to the RAM itself or low power source;
- 3. Uncorrectable RAM error (defective or corruptive RAM);
- 4. Print failure, if the gaming kiosk has no other means to make a payout, a replacement ticket may be printed once the failure condition has been cleared;
- 5. Printer mechanism paper jam. A paper jam condition shall be monitored at all times during the print process;
- 6. Printer mechanism paper out;
- 7. Presentation error; and
- 8. Program error (Defective program storage media).

Gaming kiosk shall be capable of storing and displaying a minimum of the last 30 events.

3.7 Audit Mode

3.7.1 Audit Mode Requirements

Audit mode is to include as a minimum the following items:

- 1. Display of all electronic meter information as per the **section 3.4.2** 'Meter Definitions';
- 2. Display of terminal identification;
- 3. Display of software identification;
- 4. On-screen hashing algorithm signature verification;
- 5. Last Bill In, Ticket In and Ticket Out Data;
- 6. Machine configuration information; and
- 7. Display of any other statistics, if maintained by the gaming kiosk and not transferred to and maintained by CMS.

3.7.2 Audit Mode Access

- 1. Access to Audit mode is limited to the operation of a key-switch or other secure methods.
- 2. Auditing of metering information must be accessible by an authorized person at any time, except during collect in progress.
- 3. The gaming kiosk must not be in operational (cash in/out; ticket in/out) while in Audit mode.



3.7.3 Signature Verification

The gaming kiosk shall provide capability to verify the signature of all PSDs or individual software files used in the gaming kiosk in the audit mode. This function shall support the following:

- 1. The gaming kiosk shall provide capability to verify the signature of all physical / logical PSDs or individual software files using a secure hashing method such as HMAC-SHA1 or other better well-known security algorithms which are recognized by the gaming industry.
- 2. The gaming equipment must allow the manual entry of a signature key for the hashing algorithm. Signature key entry must be via an interface provided by the gaming equipment and there must be an on-screen legend displayed. The default signature key is hexadecimal 00 / 0000.
- 3. Signature key entry is to be :
 - a. In hexadecimal characters;
 - b. Entered least significant bytes (LSB) first;
 - c. Suitably formatted for displaying for easy reading; and
 - d. For gaming equipment with multiple physical or logical PSDs, the gaming kiosk shall display individual signature results of each physical/logical PSD in the gaming equipment.

3.8 Software Verification

- 1. The gaming kiosk shall allow for an independent integrity test of the machine's software from an external source. This may be performed by the medium being able to be removed and authenticated by an external device or employing an interface port for an external device to authenticate the media. This integrity test procedure shall provide the means for field testing of machine software for verification purposes.
- 2. The gaming kiosk shall also be enabled for self-authentication of the machine software with its management system.



4 **REPORTS AND LOGS;**

4.1 Events Reporting

Kiosk shall detect, store and report the following events to the CMS or associated kiosk back office system and must indicate the error condition either through an audible alarm or through a tower light:

- 1. Payout Failure
- 2. Short Pay
- 3. Any door open & close
- 4. Thermal Printer & Dot Matrix Printer jam
- 5. Thermal Printer & Dot Matrix Printer disconnected
- 6. Printer Paper Low
- 7. Cash Cassette Empty
- 8. Bill Acceptor Stacker Full
- 9. Bill Acceptor Jam
- 10. Stacker Removed
- 11. System Communication is Down
- 12. Critical RAM Error

4.2 Transaction Logs

There shall be the capacity to display a complete transaction log for the previous thirty-five (35) transactions that incremented any of the meters related to bills, wagering instruments, EFT, and player account transactions. The following information shall be displayed:

- 1. The transaction value in local monetary units in numerical form;
- 2. The time of day of the transaction, in twenty-four (24) hour format showing hours and minutes;
- 3. The date of the transaction, in any recognized format, indicating the day, month, and year;
- 4. For wagering instrument transactions, the validation number with the following conditions:
 - a. Where the log can be displayed from kiosk terminal, only the last/first four (4) digits may be displayed for voucher-out transactions where the vouchers are yet to be redeemed;
 - b. Where the log can be displayed from back-office platform, at least the last four (4) digits shall be displayed for voucher-in transactions;
- 5. For player account transactions:
 - a. The type of transaction (upload/download) including restrictions (cashable, non-cashable, etc.); and
 - b. The account number or a unique transaction number, either of which can be used to authenticate the source of the funds (i.e. where funds came from/went to).



4.3 Significant Event Logs

The last one hundred (100) significant events for a kiosk shall be stored with an appropriate timestamp in one or more secure logs that are not accessible to the player and which minimally include the following events, as applicable:

- 1. Software verification errors or critical NV memory errors, if technically possible to log these events based on the nature and/or severity of the error;
- 2. Changes made to kiosk configurations;
- 3. Kiosk communication failure, if supported;
- 4. Power resets;
- 5. Redemption conditions;
- 6. Access to secured areas or secured compartments; and
- 7. Peripheral errors, if supported.

4.4 Reporting Requirements

Kiosk or kiosk-associated equipment shall be capable of producing the following reports upon demand.

4.4.1 Ticket or Voucher Transaction Report

This report must include the disposition (paid, partial pay, unpaid etc.) of vouchers accepted by the kiosk, the validation number, the date and time of redemption, and the amount. This information must be available by reconciliation period (i.e. by day, shift or drop cycle).

4.4.2 Reconciliation Report

This report must include the current cash balance of the kiosk by denomination in counts & in dollar amount, the current voucher balance in total by dollar amount, voucher count of the kiosk, bills inserted for 'Bill Breaking' by denomination in counts & in dollar amount, the currency used to dispense this by denomination in counts & in dollar amount and short pay vouchers issued. It must be possible to produce this report for any given reconciliation period.

4.4.3 Bill Breaking Report

This report must show the details of the currency inserted and the denominations used to pay out the value. This information must be available by reconciliation period (i.e. by day, shift or drop cycle).



5 COMMUNICATION REQUIRMENTS

5.1 Objective

The intent of this section is to ensure that communications with the gaming kiosk are secure so as to avoid unauthorized access or modification of communicated data as well as to ensure that all related translations are precise and free from error.

5.2 Communication Requirement

- 1. All external data communication shall be protocol based and/or integrate an error detection and correction scheme to ensure an accuracy of not less than 99% of messages received.
- 2. The communication protocol shall ensure that incorrect data or signals would not harmfully affect the operation of the gaming machines.
- 3. Certificates, keys or seeds that are used for encryption purposes shall not be hard coded and shall be changed from time to time.
- 4. The communication protocol shall also ensure that erroneous data or signals would not adversely affect the operation of the gaming machine through the use of proven error checking mechanism on the transmission. The error checking mechanism used shall be at least Cyclic Redundancy Check (CRC) of 16 bits.
- 5. External data communication protocols shall as far as possible be open standards based to allow for interoperability between gaming kiosk and the central monitoring system (CMS).
- 6. The gaming kiosk shall be able to synchronize its local date and time with the electronic gaming management systems intended for, less than sixty (60) seconds so as to ensure that time stamping of all events and data is correct.
- 7. Data communications associated with monetary player balances shall be encrypted for secure communication purposes.
- 8. The kiosk must perform a self-check of all executables at least on every power up. It is desirable to perform this check periodically (once every day) as well as communication to the host is lost and restored. The kiosk must go into a disable state when any corruption is detected.
- 9. To avoid loss of ticket data from communication disruption or from corrupted packets, kiosk must keep re-sending data to the Host if no acknowledgement has been received for a particular transaction. If the failure of sending final acknowledgement was due to communication failure, upon communication re-establishment the data for the pending transaction will be re-sent, until it has been acknowledged. No other tickets will be processed till this process is successfully completed.
- 10. In event of communication breakdown between the kiosk(s) and CMS, all monetary associated transactions shall halt immediately, any uncompleted monetary transaction will be terminated and the person carrying out the transaction must be informed of the error. All transactions shall reconcile upon the resumption of connectivity, and the system shall be able to account for all payments made and the balance residing in the player's accounts accurately.
- 11. The kiosk must not payout the ticket value unless the ticket is stacked.
- 12. Each kiosk connected to a host system must be uniquely identified by the host.



5.3 Central Monitoring System (CMS)

A CMS is an electronic monitoring system or device, which is computerized or with communication intended to be used or adapted to send or receive data about gaming machines and kiosks, namely with respect to its safety, integrity, accounting control, auditing.

- 1. The gaming kiosk must be permanently connected to a CMS.
- 2. The gaming kiosk disconnected from CMS must be suspended automatically whenever the connection cannot be immediately established.
- 3. The gaming kiosk disconnected from CMS must be removed from the gaming location, except when it is subject to installation or maintenance.
- 4. The exploitation of the gaming kiosk in the situation described in item 2 can only be resumed after the connection to the CMS.



6 TICKET IN/SHORT PAY TICKET OUT (VOUCHER IN/SHORT PAY VOURCHER OUT)

6.1 Ticket In

- 1. The acceptance device must be able to detect the entry of a valid ticket by reading its barcode or other unique identifier via the bill acceptor or other barcode reading device.
- 2. If the ticket is valid, it will be stacked, and the appropriate cash will be paid to the players.
- 3. If the ticket is invalid, the ticket system will notify the gaming kiosk that the ticket is invalid.
- 4. If the ticket control system is offline, the gaming kiosk must always reject the ticket and return it to the player.

6.2 Short Pay Ticket Out

The short pay tickets can be redeemed at the cage.

6.2.1 Ticket Information Required

The ticket shall include the following information:

- 1. Licensee (casino) name, city;
- 2. Gaming kiosk ID number or printer station number, as applicable;
- 3. Date and time of issuance;
- 4. Alpha and numeric dollar amount;
- 5. Sequence number;
- 6. Validation number;
- 7. Expiration period or date when ticket or coupon will expire, if applicable; and

A statement of "This is a short pay ticket. It can only be redeemed at the cage." shall be printed on the ticket.

6.2.2 Ticket Barcodes

Barcodes or other form of machine readable markings on a ticket must have enough redundancy and error checking to ensure that not less than 99.9% of all misreads are flagged as an error.

6.2.3 Ticket Validation Numbers

- 1. Ticket validation numbers must be unique i.e. the ticket support system must ensure that a repeated validation number cannot happen.
- 2. Ticket validation numbers must use methodology to prevent prediction of subsequent validation numbers without detailed knowledge of the algorithm and parameters.



7 GLOSSARY OF TERMS AND ABBREVIATIONS

Term or Abbreviation	Description
Approval	The legal act of approving gaming equipment.
Audit Mode	The mode where it is possible to view gaming kiosk meters, statistics, etc. and perform non-player related functions.
Bill Acceptor	The device using photo-optic, electromagnetic or magnetic sensors (internal or external to the gaming machine) and any additional devices used to validate a bill and/or printed ticket.
CMS	Central Monitoring System / Casino Management System
Cyclic Redundancy Check (CRC)	A software algorithm used to verify the accuracy of data during its transmission, storage, or retrieval. The algorithm is used to validate or check the data for possible corruption or unauthorized changes.
Critical Memory	Memory locations storing information that is considered vital for the continued proper operation of the gaming kiosk.
Critical Non-Volatile (NV) Memory	Memory used to store all data that is considered vital to the continued operation of the kiosk.
Drop Box	A secure container housed within a kiosk cabinet that collects bills or tickets
Electrostatic Interference (ESD)	The physical property of being able to create electronic interference to a device by either discharging static electricity onto the surface of the unit (such as from a user), or via a mains power or communication cable (from lightning for example).
Electromagnetic Interference	The physical characteristic of an electronic device to emit electronic noise either into free air, onto the mains power lines, or communication cables.
Hashing Algorithm	Generally, a function which accepts a variable length data message and produces a fixed length message digest (i.e. hashing algorithm signature). In this standard, the term 'hashing algorithm' referred is the HMAC-SHA1 algorithm.
HMAC-SHA1	'Keyed-Hash Message Authentication Code'. Calculated using a cryptographic Hash Algorithm in combination with an input key. (refer: FIPS PUB 198).
Meter	A non-volatile variable, storing gaming kiosk audit and other information.
РСВ	Printed Circuit Board – the piece of board used to connect together electronic components in a certain manner using tracks and holes to route the signals.



博彩 監察協調局 Direcção de Inspecção e Coordenação de Jogos

Term or Abbreviation	Description
PSD	Programmable Storage Device, an integrated circuit including SSD, Flash-ROM, RAM, USB thumb drive, Hard Disk and logic functions on a single chip.
Random Access Memory (RAM)	Electronic component used for computer workspace and storage of volatile information in a gaming kiosk.
RFI	A Radio Frequency Interference which affects the operation of an electronic device.
Security Area	The separately locked area within a gaming kiosk that houses the electronic components that would significantly influence the gaming kiosk.
Short Pay Ticket/Voucher	A ticket with a value less than the minimum banknote denomination of the currency. Or, in a situation when the amount of cash in the kiosk is not enough for the redemption.
Signature	The result from a mathematical algorithm, including the keyed HMACSHA1 algorithm, applied to the entire contents of a Program Storage Device or software file.
Signature Key	An input parameter used in conjunction with a signature algorithm.
Tilt	An error in kiosk operation that halts or suspends play and/or that generates some intelligent fault message.
Ticket (Voucher)	A printed or virtual ticket issued by a gaming kiosk which can be redeemed for cash or used to subsequently establish credits on a device.
Ticket In	A method for inserting a valid printed ticket to get the corresponding credits.
Ticket Out	A method for redeeming the current available credits by means of printing a ticket.
Touch Screen	A video display device that also acts as a player input device by using electrical touch point locations on the display screen.
USB, Universal Serial Bus	An industry standard interface that defines the cables, connectors and communications protocols used for connection, communication, and power supply between computers and electronic devices. Often used to reference the type of port or a flash type storage device using this interface technology.