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Direcção de Inspecção e Coordenação de Jogos

DIRECÇÃO DE INSPECÇÃO E COORDENAÇÃO DE JOGOS

"DICJ"

(Macau)

DEALER-OPERATED ELECTRONIC TABLE GAME (DETG)

TECHNICAL STANDARDS

VERSION 1.0

With effect from 01 January, 2018

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EXECUTIVE SUMMARY

This document describes DICJ's minimum technical requirements for Dealer-Operated Electronic Table Game (DETG) for operation in Macau Casinos.

This Standard should be read together with Sections A, B and D of Macau's Minimum Internal Control Requirements.

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 or not such loss is due to negligence on its part. DETG 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 or game, especially game changes must comply with the requirements specified in this Standard. While DICJ will consider any submission made by an authorized DETG 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 machines ("other law"), which may be operative in Macau before, or after, the commencement date of this Standard (as prescribed in the accompanying DICJ Instruction), the relevant provisions of the other law will prevail.

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1 INTRODUCTION

1.1 Purpose

This document describes DICJ's minimum technical requirements for DETG. This standard should be read in conjunction with Macau legislative requirements and the current version of the EGM Technical Standards for Macau.

1.2 Objectives

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

1. Fair;

2. Secure;

3. Reliable;

4. 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 what the minimum technical requirements for DETG are instead of how 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 Macau. Concessionaires are required to be licensed by law and their DETG deployed on the casino floor shall comply with the technical requirements stated in this document before they can be lawfully operated in the Macau jurisdiction.

1.3 Certification

Certification of DETG 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.

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1.4 Regularity of Interpretation

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

1.5 Definition of DETG

DETG is the operation of a table game(s) that require a live dealer and utilizes electronics as part of the game's operation for:

1. Provide the player's choice for different betting options;

2. Presentation of the game outcome to the player;

3. Electronically collecting, storing, dispensing credits; and

4. Communicating accounting and significant event data.

This standard is to be applied when there is a live dealer and the game play without significant human interaction including the commencement of game play is not possible. The player terminals will be responsible for all monetary transactions including credit reception, collecting wagers, allocating winnings, and ensuring all wagers are registered correctly.

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2 GENERAL REQUIREMENTS

This standard provides requirements for the operation of DETG in Macau Casinos.

2.1 Applicability of EGM Technical Standards

DETG shall comply with the requirements stipulated in the Technical Standards for Electronic Gaming Machines (EGM Technical Standards) for Macau wherever applicable.

If the integrity of the game in play is not compromised, it is permissible for the DETG to disable just the terminals affected by the errors stipulated in the Section of Electronic Gaming Machine Events (Tilt Situation) of the EGM Technical Standards for Macau and allow gaming to continue on unaffected terminals.

2.2 Live Game Correlation

Where the DETG plays a game that is recognizable as an existing table game the same probabilities associated with the live game shall be implemented in the simulated game.

2.3 Game Rule

1. All game rules and payout of the DETG must strictly follow the corresponding official game rules for approved table games in Macau unless otherwise amendments to the rules or the payouts are specifically approved for specific DETG.

2. A placard or video display used to communicate game play information shall clearly identify and shall precisely state the house rule of the game, game outline and collection schedule, and the prize that will be paid to the player when the player obtains a specific win;

3. The placard or video display shall clearly indicate whether awards are designated in denominational units, currency, or some other unit;

4. All paytable information must be presented to the player, prior to them committing to a bet ;

5. The game being played must at all times be clearly visible to the player, seated at a player interface terminal to which the game is connected; and

6. Each individual bet to be played shall be clearly indicated on the player interface so that the player is in no doubt as to which wagers have been made.

2.4 Card Games

The requirements for games employing cards being drawn from a deck are the following:

1. At the start of each game/hand, the cards shall be drawn from a randomly-shuffled deck; the replacement cards shall not be drawn until needed, and in accordance with game rules, to allow for multi-deck and depleting decks;

2. Cards once detached from the deck shall not be returned to the deck except as provided by the rules of the game depicted;

3. As cards are detached from the deck they shall be immediately used as directed by the rules of the game (i.e., the cards are not to be discarded due to adaptive behavior by the DETG)

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*NOTE: It is acceptable to draw **random numbers** for replacement cards at the time of the first hand random number draw, provided the replacement cards are consecutively used as needed.*

2.5 Mandatory Credit Return (Forced Bet)

The DETG should reject and return the credits wagered by the player if the credits bet are less than the minimum bet value for the selected bet option (e.g. a roulette game that has different minimum bet values for different types of bet types)

2.6 System Clock

The DETG shall maintain an internal clock that accurately reflects the current time (24hr format: in hours, minutes and seconds) and date that shall be used to provide for the following:-

1. Time stamping of significant events;
2. Reference clock for reporting; and
3. Time stamping of configuration changes.

If multiple clocks are supported, the DETG shall be capable of maintaining and synchronizing the time for all clocks in each system component within accuracy of five (5) second so as to ensure that time stamping of all events and data is correct.

2.7 Player Interface Terminal Requirements

The player interface terminal(s) must comply with both hardware and software requirements specified in the current version of the EGM Technical Standards for Macau.

2.8 Player Interface Error Circumstances

The Player Interface shall be capable of detecting and displaying the following error circumstances and illuminating a light system for each, or sound an audible alarm. Error conditions should make the player terminal lock up and require attendant involvement except as noted within this DETG standards. Error circumstances shall be cleared either by an attendant or upon commencement of a new player sequence after the error has cleared except for those denoted by a "#" which will require further assessment since deemed as a critical error.

1. Door open error circumstances
   a) all external doors on the DETG;
   b) processor door/logic door;
   c) stacker door;
   d) drop box door; and
   e) any other currency storage areas that have a door.

The system or components of the system shall be able to detect and meter access to the above secure areas provided power is supplied to the device:

2. Other error conditions

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a) non-volatile memory error (for any critical memory)#;

b) low non-volatile memory battery for batteries external to the non-volatile memory itself or low power source; and

c) program error or authentication mismatch#

2.9 Game Recall

2.9.1 Game Recall (Terminals)

1. For the Game Recall information held by each terminal in a multiple terminal environment, it must be possible to show to the player the results of the play(s) as the player originally saw it. The manner in which the information is provided must enable observers to clearly identify the game sequences and result(s) that occurred.

2. Information on at least the last ten (10) games played on the terminal is to be always retrievable on the operation of a suitable key-switch, or another secure method that is not available to the player. *The Game Recall information held by the DETG's terminals shall include all the relevant sections stipulated in the Section of Game Recall of the EGM Technical Standards for Macau'.*

2.9.2 Game Recall (Server)

1. For the Game Recall information held by the server in a multiple terminal environment, it must be possible to review the results of the play(s).

2. Information on at least the last hundred (100) games played is to be always retrievable using a suitable arrangement.

2.9.3 Game Recall Information Required

1. Card values, balls drawn or other form of game result;
2. Total number of credits at the start of play (less credits bet);
3. Total number of credits at the end of play;
4. The total number of credits bet including details of the bet made by the player;
5. The total number of credits won associated with the prize resulting from the last play or the value in dollars & cents for progressive prizes;
6. The total number of credits added (separated into coins, bills and cashless) since the end of the previous play and through to the end of the last play;
7. The total number of credits collected (separated into coins, vouchers and cashless) since the end of the previous play and through to the end of the last play;
8. The total value of cancelled credits (in dollars & cents) since the end of the previous play and through to the end of the last play (credits added or collected after the last play will be recorded on the completion of the next play);
9. Any player choices involved in play outcome including cards held, balls selected, etc.; and
10. The value of all Standard Meters (as defined in Section 3.5.2 of the EGM Technical Standards for Macau) as at the end of the last play. Specific meters that are not applicable, may be omitted.

Note: The above requirements are the default for Last Play Information in that events after the completion of the last play (such as inserting money to add credits, or collecting credits) do not form a part of the last play requirements. However, it is permissible for manufacturers to display this information provided it is clear what happened after the completion of the last play.

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2.10　Game Play Information

A terminal in a multiple terminal DETG setup must display the following information to the player at all times when the machine is available for player input:

1. The current credit balance;
2. The current bet amount;
3. The amount won for the last completed game (until the next game starts or the betting options are changed); and
4. The results for the last completed game shall be clearly indicated to the player (until the next game starts);
5. The denomination of the game being played;
6. A disclaimer regarding malfunction voids all pays.

2.11　Artwork

1. There must be sufficient information to allow a player to determine the correctness of prizes awarded.
2. The paytable applicable to the device must be clearly visible, or the means of displaying such information must be readily available to the player prior to committing to a bet.
3. All statements on the artwork must be true.
4. Written messages shall be in English and Chinese (Traditional / Simplified) and there must be an option for the player to view all written messages in the artwork, game rules and messages displayed to the player either in English or in Chinese (Traditional / Simplified). All messages displayed shall be both grammatically and syntactically sound, in the languages.
5. The display of the result of a game outcome must not be misleading or deceptive to the player
6. The message "Malfunction Voids All Pays and Play" or its equivalent must be displayed on each terminal in a multiple terminal DETG setup.
7. In the event of a discrepancy between the terminal outcome on the video display and the table outcome, the table outcome will be the official result.
8. The game instructions must be clearly visible, or the means of displaying such instructions must be readily available to the player prior to committing to a bet and when the EGM is waiting for player input.
9. All game instructions on the artwork must be easily interpreted, not ambiguous, and sufficient to explain all game rules.

2.12　Significant Logs and Events

Significant events are produced at the DETG and sent directly to the backend utilizing an approved Communication Protocol, as stated in the earlier part of this document. All Significant Events that occur at each table will be monitored and recorded within the DETG in an Event History. The Event History may be divided into sections; these events will be logged by date, time and event. Each event must be stored in a database(s) which contains the following:

1. Date and time which the event occurred;
2. Identity of DETG system element that generated the event;
3. A unique number/code that identifies the event; or
4. A brief description that explains the event.

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2.13 Control Program Verification

a) EPROM-based Program Storage:

i. Electronic table games which have control programs residing in one or more EPROMs must employ a mechanism to verify control programs and data. The mechanism must use at a minimum a checksum; however, it is recommended that a Cyclic Redundancy Check (CRC) be used (at least 16-bit).

b) Non-EPROM Program Storage shall meet the following rules:

i. The software shall provide a mechanism for the detection of unauthorized and corrupt software elements, upon any access, and subsequently prevent the execution or usage of those elements by the electronic table game. The mechanism must employ a hashing algorithm which produces a message digest output of at least 128 bits.

ii. In the event of a failed authentication, after the game has been powered up, the electronic table game should immediately enter an error condition and display an appropriate error. This error shall require operator intervention to clear and shall not clear until; the data authenticates properly, following the operator intervention, or the media is replaced or corrected, and the electronic table game's memory is cleared.

2.14 Accounting Information

There shall be a method to precisely retain the accounting information that is needed for appropriate revenue reporting and auditing. For DETG systems that do not retain these information electronically operational procedures are to be integrated with the system submission. DETG systems that do retain electronic accounting information shall efficiently collect and store the information in a secure manner. The clearing of stored Accounting Information may only be achieved by authorized personnel via secure system controls or permitted internal controls. Data recorded by electronic meters shall be preserved after a power loss to an interface element and shall be retained for a period of at least thirty (30) days.

2.15 Report

For DETG systems that retain significant event and accounting information, reports shall consequently be obtainable on demand. The reports must be generated precisely and provide effective information for the purpose of security, accounting and auditing. For DETG systems that have the capability to communicate the Significant Event and Accounting Information to separate Central Monitoring System and it must be by means of a secure communication protocol.

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3　SYSTEM REQUIREMENTS

DETGs typically will have a 'dealer terminal' and a 'server' that stores all information relating to the game. Hence the following are the requirements applicable to the DETG.

3.1　System Redundancy

The system shall have sufficient redundancy and modularity so that if any single component or part of a component fails, no gaming data is lost. There shall be redundant copies of each log file or system database or both on the system with open support for backups and restoration.

3.2　Backup & Recovery

In the event of a failure whereby the Server cannot be restarted in any other way, it must be possible to reload the database from the last backup point and fully recover at least all of the following vital transactions:

1. Information on system configuration;
2. Significant Events;
3. Account information including winnings, bets, cash deposits and cash withdrawal, PIN change;
4. Auditing information;
5. Specific site information such as Device file, employee file, game profiles, etc;
6. Game Play statistics; and
7. Current system encryption keys.

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4 SYSTEM SECURITY

4.1 Physical Access

The server or system element(s) must be located in a secure area where access is limited to authorized personnel. The logical access to the game is logged on the system or on a computer or other logging device that resides outside the secure area and is not accessible to the individual(s) accessing the secure area. The logged data should include the date, time and the identity of the individual accessing the secure area. The resulting logs should be kept for a minimum of 100 days.

4.2 Data Amendment

The system shall not allow the amendment of any accounting or significant event log information without supervised access controls. In the event financial data is amended, the audit log must record:

1. Date and Time of amendment;

2. Data element value prior to amendment;

3. Data element value after amendment;

4. Data element amended; and

5. Personnel that performed amendment (by user name/ID).

4.3 Access Control

1. Role Based Access Control whereby users are only allowed access to programs and menu items related to their job functions shall be supported.

2. A record of all privileges allocated to user accounts shall be maintained.

3. All passwords, PINs, biometrics or other electronic forms of information, if used as part of the authentication method, shall be encrypted in storage.

4. There shall be a non-alterable audit trail of all user logon activities.

5. There shall be a provision for system administrator notification and user lockout and audit trail entry after a set number of unsuccessful login attempts.

6. The system shall record: Date and Time of the Login attempt, username supplied, and success or failure.

7. The use of generic user accounts on servers is not permitted.

4.4 Remote Access

Remote Access can be made by an element outside the 'trusted' network. Remote access where permitted, shall validate all computer systems based on the approved setting of the DETG and firewall application that establishes a link with the DETG when the following requirements are met:

1. No unauthorized remote user administration functionality (adding users, changing permissions, etc.);

2. No unauthorized access to database;

3. No unauthorized access to operation system;

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4. If remote access is to be on a continuous basis then a firewall must be installed to protect access; and

5. Remote Access User Activity log is retained by the operator depicting: authorized by, purpose, logon name, date/time, duration, and activity while logged in. A capability for reviewing this activity log remotely to authorized DICJ representatives shall also be provided.

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5 MULTI-GAMES

In multi-game DETG, players have choice to select a game to play from a given number of games. The following requirements apply to these types of DETG:

1. There shall be a clear indication to the player about the game options available for play.

2. The player shall be able to review the information on all the games available for play without the need to place a wager.

3. The terminal shall unambiguously indicate the game being selected for play once the player makes a selection.

4. The selection of games shall be available only when the current game being played is completed.

5. The terminal shall display any residual credit left when a player has an uneven credit left on the DETG.

6 CONCURRENT PLAY

In concurrent play DETG, players may play two or more games concurrently using a single terminal. The following requirements apply to these types of DETG:

1. There shall be a clear indication to the player about the games available for play.

2. The player shall be able to review the information on all the games available for play without the need to place a wager.

3. The terminal shall unambiguously indicate the games being selected for play once the player makes their selection.

4. Game Play outcome of all the individual games being played by the player shall be clearly displayed to the player.

5. Selection of games to play (both addition and removal of games) shall only be permitted while the current game being played is completed.

7 COMMUNICATION PROTOCOL

1. Each component of an DETG must function as specified by the communication protocol implemented.

2. All protocols must use communication techniques that have proper error detection and/or recovery mechanisms which are designed to prevent unauthorized access or tampering, employing suitable encryption algorithms.

3. Communication between the terminal's peripherals and terminal, as well as, communication between the terminal and the CMS should be in compliance with the communication protocols outlined in the current version of GSA standard or using equivalent communication protocols.

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8   GLOSSARY OF TERMS AND ABBREVIATIONS

Term or Abbreviation	Description
Approval	The legal act of approving gaming equipment.
DETG	Dealer-Operated Electronic Table Game
Concurrent Play DETG	An DETG where player can to bet on a number of DETG concurrently
EGM	Electronic Gaming Machine
Game	A game is a set of rules that a gaming device follows. Major constituents of a game are rules, artwork (virtual or static and inclusive of game symbols and paytable), winning combinations and game symbol distribution.
Multi-Game DETG	A DETG where player can select from a given number of games
Play	A sequence of actions and states in the gaming device initiated by a player through a wagering of credits and terminated when all credits wagered have been lost or all winnings have been transferred to the gaming device's total wins meter and the player's credit meter.