

CHANCE

- RECAP - Primary Theories
 - Dominant Factor Test
 - Gambling Instinct Test
 - Material Element Test
 - Named Games/Characteristics

TECHNOLOGY OF GAMING DEVICES

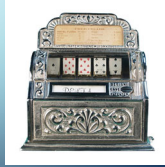
SLOT MACHINES

- The original gambling device is the slot machine
 - Mechanical devices
 - 50 Card Poker
 - Payout by attendants or clerks
 - Table/Bar Top
 - Clockwork mechanisms
 - German immigrants – Cabinet makers and clock makers



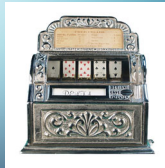
SLOT MACHINES

- One of the most popular slot machines of the late 1880s was the Sittman Pitt poker machine.
- The machine had 5 reels with cards on them (50 cards).
- Payouts were based on the strength of the hand after the spin.
- Often found in cigar shops and taverns, the machines usually entitled the winner to cigars or drinks.



SLOT MACHINES

- Because the machines lacked two cards from a standard deck, they were often referred to as "drop card" machines.
- By dropping the jack of hearts and the ten of spades the chance of a royal flush was cut in half.
- While originally made and used in New York, the machine's popularity skyrocketed once it reached San Francisco.



SLOT MACHINES

- In the late 19th century San Francisco quickly became the hot bed of gaming machine technology.
- The first coin-in-coin-out machine appeared in San Francisco and the payout was two nickels for each nickel wagered.
- Charles Fey eventually created a poker machine that included a similar coin payout mechanism, but the device was reportedly complicated and unreliable



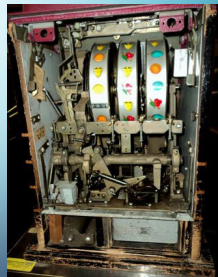
SLOT MACHINES

- In an effort to simplify his machine, Fey reduced the complexity by relying on three reels rather than five reels.
- In moving to three reels, the poker hand theme was essentially rendered ineffective.
- Fey then replaced the poker theme with icons including a liberty bell icon.



SLOT MACHINES

- The original slot machines worked on a mechanical basis, similar to a clock work.
- Players would insert coins and that act would release a lever lock.
- Players would pull the lever, lifting and releasing a weight or tightening a spring mechanism.
- The weight would, or a spring would release, fall causing wheels and gears to spin the reels while a timed brake would stop the reels.



SLOT MACHINES

- The Liberty Bell slot was the first popular slot machine that a player today would recognize.
- It was a commercial success just in time to be outlawed in San Francisco and elsewhere.



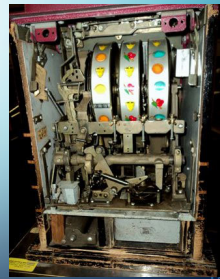
SLOT MACHINES

- By the early 20th century slot machines and gambling devices were generally outlawed in every state.
- Many machines were converted to gum dispensing machines.
- As gum machines, the devices used gum flavors on the reels such as cherries, lemons, and oranges.



SLOT MACHINES

- The mechanical nature of early slot machines start the popular myth of a "hot slot machine"
 - Mechanical slots could be "hot" due to wear
 - Many moving parts
 - Metal on metal parts
 - Maintenance is key to good and random operation



SLOT MACHINES - EVOLUTION




EVOLUTION

- Mechanical weights, springs, wheels and reels
- Electronic motors with wheels and reels
 - Controlled by a computer to start and stop motors
- Video slots
 - No physical reels, display is on a video screen
- Server based slots
 - Slot games run on central systems with "boxes" used for player input and display of game play
- Mobile gaming slot games
 - Mobile devices used to show play from server run games

COMPUTERS

- Modern slots are basically computing devices with peripherals to work as a slot machine
 - Coin hoppers
 - Bill validators
 - Ticket scanners
 - Ticket printers
 - Button interfaces

COMPUTERS

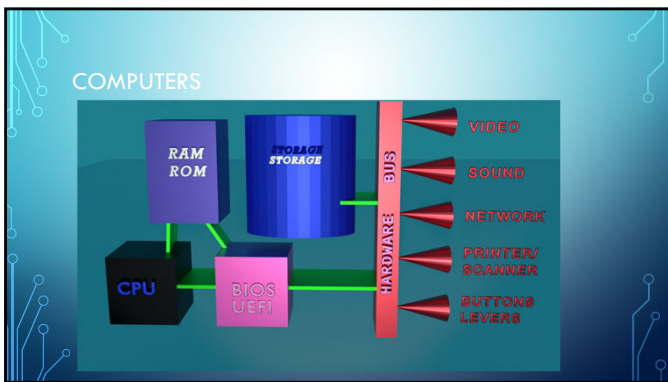


IGT Game King 3902 Main Board

COMPUTERS

- <https://www.amd.com/system/files/documents/digital-gaming-application-brief.pdf>

IGT Game King 3902 Main Board



COMPUTERS

- CPU
 - AMD/INTEL/ARM
 - Off-the-shelf CPUs are now common
 - Custom CPUs were used by some manufacturers in the past

RAM ROM

STORAGE

CPU

BIOS UEFI

HARDWARE BUS

VIDEO

SOUND

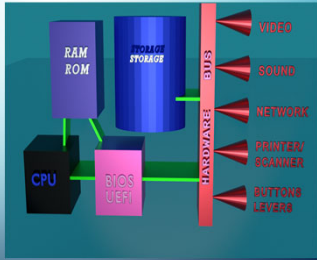
NETWORK

PRINTER/SCANNER

BUTTONS LEVER

COMPUTERS

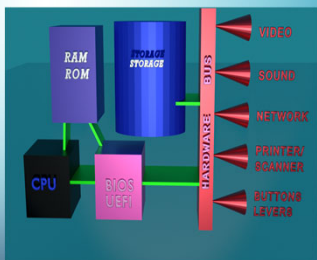
- RAM/ROM
 - Memory
 - Most older machines have software in ROM or EPROM chips
 - RAM allows faster operation of slot programs



The diagram shows a central CPU connected to RAM ROM and BIOS UEFI. These are connected to STORAGE and a BUS. The BUS is connected to various hardware components: VIDEO, SOUND, NETWORK, PRINTER/SCANNER, and KEYBOARD/LEVER.

COMPUTERS

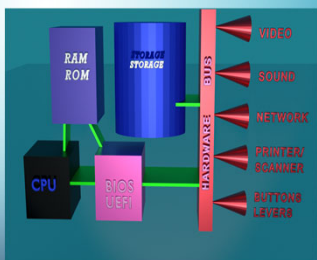
- RAM/ROM
 - Storage
 - Often SSD or HDD in machines
 - May be in non-volatile ram
 - Interface depends on manufacturer
 - Older machines may use CD-ROM, DVD-ROM or E-PROM storage



The diagram shows a central CPU connected to RAM ROM and BIOS UEFI. These are connected to STORAGE and a BUS. The BUS is connected to various hardware components: VIDEO, SOUND, NETWORK, PRINTER/SCANNER, and KEYBOARD/LEVER.

COMPUTERS

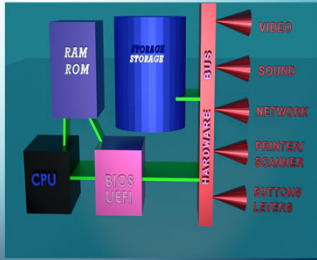
- BIOS/UEFI
 - Controlling chips
 - Depends on manufacturer
 - Chips control the flow of operations and interrupts
 - UEFI may be in non-volatile storage



The diagram shows a central CPU connected to RAM ROM and BIOS UEFI. These are connected to STORAGE and a BUS. The BUS is connected to various hardware components: VIDEO, SOUND, NETWORK, PRINTER/SCANNER, and KEYBOARD/LEVER.

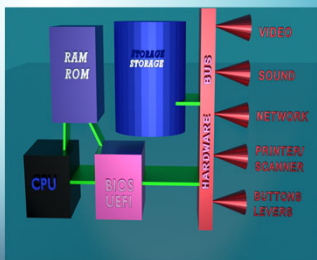
COMPUTERS

- Hardware Bus
 - Modular architecture allows for standardization of components
 - HDMI video
 - 802.3 Ethernet networking
 - Modular scanners
 - Modular printers (<https://am.enjamlab.com/product/gan-5/>; <https://am.enjamlab.com/product/gan-2u>)



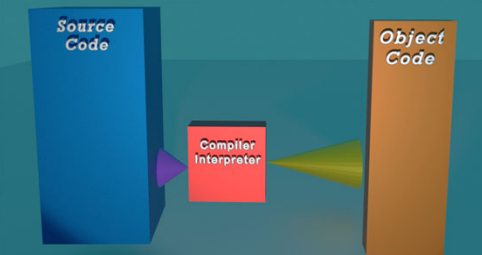
COMPUTERS

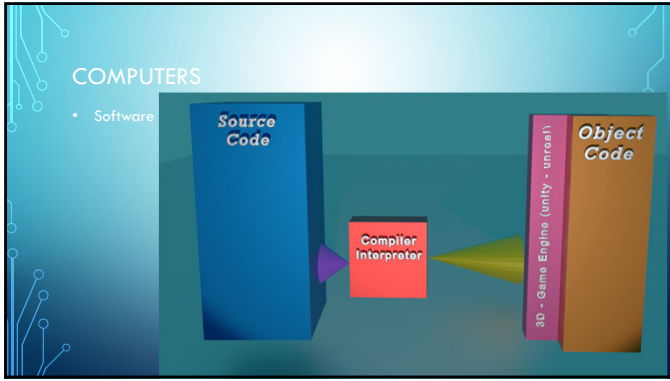
- Hardware Bus
 - Bill acceptors and validators (https://am.enjamlab.com/wp-content/uploads/cs_uba.pdf)

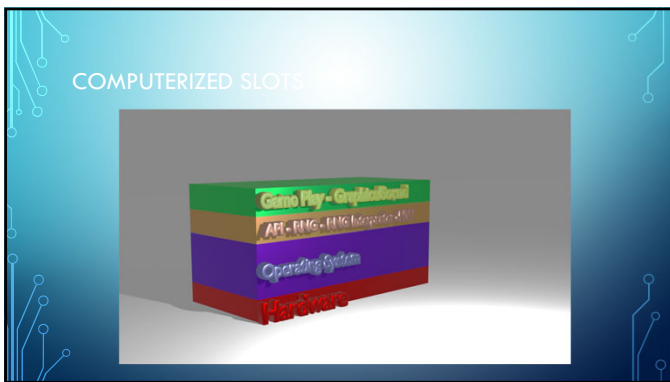


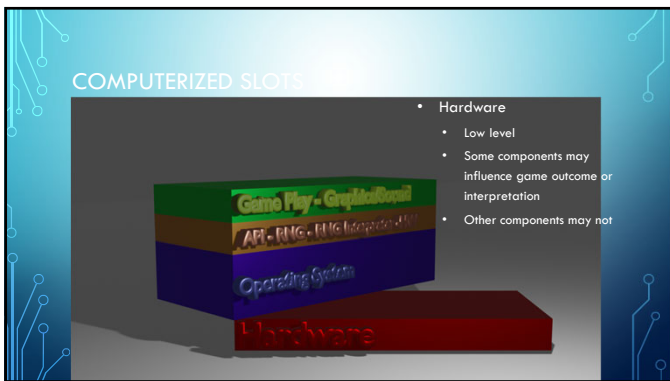
COMPUTERS

- Software









COMPUTERIZED SLOTS

- Operating System
 - Windows
 - Windows CE
 - Windows Embedded
 - Linux (customized)
 - Proprietary
 - Locked from game play (green) layer

COMPUTERIZED SLOTS

- API
 - RNG Interpretation
 - RNG Initiation
 - "Control Program"
 - Determines Win/Loss
 - Interacts with Game Play
 - Role of licensed manufacturers

COMPUTERIZED SLOTS

- Game Play
 - Entertaining display
 - Entertaining sounds
- Game Play
 - Calls to the API to start a game
 - Calls to the API to see results of game
 - Displays results

COMPUTERIZED SLOTS

- Game Play

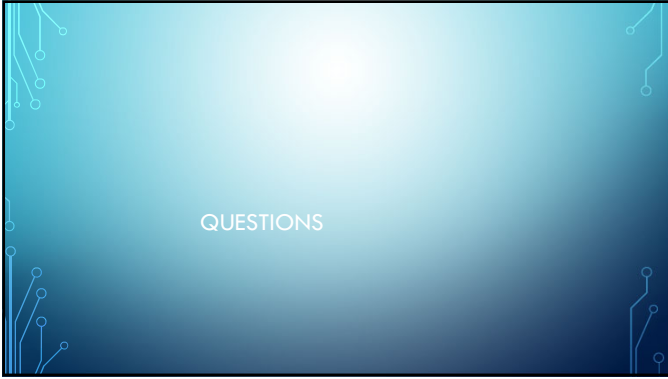
- Can be separated from other layers
- Can work through a communication layer
- Allows portability of games to multiple hardware and OS systems

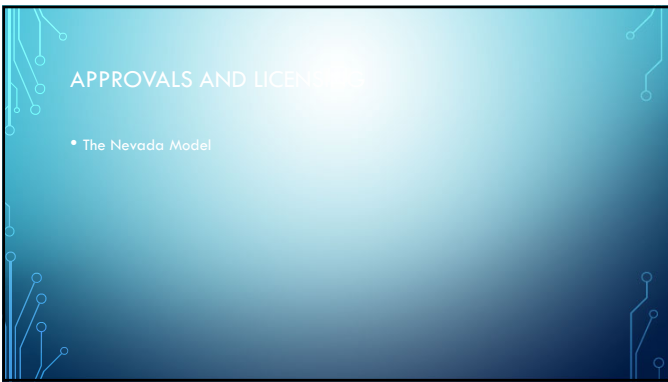
RANDOMNESS AND THEORETICAL PAYOUTS

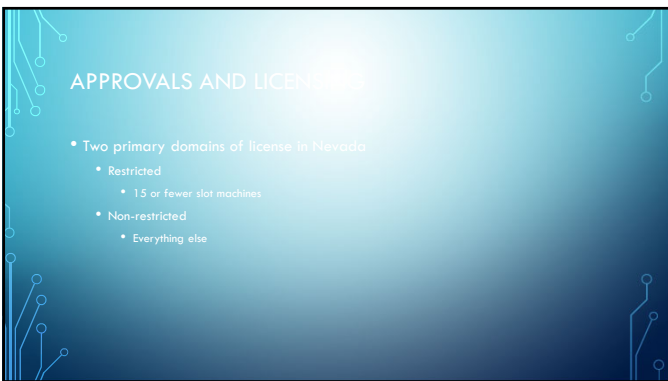
- Many jurisdictions have minimum theoretical win requirements
- How do you have a random device with minimum theoretical payouts?

RANDOMNESS AND THEORETICAL PAYOUTS

- Example







NEVADA GAMING CONTROL BOARD
GAMING COMMISSION

Nevada Gaming Control Board
Investigative Division
Attention: Applicant Services
1919 George Parkway
Carson City, NV 89706
(775) 884-7940

MANUFACTURER AND/OR DISTRIBUTOR LICENSE INSTRUCTIONS

Business Name: _____

Individual Name: _____

Complete and return this checklist with your application. All applications must be arranged in the order listed below. A complete application will consist of the applicable documents/items listed below and any additional documents/items as may be necessary and/or required by NCC Regulations. All forms can be found on our website at www.nvcg.com.

The following forms and items must be submitted to the Nevada Gaming Control Board.

- Form 1** This checklist, completed and signed.
- Form 2** Application for a Nevada Gaming License: to be submitted by individual applicants, officers, directors, members, shareholders, etc.
- Form 3** Application for Approval by Corporation/Partnership/LLC.
- Form 4** Statement of Pre-Opening Cash/First Years Cash Flow: to be submitted if the business entity is seeking initial licensing.
- Form 5** Multi-Jurisdictional Personal History Disclosure Form: to be filed by each individual required to be licensed or found suitable.
- Form 6** Nevada Supplemental Personal History Disclosure Form: to be filed by each individual required to be licensed or found suitable.
- Form 7** Affidavit of Full Disclosure: to be filed by each individual required to be licensed or found suitable.
- Form 8** Release and Indemnity of All Claims: to be filed by each individual and entity required to be licensed or found suitable.
- Form 9** Request to Release Information: to be filed by each individual required to be licensed or found suitable. If the applicant is married, the applicant's spouse must also sign the form.
- Form 28** Fingerprint Receipt: Complete Form 28 and go to any [certified fingerprinting facility](http://www.nvcg.com) in Nevada to have your fingerprints electronically taken. Ensure the printing facility signs and dates the form. In the event



- ## COMMISSION
- Part time agency
 - Issues gaming licenses
 - Approves new games
 - Approves new devices
 - Adopts gaming regulations
 - Acts as adjudicator for enforcement/disciplinary matters

BOARD

- Full time agency administering the Gaming Control Act
- Comprised of three board members
- Serves as prosecutorial agency for enforcement measures
- Serves as adjudicator in patron disputes

GAMING CONTROL BOARD

- Has six divisions
 - Administration
 - Audit
 - Technology
 - Enforcement
 - Investigations
 - Tax and Licensing

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TECHNOLOGY, INNOVATION, & GAMING LAW

GAMING CONTROL BOARD

- Has six divisions
 - Administration
 - The Administration Division serves as the administrative arm of the Board, providing personnel management, training, and budgetary services. The Division also has a hearing officer who presides over employee termination hearings, patron dispute hearings, and work card revocation hearings.

TECHNOLOGY, INNOVATION, & GAMING LAW

GAMING CONTROL BOARD

- Has six divisions
 - Audit
 - The Audit Division conducts periodic audits of casinos to assure they have made proper accounting of taxes and fees owed to the state. The Division also reviews compliance with procedures mandated by law, regulation, or by the casino's own system of internal controls. The reviews assure the casinos are following proper procedures in counting and reporting transactions, handling cash and cash items; conducting credit transactions, and other administrative, accounting, operating, and physical controls.
 - Audit Division agents verify casino bankrolls, monitor financially-troubled operations, and inspect accounting equipment. They also assist investigations into allegations of skimming and hidden interests.

TECHNOLOGY, INNOVATION, & GAMING LAW

GAMING CONTROL BOARD

- Has six divisions
 - Technology
 - The Technology Division, commonly referred to as the Lab, inspects and tests electronic gaming devices—primarily slot and video poker machines—for use in casinos. Lab technicians also test new games being introduced into the casino market.
 - The Lab provides key support to the other divisions. An investigation of slot manufacturers, for example, will likely involve an inspection of gaming devices by Lab agents. The Division tests devices suspected of being altered to cheat players. The Board also may call on Lab agents to inspect machines involved in customer disputes. The Lab works with the Audit Division to test computerized systems for games such as keno.
 - The Division also maintains the Board's internal computer and word processing systems, including data storage and retrieval.

TECHNOLOGY, INNOVATION, & GAMING LAW

GAMING CONTROL BOARD

- Has six divisions
 - Enforcement
 - The Enforcement Division conducts law enforcement, investigative and intelligence activities for the Board. The Division is divided into the Complaint/Compliance Section and the Criminal/Intelligence Section.
 - The Division's primary task, which the complaint/compliance section carries out, is to ensure the integrity of all games and devices in Nevada. Agents investigate allegations of cheating by customers and casino employees. They also investigate player disputes, review surveillance systems, inspect and approve gaming tokens and chips, and investigate casino compliance with regulations and accepted standards of operation.
 - The Criminal/Intelligence Section gathers information on organized crime activities. It also investigates allegations of skimming and hidden interest in casinos by unsuitable persons.

TECHNOLOGY, INNOVATION, & GAMING LAW

GAMING CONTROL BOARD

- Has six divisions
 - Investigations
 - The Investigations Division investigates individuals, privately-held businesses, and other applicants that file applications with the Board
 - The Board generally has two types of investigative agents: financial and background. In the early 1970's, the Board transferred the responsibility for financial investigations from the Audit Division to the Investigations Division. This shift of responsibility created the need for agents with accounting skills. Financial agents usually have accounting backgrounds and are primarily responsible for investigating an applicant's finances, source of funds, and similar matters.

TECHNOLOGY, INNOVATION, & GAMING LAW

GAMING CONTROL BOARD

- Has six divisions
 - Tax and Licensing
 - The Tax and License Division collects and records the gaming taxes and fees paid by Nevada casinos. It assists the Administration Division in conducting economic analyses of casino revenues. The Administration Division publishes much of this information and analysis in the annual Nevada Gaming Abstract. The Division also distributes monthly and quarterly reports.

TECHNOLOGY, INNOVATION, & GAMING LAW

LICENSES - RESTRICTED

- Application Submission (<https://gaming.nv.gov/index.aspx?page=49>)
- 1. Application for Nevada Gaming License:
 - (a) Form 1 is to be submitted by individual applicants.
 - (b) Form 2 is to be submitted by corporations, partnerships, and limited liability companies.
- 2. Form 4, Personal History Record: To be filed by each applicant, including corporate officers, directors, members, or equity holders. (11 Page form)
- 3. Form 6, Statement of Pre-Opening Cash/First Year Cash Flow for Business Entity Applicants
- 4. Form 7, Multistate Personal History Form
- 5. Form 7A, Nevada Supplement to Form 7
- Various affidavits, releases and fingerprint forms.

TECHNOLOGY, INNOVATION, & GAMING LAW

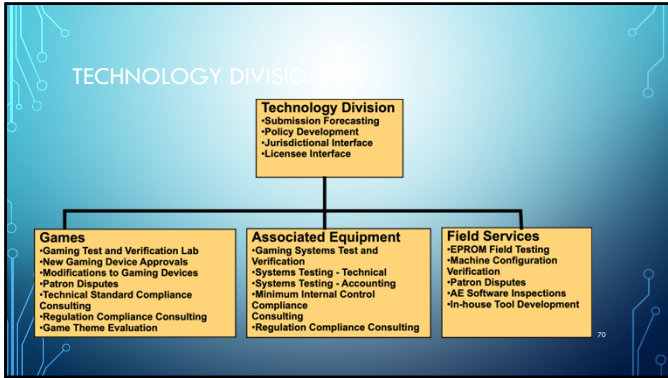
LICENSES - NON-RESTRICTED

- Process
 - Application filed with fees
 - Application reviewed
 - Document request and deposit request
 - Applicants pay for their own investigative costs
 - Investigative report to GCB
 - Licensing hearings

TECHNOLOGY, INNOVATION, & GAMING LAW

LICENSES - NON-RESTRICTED

- TIPS
 - Inform client of the process and likely costs
 - Inform clients that the process is invasive
 - Inform clients that a gaming license is a privileged license and the obligation is on the applicant to prove their suitability
 - There is no right to a license, and no recourse through the courts for rejection or denial of a license
 - Attorneys should review forms before filing
 - Errors and omissions can lead to additional investigative costs



- TECHNOLOGY DIVISION**
- Technology division is primarily responsible for:
 - New Gaming Device Approvals
 - Gaming Device Modification Approvals
 - System Supported, System Based and Mobile Gaming Systems Approvals
 - Installation Approvals for System Supported, System Based and Mobile Gaming installations

- APPROVAL PROCESS**
- NRS 463.0155 "Gaming Device" defined:
 - Any equipment or mechanical, electromechanical or electronic contrivance, component or machine used remotely or directly in connection with gaming or any game which affects the result of a wager by determining win or loss.
 - Approval process described in Regulation 14
 - Requires manufacturer's license to officially submit a device for approval

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73

APPROVAL PROCESS

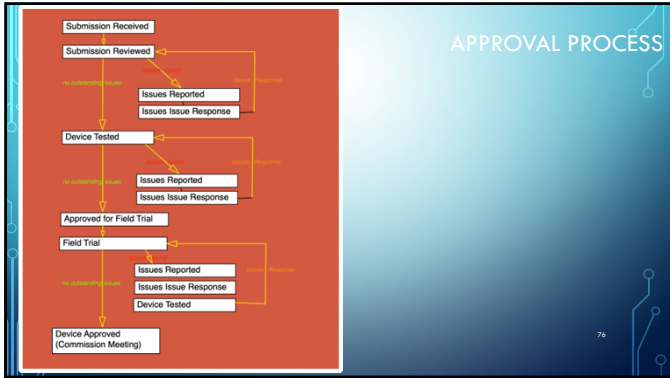
- Approvals are required for:
- Conventional gaming devices such as slot machines.
- System based gaming devices
- System supported gaming devices
- Mobile gaming devices and systems
- Interactive gaming devices and systems
- Electronic Table Games

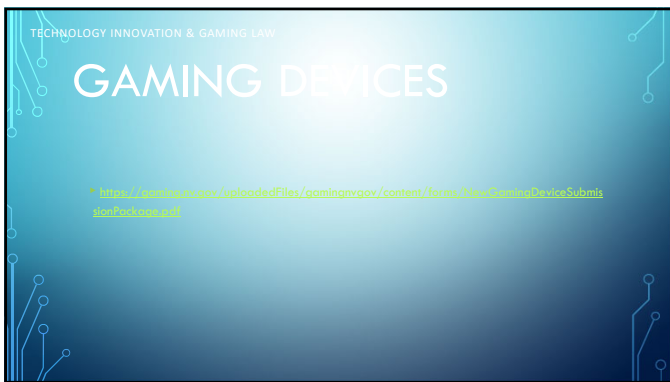
74

APPROVAL PROCESS

- Initial Submission
- Lab Evaluation and Testing
- Issue Reporting and Resolution
- Manufacturer Corrections
- Field Trial
- Board/Commission Review

75





-
- INITIAL SUBMISSION**
- Submission package
 - Compliance Report
 - * Complete, accurate, technical description of device, how it operates, and how it complies
 - * Saves the most time during the test process
 - Manufacturer statement
 - All source code, graphics, and items necessary for device evaluation
 - Installation plan, Internal controls

SUBMISSION PACKAGE

- Request for review
- Digital image of the production version of the device
- A copy of all source code
- A copy of all executable code
- A copy of all images used in the device
- Game math and theoreticals
- Testing reports

82

SUBMISSION PACKAGE

- A testing environment and compiler
- Schematics
 - Electrical
 - Network
- A field test letter
- Any special testing requirements or characteristics
- Any other information that may be helpful to the Lab in developing a test plan and understanding how the device works.

83

SUBMISSION

- At least two complete devices
- Arrange for delivery with Lab staff
- The machines will be tested rigorously and completely disassembled

84

PROCESS

- **Kick Off Meeting**
 - The Lab will review the submission packet for completeness and adequacy.
 - Usually, within a month of a completed initial submission, the Lab will set up a kickoff meeting to discuss the project plan, estimated milestone dates, estimated costs, and contact information.
 - Estimated fees will be paid shortly after this meeting. Estimates are based on current hourly rates.

85

APPROVAL PROCESS

```

graph TD
    A[Submission Received] --> B[Submission Reviewed]
    B --> C[Device Tested]
    C --> D[Approved for Field Trial]
    D --> E[Field Trial]
    E --> F[Device Approved  
(Commission Meeting)]
    
    B --> B1[Issues Reported]
    B1 --> B2[Issues Issue Response]
    B2 --> B
    
    C --> C1[Issues Reported]
    C1 --> C2[Issues Issue Response]
    C2 --> C
    
    E --> E1[Issues Reported]
    E1 --> E2[Issues Issue Response]
    E2 --> E3[Device Tested]
    E3 --> C
  
```

86

PROCESS

- After testing, the Lab will issue an "Issues list" and testing will cease.
- After receiving the Issues list, the Lab will expect a response with proposed resolutions to all issues.
- The Lab will assess the response for adequacy and compliance and communicate with the manufacturer regarding how to address the issues.

87

PROCESS

- The Testing - Issue List – Proposed Fixes – Permission To Apply Fixes cycle is iterative until testing reveals no issues.
- DO NOT MAKE CHANGES TO ANY CODE WHILE TESTING IS ONGOING.

88

TIPS

- Test thoroughly before submitting
- Make sure submissions are complete and accurate
- Stay in contact with the Lab to facilitate the evaluation process

89

FIELD TESTING

- Prior to any testing, a manufacturer must secure a licensed facility to accept a field test of the new device.
- Field testing generally runs from 30-60 days and must be completed within 180 days.
- Weekly reporting requirement regarding device operations.

90

