



Vice President of Casino Operations

August 26, 2023
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Phone: *****

Email: *****

Hello *****,

Hope all is well. As we discussed, I have spoken with the chief engineer of Scientific Games in regards to the operation and integrity of the I-Deal Shuffle Machine. NOTE the entries highlighted in **Green**.

Extract From the I-Deal Plus Shuffle Manual

2.0 Principles of Operation:

The I-Deal Plus Single Deck Shuffler forms and delivers sets of random cards to be used in poker game variations such as Let It Ride®, Three Card Poker®, Four Card Poker®, Pai Gow Poker, Caribbean Stud Poker®, etc. Two decks of cards are required (usually with different-color backs) to utilize the shuffler most effectively for game play; while one deck of cards is in play, the other is being shuffled. Cards from a deck are randomly placed into compartments to form poker hands for the players and the dealer. Discards are placed in separate compartments to be unloaded after the player and dealer hands. At the beginning of each cycle, the random number generator (RNG) assigns a compartment number for each card of the first un-shuffled deck. The shuffler then places the corresponding card into the assigned compartment, producing random sets of cards based on the number of cards per hand. Discards are placed in separate compartments. The dealer places the second deck into the Input Tray and then presses the green button. The hands of the first deck are randomly unloaded. Discard slots are always unloaded last. The decks are not intermixed within the shuffler. Shuffling of the next deck does not begin until all of the cards of the previous deck are delivered into the Output tray. Cards are counted as they are shuffled in. The shuffle is aborted when the proper number of cards are not present. The I-Deal Plus Single Deck Shuffler includes a Front Display that presents game-specific animation, pay tables and the configurable minimum and maximum bet limits for the selected game and table.



IDEAL SHUFFLE MACHINE

They always read the playing cards first, then shuffle afterwards. These are two distinct and separate processes. The playing cards cannot be viewed while shuffling or assigning to shelves or while dealing. The machine does not know the playing cards dealt to any player.

- **FIRST:** They read the cards to verify all the cards that are required for the game being dealt are present. In this way they can verify that there are no extra, missing or unknown cards.
- The cards individually pass over the camera and are verified against a known image library of the casinos' actual cards.
- If any cards are missing, extra or unknown, the shuffler will **"Red Light"** and not allow the game to be played.
- If this occurs, the shuffler will only allow you to empty it so that the cards can be physically checked
- **After the cards have passed over the camera - they are then randomly shuffled with no reference to the actual value of the card**
- In the I-Deal plus there is a wheel where cards are randomly distributed around the wheel on shelves to create hands which are then randomly dealt out...**No connection to the camera.**
- **In this way they can guarantee that prior to any card being dealt they do not know any cards' location or hands composition**
- It is impossible to change the random order or to specify the order of the cards in the shuffling process
- This is by intentional design and verified by regulation to satisfy Regulatory Approvals...Because;

All our shufflers have a **"Checksum Feature"** on start-up where the first thing the shuffle machine does is to **verify the software's integrity.** If it detects even a single byte of information that is different to its' approved software it will go into a 'Seed RNG Mode' which **disables the shuffler completely and it cannot be used.**

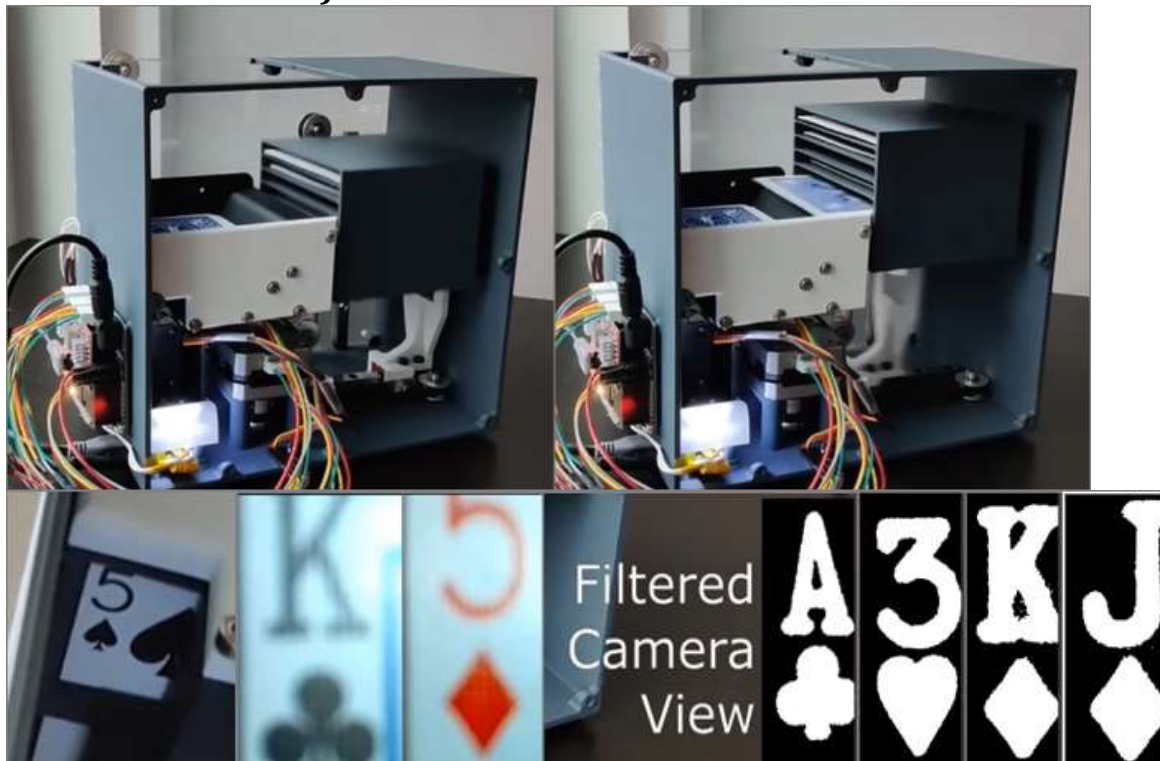
-3- Shuffle Machine

*****, according to Scientific Games the “Checksum Feature” mentioned above is what protects the software from being tampered with. However, it is highly unlikely (next to impossible) that anyone could tamper with the program in an I-Deal Shuffle machine without being detected, or so they say. Keep in mind I was speaking to a software engineer not a computer hacker...So, this information may not be accurate in regards to the Deckmate 2 shuffle machine.

UPDATE:

In regards to a YouTube video which shows a Rigged Shuffle Machine...It is correct, meaning that it is possible for someone to build a shuffle machine which could assign specific cards to specific hands.

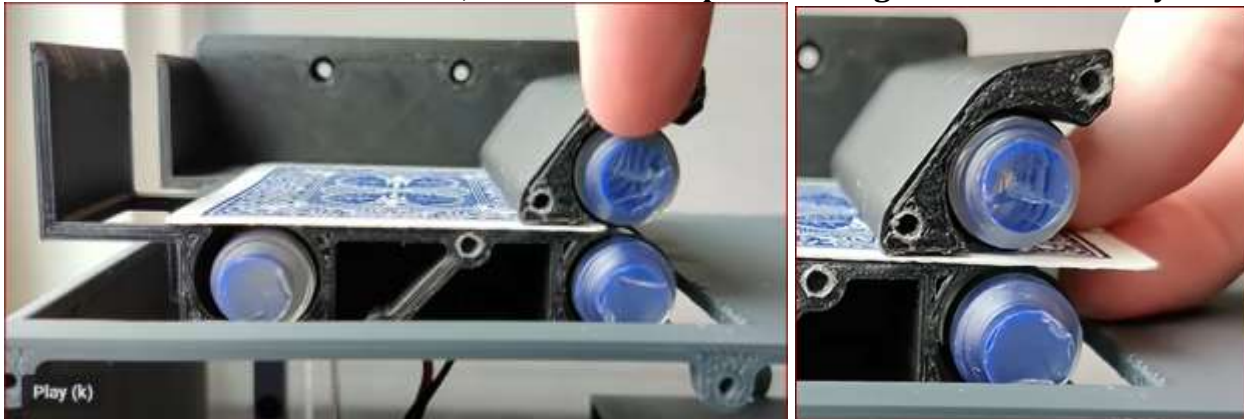
Pictured below is a card shuffler designed to allow any “Called For” cards to be dealt in any Called For Hand in any game...(One Function is Legal - No Function Is Not)



-4- Shuffle Machine



One application of the above shuffler is that predetermined cards can be assigned in advance to any position for a known outcome. Additionally, playing cards could be read during the shuffle and values and sequences could be transmitted. The above machine could be used to cheat, or for use in Duplicate Bridge Tournament Play.



A series of rubber roller ensure that only one card is dispensed at a time.



As compared to the Ideal Shuffler, this device identifies card before being dispensed.

-5- Shuffle Machine

The video shows a called for Full House (Aces Full) to be dealt to the dealer position in Texas Hold Em'.



What this inventor did not consider in his demonstration is the Poker Dealer Cut. (He does not perform the required dealer cut after the machine shuffle when doing his demonstration.) (In addition, his shuffle machine requires nearly two minutes to complete a single deck shuffle-up...As opposed to approximately 22 seconds for a Deckmate 2.)

The idea of assigning particular playing cards to a known position is not new. Pictured below is the Duplimate Shuffle Machine used in Duplicate Bridge Tournaments. There are four players on each table. Each player in position 1 must receive the exact same 13 card starting hand as each other player in position 1 on every other game.



The Duplimate sorts a new (or shuffled) deck into four Bridge Hands for each round and stores them in stackable boards for delivery.



The Deckmate 2 hack is much more realistic. The cheaters (hackers) would have to contend with the poker dealer cut. They might have to bet Pre-Flop & Flop and wait for the Three Flop Cards to be dealt to determine a key location.

IMPORTANT TO NOTE:

If any shuffle machine has the capacity to suit & sort and/or verify deck completeness and/or record initial hand composition, then it is academic that a technology is employed (camera or barcode scanner) to record the card index values. If what was reported is true...It appears this is the operation (of the Deckmate 2) into which these security investigators have hacked. The hackers utilized a Raspberry Pi (mini computer) attached via an exposed USB port and proprietary software.

They know the order of the machine shuffled deck...Top to Bottom.

They did however consider the dealer cut. They had to wait until the Board Cards were dealt to "Pick Up" the order in the sequence. The cheat would have to, bet Pre-Flop before the Board Cards were dealt. Once the Board Cards are dealt, they simple find those values in the sequence and "Back Up" to determine all players Hole Cards, the Turn Card & River Card. As an example;

Suppose this was the random order after the machine shuffle...



Suppose the poker dealer randomly cut the playing cards at this point...



The new random order after the dealer cut would now be as pictured...



-8- Shuffle Machine

The player(s) in league with the hackers would not stay in the hand if they were not seated in the 3 Spot.

NOTE: It is very important to understand a fundamental difference between known cards in Poker versus known cards in Blackjack or Baccarat. Known cards in Blackjack or Baccarat help you win the hand, (the cheater knows when to Hit or Stand or Take Insurance in Blackjack ...Or which Side, Player or Banker to wager on in Baccarat). In Poker, known (or marked cards)(as opposed to a Stacked Deck) help you not lose...or not lose as much.

Consider the hand above...The Pair of 9s' in the 7 Spot has nothing to fear based on the Flop Cards, so he should continue to bet all the way to the River. (The cheaters know they will win with the Ace on the River if they are in the 3 Spot) However, if the cheater was in the 7 Spot he would know the Pair of 9s' would not stand up and would lose to Two Pair and would Fold Pre-Flop. Spot 7 would not invest in a losing hand.

The minor flaw I'm speaking of, the security investigators missed is that the player accomplice on the table need only transmit or tell or signal the value of the 1st Card dealt to them (the 1st Hole Card) and the computer can access the sequence from that card backwards. They would gain the same complete Hand & Board knowledge Pre-Flop.

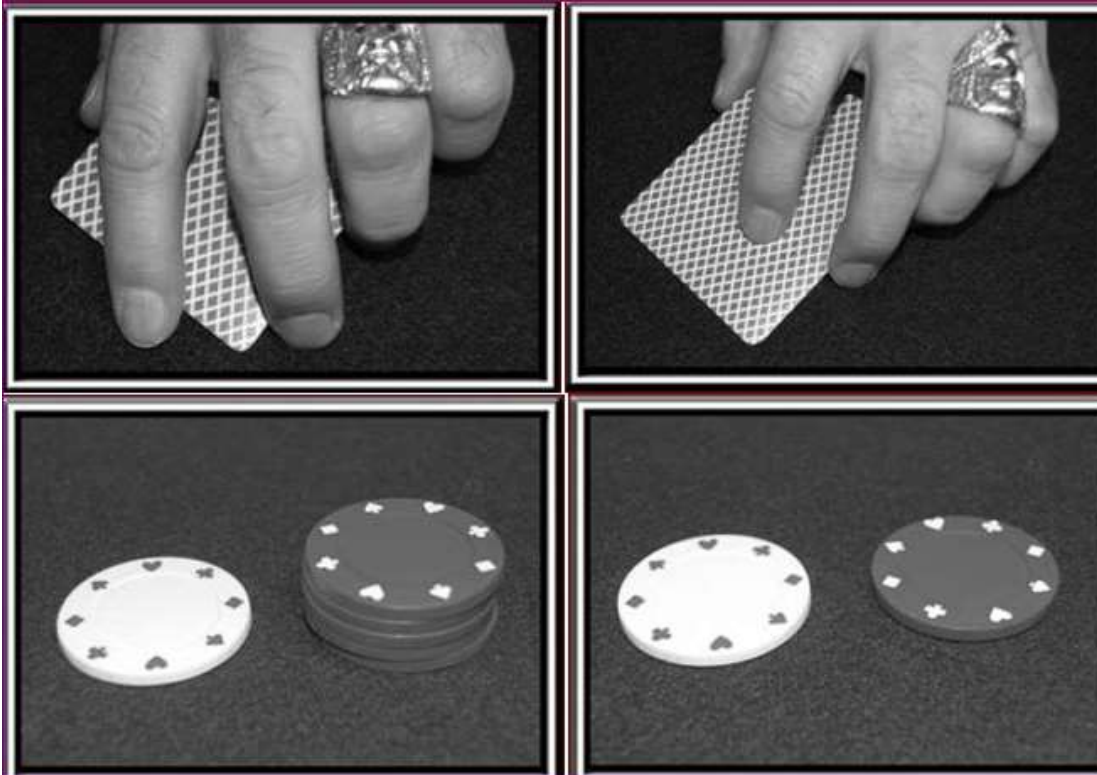


-9- Shuffle Machine

Spot 7s' 1st Hole Card is the 9 of Clubs...The computer can sequence the playing card order backwards and forwards and know all player Hole Cards and the Board Cards.



Pushing The Envelope: If the Poker Dealer was part of the scheme, he need only Flash or Peek the Top Card or Flash the Bottom Card during the Cut and the sequence could be accessed from that card forward or back. Some sort of Office might be used;



FYI: I extracted the above photos from my poker cheating book...They illustrate a Finger Office and a Chip Office used to identify card values.

-10- Shuffle Machine

Pictured below is a Verbal Wire Office using coded words to identify card values or hand types.

VERBAL WIRE SCAM - POKER			
Card Value	Key Word	Key Word	Key Word
Ace	Play	Say	Day
King	Come	Key	Keep
Queen	Lovely	Beautiful	Bean
Jack	Just	Must	Dust
Ten	Time	Dime	Lime
Nine	Nice	Mice	Dice
Eight	Easy	Greasy	Lazy
Seven	Something	Nothing	Heaven
Six	Shoe	Boo	Lou
Five	Fine	Wine	Dine
Four	Funny	Money	Honey
Three	There	Bear	Scare
Two	Loose	Goose	Moose
Gentlemen a pat hand		George it's good	
Boys Trips		Tom it's bad	
Gang Quads		Run RUN!	

VERY IMPORTANT:

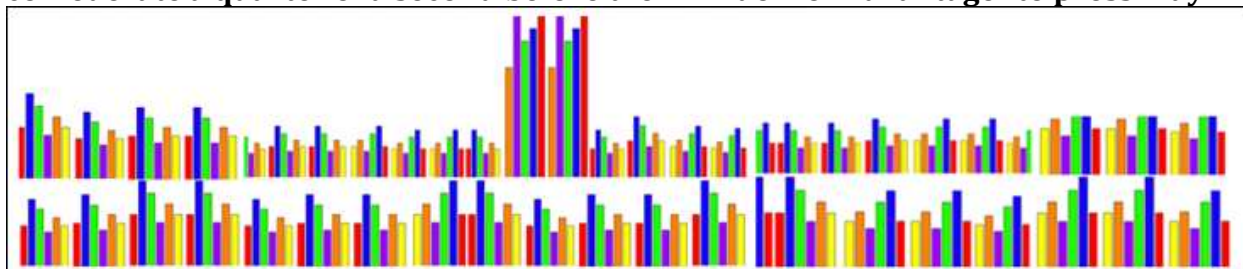
The cheating methods described in my Deckmate 2 memo, Leo Weeks video poker slot device (pictured below), the Russian Slot Hack, Ron Harris & Reid McNeal's hack of an electronic Keno Game in Atlantic City, have one thing in common...**



-11- Shuffle Machine

RUSSIAN SLOT MACHINE HACK

Using a cell phone hidden on their body...(Sometimes in a pocket which covers the phone in mesh to reduce light)...20 to 30 spin outcomes are recorded. The slot outcomes are sent via cell phone to a mega computer in Saint Petersburg Russia...(???) The recorded outcomes are cycled through all possible outcomes at super speed to determine a start point. A text vibration is sent to alert their confederate a quarter of a second before the "Window of Advantage" to press Play.



Having Hacked & Cracked the PRNG Allows Their Computer to Identify the High Payback Windows of Advantage



Ron Harris & Reid McNeal reverse engineered electronic Keno

****These devices were operated from the outside with no direct connection to the slot machine or shuffle machine. The Deckmate 2 hack described in a previous memo required a Raspberry Zero microprocessor to be hardwired and secretly attached to the USB port underneath the shuffle machine. Note how the Weeks device late 1980s', looks similar to the Raspberry Pi.**

I believe we all have to concede (including shuffle machine manufacturers) that if the Bad Guys gain access to any shuffle machine (Deckmate 2 or IDEal) capable of reading card values, they can surreptitiously record and/or transmit that information. As we have discussed, the new IDEal Shuffler has an On-Board Printer function;

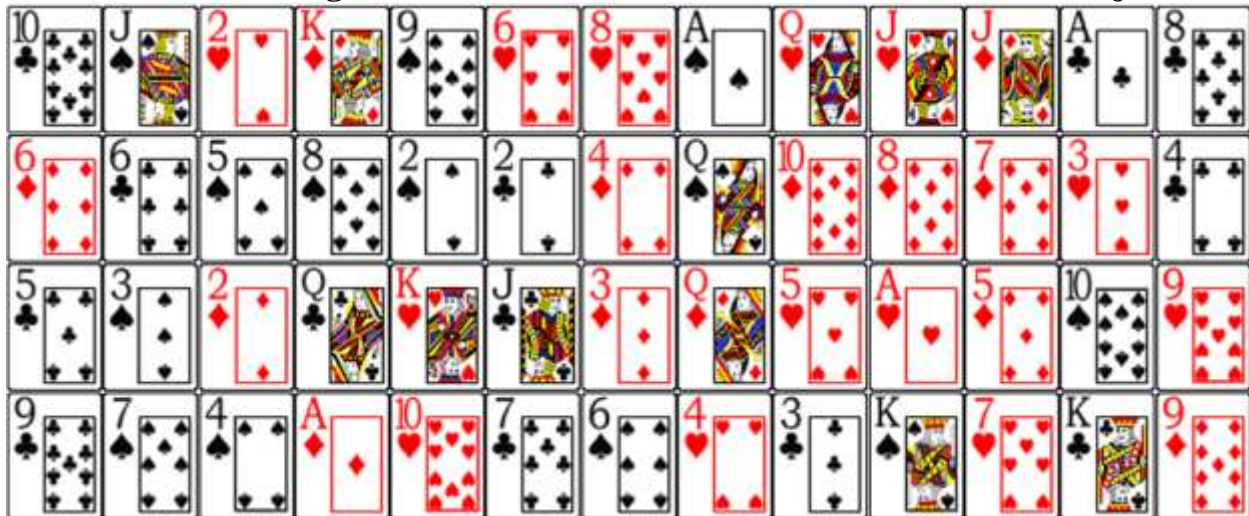
-12- Shuffle Machine



This function is used to verify the initial playing card order dealt to each player and is most often accessed as part of the integrity review of jackpot payoffs. (This also indicates that there is a point at which playing card order can be known after the shuffle-up.)

Also keep in mind that in a Baccarat or Blackjack setting the resulting corrupt play might be easier to uncover and investigate (depending on how “Street Wise” the cheaters are) because all playing cards will eventually be faced and the resulting strategy of play examined. In Poker however, folded hands are not faced and most often the secret knowledge gained will remain a secret hidden in the Mucked Cards.

Consider knowing the order of shuffled cards in Baccarat or Blackjack



(Extracted from my Baccarat Game Protection Presentation)



-13- Shuffle Machine

That order is entered into a program similar to one I wrote several years ago;

```
00920681000186658422008734  
53200030515099741076430709
```

When this order of playing cards is encountered...These outcomes will follow;

```
Player:35  
Bank:01  
Player has a Natural  
Player:35  
Bank:01  
Result: PLAYER WINS  
-----  
Player:59  
Bank:09  
Banker has a Natural  
Player:59  
Bank:09  
Result: BANKER WINS  
-----  
Player:71  
Bank:40  
Player has a Natural  
Player:71  
Bank:40  
Result: PLAYER WINS  
-----  
Player:74  
Bank:63  
Banker has a Natural  
Player:74  
Bank:63  
Result: BANKER WINS  
-----  
Player:00  
Bank:79  
Player:000  
Bank:79  
Result: BANKER WINS  
-----  
Player:02  
Bank:90  
Banker has a Natural  
Player:02  
Bank:90  
Result: BANKER WINS  
-----  
Player:61  
Bank:00  
Banker has a Natural  
Player:61  
Bank:00  
Result: BANKER WINS  
-----  
Player:01  
Bank:00  
Banker has a Natural  
Player:01  
Bank:00  
Result: BANKER WINS  
-----  
Player:65  
Bank:68  
Player:654  
Bank:682  
Result: BANKER WINS  
-----  
Player:20  
Bank:00  
Banker has a Natural  
Player:20  
Bank:00  
Result: BANKER WINS  
-----  
Total Results:  
Hands: 10 Player: 2 Banker: 8 Ties: 0  
...End of Deal
```

In a Blackjack Game the cheater is instructed on how many hands to play and how many cards to draw in order to maximize the number of winning wagers.

```
Begin Play...  
4 Hands, 2 Hits  
5 Hands, 2 Hits  
5 Hands, 1 Hit  
1 Hand, 1 Hit - Player Loses  
1 Hand, 0 Hits - Player Wins  
Cannot Continue!!  
...End of Deal
```

These examples illustrate the threat when known sequences are encountered

UPDATE: 07.21.24

I sent you a memo last year...August 23, 2023. I had spoken with a Shuffle Master programmer in Australia who told me...

They always read the playing cards first, then shuffle afterwards. These are two distinct and separate processes. The playing cards cannot be viewed while shuffling or assigning to shelves or while dealing. The machine does not know the playing cards dealt to any player.

Apparently this is not true of the Deckmate 2. According to the IOActive Researchers I spoke with, they could assign particular playing card values to particular shelves during the shuffle process...thereby creating any hand(s) they desire.

Hackers Rig Casino Card-Shuffling Machines for 'Full Control' Cheating AUG 9, 2023 6:00 PM

Security researchers accessed an internal camera inside the Deckmate 2 shuffler to learn the exact deck order—and the hand of every player at a poker table.



With a tiny hacking device slipped into a shuffling machine's USB port, which often sits exposed under a poker table, IOActive's researchers showed they can carry out omniscient cheating in a game like Texas Hold Em

They ultimately found that if someone can plug a small device into a USB port on the most modern version of the Deckmate—known as the Deckmate 2, which they say often sits under a table next to players' knees, with its USB port exposed—that hacking device could alter the shuffler's code to fully hijack the machine and invisibly tamper with its shuffling. They found that the Deckmate 2 also has an internal camera designed to ensure that every card is present in the deck, and that they could gain access to that camera to learn the entire order of the deck in real time, sending the results from their small hacking device via Bluetooth to a nearby phone, potentially held by a partner who then could then send coded signals to the cheating player.

The implication for Poker Hands and Carnival Game Hands is obvious.

-15- Shuffle Machine

Knowing the order of a shuffled deck and therefore the value of your opponents' Hole Cards Pre-Flop or knowing the House Hand in Three Card Poker or Board Cards in Mississippi Stud prior to a Play Wager or Board Wager is a cheaters dream. You do not invest in hands you cannot win. But now consider the ability to arrange Poker Hands at will...

But now consider;

"What if hackers could trigger a Royal Flush on any of the Carnival Games with a progressive Jackpot...?"

"What if a Hacker could arrange Poker Bad Beat Jackpot hands...?"



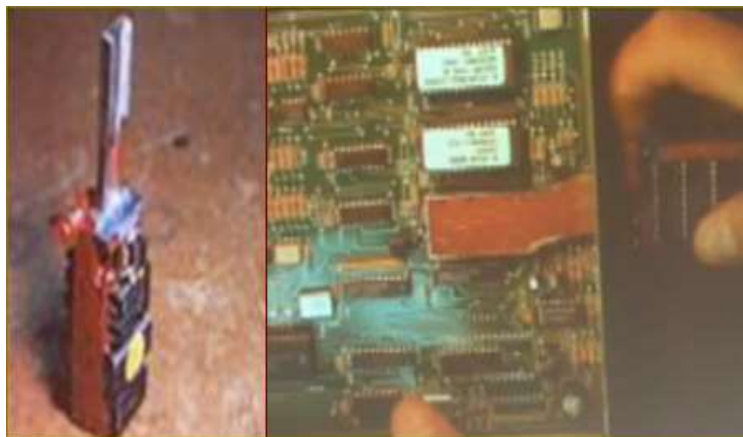
Above is a \$1.9 million Bad Beat Jackpot hand in Kahnawake, Quebec CA. (This is the largest Bad Beat Poker Jackpot on record...August 3, 2023)

(FYI: A Bad Beat Poker Jackpot hit at Rivers Casino in Pittsburgh, PA for \$1.7 Million last year and a \$1.2 Million at Motor City Casino in Detroit, MI.) NOTE: A "Stacked Deck" from a shuffle machine must still have to somehow bypass the fair cut...(Two Hand release One Hand Cut.) (I have my own method to accomplish this sleight of hand.)

-16- Shuffle Machine

I was told by the fellas at IOActive that with the use of a wireless network connection they could accomplish the same software corruption. I asked if once the machine software was corrupted would there be any evidence in the software code...? I compared my question to the Dennis Nikrasch device used to download Easter Egg corruption on the motherboard of a slot machine and trigger a slot jackpot.

Nikrasch Device



If you remember, it was estimated that Dennis Nikrasch and his crew stole approximately \$16 Million in two years from slot machines in Las Vegas. His single biggest slot jackpot theft was \$3.7 Million at Harrah's on the strip. When the Gaming Board examined the slot machine with a Kobetron Device, they found no evidence of tampering. Nikrasch was clever enough to have a subcode which erased his Easter Egg after the jackpot win was triggered. They also waited to trigger the jackpot until surveillance video retention had passed. The eventual protection was to Scribble over any excess space on the EProm so no additional information (Easter Egg) could be downloaded.

According to the IOActive Hackers, using Bluetooth technology (in close proximity to the shuffle machine) if they could access an open network connection, they could accomplish the same software

-17- Shuffle Machine

corruption remotely...No physical connection to a USB port. They could also (according to them) erase their corrupted code and restore the original code and leave no evidence.

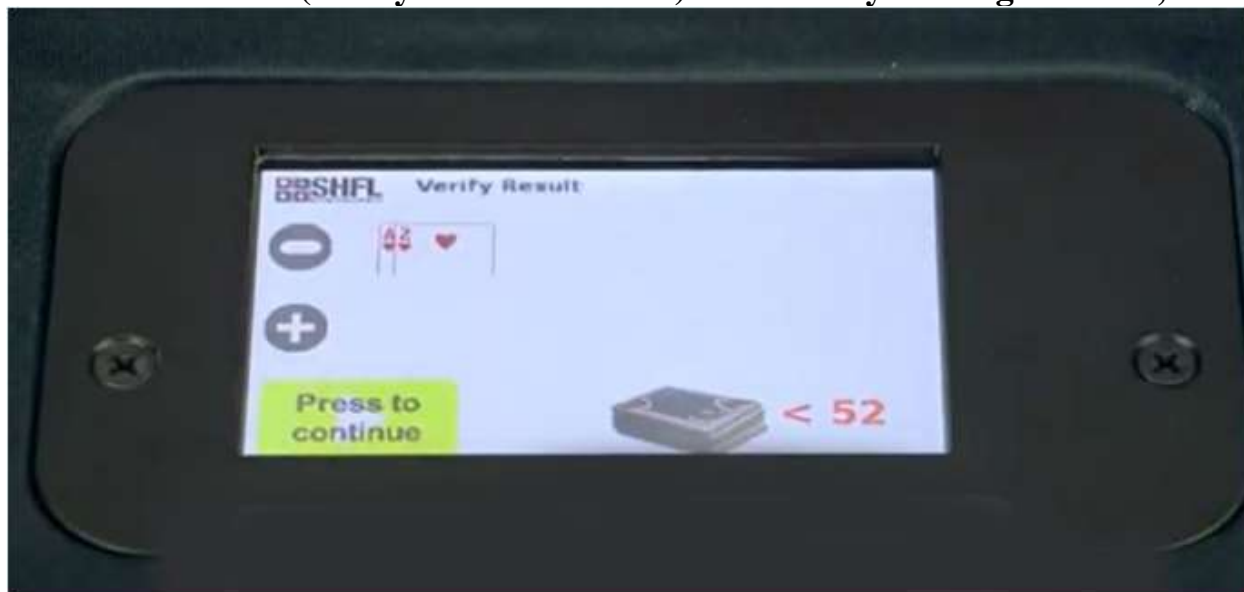
Keep in mind, the IOActive guys are not casino cheaters. They accomplished their hack as an experiment in their office under their conditions not in a Poker Room or Casino.

The implications however for any shuffle machine which employs camera technology and/or open networks is still in question.

At first the Deckmate 2 Hack seems like a very simple fix, disable that USB port and/or move the port to a location that cannot be accessed from the outside. (This does not mean if the USB is accessible that a Hacker could not plug in the Raspberry Pi on a dead game...corrupt the software code and then unplug...Then trigger known results or hands at a later time...Similar to a "Sleeper Cooler" which I demonstrate in Poker Cheating lectures.)

COMMON SENSE:

If the Deckmate 2 (or any shuffle machine) can identify missing cards or;



Deckmate 2 Can Identify Missing or Extra Playing Cards

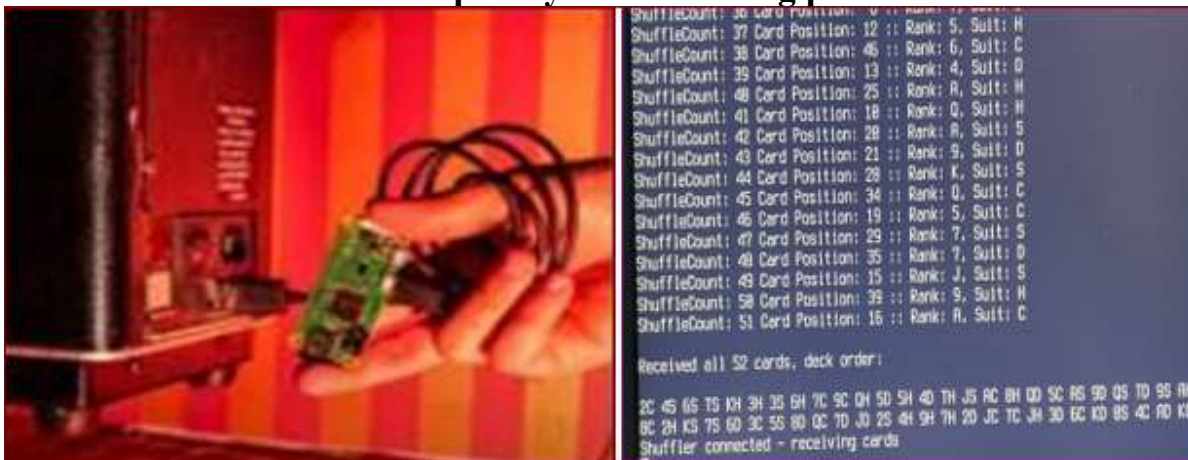
-18- Shuffle Machine

Can Sort and Suit cards into a known order... Then common sense dictates



Deckmate 2 Can Sort & Suit Playing Cards in 3 Orders

the shuffle machine has the capability to assign particular cards to called for shelves. Pictured below Raspberry Pi & resulting printout of card orders...



This is the print out of random card order they receive after Hacking...



They have knowledge of the card position and card value at that position



-19- Shuffle Machine

What the IOActice Researchers are able to accomplish is to assign particular playing cards to particular shelves, not to create a New Deck Order as is a function of the Deckmate 2, but to create any Poker Hand(s) they choose.

FYI: I have heard that many card rooms in Texas & Southern California are employing an additional precaution. When the shuffled deck is removed from the machine they perform a riffle shuffle and cut...Two Hand Release...One Hand Cut onto a Cut Card.

Contact me if you have questions.

I will keep you updated

Respectfully Submitted,

**George D. Joseph
Worldwide Casino Consulting, Inc.**

GJ/ccj