

DYNAMIC. REVEALING. PROVEN.

March 6, 2024

Hello \*\*\*\*\*\*,

Hope all is well. I wanted to update you on the Deckmate 2 Shuffle machine hack.



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.



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-2- Hack Update 03.06.24

I recently met with members of IOActive Research at the World Game Protection Show.. They are the company whose *"Hackers"* used a Raspberry PI (mini microprocessor) to corrupt and alter the code of a Deckmate 2 Shuffle Machine. Note, the Raspberry PI must be plugged into an exposed USB port at the back of the shuffle machine.

This is my recreation of their Hack...Before I witnessed their demonstration...

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

6 5 10 J A K Q 3 4 8 7 8 9 3 2 K A 210 9 6 7 5 4 J Q Q J 4 5 7 6 9 10 2 A K 2 3 9 8 7 8 4 3 Q K A J 10 5 6 This is the print out of random card order they receive after Hacking...

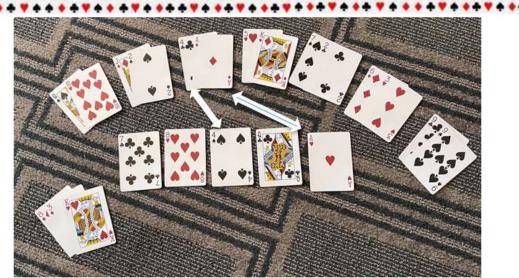
2C 4S 6S TS KH 3H 3S 6H 7C 9C QH 5D 5H 4D TH JS AC 8H QD 5C AS 9D QS TD 9S AH 8C 2H KS 7S 6D 3C 5S 8D QC 7D JD 2S 4H 9H 7H 2D JC TC JH 3D 6C KD 8S 4C AD KC

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

ShuffleCount: 36 Card Position: 6 ... Kank: 1, Suit: 6 ShuffleCount: 37 Card Position: 12 :: Rank: 5, Suit: H ShuffleCount: 38 Card Position: 46 :: Rank: 6, Suit: C ShuffleCount: 39 Card Position: 13 :: Rank: 4, Suit: D ShuffleCount: 40 Card Position: 25 :: Rank: A, Suit: H ShuffleCount: 41 Card Position: 10 :: Rank: Q, Suit: H ShuffleCount: 42 Card Position: 20 :: Rank: A, Suit: S ShuffleCount: 43 Card Position: 21 :: Rank: 9, Suit: D ShuffleCount: 44 Card Position: 28 :: Rank: K, Suit: S ShuffleCount: 45 Card Position: 34 :: Rank: Q, Suit: C



The known order of cards after the shuffle allows them to predict outcomes 6 5 10 J A K O 3 4 8 7 8 9 3 2 K A 210 9 6 7 5 4 J O Q J 4 5 7 6 9 10 2 A K 2 3 9 8 7 8 4 3 Q K A J 10 5 6



Study the above Poker Hand and you can quickly determine that player three (3) will win the Pot with two pair (Aces & 4s' Queen Kicker). The player(s) in league with the hackers would not stay in the hand if they were not seated in the 3 Spot.

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, <u>then</u> shuffle afterwards. These are two distinct and separate processes. The playing cards cannot be viewed while shuffling or assigning to shelfs or while dealing. The machine does not know the playing cards dealt to any player.

This may be true of the Ideal Shuffler, but apparently this is not true of the Deckmate 2. According to the IOActive Hackers I spoke with, they can assign particular playing card values to particular shelves during the shuffle process...thereby creating any hand(s) they desire.



The implication for Poker Hands and Carnival Game Hands is obvious. "What if hackers could trigger a Royal Flush on any of the Carnival Games with a progressive Jackpot...?"

Now consider a Hack which could arrange a Poker Bad Beat Jackpot.



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 recently at Rivers Casino in Pittsburgh, PA for \$1.7 Million last year and a \$1.2 Million at Motor City Casino in Detroit, MI.)

Keep in mind, the Raspberry PI processor must be physically plugged into the exposed USB port. The simple fix which many casinos and Poker Rooms have taken is to block access to that USB port.



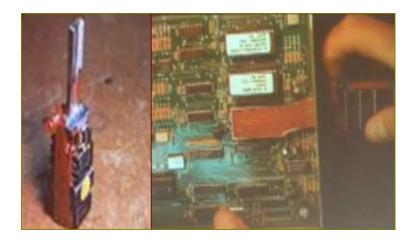
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However, note the photo I took in my meeting with IOActive. Note the yellow ethernet cable.



I was told by the "Hackers" 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 Nikrasch device used to download Easter Egg corruption on the motherboard of a slot machine and trigger a slot jackpot.



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-6- Hack Update 03.06.24

If you remember, it was estimated that Dennis Nikrasch and his crew stole approximately \$16 Million in two years. 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 pot was triggered. 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 they same software 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. I did not see them assign known playing cards to particular shelves or create a known hand.

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

I will update you.

Pease contact me if you have any questions.

**Respectfully Submitted,** 

George D. Joseph Worldwide Casino Consulting

GJ/ccj



From my previous memo August 23, 2023...

FYI: I have heard that in response to reports of the Deckmate 2 hack several Poker Rooms in Texas and Reno and California have begun to add a riffle shuffle (then cut) after taking the cards from the shuffler or have disabled the USB port on the Deckmate 2.

This policy would seem to disrupt any known order of shuffled cards as described, unless a false shuffle & cut were employed by the dealer in league with the conspiracy.