

**Analysis
For
Headstart Hold'em Keno
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**Prepared
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Analysis of Headstart Hold'em Keno

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Game Description:

Headstart Hold'em Keno is based on the popular game of Texas Hold'em Poker. Five initial 2-card predetermined hands are used for each Player to make a wager on. For each ticket, Players have the option to wager on one or all of the hands according to pre-determined minimums and maximums. To complete the draw, 5 random community cards will be chosen from the remaining 42 cards.

The object of the game is for the player to choose the highest hand. The hand that has the highest Poker Rank is deemed the winning hand. If the five randomly chosen community cards create the winning hand, all hands are considered to be winners and will be paid according to the payable for that rank for that hand. Players will win the amount shown on the pay table, depending on which hand they chose and the final rank of that hand if it is a winning hand. Several different pay tables have been created, with each hand having its own unique pay table within each. The first three paytables are shown below, and the remainder are shown in Appendix A:

Headstart Hold'em Keno Paytable – HHK-01						
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥	
Diamond Royal	1000	1000	1000	1000	1000	
Other Royal	250	80	NA	NA	NA	
Straight Flush	100	50	50	200	300	
Four of a Kind	50	15	30	10	100	
Full House	10	5	7	6	20	
Flush	6	3	4	NA	NA	
Straight	4	3	3	5	10	
Three of a Kind	3	2	3	3	5	
Two Pair	2	2	2	2	4	
Pair	1	1	2	NA	NA	

Headstart Hold'em Keno Paytable – HHK-02					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1000	1000	1000	1000	1000
Other Royal	250	80	NA	NA	NA
Straight Flush	100	50	50	250	250
Four of a Kind	45	20	25	10	100
Full House	10	4	5	5	20
Flush	5	3	4	NA	NA
Straight	4	2	3	5	10
Three of a Kind	2	2	3	3	4
Two Pair	2	2	2	2	3
Pair	1	1	2	NA	NA

Headstart Hold'em Keno Paytable – HHK-03					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1000	1000	1000	1000	1000
Other Royal	250	100	NA	NA	NA
Straight Flush	100	50	50	200	250
Four of a Kind	40	25	25	10	100
Full House	10	3	4	5	20
Flush	4	3	4	NA	NA
Straight	3	2	3	3	8
Three of a Kind	2	2	2	3	4
Two Pair	2	1	2	2	2
Pair	1	1	2	NA	NA

Additionally, there is an optional Flop Bonus bet. This wager is based on the first three community cards. The pay table for this wager will be presented later on in this report.

Headstart Hold'em Keno uses a standard 52-card deck. There are ten cards that make up the five initial 2 card predetermined hands. These ten cards cannot be drawn as a community card as they have been removed from the 'deck' prior to the draw of the community cards.

Analysis Methodology:

As there are only five 'random' cards being drawn per hand, it is possible to create a computer program that will analyze every possible draw. This program calculated how often each of the five hands wins and with what Poker Rank each hand wins with.

Results:

The results from the first program are shown in the tables below. This program simulated the 850,668 possible ways that five cards can be dealt from the remaining 42 cards in the deck. The total number of wins is greater than this, because if the community cards make up the highest hand, all hands are considered to be winners. This will occur 813 times out of the 850,668 hands.

Headstart Hold'em Keno Winning Hands					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1	1	1	1	1
Other Royal	76	741	NA	NA	NA
Straight Flush	48	2,157	1,417	197	122
Four of a Kind	1,631	1,491	1,491	9,878	1,491
Full House	23,049	21,165	19,280	56,785	16,116
Flush	15,957	69,951	56,925	NA	NA
Straight	17,789	40,926	36,408	15,579	7,329
Three of a Kind	20,847	22,740	22,588	68,046	19,550
Two Pair	67,259	53,026	34,519	4,983	23,044
Pair	69,344	25,222	4,748	NA	NA

The overall win frequency for each hand is in the table below:

Hand	Win Frequency
A♣ K♥	25.39%
J♠ Q♠	27.82%
8♦ 9♦	20.94%
5♦ 5♥	18.28%
2♣ 7♥	7.95%

Calculating the overall payback of each wager can be computed by multiplying the frequency of each hands winning rank by the payout for that rank for that hand.

Keno Version – Payback Calculation: Units Won per Hand per Rank (Paytable HHK-01)					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1,000	1,000	1,000	1,000	1,000
Other Royal	19,000	59,280	NA	NA	NA
Straight Flush	4,800	70,850	107,850	39,400	36,600
Four of a Kind	81,550	22,365	44,730	98,780	149,100
Full House	230,490	105,825	134,960	340,710	322,320
Flush	95,742	209,853	227,700	NA	NA
Straight	71,156	122,778	109,224	77,895	73,290
Three of a Kind	62,541	45,480	67,764	204,138	97,750
Two Pair	134,518	106,052	69,038	9,966	92,176
Pair	69,344	25,222	9,496	NA	NA
Total	770,141	768,705	771,762	771,889	772,236
Payback	90.53%	90.36%	90.72%	90.74%	90.78%
House Advantage	9.47%	9.64%	9.28%	9.26%	9.22%

If each of the hands were wagered on equally, the overall Payback would be 90.63% for a house advantage of 9.37%.

Keno Version – Payback Calculation: Units Won per Hand per Rank (Paytable HHK-02)					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1,000	1,000	1,000	1,000	1,000
Other Royal	19,000	74,100	NA	NA	NA
Straight Flush	4,800	70,850	107,850	49,250	30,500
Four of a Kind	73,395	29,820	37,275	98,780	149,100
Full House	230,490	84,660	96,400	283,925	322,320
Flush	79,785	209,853	227,700	NA	NA
Straight	71,156	81,852	109,224	77,895	73,290
Three of a Kind	41,694	45,480	67,764	204,138	78,200
Two Pair	134,518	106,052	69,038	9,966	69,132
Pair	69,344	25,222	9,496	NA	NA
Total	725,182	728,889	725,747	724,954	723,542
Payback	85.25%	85.68%	85.32%	85.22%	85.06%
House Advantage	14.75%	14.32%	14.68%	14.78%	14.94%

If each of the hands were wagered on equally, the overall Payback would be 85.31% for a house advantage of 14.69%.

Keno Version – Payback Calculation: Units Won per Hand per Rank (Paytable HHK-03)					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1,000	1,000	1,000	1,000	1,000
Other Royal	19,000	74,100	NA	NA	NA
Straight Flush	4,800	70,850	107,850	39,400	30,500
Four of a Kind	65,240	37,275	37,275	98,780	149,100
Full House	230,490	84,660	77,120	283,925	322,320
Flush	63,828	209,853	227,700	NA	NA
Straight	53,367	81,852	109,224	46,737	58,632
Three of a Kind	41,694	45,480	45,176	204,138	78,200
Two Pair	134,518	53,026	69,038	9,966	46,088
Pair	69,344	25,222	9,496	NA	NA
Total	683,281	683,318	683,879	683,946	685,840
Payback	80.32%	80.33%	80.39%	80.40%	80.62%
House Advantage	19.68%	19.67%	19.61%	19.60%	19.38%

If each of the hands were wagered on equally, the overall Payback would be 80.41% for a house advantage of 19.59%.

The five community cards will form the winning hand 813 times (0.096% of all hands). Of these hands, 609 will be Straights, 180 will be Full Houses, 12 will be Four of a Kinds, 11 will be Straight Flushes and 1 will be a Royal. The impact of the community cards forming the highest possible hand been fully accounted for in the calculations of overall payback for Headstart Hold'em Keno.

The Flop Bonus bet is based on the first three community cards, generally referred to as the 'Flop'. Because ten cards have in essence been removed from the deck to form the five initial 2-card hands, the distribution of hands is unique to this game. The frequency distribution is shown in the table below:

3-Card Distributions				
Hand	Headstart Hold'em		Standard 52-Card Deck	
	Occurrences	Frequency	Occurrences	Frequency
Straight Flush	27	0.2353%	48	0.2172%
Three of a Kind	24	0.2091%	52	0.2353%
Straight	370	3.2230%	720	3.2580%
Flush	543	4.7300%	1,096	4.9593%
Pair	1,888	16.4460%	3,744	16.9412%
Nothing	8,628	75.1568%	16,440	74.3891%
Totals	11,480	100.0000%	22,100	100.0000%

Based on the distributions in the above table, several possible pay tables have been developed for this Flop Bonus Bet. They are shown in the tables below:

Pay table HFB-01 for Headstart Flop Bonus		
Hand	Pays	Contribution
Straight Flush	100 for 1	23.53%
Three of a Kind	50 for 1	10.46%
Straight	6 for 1	19.34%
Flush	4 for 1	18.92%
Pair	1 for 1	16.45%
Total Payback		88.69%
House Advantage		11.31%

Pay table HFB-02 for Headstart Flop Bonus		
Hand	Pays	Contribution
Straight Flush	50 for 1	11.76%
Three of a Kind	30 for 1	6.27%
Straight	6 for 1	19.34%
Flush	4 for 1	18.92%
Pair	2 for 1	32.89%
Total Payback		89.18%
House Advantage		10.82%

Pay table HFB-03 for Headstart Flop Bonus		
Hand	Pays	Contribution
Straight Flush	40 for 1	9.41%
Three of a Kind	30 for 1	6.27%
Straight	5 for 1	16.11%
Flush	4 for 1	18.92%
Pair	2 for 1	32.89%
Total Payback		83.61%
House Advantage		16.39%

Pay table HFB-04 for Headstart Flop Bonus		
Hand	Pays	Contribution
Straight Flush	40 for 1	9.41%
Three of a Kind	30 for 1	6.27%
Straight	5 for 1	16.11%
Flush	3 for 1	14.19%
Pair	2 for 1	32.89%
Total Payback		78.88%
House Advantage		21.12%

Appendix A
Additional Paytables and Paybacks

The following tables contain alternative paytables for Headstart Hold'em Keno Version. The paybacks shown in the bottom row were calculated in a similar fashion to those shown in the main report, by summing up the values of the frequency of each winning hand rank times the payback of that hand. The details of these calculations can be provided upon request.

Headstart Hold'em Keno Paytable – HHK-04					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1000	1000	1000	1000	1000
Other Royal	200	100	NA	NA	NA
Straight Flush	100	50	40	150	200
Four of a Kind	25	15	20	10	75
Full House	10	4	4	5	20
Flush	5	2	3	NA	NA
Straight	3	2	3	3	5
Three of a Kind	2	2	2	2	3
Two Pair	1	1	2	1	2
Pair	1	1	2	NA	NA
Payback	70.97%	70.35%	70.29%	70.66%	70.64%
House Advantage	29.03%	29.65%	29.71%	29.34%	29.36%

Headstart Hold'em Keno Paytable – HHK-05					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1000	1000	1000	1000	1000
Other Royal	150	100	NA	NA	NA
Straight Flush	100	50	40	150	200
Four of a Kind	25	15	25	10	50
Full House	6	4	4	5	20
Flush	4	2	3	NA	NA
Straight	4	2	3	3	10
Three of a Kind	3	2	2	2	3
Two Pair	1	1	2	1	2
Pair	1	1	1	NA	NA
Payback	70.26%	70.35%	70.61%	70.66%	70.57%
House Advantage	29.74%	29.65%	29.39%	29.34%	29.43%

Headstart Hold'em Keno Paytable – HHK-06					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1000	1000	1000	1000	1000
Other Royal	200	100	NA	NA	NA
Straight Flush	100	50	50	100	200
Four of a Kind	25	30	25	15	50
Full House	7	5	5	5	20
Flush	5	2	3	NA	NA
Straight	4	2	3	3	10
Three of a Kind	3	2	2	2	4
Two Pair	2	1	2	1	3
Pair	1	1	1	NA	NA
Payback	75.29%	75.47%	75.41%	75.31%	75.58%
House Advantage	24.71%	24.53%	24.59%	24.69%	24.42%

Headstart Hold'em Keno Paytable – HHK-07					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	599	599	599	599	599
Other Royal	200	100	NA	NA	NA
Straight Flush	100	50	50	100	200
Four of a Kind	25	30	25	15	50
Full House	7	5	5	5	20
Flush	5	2	3	NA	NA
Straight	4	2	3	3	10
Three of a Kind	3	2	2	2	4
Two Pair	2	1	2	1	3
Pair	1	1	1	NA	NA
Payback	75.24%	75.42%	75.36%	75.26%	75.53%
House Advantage	24.76%	24.58%	24.64%	24.74%	24.47%

Headstart Hold'em Keno Paytable – HHK-08					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1000	1000	1000	1000	1000
Other Royal	300	75	NA	NA	NA
Straight Flush	200	50	50	200	200
Four of a Kind	50	15	20	10	100
Full House	10	4	7	7	20
Flush	7	4	5	NA	NA
Straight	5	3	3	4	9
Three of a Kind	3	2	3	3	7
Two Pair	2	2	2	2	5
Pair	1	1	2	NA	NA
Payback	95.51%	95.66%	95.66%	95.58%	95.79%
House Advantage	4.49%	4.34%	4.34%	4.42%	4.21%

Headstart Hold'em Keno Paytable – HHK-09					
Winning Hand	A♣ K♥	Q♠ J♠	8♦ 9♦	5♦ 5♥	2♣ 7♥
Diamond Royal	1000	1000	1000	1000	1000
Other Royal	300	75	NA	NA	NA
Straight Flush	200	50	50	200	300
Four of a Kind	50	15	20	10	100
Full House	10	4	5	7	20
Flush	7	4	5	NA	NA
Straight	5	3	4	4	10
Three of a Kind	3	2	3	3	7
Two Pair	2	2	2	2	4
Pair	1	1	2	NA	NA
Payback	95.51%	95.66%	95.41%	95.58%	95.38%
House Advantage	4.49%	4.34%	4.59%	4.42%	4.62%