

MONOPOLY

VERSION 0.02.56 BETA

FOR THE COMMODORE 64

BY DANIEL ENGLAND FOR ECCLESTIAL SOLUTIONS

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You probably need to own a copy of the official board game to even be reading this. *ugh*

I feel this is how the game **should** be played in this format...

Contents

- 40 game board squares
- 4 board quadrants
- 10 player colours
- 28 title deed cards (plus title cards for all other squares)
- 16 chance cards
- 16 community chest cards
- 32 houses
- 12 hotels
- 2 dice
- 16 bit signed money, 24 bit signed wealth, 16 bit signed score
- 2-6 players
- 8+ years
- 3 house rules (one always enabled: reshuffle CCCCards)
- strictly turn-based (with interrupts and flexible management)

Introduction

The goal has been to make an implementation as close to the standard as possible. However, a strict, turn-based structure to the game is more-or-less required when attempting to have multiple players on a single console. A few changes to the rules would be required, then. An official release of the game for the C64 back in the day was nightmarishly slow and cumbersome for trying to avoid these changes (rent nomination delays, waiting endlessly for the dice and strange menus). All of the new releases I have seen, on modern hardware, have the same structure as used here, strictly turn-based, and the same related rule changes.

Some rules in the standard set are not entirely specific. Many technicalities of the standard rules are largely unseen in the wild. Every version I know of lacks the improvement auctions, for example. I am adhering to the standard rules in relation to eliminations, trades and auctions better than any other version I know of.

Rule Changes

The game is identical to the most recent, standard rules as per my copy (Australia, 2018) except for the following details:

- Rent is always paid, there is no need to declare it owed. I'll put a note here. When paying, only the amount available to the player is paid in the case where they do not have sufficient wealth (equity + money, see the deductions/observations section). As to the rule change, having to declare it owed all the time is nonsense, especially when the board has markers for player ownership. Also, in this single console implementation, trying to incorporate the standard rule would only serve to drastically reduce the rate of play (as it probably does for the board game) and I feel it could generally only foster the development of anticompetitive behaviour. I know of no version (other than the original C64 one) that doesn't simply always charge rent.
- Trade initiation can only be done in the player's turn (when they "have the dice") or when it is their turn during an auction (see below). I discuss the trade implementation issues thoroughly in the deductions/observations section. Overall, I think this is a fair interpretation given the platform/structure restrictions.
- As for the most strange case, trade initiation is not permitted when receiving deeds from an elimination. Ordinarily, a player is eliminated when it is their turn so this does not happen. However, if I was to always allow trading when it was your turn then it could happen that due to the Community Chest card that requires other players to pay you and you are receiving deeds from an elimination, you could trade. This is an extraordinarily rare, corner-case (it is only \$10) and it seems better, in the interests of fairness, all player's best interests and providing a standard mechanism, that it is not allowed. Again, trades in the standard rules can be at "any

time" but there is no mention of them in the standard rules pertaining to the elimination (they only state simple possible actions) nor which action might have priority when paying and dissolving equity. This rule brings a degree of simplicity to the mechanisms.

- House/Hotel (improvement) and mortgage management can always be done in the player's turn. It can also be done when offered a trade or receiving a defeated player's deeds for example or when a player has gone into debt out of turn (see the deductions/observations section for more information). All of these events occur sequentially, not concurrently. This will affect how improvements are sold and their availability.

- As a side effect of the above, there is no auctioning of houses/hotels which should occur by the standard rules if there are multiple demands for them (and there is an insufficient number to meet demand) since they are bought and sold in-turn. I'll note here that the standard rules are somewhat vague as to how these (perhaps just houses, even) improvement auctions actually occur, anyway. Out of all the changes, this is perhaps the biggest although it might not seem that way. It is certainly the one I'm most upset about having to follow.

- Auctions of deeds are also turn-based. If all but one player passes in a round, the player that did bid wins the auction. A player may forfeit any further bids in their turn, effectively always passing for the remainder of the auction. As per the standard rules, all players can pass or forfeit and no one will win the auction, the deed will remain unclaimed. Auctions also start at \$10, as per the standard rules and this is the minimum bid value in this version. The standard rules don't clearly specify if lower opening values are actually permitted or not (if its a reserve) but the idea seems to be that it is a minimum asking price.

- The standard debt recovery rules are always applied to their furthest extent when a player has insufficient wealth in this version. The standard rules are absolutely amiss in regards to specifically detailing what occurs when a player is defeated by another player and how they should manage the debt. Applying this convention as an assertion is the only truly logical and fair decision. Too many of the standard rules are vague in relation to the matters involved and not having this particular rule would open many of them up to peculiar interpretation. One of them would even be what I would consider to be broken if not following this as a rule because it does not specify what should happen when there is an alternative, something the standard rules don't specifically disclaim. Having this rule in place clears up a number of issues. I will discuss the issues further in the deductions/observations section.

- The Community Chest and Chance cards are reshuffled when the last is returned (independently, of course). The standard rules don't mandate this. I feel this is a more interesting behaviour. I may be persuaded to make this a configurable house rule however I strongly prefer it as is.

- When you are able to use a Get Out Gaol Free card, the standard rules would allow you to use any that you have but in this implementation, the Community Chest one is used first and then the Chance one, if both are owned. This is for the sake of simplicity. I'm happy to take on board any valid criticism of this decision but having to select would be a disproportionate complication of the mechanisms.

- Gaol is spelt "G A O L" instead of "J A I L" because that's how it was on the board I played on as a child and I prefer the old or even correct spelling. I'm not intending on using American "spelling" and place names any time soon but perhaps for an NTSC version (see known issues).

- The maximum amount of money each player can have in this version is fixed at \$32767. The odd value is due to the implementation. It is still an extremely high amount of money to have, even for a game by the standard rules. For example, the standard board game version only comes with \$15140 in printed money. I have played games where I had some \$12000 money or so and only half of the maximum equity during testing but they were uncommon. I have heard of a house rule where you can only have the printed money in play but the standard rules do say that the banker is quite free to print more bills (which this version can effectively do to a very large extent).

House Rules

The following optional house rules are available (or considered):

- Starting money can be set low (\$1000) or high (\$2000). I have done this because I feel that with only two players, the normal starting money (\$1500) is too low. There just isn't enough capital in play in my opinion. \$2000 for three players is questionably high but still works alright enough. For four or more you probably want the normal amount. I may expand the selection range. I have been asked for \$3000 but this is definitely too high.

- Taxes can be sent to and collected from Free Parking. I actually hate this house rule because it is insanely unbalanced and can cause the game to drag on. It is widely desired, however so I provide it (it has been almost free in the implementation anyway). Only tax accumulation is implemented and that's all I'll allow. Ever. Period.

- I am considering the "double salary for actually landing on Go" house rule but I feel it is largely redundant with a high starting money option.

- Since I have mentioned it, I will field requests for the printed bills only house rule (since there is always going to be some kind of cap). It would be implemented such that effectively, a best-fit of bills would be applied (shuffling them about through all accounts). So simply a game-wide, total funds cap.

Rule Observations and Deductions

The following deductions and observations are made from the rule changes that were required for this platform and from attempting to best incorporate the remaining rules unchanged:

- To clarify, equity refers to the amount of money the player has access to by dissolving their assets through the sale of improvements and the mortgaging of deeds. Wealth refers to the total amount of money potentially available to the player -- that is, actual money plus equity.

- When a player's deeds are transferred after losing to another player, if the recipient cannot afford at least the fee for a deed, the remaining, unpaid for deeds are auctioned to all players (as per losing to the bank). I'll add some more detail here because there is a commonly unknown rule and it has not been implemented on any other version I've seen. When a player loses to another player (after trying to pay by selling and mortgaging, see the point following the next), the "mortgaged deeds" (which one can assume is all of them owned by the defeated player) are transferred to the owed player but that player must either pay to repay each one or pay the 10% fees and keep the deeds mortgaged as decided by them, per deed. Recall that mortgages are repaid by paying the mortgage value plus 10% (rounded up). These charges are paid to the bank. Conversely, when losing to the bank, the player's properties are all unmortgaged and auctioned. The standard rules do not specify what happens if the defeating player cannot pay, nor the order in which the deeds are paid for in. They are also decidedly vague about what "these mortgaged deeds" should be and what happens to any other kind of deed the defeated player may have (which in this version isn't any because I do assume the standard debt recovery rules are completed in full).

- Further to the above, when a player has defeated another player, they are able to determine which deeds they will take ownership of and which deeds go to auction (within their means). I have decided to do this because the player must pay and the standard rules are so vague in relation to the matter. Instead of determining the priority order, I am allowing the player to do it. This seems to be the only truly fair option and the most flexible interpretation of the standard rules. The only caveat is that once at auction, they may go for as low as \$10 which is lower than the fees for the big name deeds (from red or so onwards but not the stations). Letting these deeds go is a big gamble. Big enough that I feel this assertion is still valid. The player is still having to determine the deeds they will pay fees for or repay which is the only thing the standard rules are truly specific about requiring. I will not force the player to go down to zero wealth in order to attempt to stringently adhere to the standard rules by requiring they take as many deeds as possible when those

rules don't specify what should happen when the player can't pay anyway, let alone the order they will be required to pay in.

- When a player has insufficient wealth to pay another player, they have lost the game and all houses and hotels will be sold and all deeds mortgaged in order to attempt to pay. All equity will be converted to money and the total, remaining amount transferred to the defeating player. This requirement is somewhat vague in the rules (they do state that it is how a debt should be recovered, though). However, trades are supposedly possible "at any time". I believe the specified mechanism should take priority over trades in order to avoid a drawn-out game. The fact is that the standard rules clearly state that once incurred, expenses must be paid and don't truly specify other options of debt recovery and the priority for negotiating the bank between paying the debts and managing trades is not specified. No version I have ever seen allows a trade to override a catastrophic debt let alone requiring traded mortgaged deed fees but theoretically, according to a strict interpretation of the standard rules, trading with a gullible player could get you out of debt at the midnight hour? There is no (other) way to "resign" in the standard rules... The following points will go on to prove that trades must take a back-seat to debts. Fully applying the debt recovery rules to their furthest extent, is the only logical behaviour.

- To be specific, when in debt (unable to pay from money) but have equity to cover those expenses, there is an established amount outstanding and it must be paid before the player can finish their turn. A trade or other action cannot be initiated that would prevent this. The standard rules state that rent and other expenses "must be paid" when declared or incurred (always in this version). Debts must be recovered in some priority to other actions.

- A certainty is that trades must not be permitted if they would cause a losing state. The menus will not allow a trade that would cause the player to lose due to a catastrophic reduction of wealth and know about fees and repay requirements. That is, when trading, the repay or payment of fees requirement is placed on both parties for all mortgaged deeds they receive in the trade, as well. You must pay to repay the mortgage or keep the deed in a mortgaged state and simply pay the 10% fee. These rules are almost unheard of but are standard rules. Again, I believe this is the only version I have ever known to include them.

- The standard rules state that a deed cannot be traded if any in the group has improvements on it. In order to have improvements, the whole street group must be owned. Therefore, if any of the group has improvements, none of the group can be traded. I'm simply reiterating this to be fully stated.

- When offered a trade, if the player cannot afford at least the fee as mentioned above for trading a mortgaged property, any remaining mortgaged properties would not be transferred and the trade would be incomplete. Also, if they have insufficient money when accepting a trade, they should not be permitted to mortgage the deeds received to recover it. As such, a player must have sufficient money to cover nominated or required fee and repayment charges in order to accept the trade. Portfolio management is available from trades (in a limited form), see below.

- Players should review the trade information and be satisfied with how they will make repayments or fee payments for that trade and must have sufficient money and wealth to commit to the exchange.

- To ensure all of the above conditions, trades cannot be initiated when the player is in debt nor can players utilise more equity than they currently have (before the trade is executed) in order to accommodate a trade agreement. Mandating this is supported by the fact that the term "immediately" is used where there are details in the standard rules so one can assume that all deeds are transferred and all payments made in a single transaction. Recall that debt repayments must be a priority to other actions and the only described mechanism for this in the standard rules is dissolving equity. There would be an impact of the mortgage and dissolving process of the player in recovering debt that would affect any trade from that player. Fair market value is at stake and for it to be fair to all players, trades must be a lower priority. The idea is to win the game.

- When the player has gone into debt outside their turn, during a trade, while receiving defeated player deeds or in some other way, the player is able to mortgage deeds and sell improvements ("manage" their portfolio). This is to facilitate more timely trade arrangements and because players must be able to utilise their equity to recover commitments to the bank and other players in all instances. Please note that there is currently a limitation on the construction of improvements -- it cannot be done during trades or elimination transfers. This is to ensure that the state of the board does not change such as to cause an invalid trade or transfer and for fairness. Out-of-turn debt handling is done by a special game play interrupt mechanism in this version. I believe this provides a great deal of freedom inside the turn-based structure and is the most logical way of accommodating the possible actions. When multiple players are in debt out of their turn, they are serviced in play order, starting with the next player after the current player (player "with the dice"). This will affect management options.

- When there are not enough houses available after breaking down a hotel, the number of outstanding, phantom houses must be sold in order to continue. The standard rules are unclear about how this is to happen precisely but assert that it is

impossible to have more than the set number of houses or hotels on the board. I have implemented it in the most fair manner possible. In this way, the players can retrieve all of their equity which should be the expected outcome. Any of the player's houses can be sold to make up the numbers. They could theoretically juggle them however they liked, since the standard rules make no mention of it, and so too they can in this version.

- If paying all players money from the Chance card and the player does not have sufficient wealth, the player will lose to the next player in play order that they cannot pay (not the bank as per other cards, except below) by using all their wealth to make the payments. This is to be clear about how this card functions. Some players may not get any of their money, another only some.

- If receiving money from all players with the Community Chest card, if a player cannot pay (insufficient wealth) then they will lose to the owed player (not the bank as per other cards, except above). Again, just to be clear. Any number of players may lose to the owed player and the owed player may not get all of the money.

- If you roll for the third time in attempting to get out of gaol, you cannot then use a Get Out of Gaol Free card. This is due to the fact that the standard rules do not specifically allow it and the gaol rules are quite specific.

- When rolling for first turn, the lowest player wins when there is a tie. Player one would win over player six. The standard rules do not specify how this condition should be handled and its a pretty common one. I used the path of least resistance.

•A score statistic is generated for each player based on their equity, money and range of improvements. It is quite simple to calculate. This may be of interest in declaring a winner instead of playing until all but one player remains which can be difficult to achieve in some games, especially when no trade arrangements can be made. I permit all players to agree to abandon the current game and a winner is declared, by default, based on the score. Resignations actually do not seem to be permitted by the standard rules. I am not permitting them on a player-by-player basis, either. The score is calculated by:

```
[equity/2] + [money/8] + [#deeds] +
[#gofree] + (foreach group [(#ingroup - 1)*2]) +

          50 | 100 | 150 | 200 |   for each street deed
1 house |   1 |   5 |  10 |  20 |
2 house |   2 |  15 |  20 |  35 |
3 house |   5 |  30 |  50 |  80 |
4 house |   7 |  40 |  70 | 110 |
1 hotel |  15 |  70 | 100 | 180 | +

#stations/2 * 2^#stations + #utilities      ???
```

Further Details

I have used a customised version of the GoatTracker 2.73 driver for this game. I also used custom tools for it (I wanted the source code, not a "standardised" binary module). I modified the driver to not touch the third voice (it is used for random number generation in a unique way, instead of for producing sound) and in order to compile it with ca65. Decent psudeo-random number generation is expensive for a MOS6502 so generating them with another "processor" is very convenient. I should do tests to see how "natural" and "random" the values generated are and if they match real dice closely enough but I am yet to do so. From play-testing, I haven't noticed any peculiarities. Theoretically, they should be equal to anything I could reasonably do in a great deal more memory and time or perhaps better. Also, I like that it potentially has a type of rhythm.

Compilation

To compile:

```
ca65 -g -l c64client.lst -o c64client.o c64client.s
cl65 -t none c64client.o -Ln c64client.lbl -o c64client.prg
```

There are some more details about building the strings, screen and rules but these aren't available yet.

The game must also be run from the disk image so it too must be built (put all of the programs on it: c64client.prg, strings.prg, screen.prg and rules.prg).

Running

Insert the disk.

```
LOAD "*", 8  
RUN
```

Known Issues

- Pasting the clipboard in VICE causes all kinds of problems including data corruption and crashes. It is definitely a VICE issue because my code never sees it happen. Don't paste in VICE!
- There seems to be an odd race condition which will, on occasion, cause the game to not update correctly and hang at launch. It only happens once in a hundred times when loading on VICE (and perhaps a real C64) but on the Mega65, it happens all the time unless the machine is warm booted prior to loading the game. I will now endeavour to debug it if and when it occurs in my testing. From what I have been able to see, it seems that some IRQ is not being acknowledged correctly when this occurs. I have attempted another fix but I am unsure if I have succeeded.
- Load times on a real machine will seem extraordinarily long compared with other games due to the fact that I'm currently not using any compression. I will fix this before release.
- SFX often get lost and "music" breaks up because of the limited number of channels (two) available to play sounds on. The third voice is used for random number generation. Even though it is a more comfortable pace, using the stepping (not jumping) mode is worse for the sound. You can play very fast in the jumping mode and cause some interesting squeaks too.
- The game was written and designed for a PAL machine. The audio driver, IRQ handler and even input driver are all expecting this. You get slightly strange results on an NTSC machine, from my testing. The game is playable though. I may release an NTSC/PAL-N compatible version in the future and perhaps translate the game for that version, also.

End of Transcript