

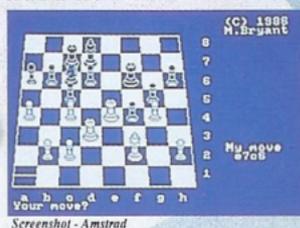
# COLOSSUS CHESS

Colossus is probably the most complete chess program available for any home computer, written using the very latest techniques. It has the widest range of true features available, including some never implemented.

Colossus also has a perfect understanding of all the rules of chess, including underpromotions, the fifty move rule and all draws by repetition. It can also handle all the standard mates, including the very difficult King, Bishop and Knight versus King.

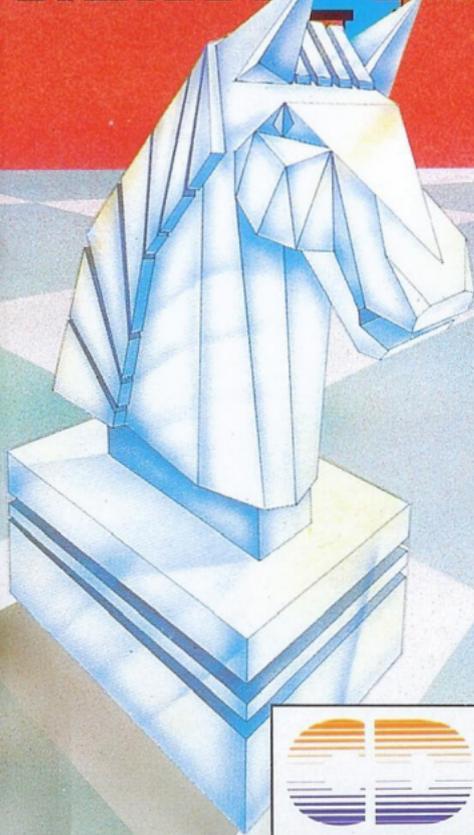
Colossus offers the choice between the usual two dimension flat board display or the three dimensional real life board which allied to optional joystick control makes it clear and easy to use.

"92% AA RAVE" — AMSTRAD ACTION. *Let it be said immediately if you want a chess program, Colossus is the one to go for.* Popular Computing Weekly.



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**Display: General** - The display uses two screens to provide information as to the state of the game. The main screen shows a graphics chess board and various messages and questions. The second screen shows the past move record, including the player names and chess clocks and information on the programs thought processes including lookahead positions examined, current-line and best-line with evaluation. The display can be toggled between the two screens by pressing the <SPACE> bar.

**The move record** - The secondary screen shows the last moves made by each side in two columns including move numbers. Above the moves are displayed the colours, player names and elapsed-time chess clocks for each side. (There is a slight variation in the position of this information on the screen dependent on the format.)

**The clocks** - Below the player names are displayed the elapsed-time clocks for white and black. The clocks are in the format "hh:mm:ss" (hh = hours, mm = minutes, ss = seconds). The clocks show the total time used by each side in the game so far.

**The moves** - The moves are displayed in algebraic notation with the from-square followed by the to-square. The separator between the from- and to-squares indicates whether the move is a capture or not ("x" signifies a capture, "-" signifies a non-capture). Castling moves are indicated with the from-and to-squares of the moving king. En-passant captures are indicated by the letters "EP" printed over the move. Promotions are indicated after the move by a "f", followed by a letter to indicate the promoted piece ("N"= knight, "B"= bishop, "R"= rook, "Q"= queen). Checks are indicated being printed after the move, by a "+" being printed after the move.

**Technical information** - The bottom of the secondary screen is used to display detailed information of the programs thought processes.

**Lookahead** - When the program thinks about its move, it displays the lookahead depth of its search. The depth is printed in "ply" or "half-moves". The program will search most move sequences to at least this depth, with some being searched much deeper.

**Positions examined** - The number of positions examined in the tree of move sequences is displayed. This number is updated at every position and in fact takes very little time because of the single-byte/character type of display.

**Best line** - The program displays the best line it has found so far in its search. This can provide you with the usual "hint" move and also an analysis of the game in the next few moves beyond the "hint"! (Usually the line will contain a "null" move. This simply means a passive, non-capturing move has been assumed). Also displayed is the evaluation of the best-line, as two numbers. The first is the material evaluation (in terms of number of pawns up or down), the second the positional evaluation. A positive number means the program is better, a negative number means the opponent is better. If the best-line is found to lead to a checkmate then the material score will be set to plus or minus 62, with the positional score a measure of how many moves to the checkmate.

**Current line** - The move sequence the program is currently considering is displayed. The length of the line shown, can be adjusted as required (for further details see the "Quantify" command described later).

**Assumed move** - Colossus thinks on its opponents time. The move assumed is displayed so that you can follow the programs thought processes and to provide a "hint" move. The control keys relate to the Amstrad machines and may vary from

the format you are using.

**New Game** - When a new game is started, the pieces are set-up in their initial positions, the clocks are reset to "00:00:00", the move display list cleared and you are given the option of moving first.

**Typing:** <SHIFT> "G" for Commodore 64/128/Spectrum/MSX/ Amstrad CPC or "G" for Atari/BBC/Electron/Master will make the program take the white pieces and move first.

**Your move** - Whenever it is your turn to move, the program asks "Your move?" You enter moves by the following cursor positioning method. 1) Move the cursor to the square of the piece you wish to move, and press the <RETURN/ENTER> key or the joystick #FIRE#. This causes the from-square to be displayed. If you accidentally enter the wrong from-square it can be cancelled by pressing the <ESCAPE/DELETE> key. (The cursor is shown as an inverse line drawn through the current square). 2) Move the cursor to the square you wish to move to and again press <RETURN/ENTER>. This causes the "to-square" to be displayed. If the move is illegal, the message "Illegal" is displayed and the move entry cleared. You must then return to step-1 above and try again. 3) If the move is a pawn promotion the program then asks "Promote to?" You must then specify the piece you want to promote to by typing one of the following: "N"- knight, "B"- bishop, "R"- rook or "Q"- queen. If you press any other key, the program assumes you promote to a queen.

**Note:** If you wish to enter a castling move, you should move the king two squares either way. If you wish to enter an en-passant capture, you should move the pawn as in a normal capture. The legal move is now indicated on the board, by flashing the cursor on the from-square, then moving the piece and flashing the cursor on the to-square.

**Colossus move** - When the program computes its move it displays the message "Let me think..." below the board. The technical information on the secondary screen is updated as the search progresses. When the program has finished its search, it prints the selected move in the move-record and to the right of the board, and also indicates it on the board (in the same way as your moves are indicated). Pressing the <ESCAPE/COMMODORE/DELETE/EXIT> key, whilst the program is thinking about its move, will cause it to abort its search, display the message "Escape" and make the best move it has found so far. If the program has found that its move leads to checkmate, it announces the move with the message "Mate in N where N is the number of moves till the mate."

**Game over** - When a game is completed, the clocks are stopped and the program displays a message, to the right of the board, to indicate the final state of the game. The messages are: "Drawn" the game has been drawn by 3 fold repetition of position, the 50-move-rule or by neither side having enough material to mate the opponent. This occurs in the cases of King, King and Bishop or King and Knight versus a lone King. "Checkmate" the side which moved last delivered checkmate. "Stalemate" the side to move is in stalemate "Time-up" the side to move lost "on time". This occurs only if you are playing an "All-the-moves" game. The program then asks "What now?" and waits for you to enter one of the program commands. **Type:** <SHIFT/CTRL> "N" to start a new game.

**Cursor movement** - The cursor is indicated by an inverse line, drawn through the middle of the current square. It can be moved in three ways.

1) Cursor keys. Four cursor controls, provide single square movement in any direction. The <LEFT-ARROW> and <RIGHT-ARROW> keys give left/right



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movement, while the <UP-ARROW> and <DOWN-ARROW> keys give up/down movement. If the cursor is moved off one edge of the board, it reappears at the opposite edge. 2) Algebraic keys. The cursor can be moved immediately to any rank, by typing one of the number keys "1" to "8". It can be moved to any file by typing one of the letters "a" to "h". This allows algebraic notation to be used when entering moves e.g. typing e2 <RETURN/ENTER> e4 <RETURN/ENTER> will enter the common opening move Pe2-e4. Note that if the rank or file of the from- and to-squares is the same, the key sequence can be shortened, i.e. in the above example e2 <RETURN/ENTER> 4 <RETURN/ENTER> would also work.

3) Joystick. Use of joystick is available to certain formats. Once loaded a message is printed to show current joystick status. The initial position of the cursor depends on the current side to move. If white is to move, the cursor starts on a1. If black is to move, the cursor starts on h8.

Numeric Data \*IMPORTANT\* Please Read Many of the programs commands require numbers to be entered to set-up new values of parameters etc. The program employs a simple to use, error-proof method for entering numbers. First the current value of the parameter is displayed at the query position. To increment the displayed value, use the <UP-ARROW> key. If the new value is above the upper limit for that parameter then it is reset to its lower limit. To decrement the displayed value, use the <DOWN-ARROW> key. If the new value is below the lower limit for that parameter then it is reset to its upper limit. To enter the new value into the program, press <RETURN/ENTER>. (If you do not wish to change the current value, then press <RETURN/ENTER>, instead of using the "increment" or "decrement" keys).

Commands - The following commands can be entered, when it is your turn to move or when the game is over. To enter a command, just type its first letter (shown in capitals in the descriptions below) with the <SHIFT/CTRL> key also pressed. On BBC machines press capital only. The commands are ordered alphabetically and are designed to be easy and logical to use and to greatly increase your enjoyment of the game of chess.

Note 1: If the selected command requires numeric input, and you are viewing the secondary text screen, then the program will automatically switch back to the primary graphics screen.

Note 2: If the command is entered, then any "thing on the opponents time" will be aborted.

Alter-position: Type <SHIFT> "A" Any legal chess position can be set-up with this command. When selected, the program displays the message: "Alter position: SSSSS: Command?" (where SSSSS is the side to move). When in "Alter-position" mode, a further subset of commands, allow you to adjust the board thus:-

Get initial data: Type "G" If after changing part of the position, you decide you have made a mistake, the initial position can be retrieved with this command. Move-number: Type "M" The program asks "Move number?", thus allowing you to enter the new move number required.

Side-to-move: Type "S" This toggles the side to move between white and black. When pieces are added to the board, their colour is determined by the current side to move. Clear, Pawn, Knight, Bishop, Rook, Queen, King: Type "C", "P", "N", "B", "R", "Q", or "K". To change a particular square, place the cursor over it and enter one of the above, to determine the new status of that square. When a square

is changed the cursor will move one square to the right to make the setting up of complete rows of pieces very easy.

Wipe: Type "W" This removes all pieces from the board, thus allowing positions with very few pieces, to be set-up more quickly.

New game: Type <SHIFT> "N" The "New-game" command is still available when in "Alter position" mode.

Exit: Type "E" This allows you to exit from "Alter-position", when the required position has been achieved.

Back-step: Type <SHIFT> "B" & For-step: Type <SHIFT> "F" All the moves in the game are stored in the programs memory. This allows you to step backwards or forwards through the game record, to get to any required position.

Colours: Type <SHIFT> "C"

The ink, paper and border colours can be set to any of the available colours.

Disk/Tape: Type <SHIFT> "D"

This allows you to save/load move-records and positions to/from the disk/tape. The program asks "Load or Save?" Type "L" to load a previously saved record, or "S" if you wish to save the current record. Any other keypress will abort the "Disk/Tape" command. The program then asks for a file number (from 0 to 255), which is used as part of the file name on the disk/tape. (See section 4.b for details how to enter numeric data). If any error occurs during loading the current move-record will be lost. Note that the program parameters, such as playing speed, elapsed time, are not saved and so may need to be re-set after loading. The <ESCAPE/STOP/BREAK> key can be used to abort a save/load early.

Elapsed-time clocks: Type <SHIFT> "E" The elapsed time clocks for both sides can be set from 00:00:00 to 255:59:59. First the program asks for the new value for the white clock and then the new value for the black clock. This can be used to set-up reasonable values for the elapsed time clocks, if you change the playing speed in mid-game. The program makes extensive use of the elapsed time clocks to determine how quickly it should play e.g. if you increase the elapsed time on the programs clock it will then play quicker to keep within the average time it is currently set to.

Go Type: <SHIFT> "G" This forces the program to move for the current side to move.

Invisible: Type <SHIFT> "I" This allows you (if you feel confident enough) to play the equivalent of a game of "blindfold" chess, as sometimes done by strong chess players. The program asks "Invisibility?", when you must enter a number from 0 to 3. The number entered determines which pieces on the board are made invisible. 0 is the default value where both sides pieces are displayed.

1) will make the white pieces invisible. 2) will make the black pieces invisible. 3) will make all the pieces invisible. When "Invisible" is selected, the word "Invisible" appears at the top right of the board, to avoid confusion.

Legal moves: Type <SHIFT> "L" All the legal moves by any piece of the side to move can be shown. First position the cursor on the subject piece and type <SHIFT> "L". The legal moves will be shown in sequence by flashing the cursor on the target squares. The cursor is then returned to the subject square. If no legal moves exist the cursor will not move. This can be used as a tutorial aid for learners.

New-game: Type <SHIFT> "N" A new game can be started with this command. If you have not used "Alter-position" since the last "New-game", then the game record is left intact until the first move of the new game is entered. This allows

you to replay through the whole of the last game, by using the "Fore-step", or "Replay" commands.

Orientation: Type <SHIFT> "O" The orientation of the board printout can be reversed, so that you can play the black pieces up the board. The algebraic notation around the board is also reversed.

Play-self: Type <SHIFT> "P" This makes the program play a game against itself, by moving for both sides. Pressing the <ESCAPE/COMMODORE/EXIT/DELETE> key whilst the program is thinking about its move (but not while it is indicating its move on the board) or after the game is over, will stop the program playing against itself and allow you to resume play for the current side to move.

Quantify parameters: Type <SHIFT> "Q" (3D GRAPHICS) - This allows you to adjust some of the programs internal parameters to make it function in different ways. (See section 4.b for details on how to enter numeric data). The program first asks "Book?". The parameter value can be 0 or 1. If it is set to 0 the program will not search its "openings book" for moves (effectively making the openings easier for you). If it is set to 1 the program will use its book in the normal manner. The program then asks "Prediction?". The parameter value can be 0 or 1. If it is set to 0 the program will not predict your move or think ahead on your time (effectively making the whole game easier for you). If it is set to 1 the program will predict your move in the normal manner. The program then asks "Line depth?" The number of moves in the "current-line" display can be set from 1 to 15 ply. The default is 1, i.e. the moves at the first ply of the tree are displayed. The program then asks "Dimensions?" The parameter value can be 2 or 3. If it is set to 2 the graphics board printout will be the two-dimensional representation as used in chess literature. If it is set to 3 the board is displayed as 3-dimensional as though you were looking at a real board and pieces. The program then asks "Draw score?". The "material" part can be set from -9 to +9 and the "positional" part from -60 to +60.

Replay: Type <SHIFT> "R" The whole game-record can be replayed from the start to the final position to demonstrate the game-so-far to a spectator. The program pauses between moves to allow you to follow the game. The pause time can be set from 0 to 20 seconds. You can interrupt the replay by pressing the <ESCAPE/DELETE/COMMODORE/EXIT> key during one of the pauses. When an action replay is in progress, the message "Replaying" is displayed below the board.

Supervisor: Type <SHIFT> "S" This stops the program making any moves, and allows you to play moves for both sides.

Type of playing mode: Type <SHIFT> "M"

1) Tournament mode Full tournament parameters can be set-up.

First, the program asks for the move number of the first time control.

Second, the program asks for the number of moves to secondary time controls.

Third, the program asks for the time of the first time control. Fourth, the program asks for the time to the secondary time controls.

2) Average mode This is really an easy usage version of Tournament mode, instead of entering all four parameters needed for tournament mode, the program simply asks you "Move time?". The program will then control its search to use on average the time you enter. (Entering 0 seconds for the average move time, selects the programs fastest level). This effectively provides thousands of "levels" of play.

3) All-the-moves mode In chess clubs, most games are played with chess clocks, with each player having say five minutes to complete the game or "lose on time".

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Designed and Printed by Appletree Print 0302 890000

This mode allows you to set the complete game-time and the program will try to play all the moves of the game within the specified time. If either player exceeds the game time, the game will be terminated with the message "Time up". By using the "Elapsed-time clocks" command, you can "handicap" the program or yourself, by putting some time on one of the clocks before starting the game.

4) Equality mode In this mode, the program will attempt to keep its elapsed time clock, closely matched to your elapsed time clock, effectively playing at a similar speed as you are playing.

5) Infinite mode This mode can be used to solve chess puzzles of the form "find the best move in this position". It searches all combinations of all moves to ensure that it does not miss a sacrifice. It continues to search, further and further ahead, until you tell it to stop, or it finds a forced checkmate for either side, or it has searched 12 ply ahead (the programs maximum lookahead) or there is only one legal move in the position.

6) Problem Mode This mode is used to solve chess mating problems. When selected the program asks "Problem Type?". The program can solve three types of problems:-

1) Normal mates - of the form "White to move and mate black in X moves"  
2) Self mates - of the form "White to move and force black to mate white in X moves" and 3) Help mates - of the form "White to move and help black to mate white in X moves". The program then asks "Mates in?", whereupon you must enter the number of moves till the intended mate. When the program starts searching for the mate, the clocks are set to 00:00:00, so that the time to find the mate can be recorded. If the program finds a mating move, it prints the mating line below the move record, stops the clocks, and asks "Continue?". If you are satisfied with the discovered move, then pressing "N" will cause the program to make this move immediately. If however, you wish the program to continue searching for any alternative mate, press "Y" and the program will restart the clocks and continue searching for another mate. If the program does not find any mate, the message "No mate" is displayed and the program automatically enters "Alter-position" to allow you to select another position or correct the current one.

Use next best: Type <SHIFT> "U"  
After the program has made a move, you can instruct it to choose a different move from those remaining. You can use this repeatedly until all the moves have been used up. When no more moves are available, it prints the message "NO MORE MOVES\*" and starts again choosing from the whole move list. If the program is still using its openings book, it will choose the next book alternative (selected at random). This can be used to examine the programs book choices to select the line you prefer. (No non-book moves are considered!) If the program is out of book, it will choose the move it considers to be its next best choice from the remaining moves.

Volume: Type <SHIFT> "V" The volume of the programs "beeps" can be adjusted from 0 (silent) to 7 (loudest). (See section 4.b for details on how to enter numeric data). Loading Instructions: Please refer to the Cassette Inlay.