NOVAG® DIAMOND

INSTRUCTION

INSTRUCTIONS

V.   MINOR FUNCTION KEYS
(These functions are accessed by first pressing the SET LEVEL Key)

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27.   *PRINT GAME
28.   *PRINT MOVES
29.   *VIDEO MODE
30.   *HUMAN MODE
31.   REPLAY
32.   *AUTOCLOCK
33.   AUTOPLAY/DEMO
34.   *ANALYZE GAME   (Save Game key)
35.   HASH TABLE   (Square H8)
36.   SELECTIVE SEARCH (Square H7)
37.   PASSIVE BOOK   (Square H6)
38.   ACTIVE BOOK   (Square H5)
39.   OPENING BOOK   (Square H4)
40.   LEARN   (Square H3)
41.   EXTENSIONS   (Square H2)
42.   *TEST   (Square H1)
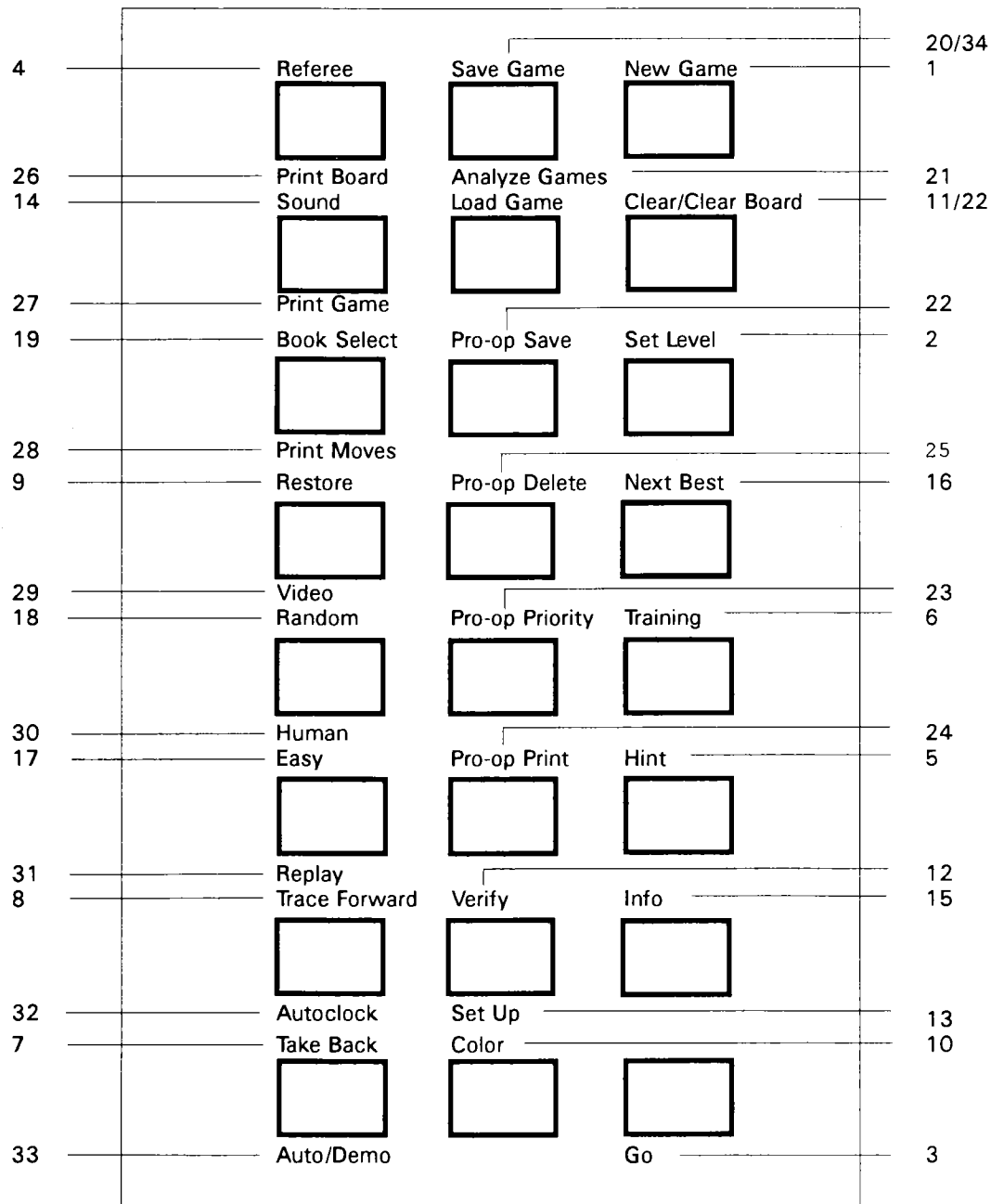   (* functions require a Personal Computer and the NOVAG INTERFACE cable to be useful.)

VI.   LCD DISPLAY OF NOVAG DIAMOND / EXAMPLES & EXPLANATIONS

VII.   TROUBLE SHOOTING

VIII. TECHNICAL DATA AND FEATURES

KEYBOARD FOR
NOVAG® DIAMOND

4 — Referee	Save Game	New Game — 20/34 / 1
26 — Print Board	Analyze Games	— 21
14 — Sound	Load Game	Clear/Clear Board — 11/22
27 — Print Game		22
19 — Book Select	Pro-op Save	Set Level — 2
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29 — Video		23
18 — Random	Pro-op Priority	Training — 6
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The description of the function keys is listed under the marked reference numbers.

I.   INTRODUCTION

The DIAMOND is the latest Chess Computer from NOVAG with H8 RISC-Style Technology, which offers an array of new features such as : the computer is learning from its play so as not to repeat bad moves. The new DIAMOND has incorporated Hash-Tables to significantly improve the chess computer's play, especially the end-game play.

The DIAMOND is also compatible with the NOVAG SUPER SYSTEM. This will enable its full thought processes to be recorded on a PC (most types) or the game to be displayed or recorded onto a domestic TV through the NOVAG DISTRIBUTOR. Watch as your chess game gains a whole new dimension.

We recommend that you read the Instruction Manual thoroughly in order to learn how to fully operate and enjoy your DIAMOND. Section II on Playing the DIAMOND, will provide you with basic information on getting started and on how to play a game of chess against your computer. After you are comfortable with the basic functions, you will enjoy learning to use the many special features the DIAMOND offers.

II.   PLAYING THE DIAMOND

If you wish a quick game of chess without having to use all the special functions of the DIAMOND, you may refer to the following instructions.

Step 1 :   Insert the adaptor plug into the socket marked DC 9V and switch ON the DIAMOND.

Step 2 :   SET UP all the chess pieces on the chessboard in the starting position.
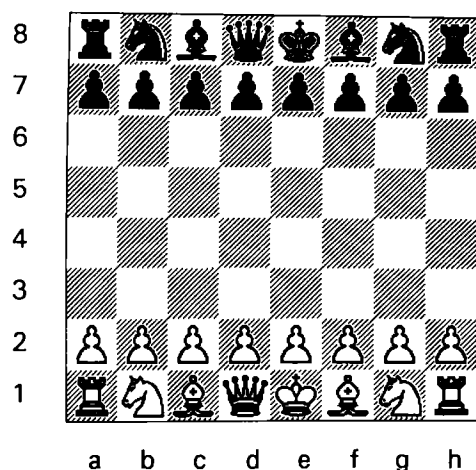
Step 3 :   Press NEW GAME Key. When all the pieces are in their respective positions you will see [⊟⁻ ⁻ ⁻] on the LCD and you are now ready to begin to play for white side.

Step 4 :   Press SET LEVEL Key.

Step 5 :   Gently press on the piece standing on the square a1 (White Rook). This will set the DIAMOND's playing skill to the lowest of the regular levels. If this is still too strong for you, please refer to the Section on setting levels to select a training level.

Step 6 :   Press GO Key to leave the level setting mode, and the display will show again [⊟⁻ ⁻ ⁻].

You may now begin to play the White side against the DIAMOND. To make a move press gently on the piece that you wish to move (you may also lift up the piece you wish to move and press with your finger on the square that it stood on) then lift up this piece and place it on the square that you wish it to go to by pressing gently on that square. The DIAMOND will begin to compute its counter move if your move was a legal one. Illegal moves are not accepted and the DIAMOND will beep 3 times and show "Err " on the LCD. When executing a capturing move please remove the captured piece first before moving your piece to that square.

When the DIAMOND is ready to move it will beep and show its move on the LCD and at the same time the rank and file LEDs which correspond to this move will light up. For example if the DIAMOND wishes to make a move from E2 to E4, the rank LED marked 2 and the file LED marked E will be lit. Execute this move for the DIAMOND by pressing on the piece standing on the "from" square. Now the "to" square will light up. Pick up the piece on E2 and move it to square E4 by pressing gently on the "to" square to complete the move. Remember to remove the captured pieces first when making a capturing move for the DIAMOND.

Note : If you wish to play the Black side, press NEW GAME then set up the pieces so that the Black pieces are in front of you and the White pieces are on the opposite side of the board. When the DIAMOND is ready to start the LCD shows [⊟⁻ ⁻⁻]. Press the COLOR Key then the GO Key and the DIAMOND will make a move for White but playing from the top of the board.

When indicating its move the display will show the correct algebraic notation (eg: E2E4) but the lights on the board will indicate different squares (eg: the move E2E4 will appear as D7D5). When using the computer with Black playing from the bottom the board always read the computer's move by looking at the indicator lights and not the LCD display.

III. GAME FEATURES

a)   Making moves
Making a move on the DIAMOND is simplicity itself. Gently press the piece that you wish to move and place it on the center of the square that you wish to play it to. Of course, illegal moves are not accepted and the DIAMOND will beep three (3) times and will also flash the Error message on the LCD.

When the DIAMOND has made its move, the LEDs of the "from" square light up. Gently press on that square and the LEDs of the "to" square will light up, put down the piece on the square indicated by pressing gently on it to complete the computer's move.

b)   Computing
When the DIAMOND is computing a move the sign "COMP" will flash on the LCD.

c)   Capturing a piece
When capturing please remove the captured piece first, then move your piece to occupy that square. Do the same when making a capture for the DIAMOND.

d)   Illegal moves
The DIAMOND will indicate all Errors by making three (3) beeps and will flash an "Err" message on the LCD. For Errors that need your attention the LCD will show the piece and the square. Correct the Error as indicated. However, most Errors will not need any assistance from you.

e)   Castling
According to the rules of chess you must first move the King then the Rook to complete this move. The DIAMOND will indicate all the squares that you will need to press. The computer accepts and executes castlings in set-up positions.

f)   En passant
If you or the DIAMOND makes an En passant capture (please refer to chess literature if you do not understand this chess rule) you must remember to remove the captured pawn as indicated by the DIAMOND, by gently pressing on that square.

Offical Rules of Chess:

A pawn attacking a square crossed by an enemy pawn which has been advanced two squares in one move from its original square may capture this enemy pawn as though the latter had been moved only one square. This capture may be made only on the move immediately following such an advance and is called capturing "en passant".
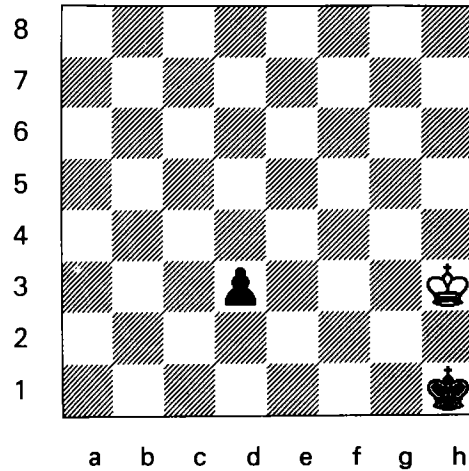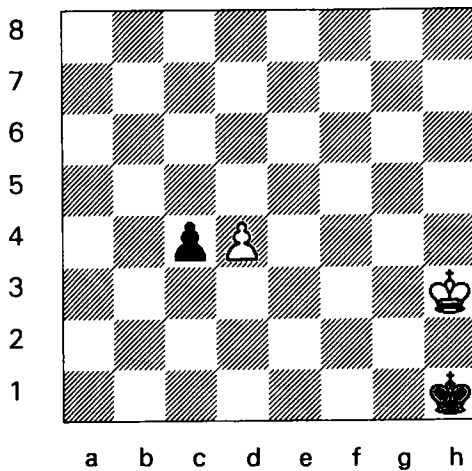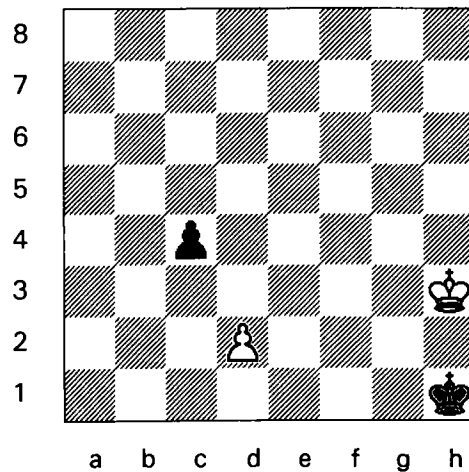
g) Pawn Promotion / Underpromotion

If one of your pawns reaches the 8th rank, the DIAMOND will show this message on the LCD **"pro piece ?"**. Press the appropriate piece symbol key to enter your choice for promotion.

THE DIAMOND PROMOTES :
The LCD will show the piece that the DIAMOND wishes to promote to and the square where this promotion takes place. Exchange the pawn with the promoted piece and put it onto the lit TO square.

WHEN YOU PROMOTE :
The LCD will show **"pro piece ?"** and you will have to press one of the four possible piece symbol keys to indicate your choice. Please exchange your pawn with the piece that you selected.

h) Stalemate / Draw

A draw is announced on the LCD with the appropriate message :

[d St]	no legal moves, but not in check, therefore draw
[d 3r]	position repeated 3 times
[d 50]	50 moves made without capture and pawn move
[d -in]	insufficient material for either side to check mate the other

i) Check and Checkmate

Check announcements are made with the "+" sign on the right side of the move shown on the LCD. Checkmate will be indicated on the LCD with [mate].

j)   Early Mate Announcements
The DIAMOND will always announce mate if it sees it and will show the number of moves to mate on the LCD. Example : [n 2]

k)   Resignation
The DIAMOND will recognize positions where it is lost or seriously behind in material and will resign the game showing [RSGN] on the LCD. You may reject this resignation and play on but please NOTE that the DIAMOND will only resign once per game. When you are about to checkmate the DIAMOND, it will not resign and spoil your moment of glory.

Note: If either side's time runs out, the lcd display will flash "FLAG" you may continue the game by entering your next move.

IV.   MAJOR FUNCTIONS

1.   NEW GAME Key

The NEW GAME Key will reset the board to the starting position and the LCD shows [‾‾ ‾‾]. When all the pieces are set up in their starting position, you are ready to play. Press NEW GAME every time you switch the computer on, or whenever you wish to commence a new game.

Note: The SOUND, BOOK SELECT, RANDOM, LEVEL and column H8 options will remain the same. EASY and REFEREE are turned off.

2.   SET LEVEL Key

NUMBERING SYSTEM FOR THE SELECTION OF
PLAYING LEVEL ON THE CHESSBOARD

	A	B	C	D	E	F	G	H
8	TR8	AT8	SD8	FD8	AN8	EA8	IN8	
7	TR7	AT7	SD7	FD7	AN7	EA7	IN7	
6	TR6	AT6	SD6	FD6	AN6	EA6	IN6	
5	TR5	AT5	SD5	FD5	AN5	EA5	IN5	
4	TR4	AT4	SD4	FD4	AN4	EA4	IN4	
3	TR3	AT3	SD3	FD3	AN3	EA3	IN3	
2	TR2	AT2	SD2	FD2	AN2	EA2	IN2	
1	TR1	AT1	SD1	FD1	AN1	EA1	IN1	

Selecting a level:
The DIAMOND has 7 different types of Levels and 56 unique time controls to suit every type of players. You may enter different playing levels for WHITE and BLACK.

There are two ways to select a level :

a. By pressing the SET LEVEL Key as many times as necessary until the LCD shows the desired type of level (tr = Tournament Level, At = Average Time Level, Sd = Sudden Death Level, Fd = Fixed Depth Level, An = Analytical level, EA = Novice Level, in 1 = Fixed Mate Level).

To set the required level of each level group press the corresponding square on the "A" through "G" column. Please refer to the Level Chart for the meaning of each of the 56 time controls.

b. A better alternative in setting the playing Level is by pressing gently any of the squares corresponding to the level you wish to set (LCD will show the level number).

Example: If you wish to set level At 4, press SET LEVEL and the square B4. On the LCD display you will see "At 4" indicating the level which is set up. Once you have selected the desired skill level press GO to exit this mode.

You can always check or change the skill level during a game, however not whilst the computer is calculating. Changing level resets the clocks.

Note: If you switch the computer off to continue your game at a later time or if you start a new game, the previously set skill level will be retained.

LEVEL CHART

Level	Square	Time Control	Level	Square	Time Control
TR 1	a1	40 moves in 5 minutes	**AN** 1	e1	9 ply search
2	a2	40 moves in 15 minutes	2	e2	10 ply search
3	a3	40 moves in 30 minutes	3	e3	11 ply search
4	a4	40 moves in 60 minutes	4	e4	12 ply search
5	a5	40 moves in 90 minutes	5	e5	13 ply search
6	a6	40 moves in 100 minutes	6	e6	14 ply search
7	a7	40 moves in 2 hours	7	e7	15 ply search
8	a8	40 moves in 2.5 hours	8	e8	Infinite search
					1 ply search with limited capture search:
AT 1	b1	2 seconds per move	**EA** 1	f1	1 ply + 2 captures
2	b2	5 seconds per move	2	f2	1 ply + 3 captures
3	b3	10 seconds per move	3	f3	1 ply + 4 captures
4	b4	15 seconds per move	4	f4	1 ply + 5 captures
5	b5	30 seconds per move	5	f5	1 ply + 6 captures
6	b6	1 minute per move	6	f6	1 ply + 7 captures
7	b7	2 minutes per move	7	f7	1 ply + 8 captures
8	b8	3 minutes per move	8	f8	1 ply + 9 captures
SD 1	c1	game in 3 minutes	**IN** 1	g1	mate in 1
2	c2	game in 5 minutes	2	g2	mate in 2
3	c3	game in 10 minutes	3	g3	mate in 3
4	c4	game in 15 minutes	4	g4	mate in 4
5	c5	game in 30 minutes	5	g5	mate in 5
6	c6	game in 1 hour	6	g6	mate in 6
7	c7	game in 1.5 hours	7	g7	mate in 7
8	c8	game in 2 hours	8	g8	mate in 8
FD 1	d1	1 ply search			
2	d2	2 ply search			
3	d3	3 ply search			
4	d4	4 ply search			
5	d5	5 ply search			
6	d6	6 ply search			
7	d7	7 ply search			
8	d8	8 ply search			

Description of level time controls:

- **Tournament Level TR 1 – TR 8 :**
  For tournament time controls. All moves are pre-set which have to be played within a fixed time, e.g. 40 moves in 120 min. (level 8 is the strongest). If you or the computer exceeds the specified time control, the game will be declared lost.

- **Average Time Level AT 1 – AT 8 :**
  The At levels are to be used for casual play. They allow you to enter the average response time per move for the computer.

- **Sudden Death Level SD 1 – SD 8 :**
  For play to the finish. The computer has to finish its game within a given time. If you or the computer exceed the specified time control, the game will be declared lost. (clocks count down to zero and LCD shows "FLAG" and 3 beeps to warn you if you overstep). If you wish you can continue to play and finish the game. On the LCD display the total time used will be shown and will count continuously.

- **Fixed Depth Level FD 1 – FD 8 :**
  Important for analysis purpose. The computer will only compute up to the depth selected. This provides a means of limiting the DIAMOND's play to suit a wide range of opponent's abilities.

- **Analysis Level AN 1 – AN 8 :**
  These levels provide deeper searches for more difficult problems.

- **Novice Level EA 1 – EA 8 :**
  1 ply search with limited capture search. These levels provide a level of play even suitable for beginners.

  Note: All of the above levels can be modified by turning on the EASY mode (see section 17). This keeps the computer from searching while you are thinking and weakens its play.
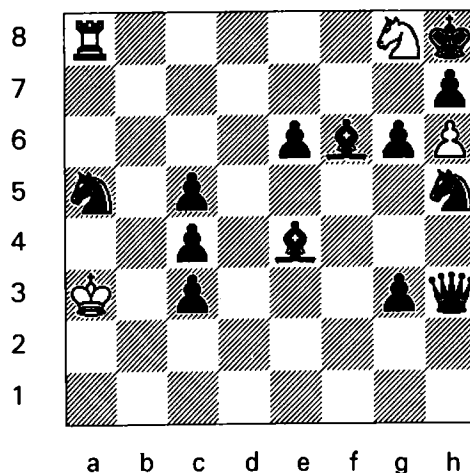
- **Find Mate Level mate-in-1 – mate-in-8 :**
  The Find Mate levels will find the shortest mate up to the stipulated depth. The Find Mate levels use a different program than the normal play levels. The normal play levels will generally find a check mate in any given position in less time, and generally in MUCH less time than the Find Mate levels. However, the normal play levels do not guarantee that the check mate found is the SHORTEST mate possible.

  The following position illustrates this point. On Find Mate Level 4, it takes the computer 40 seconds to find Bxa7 and announce mate in 3 more moves. However, on the normal play levels it takes the computer only 11 seconds to find e2-e4 which is however a Mate in 5 moves!
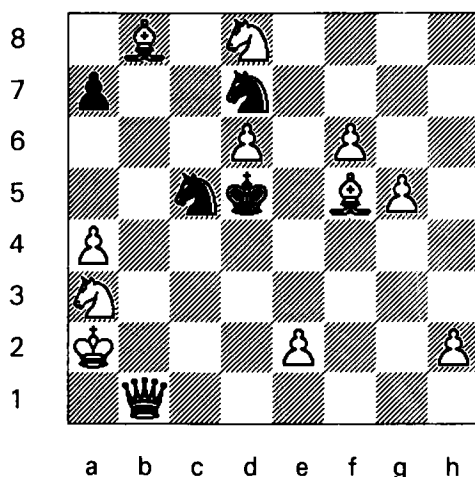
On the other hand, the mate in 6 moves is found MUCH faster by Find Mate Level 6.

Generally expect the Find Mate levels 5, 6, 7 and 8 to take a long time. If there is no mate in the stipulated number of moves the LCD display will show "no nE".

The solution to this position - Rb8, takes about 46 seconds on Find Mate level 6 but takes a couple of hours on regular search!

INDEPENDENT LEVEL SETTINGS FOR BLACK AND WHITE

a. Press LEVEL key to enter level mode. Follow procedure on pages 7 & 8 to set level for WHITE.

b. Then press COLOR key (to toggle to BLACK). Repeat procedure on pages 7 & 8 to set level for BLACK.

c. Press GO to exit.

Note: Setting a WHITE level will change the level for both BLACK & WHITE. Setting a black level will change BLACK only.

USER PROGRAMMABLE TIME CONTROLS
You may set your own time controls either for both sides or independently for each side.

Use the procedure on pages 7 & 8 to choose any **TR** (tournament level) or any **AT** (average time) or any **SD** (sudden death) level. For **TR** levels you can now program the number of moves to the time control and the time control, for **AT/SD** levels you can program the time control only, using the following procedure:

After selecting your level type press VERIFY to enter user programming mode.

1) If a **TR** level is programmed, then the display will show "n 40" with '4' blinking. This shows the number of moves to be played in the designated time and the active digit is the '4' (10s of moves). Press Trace Forward key or Take Back key to decrement or increment. Press VERIFY to advance to the next editing digit. Press Trace Forward key or Take Back key to decrement or increment.

   When both digits of the number of moves have been programmed the time control will be displayed. Continue with the instructions below to set the time control.

2) If an **AT** or **SD** level is programmed, then the display will show "00:05" with the first '0' (10s of hours). The display will show "hh:mm" (hours:minutes) which can be programmed using Trace Forward or Take Back and verify as above. When the right most minutes digit has been programmed the display will change to "mm:ss" (with the left most seconds digit and the colon blinking). Program the seconds using TRACE FORWARD or TAKE BACK and VERIFY as above.

Once you have programmed the white level either press GO to save your programmed level and play with both WHITE & BLACK set to this level, or press COLOR to toggle to black. You may now repeat the above procedure for programming move number and time controls for the black side. Press GO to exit.

The number of moves may be set 01-99 inclusive and the time may be set to 00:00:00-17:59:59 inclusive. The user is never allowed to violate the min/max moves and time.

3 When reprogramming levels the following keys perform the following functions:
- VERIFY - select the next digit.
- PRO OP - select the previous digit.
- TRACE FORWARD (▶) - increment the current digit.
- TAKE BACK (◀) - decrement the current digit.
- CLEAR - return to default table settings.
- LEVEL - exit without saving the new time control. Use LEVEL to exit after viewing programmable levels.
- COLOR - set a different level for BLACK.
- GO - exit procedure and return to game.

3. GO Key

The GO Key is used in conjuction with many of the DIAMOND's special functions and normally acts as an Exit Key. Please note that in many cases when Error appears, the GO Key has not been pressed to exit the last function used.

MAIN USES:
a) To make the DIAMOND compute for the color to move, even if in REFEREE mode.
b) To exit from the VERIFY / SET UP / SET LEVEL mode.
c) To start the SOLVE MATE search.
d) To start the AUTOPLAY/ DEMO mode.
e) To interrupt the computing time and force a computer move instantly. The computer will make the move it currently considers the best. Please allow at least 5 seconds of search time before pressing this key in order to let the computer calculate a reasonable move. The evaluations of these moves do not correspond with the evaluation of the set-up level.
f) To change sides during a game. Wait until it is your turn to move then press GO. The computer will now compute a move for your colour, and you will play the other colour from now on.
g) To let the computer play against itself, which might be of special interest at a certain point during the game or for learning purposes. Everytime you press GO the computer calculates for the side to move. All moves will be computed according to the set playing levels.
h) To accept a HINT. If the first Hint is shown on display, pressing GO accepts the Hint as though keyed in.

4. REFEREE Key

This is a toggle function which allows the user to play a game on the computer with the computer only legal checking the moves and declaring DRAW, CHECK MATE, and STALE MATE. This is also how games can be entered into the computer to be analyzed (see ANALYZE function). All games played could be stored in one of the 64 games slots (see STORE GAME) or could be entered for processing to a PC (see INTERFACE). The LCD display will show "reF" where REFEREE is off and "rEF =" when REFEREE is on. The first press shows the current status of REFEREE. Press the REFEREE key a second time within the two seconds that the REFEREE message is on the LCD display to change that function. The REFEREE mode may be selected at any time during a game except while the DIAMOND is computing.

Note: The DIAMOND may be called upon to compute for the side to move by pressing the GO key.

5. HINT Key

The DIAMOND can suggest moves, if you are not sure how to continue your game, which is a great tutoring feature. When pressing the HINT key you may recall the following information.

ON YOUR MOVE :
Pressing the HINT key when it is your turn to move will show the move which the computer thinks is your best move. Pressing the GO key while the computer displays the first Hint, makes the computer accept this move as though you played it.

Note: The displayed hint move is the move which the computer is thinking on when EASY is off.

WHILE COMPUTING :
When the computer is thinking, pressing the hint key will cause the move which the computer thinks is so far best for itself to be displayed on the LCD and alternately it will be flashed on the board.

Press CLEAR key to display the move(s) being considered by the computer as the best line of play up to 9 ply (the display shows the "from" and "to" square of the considered move and "Hnt#", where # represents a number from 1-9 showing the depth of the move).

- Press HINT to cycle through the best line.
- Press CLEAR to remove the hint display.
- Press GO when "Hnt1" is displayed during the human's turn to play the hint move on the board.

6.   TRAINING Key

This function is provided for the novice player. It could be useful for the beginning player who is in check and does not know what choices he or she has to get out of check.

Step One: When it is your turn to move press the TRAINING key and the compter will show the "from" square (indicated on the LCD) of the first piece with a legal move.
If you continue to press the TRAINING key, the NOVAG DIAMOND will show you all pieces with at least one legal move. You may cycle through this step as often as you wish. When no more pieces are available to be legally moved, then the display shows "_ _ _ _".

Step Two: Once you have selected a piece, press GO to have this square accepted as though keyed in. If a "from" square has been entered then each press of the TRAINING key will show now each legal "to" square by this piece.

Step Three: If you accept the move as displayed, press the GO key and the computer will then make its counter move.
If you wish to make a move other than displayed clear first the display by pressing the CLEAR key and then execute the move of your choice.
Should you wish to go back to Step One, use the CLEAR key to reset the LCD display and then press the TRAINING key to go to Step One.

7.   TAKE BACK Key

Use this key to retract a bad move or just try a different line of play. Wait until it is your turn to move. Press the TAKE BACK key and the move to be taken back will be alternately flashed on display along with the captured piece and square if any (remember to replace this piece). Press TAKE BACK several times to take back multiple moves. When you reach the beginning of the current game the display will show "bEG". You do not have to press the squares shown on the board.

To exit this mode press the square lit or make your next move or ask for the computer's next move by pressing the GO key. To clear the display press the CLEAR key.

Note: If you select the COLOR or SET UP function to alter the position of any of the pieces, all prior moves will be deleted and you may not TAKE BACK moves before the change of colour or position. If no moves are in the game history the LCD will show "bEG".

8.   TRACE FORWARD Key

This key is mainly used for tracing forward all moves after using the TAKE BACK or RESTORE function. Every press of this key will replay a move of the current game until all moves in memory have been replayed. This is indicated by the word "En d" on the LCD. You do not have to press the squares shown on the board. To clear the display press the CLEAR key.

9.   RESTORE (GAME) Key

Pressing this key will immediately make the computer go to the first move of the game. The LCD display will show "b EG" to indicate the beginning of the game history. You may then use the complementary function key TRACE FORWARD to step through the game move by move.

Note: If you play any move on the board during the RESTORE or TAKE BACK function, this will clear the remaining game history.

10.   COLOR Key

This key has different functions :
- When in VERIFY or SET UP mode this key changes the colour for the entry or verification of the board position.
- Press the COLOR key after pressing NEW GAME key at the start of a new game to reverse the board with White playing down the board. Remember to set up the White pieces on the top of the board and the Black pieces in front of you. In this case disregard the notations along the chess board.
  Key sequence: NEW GAME → COLOR → GO
- The COLOR key can be pressed at any time during a game and the colour to move will be reversed. Any moves made prior to pressing this key will be erased and the game history will begin with this position.
- When in SET LEVEL mode this key will allow the setting of separate levels for White and Black.

11.   CLEAR / CLEAR BOARD Key

This key has different functions :
- When in SET UP mode the CLEAR BOARD key will clear the entire board to make setting up a position easier.
- When in LEVEL mode and while the LEARNING message "**Lrn** ≡" is on display, this key will clear all the current learned positions from the computer memory.
- When the CLEAR BOARD key is pressed at all other times it will act as a clear entry key.
  For example: If there are messages on the LCD display like "**RAn** ≡", "**Esy** ≡" etc. you can clear them by pressing this key.
- If you start entering a move and wish to cancel it you may press this key to clear the LCD display and start over again. It will also clear the chess board of any lit squares, for example after the computer has moved or during TAKE BACK or TRACE FORWARD. Pressing the key will clear the LCD display back to "− − − −" and the colour to move symbol.

12.   VERIFY Key

This key has a double function:
a) On the first press you will enter the VERIFY mode and the LCD will show "VEr".
b) On the second press you will enter the SET UP mode and the LCD will show "SEt".
c) To exit either of these modes press the GO key.
At any point in a game or after entering a board position you can check the position of any number of pieces. You can also check each square to see if it is occupied and by which piece. In this mode there are two ways to verify the position of pieces.

- Press any piece type key and the computer will show all pieces of this type and colour on the board row by row with each press of the piece type key. The LCD will show a letter from the piece type (P = Pawn, n = Knight, b = Bishop, r = Rook, q = Queen, and H = King). Where there are no more pieces of this type and colour, the display will show two dashes.

- You may also press any square on the chess board and the LCD will show the type and colour of the piece on the square. Press COLOR key to change the colour of those pieces you want to look at.

To exit this mode enter your next move or press GO to start a computer search.

13.   SET UP Key

This mode is designed to enable you to set up board positions to solve chess problems or to set handicaps by removing or entering a piece, as well as changing the positions of pieces. In SET UP mode the computer's legality check as to the movement of pieces is disabled and you can enter, remove or change positions of any piece. However you cannot set up an incorrect position, e.g. play without both kings or with more than one king for each colour . . . etc.

If you exit the SET UP mode with an illegal position, you will hear three beeps and the "Err" sign will be on display. Use VERIFY mode to see what is illegal about the position.

The computer will accept and execute castlings, pawn promotion and en-passant captures if you play from a set up board position.

Note: All previous stated moves are cancelled as soon as you enter the SET UP mode.

To enter this mode press the SET UP / VERIFY key twice or if you are already in the VERIFY mode once. You will see the word "SEt" on display.

To exit this mode press the GO key or change to the VERIFY mode.

a. Removing a piece / clearing the entire board

- Press the SET UP key.
- To remove a piece just press onto the square on which it presently stands.
- To clear the entire board of all pieces press the CLEAR BOARD key.
- To end this mode press the GO key or change to the VERIFY mode to check the new board position.

b. Entering or moving a piece / setting up a board position

- Press the SET UP key, if you are not yet in the SET UP mode.
- To enter a piece, first make sure that the colour symbol at the bottom of the LCD display is correct. If not, press the COLOR key to change this. Next, press the key with the symbol of the piece you wish to enter, then press the square where you wish to place this piece. Entering an occupied square, clears that square and selects that piece as the current piece and colour.

    Samples: If a black Pawn is on E2 and the user wishes to place a white Knight on E2, then E2 is keyed in to clear the square first, then the white Knight is selected, and finally the E2 square is entered to place the piece on the square. The user CANNOT select a white Knight and enter E2 as this empties the square and selects the black Pawn as the current piece and colour.

- To move a piece from one square to another, simply press the present location of the piece that you wish to move. Next press the square that you wish to move this piece to.
- To set up a board position clear the board by pressing the CLEAR BOARD key. Select the pieces to be entered via the piece symbol key then enter the square. Change the colour whenever required.
- To end this mode press the GO key.

Note: After having left the SET UP mode if a change of colour is required, press the COLOR key. You may now enter a move for the indicated colour or make the computer move by pressing the GO key.

14. SOUND Key

The NOVAG DIAMOND has four different sound settings, which will be indicated on the LCD display.

a) Setting 1 (Snd) : There will be no acoustic signals at all. This is useful for those late night games when you don't want to bother anyone.

b) Setting 2 (Snd -) : There will be an acoustic signal only when the computer answers with its counter-move.

c) Setting 3 (Snd =) : There will be an acoustic signal when pressing any key and when the computer or you make a move.

d) Setting 4 (Snd ≡) : The same sound setting as mentioned under c) and in addition this option turns on the WARNING feature, where the computer will indicate when it moves that it is threatening to win some material. You will hear a double beep and the square on which the threatened piece is on will be displayed together with the computer's move. This is an useful feature for the novice player.

Note: Press the SOUND key to display the current sound setting. Press the SOUND key within 2 seconds to change the sound setting. The SOUND setting mode will be terminated automatically after 2 second.

15. INFO Key

This key provides information on the current game as it progresses and has a rotational display to show many messages.

- **First** press on the INFO key shows the clock of the side to move. On display you will see the message " **tot** " for 1 second and the colour symbol of the side whose clock is being shown.
- **Second** press on the INFO key shows the clock of the side not to move, ("tot" and the colour symbol will be displayed).
- **Third** press on the INFO key shows the score for the current side to move. This gives you some idea of how the computer thinks you stand in the current position.
  Example: If the computer sees that it can force a mate, the display will show the mating depth as "**n 03**", which
    means a mate-in-3.
  Disadvantageaus evaluations are marked with a " – " sign. For example if the computer sees you or it is going to be mated then the score could be "**– n 03**".

- **Fourth** press on the INFO key will show the current move count. The display will show "cnt " and the colour symbol.

Note: Use the CLEAR key to clear the INFO display. When the computer is thinking the display will show either the rotating display or one of the above INFO displays. To get back to the rotating display press the CLEAR key again.

The rotating display shows the current search status while the computer is thinking:
- The time spent on this search so far
- The first 3 ply of the line of play the computer thinks the game will follow from this point
- The computer's evaluation of the position
- The current search depth
- The number of legal moves remaining to search and the total number of legal moves.

Note: Each display stays for 2 seconds.

16. NEXT BEST Key

Key Sequence :   SET LEVEL → NEXT BEST → (take back move as indicated)

This feature enables you to check if another good move is possible to play instead of the one just played. After you have taken back the last move indicated, the DIAMOND will immediately begin computing the next best move that is available in the position. If such a move is found, it will be played.

To activate this function press NEXT BEST Key to have the DIAMOND generate the move the computer considers to be second best in the position. The LCD and the LEDs on the chess board will indicate which move has to be taken back. When you have taken back the move, the DIAMOND will begin calculating the best alternative move.

If any of the Find Mate levels are set, then this is the same as searching for 'cooks'. After pressing the NEXT BEST key the computer will prompt for you to take the last move back. You may press the CLEAR key. Then the computer will think of another alternative. You may continue this process for up to 8 alternative moves.

Note: This function only works if there is at least one move played in the current game.

17. EASY Key

This key toggles the EASY mode. When EASY is on, you will see the message "**ESy=**" on the LCD, then the thinking on opponent's time or 'permanent brain' is turned off. This has the effect of weakening all levels somewhat.

If EASY is not turned on "**ESy**", the following can happen: you are playing the computer at 5 seconds a move and you take 5 minutes to play a move which has been predicted by the computer. In this case the computer has taken the entire 5 minutes to come up with its reply to your move and it will be a stronger move than if the computer only had 5 seconds to think of its counter-move.

Note: Press first the EASY key to display the current Easy mode, then press the EASY key to toggle between the "ON" or "OFF" setting. The EASY setting mode will be terminated automatically after 2 seconds.

18.   RANDOM Key

Every time you switch the computer on, automatically the move with the highest rating is chosen, based on the depth of search which is determined by the set level. This is always the case after the opening is finished. However, this may not always provide the desired variety.

There are 4 options with RANDOM. The default is "rAn" which means little randomness and will generally make the computer play its very best. The next options designated as "rAn-", "rAn=" and "rAn ≡" , make the computer vary its play more and more. The "rAn≡" will give quite varied games but the computer will play somewhat weaker.

Note: Press the RANDOM key to select one of the four random levels. The RANDOM setting mode will be terminated automatically after 2 seconds.

19.   BOOK SELECT Key

This key is used to tell the computer whether you wish to use just the normal built in opening book or if you wish to use your own programable opening book.

See PRO-OP Book functions for how to enter your book into the computer. Once you have entered some moves into your PRO-OP book, then you select the order in which the computer scans the two opening books for its moves.

- The default is "nor" which means the computer will only look into its factory built in opening book.

- The second option, shown as "Pro" on the LCD means the computer will only search the PRO-OP Book for its opening moves and will ignore its factory built in opening book.

- The next two options allow the computer to use both the built in opening book and the user programed opening book. The options allow either the factory built in book to be scanned **first with the "no Pr"** option, or for the PRO-OP book to be scanned **first by selecting the "Pr no"** option.

20.   SAVE GAME Key

This function saves a game to the computer's memory or erases a game from its memory. It allows up to 64 games to be saved.

Pressing the SAVE GAME key when it is your turn to move allows you to enter the SAVE GAME menu. The LCD display will show "SAVE" and the LEDs on the left hand edge of the board will light up and cycle from row 1-8 for a few seconds. If any game has already been saved to one of the 64 squares on the chess board, then the row and column LED for that square will also light up.

- To save a game, press any free square during the cycle to save the game history on that square.
  After that square has been pressed the LCD display will show "– – – –" and the save game menu is exited. If a game was already saved on the square, then it will be lost forever.

  Note: Save game only works after a new game position.

- To erase a saved game, press New Game key then Save Game key and the square of which the game history is to be erased. Pressing CLR key during the LED cycle will cause the save game function to be terminated.

  Note: Save game only works after a new game position. You cannot save a game if you are in Set Up mode.

21.   LOAD GAME Key

This function loads a game stored in memory.
- You must press NEW GAME before you can LOAD a game.
- Now press LOAD GAME and as in SAVE GAME, the left edge LEDs will light up in turn to show which squares have games saved to them.
- Just press any square which has a game and the game will be loaded into the game history and the game will be traced to the final position.

- You can now use VERIFY to set up the chess pieces. To get back to the beginning of the game, just press RESTORE.
- Press CLR key during the LED cycle to terminate LOAD GAME function.

   Note: Load game works only at a new game position. You cannot load a game if you are in Set Up mode.
         All clock information is saved or restored during the SAVE/LOAD GAME function.

PRO-OP BOOK (Programmable Opening Book):

The Pro-Op Book is the user programmable opening book. Generally you will press NEW GAME - REFEREE ON - then play over the moves you want to save in the opening book.

When you get to the end of the line of play press PRO-OP SAVE key

22.   PRO-OP SAVE Key (this function requires a PC and the NOVAG Distributor)

This function saves an opening line in the user programmable opening book. This function is the same as PRO PRIOR function except the opening moves are saved at the lowest priority.

- Press NG key
- Switch on Referee mode (REF=)
- Enter opening moves
- Press PRO SAVE key

No Set Up position or colour to move changes are allowed before a Pro Save. The game history currently played is saved in the user programmable opening book.

23.   PRO-OP PRIORITY Key (this function requires a PC and the NOVAG Distributor)

This function allows the user to save the user programmable opening book at the highest priority.

- Press NG key
- Switch on Referee mode (REF=)
- Enter opening book moves
- Press PRO PRIOR key

No Set Up position or colour to move changes are allowed before a Pro Prior. The game history played becomes the highest priority line in the user programmable opening book.

24.   PRO-OP PRINT Key (this function requires a PC and the NOVAG Distributor)

This function prints the user's programmable opening book across the serial interface.

         Press   NG key " → " PRO PRINT key

Pro Print only works at a new game position and at least one programmable opening book move must be saved via PRO SAVE or PRO PRIOR function.

25.   PRO-OP DELETE Key (this function requires a PC and the NOVAG Distributor)

This function deletes one or all opening lines from the user programmable opening book. Starting from New Game position, play the opening moves you want to delete. To delete one opening line:

- Press NG key
- Switch on Referee mode (REF=)
- Play opening moves completely
- Press PRO PRIOR key
- Press PRO DELETE twice

Pressing PRO-OP DELETE key will show on the LCD displays "del?". Press PRO-OP DELETE again to confirm that you want to delete these opening lines. To delete your entire PRO-OP BOOK, press
NEW GAME " → " PRO-OP DELETE key twice.

Note: If you have entered a PRO-OP book containing 1 e2-e4 and 1 d2-d4 opening lines, then if you press NEW GAME, turn on REFEREE, play e2-e4 and press PRO-OP DELETE twice, you will delete ALL the PRO-OP opening lines beginning with 1 e2-e4. Press CLR key to avoid deleting the line after pressing PRO-OP DELETE once.

V.   MINOR FUNCTION KEYS

A)   *The following functions can be accessed by pressing SET LEVEL followed by the appropriate key. Once you have activated the function press 'GO' to return to playing mode.*

> **Note:** All functions marked * only apply when the Diamond is connected to Novag's Super System Distributor.

26.   *Print Board (immediate - action)

Pressing this key will send the current position to the interface.

27.   *Print Game (immediate-action)

Pressing this key will send the current game to the interface.

28.   *Print Moves

This key selects whether moves are sent to the interface as the computer plays them. The LCD will show " int≡ " when moves will be sent to the interface.

29.   *Video Mode

When this key is pressed, the LCD will show "vid" which means the format of information sent by the computer to the interface is compatible with the NOVAG TV interface.

30.   *Human Mode

Pressing this key will show "hum" on the LCD and this means the format of the information sent to the interface is more readily useful for the human player.

31.   Replay

Pressing replay will cause the current game to go back to the beginning and be played forward with each move flashed 3 times as it is played.

Press CLEAR key to terminate. When using with the NOVAG interface, type "CtrlS" to pause, " CtrlS " to resume and "CtrlC" to exit replay.

Note: This function does not require the interface.

32.   *Auto Clock

Pressing this key will select autoclock on or off. The LCD will show respectively "auc≡" and "auc". When AUTOCLOCKS is on, the computer will send the time on the clocks for both players to the interface.

33.   Auto/Demo

Pressing this key allows the user to select either mode.
‾ Autoplay is shown on LCD as "aut ≡" and demo mode is "den≡". If either autoplay or demo mode is selected, upon exiting LEVEL with the GO key, the computer will begin to play itself from the current position.

- The difference between autoplay and demo is that at the conclusion of the game, in demo mode a new game will be started whereas in autoplay mode the computer will stop when the end of the game is reached so you can look at the moves which were played.

- Pressing the GO key or NEW GAME will exit AUTO or DEMO play.

Note: Pressing any key during the AUTO/DEMO or REPLAY mode will cause the repeat cycle to end. To speed up the opening during AUTO / DEMO or getting to a certain position in the game, press REPLAY and then press " → " up to the position you want, then press the CLEAR key.

34.   *ANALYZE Key   (Save Game Key)

Using this feature you can ask the NOVAG DIAMOND to play through a game in memory and suggest alternative moves. The computer can be set to analyze for white, black or both.

Pressing this key allows 4 choices:-
The default is "AnL" which is analyze off.
Pressing the key again will show "AnL_", which means analyze the white moves.
Another press will show "AnL⁻ ", which means analyze the black moves.
Finally another press will show "AnL ≡ ", which means analyze both sides.

You use the ANALYZE GAME function after a game has been played against the computer or after entering your own game using the REFEREE function. Then select the level at which you want each move analyzed. Use ANALYZE GAME to select for which colour you will have the computer analyze, then press GO to exit LEVEL and begin the analysis. The computer will analyze each move and send the results to the interface. You may stop the analysis by pressing the GO key to have the computer stop thinking, then while the move is being displayed, press LEVEL and then press ANALYZE key until "AnL" is shown on the LCD. In this way your game will not be lost in the game history and you will still be able to use the TRACE FORWARD and TAKE BACK keys after you exit LEVEL with the GO key.

Note: You need the NOVAG DISTRIBUTOR to send the information to PC.

B)   The following functions can be accessed by pressing SET LEVEL followed by the appropriate square on the 'H' column.   Pressing the square has the effect of 'toggling' each function.

35.   Hash Tables (Square H8)

The default is "hSh=" which is Hash Table on. Using Hash Tables is a technique which allows the computer to search much deeper into many positions, especially in the end game. For example, the following well known end game position:
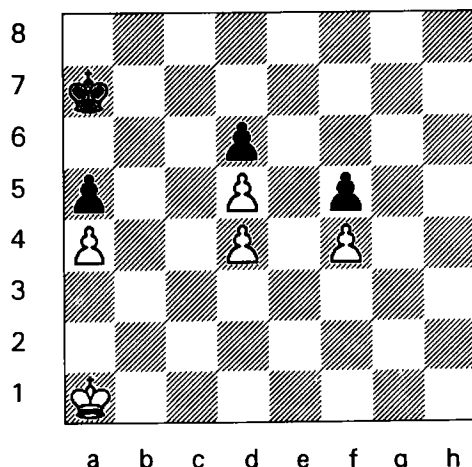
takes the computer about 28 seconds to find the correct key move KB1!. With Hash Tables turned off this would take perhaps many hours to find!

36. Selective Search (Square H7)

The default is "seL≡" which is selective search on. Normally the selective search allows the computer to find combinations much faster than a brute force search. Selective search on should play about 120 rating points stronger than having selective search off.

37. Passive Book (Square H6)
Turning on passive book will make the computer prefer to play certain opening book lines that are more passive in nature.

38. Active Book (Square H5)

Turning on the active book will make the computer prefer to play certain opening book lines which are more active in nature. Both active and passive books may be on at the same time!

39. Opening Book (Square H4)

Turning off the opening book will disable both the factory built in opening book and the PRO-OP book.

40. Learn (Square H3)

Turning learning on "lrn=" will allow the computer to learn from some of its mistakes.When the computer plays a move in which it becomes worse off, it will remember the position and how deeply it searched in the position. When it comes to this position again it will remember that things turned out badly and will try and find a different move to play. To clear all remembered positions, press the CLEAR key while the LCD shows "lrn=". The display will then show " Clr " to show you that you have cleared the current learning table.

41. Extension (Square H2)

The chess playing program in your computer uses a number of intelligent heuristics to direct the search to look deeper into relevant positions to try and resolve tactical skirmishes. Turning off extensions disables these extensions. This makes the search faster in most positions but means the computer may miss some important tactical threat.

42. Test (Square H1)

This function is provided mainly for your authorized service technician. Pressing this square a second time will cause the internal test to be performed which checks the hardware of your computer and reports any problems to the interface. Do not be alarmed when the LEDS and LCD behave erratically for a few seconds while the tests are being performed. This is because all the memory is being tested which affects the operation temporarily of the LEDS and LCD.

VI. LCD DISPLAY OF THE NOAVG DIAMOND

The LCD display for the NOVAG DIAMOND has a four character alphanumeric display. The listed symbols below are used on the display for the NOVAG DIAMOND.
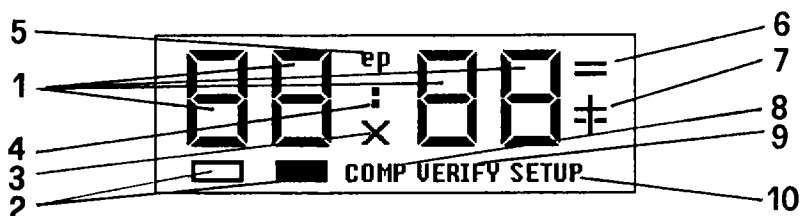
1. <u>Figures</u>

```
0 1 2 3 4 5 6 7 8 9
0 1 2 3 4 5 6 7 8 9
```

2. <u>Letters and symbols</u>

```
A b c d E F G h I H L n o
A B C D E F G H I K/X L M/N O
```

```
P q r S t u U Y ? ≡
P Q R S T U V Y ? ≡
```

<u>THE DISPLAY</u>

1 = 4 character alphanumeric display
2 = Indication for the colour
3 = Symbol for captured figures
4 = Separation for time indication
5 = Symbol for En Passant

6 = Symbol for Draw
7 = Symbol for Check/Checkmate
8 = The computer is computing
9 = Symbol for the VERIFY - Function
10 = Symbol for the SET UP-function

Symbols for the chess pieces on the display

A	King
q	Queen
b	Bishop
n	Knight
r	Rook
P	Pawn

Note: All LCD displays showing 3 bars " ≡ " indicate that a function is ON or the function is now at value 3.

LCD EXAMPLES AND EXPLANATIONS:

The following are examples of the most important displays of the NOVAG DIAMOND.
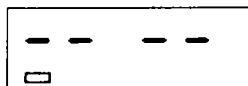
Display	Explanation
`-- -- --` `▭`	This display indicates that the NOVAG DIAMOND is ready and its your move.
`E2 --` `▭`	Display after input of the first half move, the location where you wish to move FROM.
`E2 E4` `▭`	Display after input of the destination square that you wish to play TO.
`c7 c5` `▬`	Display of the computer's counter-move.
`02:27` `▬ COMP`	INFO-Display: Shows the total time used so far for Black, while the computer is computing.
`b8 c6` `▬ COMP`	INFO-Display: The computer's counter move.
`c1 E3` `▬ COMP`	INFO-Display: The NOVAG DIAMOND expects this move after the previous b8 c6.
`c5 b4` `▬ COMP`	INFO-Display: On c1 e3 this would be the computer's reply.
`-0 03` `▬ COMP`	INFO-Display: Score for Black currently being computed.
`d__05` `▬ COMP`	INFO-Display: Number of half moves the DIAMOND has searched so far.
`39 43` `▬ COMP`	INFO-Display: Out of 43 variations there are still 39 to compute.
`c5 x d4` `▬`	The piece on square d4 gets captured during Black's moves c5 x d4.
`Err r`	Any illegal move or input will be indicated by the ERROR message.
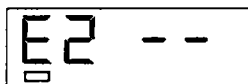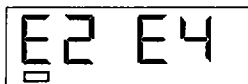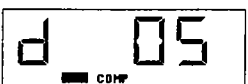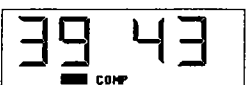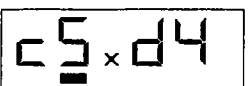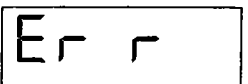
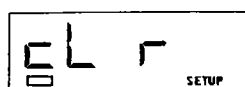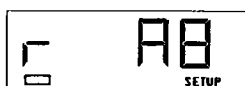| Display	Description
`rE 5n`	The NOVAG DIAMOND resigns the game.
`d 5t`	Shows the announcement for a draw, due to stalemate.
`d 3r`	Shows a draw with 3 time repetition of the position.
`to t`	INFO-Display: Shows that the total time for White is selected and will appear after 1 second.
`08:13`	INFO-Display: Shows the total time used by White so far.
`to t`	INFO-Display: Shows that the total time for Black is selected and will appear after 1 second.
`09:14`	INFO-Display: Shows the total time used so far for Black.
`cn t`	INFO-Display: The display for the number of moves is selected and will appear after 1 second.
`12`	INFO-Display: Shows the total number of moves made so far.
`5c r`	INFO-Display: The display for the scoring is selected and will appear after 1 second.
`-0 05`	INFO-Display: Position evaluation for White, and it is White to move.
`d 50`	Shows a draw according to the 50 move rule.
`d in`	Draw due to insufficient mating material (see F.I.D.E. rules).
`nA tE`	The announcement of a checkmate.
`UE r`	The VERIFY-Function is selected and you may verify the position of any piece on the board.

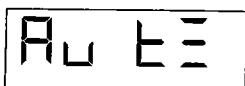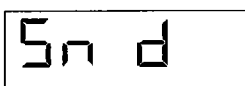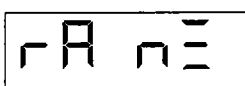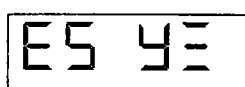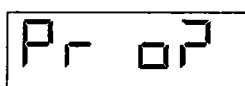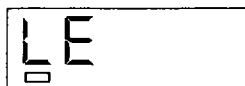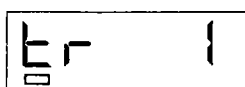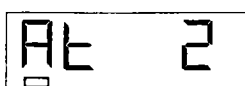|	
`5E t` SETUP	The SET UP-Function is selected and you may remove or add any chess piece to make up a new position.
`cL r` SETUP	The use of the CLEAR BOARD key is confirmed.
`r A8` SETUP	A White Rook is set up on square a8 by using the SET UP-Function.
`Au t=`	The AUTOPLAY-Function is on and the NOVAG DIAMOND will start playing itself after pressing GO.
`dE n=`	The DEMO FUNCTION is on and the NOVAG DIAMOND will start playing itself after pressing GO.
`rE F=`	The REFEREE-Function is activated by pressing the REFEREE key.
`5n d`	The SOUND is switched off.
`rA n=`	The RANDOM-Function is activated.
`E5 y=`	The EASY-Mode is activated.
`Pr or`	The computer asks into which piece your pawn will be promoted /underpromoted.
`r_ A1`	The NOVAG DIAMOND wishes to promote its pawn which has just moved onto the square a1 and requests a Rook in its place.
`bE L`	Shows that the game is set back to the beginning of the game by activating the RESTORE key.
`LE`	The SET LEVEL key has just been pressed. You will see the selected level after 1 second.
`tr 1`	Tournament level 1 has been selected and is now effective.
`At 2`	Average Time playing level 2 has been selected and is now effective.
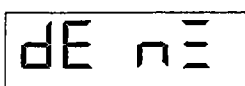
`5d 3`	Sudden Death playing level has been selected and is now effective. Clocks will count down to zero time.
`Fd 2`	Fixed Depth playing level is selected and now effective. The NOVAG DIAMOND will only analyze every move for only 2 half moves.
`An 3`	Analysis level 3 is selected and now effective.
`EA 5`	Novice playing level 5 is selected and the NOVAG DIAMOND will play less strongly.
`in 4`	A mate-in-4 is entered by using the SOLVE MATE- Level.
`En d`	The last move of the game has been made, there are no other moves stored in the memory.
`h4 x G3 +`	Black's moves was from h4: capture on square g3 and check announcement.
`AL t`	The NEXT BEST-Function has been selected and you will be prompted to take back the last move. Computing will then begin.
`n 1`	The NOVAG DIAMOND announces a mate-in-1, the game is lost for you.
`FL AG`	Time out.
`dE L?`	The NOVAG DIAMOND prompts for your confirmation to delete the user programmable opening books.
`Au c⁻`	Interface autoclocks has been turned on.
`An L⁻`	You have selected the ANALYZE GAMES option for both white and black colour.
`in t⁻`	Moves will be sent to the INTERFACE as they are played on the chess board.
`U i d`	INTERFACE VIDEO mode has been selected.

`hu n`	INTERFACE HUMAN mode has been selected.
`no r`	The built in opening book is selected.
`Pr o`	The user programmable opening book is selected.
`no Pr`	Both the built in BOOK and PRO-OP book will be consulted. The built in book will be looked at first.
`Pr no`	Both BOOKs as above but the PRO-OP Book will be consulted first.
`hn t1`	The NOVAG DIAMOND shows you the first HINT.
`hS h=`	To select the NOVAG DIAMOND's Hash Table Generation Function.
`SE L=`	To select the NOVAG DIAMOND's Selective search tactics.
`PA S=`	Certain opening book lines which are more PASSIVE in nature have been selected.
`Ac t=`	Certain opening book lines which are more ACTIVE in nature have been selected.
`bH =`	The NOVAG DIAMOND will consult the opening Book(s).
`Lr n=`	The NOVAG DIAMOND's learning mode has been selected.
`EH t=`	The EXTENSIVE search algorithm will be employed by the NOVAG DIAMOND.
`tS t`	To invoke the NOVAG DIAMOND's Self-Test function.
`SA UE`	To save a game into the computer's momery.
`Lo Ad`	To load a game from memory.

VII. TROUBLE SHOOTING

All NOVAG® computers are extensively tested before leaving the factory to ensure trouble free performance. However, if you encounter any problems during play, please check the following list first before calling your dealer or sending it in for repair.

1. **Your computer does not work**
   - Check if the adaptor plug sits properly in the socket, as tight as possible with minimal movement. If this is loose it may interrupt the power supply to the DIAMOND.
   - Check that the small adaptor plug that connects to the DIAMOND is fully inserted.
   - Check the operating voltage of your adaptor to see if it matches your local power supply.
   - Check if your power supply fluctuates by more than 10% as this may cause irregular performance.

2. **All LEDs light up and the computer is completely blocked**
   - Switch off the chess computer and disconnect the power supply.
   - Turn the DIAMOND over and you will find a hole marked RESET with a switch in it.
   - Use a thin instrument (ball pen) to poke into this hole and hold it for 5-10 seconds.
   - This will reset the internal memory of the DIAMOND and all games stored and the Pro-Op Book will be erased.

3. **One of the LEDs does not light up**
   Use this key sequence: VERIFY / SETUP → CLEAR BOARD → (press any square) → NEW GAME

   Use your finger and press on every square one after the other, to check if the LCD display the rank and file LEDs indicating the squares pressed are correct. If any of the squares do not light up you should send your set to your dealer for replacement of the faulty LED.

4. **One square does not register a move**
   Use this key sequence: SET LEVEL → (test all squares) → NEW GAME

   Use your finger and press on every square one after the other. You should hear 2 beeps and the LCD should show the level number of the square that you have activated. If any of the squares has no response. Please contact your dealer for repairs.

Care of the NOVAG DIAMOND
Dirt and dust can be removed with a soft cloth. Do NOT use any chemical solvents or water on the set. Damage caused by their use invalidates the warrenty.

VIII. TECHNICAL DATA AND FEATURES

• Microprocessor	H8 - RISC STYLE TECHNOLOGY
• Program Size	64K Byte ROM
	129K Byte RAM
• Hash - Table Size	118K Byte
• System Clock Speed	20 MHz
• Power Consumption	1.3 W Max.
•	150mA Max.
• Adaptor	9V dC rating 300mA (Novag Art. No. 8210)
• LCD Display and Information LCD	Yes
• Novag Super System Connection	Yes
• Slim Board	355 x 300 x 25mm
• Playing Levels	56
• To Make a Move	64 Touch Sensors
• Showing Move	LCD / LEDs
• Opening Book Size (ply)	> 36,000
• Maximum Opening Book Depth	60 ply
• Programmable Opening Moves	3,000 ply
• Game and Opening Memory	Yes

- Games can be saved   up to 64 games or approx. 10,000 ply
- Take Back Move   up to 400 ply
- Set Up / Verify Function   Yes
- Solves Mate   most mate - in - 8
- Mate Announcement   up to mate - in - 14
- Depth of Search   28 ply
- Shows Depth (in ply)   Yes
- Strategy of Endgame   Yes
- Special Learning Function   Learning up to 140 position.
- Random Generator   Yes
- Restore Function   Yes
- Replay of Game   Yes
- Autoplay   Yes
- Shows Score and can Resign   Yes

WARRANTY: For details please refer to the enclosed Warranty Card.

All data subject to change without notice.

This chess computer has been manufactured under the traditionally high quality and safety standards of Novag Industries Ltd. and complies with the European standard which is guaranteed by the importer whose name is marked on the enclosed warranty card. Not suitable for children under 36 months due to inclusion of small parts.

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