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# I. GENERAL HINTS

Playing with the NOVAG SAPPHIRE is simple compared to other chess computers. However we recommend reading the general instructions before starting to play. The detailed instructions are laid out in such a way that each section is self-contained, so you do not have to read everything at once.

**BATTERIES**
The NOVAG SAPPHIRE runs on four 1,5V UM 4-type **alkaline** or heavy duty batteries **(not included)**.

**Note:** Do not use regular batteries as they will result in irregular performance.

To insert the batteries, open the BATTERY DOOR on the back of the unit and place the batteries as indicated by the +/- signs. A set of new alkaline batteries last approximately 60 hours (continuous operation). If you intend not to use your computer for an extended period of time you should remove the batteries, but remember you will lose your user openings, learned positions and stored games.

**LOW BATTERY INDICATION**
When the LCD display shows "**bATT**", this indicates that the battery set of the NOVAG SAPPHIRE has to be replaced. The old batteries however will still work for 5 hours. To replace the batteries: Turn off the unit first - the internal capacitor will keep the memory for 30 seconds. To be on the safe side, we advise to use the DC adaptor to make sure that the memory will be kept.

**ADAPTOR**
The NOVAG adaptor (Art.No.8210) is not included with your set, but is available separately from your dealer. Please note that it is a DC 9V adaptor with 300 mA and it has a negative center. If you cannot get the NOVAG adaptor, please make absolutely sure that you do not buy an adaptor which does not have these specifications.
If you use a too powerful adaptor it might burn the components in your unit. Before using the adaptor, check that the voltage of your electric mains is within the range specified on the adaptor label.
When the NOVAG SAPPHIRE is connected to the NOVAG SUPER SYSTEM, you need to use an **Adaptor** to power the interfacing circuit.

**Note:** Make sure you first connect the adaptor with the computer before you plug it into the mains. The adaptor jack is at the back panel of the computer. We suggest to only use the adaptor which has been specially developed for this computer.

**MEMORY**
The NOVAG SAPPHIRE has a long term memory and will retain the last board position. However, make sure that there are batteries in the chess computer or an adaptor connected otherwise you will lose the memory contents.

# II. KEY LIST

| | | | | | |
|---|---|---|---|---|---|
| A 1 | | Color | | Go | |
| B 2 | | Takeback | /NextBest | TraceForward | /Easy |
| C 3 | King | /Info | /Restore | Verify/Setup | |
| D 4 | Queen | /Sound | /BK Select | Hint | /*Analyze |
| E 5 | Rook | /Referee | /*ProPrint | Level | |
| F 6 | Bishop | /Training | /ProPrior | Options 1/2 | /Random |
| G 7 | Knight | /SaveGame | /ProSave | Clear/Clear Board | |
| H 8 | Pawn | /LoadGame | /ProDelete | NewGame | |

The NEXT BEST / EASY / RESTORE / RANDOM / PRO PRINT / PRO PRIOR / PRO SAVE / PRO DELETE/ ANALYSE and BK SELECT are all accessed though the **LEVEL** function.

Pressing the OPTION key displays "**OPT1**" and another press shows "**OPT2**" on LCD. Pressing the "A1" through "H8" keys toggles or does the following operations. For toggle functions the first press shows current state.

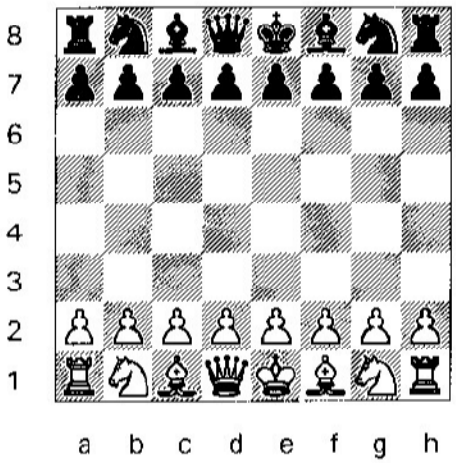
**OPT 1:**
- A1 *PrintMoves off/on
- B2 *AutoClock off/on
- C3 Auto/Demo off/on
- D4 *Human
- E5 *Video
- F6 *Replay
- G7 *PrintGame immediate action
- H8 *PrintBoard immediate action

**OPT 2:**
- A1 Hash Tables
- B2 Selective Search
- C3 Passive Book
- D4 Active Book
- E5 Opening Book
- F6 Learn
- G7 Extensions
- H8 *Test

* functions require a Personal Computer and the NOVAG DISTRIBUTOR to be useful.

## III. SHORT INSTRUCTIONS

1. Before commencing to play set up the chess pieces on the chess board attached to the NOVAG SAPPHIRE (or any chess board of your choice) in the opening position. (White pieces on the 1st and 2nd rank and the Black pieces on the 7th and 8th rank).




2. The power switch is a 2-position switch and located at the right side panel. It is marked with ON/OFF. Push this switch towards ON.
3. Press NEW GAME. You will hear 3 beeps and you can now make your opening move for White.
4. If you want to increase the level of skill, press the LEVEL key. (See section V.2. for level settings and their time controls).
5. Once you have set the level, press GO to exit the LEVEL mode.

After the above procedure you may enter your move for White using the keypad; for example E2-E4 is entered by pressing:

**E**5 B**2** **E**5 D**4**

You do not have to press any other key as the NOVAG SAPPHIRE detects your computed move and will immediately start computing its reply. When the move has been chosen it remains on the LCD display. If you wish to cancel your move you may press the TAKE BACK key while it is your turn to move. (see section V. 9.).

**Note:** Since the NOVAG SAPPHIRE has no chess board on which to indicate its moves you will have to make all the moves on your own to reflect the actual game going on inside the computer memory.

**Special feature: Keyboard lock to prevent accidental interruption to the computing.**

You will find this switch on the left side panel of the NOVAG SAPPHIRE. When using the computer please ensure that this switch is always set to NORMAL.

## IV. GAME FEATURES

### a) Making a move

Moves are entered using the algebraic notation which is the standard adopted by the World Chess Federation. Each move is completed by making all the key press in sequence. For example to enter E2-E4 press the following keys:

**E**5 B**2** **E**5 D**4**.

On the last key press the computer will start computing its reply. During the computing do not enter anything with one exception: you can interrupt the computing by pressing the GO key and the computer will make the best possible move up to that moment.

If you make a mistake whilst entering the co-ordinates of the "**from**" Square, simply press the CLEAR key to cancel your wrong entry.

**Note:** Since moves are entered using the long algebraic notation there is no need to indicate captures, castling or en passant captures. However in the event of a promotion the NOVAG SAPPHIRE will prompt you for the piece that you wish to promote to. Please press one of the **piece symbol keys** indicating your choice.

### b) Capturing a Piece

If the NOVAG SAPPHIRE makes a capturing move it will show on the LCD the symbol "x" and in cases of en passant pawn captures the display will show "**ep**".

### c) Impossible and Illegal Moves

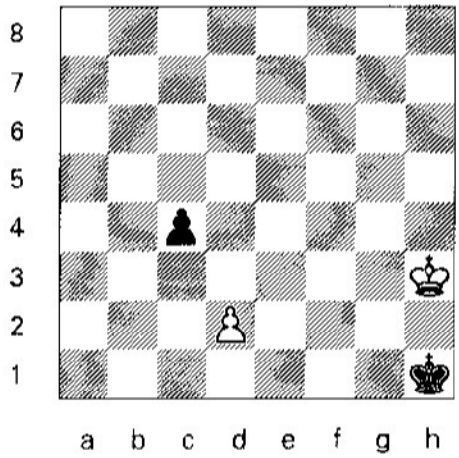
The NOVAG SAPPHIRE is programmed in accordance with the International Chess rules and does not accept nor make illegal moves. Illegal moves are not allowed and your computer will beep 3 times and show "**Err**" on the display. You can now enter another legal move.

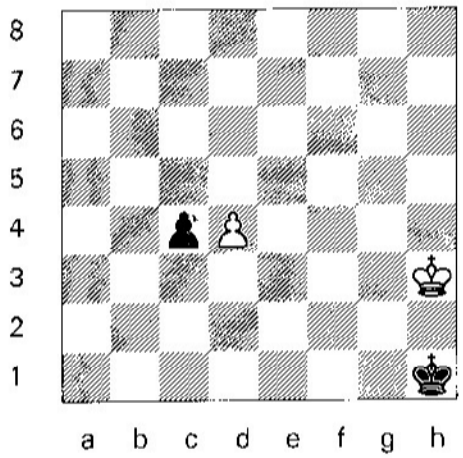
### d) Castling

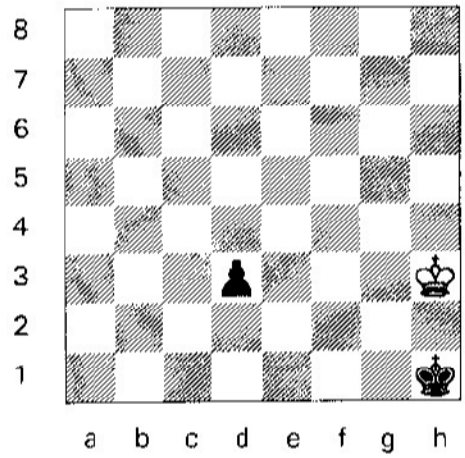
This move must be entered as a move by the King, enter the square from which the King is located then the square that it will have to go to complete the castling move. Do NOT enter the Rook move.
The NOVAG SAPPHIRE accepts and executes castling in set-up board positions.

### e) En Passant

If you make this pawn capture you only have to enter the "**from**" and "**to**" square of this move as for a normal move. The captured pawn is automatically removed by the computer and no further action is required from you. When the NOVAG SAPPHIRE makes an en passant capture it will show the words "**ep**" along with an "x" on the LCD display. You or respectively the computer can capture en passant in set up board position.







Official 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"**.

**f) Pawn Promotion / Underpromotion**
If one of your pawns reaches the opposite side of the board (the 8th rank), the NOVAG SAPPHIRE will allow you to promote or underpromote it to any desired piece. As soon as this happens the computer will prompt you for the piece that you wish to promote to and the word **"Pro ?"** will be shown on display. Please press the **piece symbol key** of your choice to select the promoted piece.

When the computer promotes one of its pawns it will flash the promoted piece on the display. If you missed this display you can use the VERIFY key to find out which piece has been selected by the NOVAG SAPPHIRE. The computer also accepts and executes pawn promotions in set up board positions.

**g) Stalemate and Draw**
The computer announces a Stalemate by the word **"d St"** on display.The NOVAG SAPPHIRE recognizes special draw conditions as stated by the World Chess Federation.

- Draw due to insufficient material is announced by the word **"d in"** on display.
- 50 moves without a capture or a pawn moves is displayed with **"d 50"** .
- And 3 times repetition of position is displayed with **"d 3r"**.

**h) Check and Checkmate**
Check announcements will be shown as a "+" sign on the right side of the LCD display. If this check is the last check of the game, ie: checkmate, this symbol "**MATE**" will appear on the display along with the last move of the game and the winning colour.

**i) Resignation**
If the computer believes its position is hopeless, it will announce "**rE Sn**" for resign.

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

## V. SPECIAL FUNCTIONS

1) **NEW GAME Key** (Key marked NG)

This key can be pressed at any time and will cause the computer to internally prepare for a new game.

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

2) **LEVEL Key**

Your NOVAG SAPPHIRE has 7 different types of levels and 56 unique time controls.

To set the NOVAG SAPPHIRE to any of the 7 different types of levels press the LEVEL key. Each further press will advance to the next level group and you will see on the LCD the abbreviation (**tr = Tournament Level, At = Average Time Level, Sd = Sudden Death Level, Fd = Fixed Depth Level, An = Analysis Level, EA = Novice Level, in- = Find Mate Level** ) of the level that you have selected. Please refer to the level table for the meaning of each of the 56 level time controls. To set the required level of each level group press the number key **A1 - H8.** To exit this mode always press GO.

**Note:** The LCD display "**in 1**" represents the last group (mate-in-x , see section V. 3. SOLVE MATE for full details).

**Example:** If you wish to set level "**At 4**", press the LEVEL key until the display shows "**At 1**", and then press the number key D4. 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.

**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 :**
  Due to a small mistake in the program code the Average Time Levels do not work properly after a few moves have been made. If you wish to select an Average Time Level, please make use of the USER PROGRAMMABLE TIME CONTROL FEATURE. You can now set the average time per move and then you have to set the number of moves to 1.

- **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 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 :**
The computer will only search to the depth specified. On FD1, FD2, and FD3 the search will be restricted and the computer's strength will be reduced. These levels are good training levels - stronger than the novice levels but weaker then the first tournament levels. The higher FD levels can be used for analysis.

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

- **Novice Level EA 1 – EA 8 :**
1 ply depth search with limited capture search. These levels provide a level of play suitable even for beginners. Each of the above levels may be modified by turning on EASY mode.

**Note:** All of the above levels (Tournament, Average time, Sudden death, Fixed depth, Analysis and Novice) can be modified by turning on EASY mode (see section 19). This keeps the computer from searching while you are thinking and weakens its play.

- **Find Mate Level mate-in-1 – mate-in-8 :**
(see Solve Mate Function)

## LEVEL TABLE

| Level | | Description | Level | | Description |
|---|---|---|---|---|---|
| TR | 1 | 40 moves in 5 min. | AN | 1 | 9 ply search |
| | 2 | 40 moves in 15 min. | | 2 | 10 ply search |
| | 3 | 40 moves in 30 min. | | 3 | 11 ply search |
| | 4 | 40 moves in 60 min. | | 4 | 12 ply search |
| | 5 | 40 moves in 90 min. | | 5 | 13 ply search |
| | 6 | 40 moves in 100 min. | | 6 | 14 ply search |
| | 7 | 40 moves in 120 min. | | 7 | 15 ply search |
| | 8 | 40 moves in 150 min. | | 8 | 16 ply search |
| AT | 1 | 2 sec. per move | EA | 1 | 1 ply + 2 captures |
| | 2 | 5 sec. per move | | 2 | 1 ply + 3 captures |
| | 3 | 10 sec. per move | | 3 | 1 ply + 4 captures |
| | 4 | 15 sec. per move | | 4 | 1 ply + 5 captures |
| | 5 | 30 sec. per move | | 5 | 1 ply + 6 captures |
| | 6 | 1 min. per move | | 6 | 1 ply + 7 captures |
| | 7 | 2 min. per move | | 7 | 1 ply + 8 captures |
| | 8 | 3 min. per move | | 8 | 1 ply + 9 captures |
| SD | 1 | game in 3 min. | IN | 1 | mate in 1 |
| | 2 | game in 5 min. | | 2 | mate in 2 |
| | 3 | game in 10 min. | | 3 | mate in 3 |
| | 4 | game in 15 min. | | 4 | mate in 4 |
| | 5 | game in 30 min. | | 5 | mate in 5 |
| | 6 | game in 60 min. | | 6 | mate in 6 |
| | 7 | game in 90 min. | | 7 | mate in 7 |
| | 8 | game in 120 min. | | 8 | mate in 8 |
| FD | 1 | 1 ply search | | | |
| | 2 | 2 ply search | | | |
| | 3 | 3 ply search | | | |
| | 4 | 4 ply search | | | |
| | 5 | 5 ply search | | | |
| | 6 | 6 ply search | | | |
| | 7 | 7 ply search | | | |
| | 8 | 8 ply 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 ◄ or ► to decrement or increment., Press VERIFY to advance to the next editing digit. Press ◄ or ► 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 ◄ or ► and verify keys 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 ◄ or ► 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.
- OPTION - 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) **SOLVE MATE FUNCTION** (use key marked LEVEL)

The NOVAG SAPPHIRE can solve most chess problems as well as mate problems up to Mate-in-8 even those that require castlings, en passant captures or pawn promotion / underpromotions. Press NEW GAME and set up the required board position (see V. 13. Set Up function). Before you start the mate search, it is advisable to verify the set-up board position via the VERIFY key and make sure that the colour to move is correct, if not change this by pressing the COLOR key.

To set the depth of mate search press the LEVEL key until the correct indication **"in 1"** shows on the display. Select now the number of moves to mate by pressing any of the number keys A1-H8.

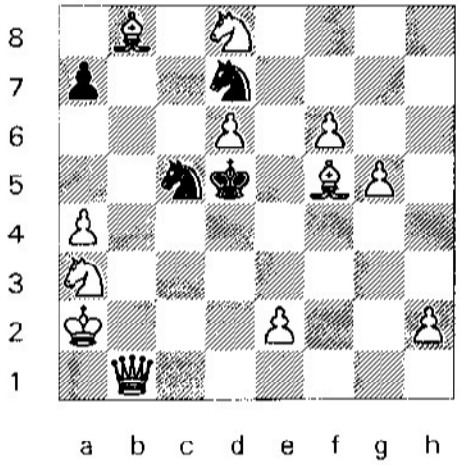
Press GO once to exit the setting of the mate search and then press GO a second time and the computer begins with the mate search.

If there is no solution you will see **"no nE"** on the LCD display. Whilst the NOVAG SAPPHIRE is searching it will show the main variations that it is presently considering and will rotate a variety of information on the LCD display in the following order:

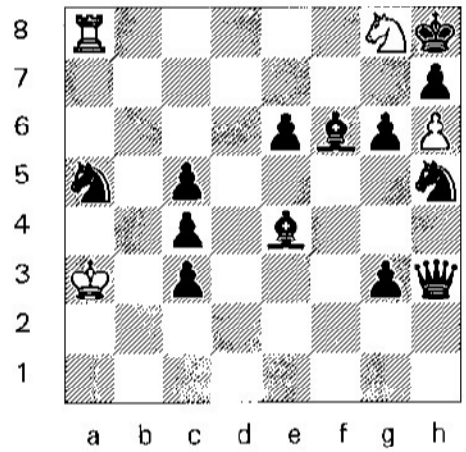
a) Time used up so far (example : " 01 : 35 ").
b) First move of main line (example : " G5 G4 ", display of the most anticipated next move for Black).
c) Second move of main line (example : " F3 H4 ", display of the thereafter expected counter-move for White).
d) Third move of main line (example : " D6 D5 ", display of the anticipated counter-move for Black).
e) Evaluation of the position = score from computer's point of view.
   (example: " 0 21 ", means + 0.21 pawn up).
f) Depth of search (d 6 means now searching 6 half moves).
g) Moves not searched during current iteration.
h) If there is no solution you will see **"no nE"** on display.

**Note on mate solving:**
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 following 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!

### 4) GO Key

The GO key is used to enter a command or to exit from the following special functions:

SET UP / VERIFY / LEVEL / AUTOPLAY or DEMO / SOLVE MATE.

These functions are explained in their respective paragraphs. Furthermore the GO key is used:

- To make the NOVAG SAPPHIRE compute for the side to move, even if in REFEREE mode.
- To interrupt the computing time and make the computer move instantly. The computer will make the move it currently considers to be 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.

  **Note:** If you do not allow the computer the full amount of time to think it will not play to the strength normally associated with the level selected.
- 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.
- To let the computer play against itself, which might be of special interest at a certain point during the game or for learning purposes. Every time you press GO the computer calculates for the side to move. All moves will be computed according to the set skill levels.
- To accept a HINT. If a hint is shown on display, pressing GO accepts the hint as though keyed in.

### 5) 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, CHECKMATE, and STALEMATE. This is also how games can be entered into the computer to be analyzed by the computer. 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. All features are available whilst in REFEREE mode.

### 6) HINT Key

The NOVAG SAPPHIRE can suggest moves, if you are not sure how to continue your game, which is a great tutoring feature. When it is your turn press the HINT key and the computer will show the move it considers the best for the colour to move (the move will be shown on display; the **from** and **to** squares of the considered move are blinking and **"Hn t#"** is shown, where # represents a number from 1 - 9 showing the depth of the move). While the first Hint is being displayed, you can press the GO key to accept the suggested move. Or, you may make a move of your choice whilst any HINT is being displayed.

If you press the HINT key whilst the computer is calculating, the display will show the move the computer thinks is so far the best for itself. Press CLEAR key to clear the LCD display and go back to the rotating info display.

The suggested move is the best possible move in this position computed by the NOVAG SAPPHIRE at the level preset by you. You may find that there is only one HINT during book openings.

### 7) 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 computer will show the **"from"** square (indicated on the LCD) of the first piece with a legel move.
If you continue to press the TRAINING key, the NOVAG SAPPHIRE 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 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.

### 8) TAKE BACK Key (key marked ◄)

The NOVAG SAPPHIRE allows you to take back up to 400 half moves to enable you to retract a bad move or just to 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. When you reach the beginning of the current game the display will show **"bEG"**.

To exit this mode make your next move or ask for the computer's next move by pressing the GO key.

**Note:** If you select the COLOR or SET UP function to alter the position of any of the pieces, all the 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"**.

### 9) TRACE FORWARD Key (key marked ►)

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 **"End"** on the LCD.

### 10) COLOR Key

The computer is generally programmed to play White first. In some cases if you want to play Black and move first,

press: NEW GAME key - COLOR key - your move

The computer will make its opening move for Black.

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.

You can choose the colour to move first via the COLOR key before entering SET UP mode (see section V.13.).

### 11) CLEAR / CLEAR BOARD Key (key marked C/CB)

This key has several uses:

- In SET UP mode this key clears the board of all the pieces.
- 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.
- 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.

### 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.

- Enter the square you wish to verify and the NOVAG SAPPHIRE will show the symbol of the piece which is occupying this square and its colour. If the square is empty the left side of the LCD will be blank. (Only the entered square position is on display).

- Press any piece key and its present position will be displayed. If the required piece is not on the board you will just see the piece symbol and the message "– – – –". If there are more pieces of the selected type you will see their respective locations with subsequent presses until there are no more and the message "– – – –" will appear.

- Press COLOR key to verify opposite colour chess pieces.

You may exit this mode any time by pressing the GO key. Once you have left Verify mode either enter your next move or press 'GO' again to make the computer move from this position.

### 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 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:** The history of the game is lost if you alter the current position in 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 **"S et"** 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 enter 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 a piece or moving / 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 enter 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.

  Example: 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 balck 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.
Pawns placed on the 8th rank are illegal and the "Err" sign will be on display.

### 14) SOUND Key

The NOVAG SAPPHIRE 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 is threatening to win some material. You will hear a double beep and the square on which the threatened piece is on will alternate on the LCD display with the computers 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 seconds.

### 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.

  Disadvantageous evaluations are marked with a "-" sign. For example if the computer sees that you are going to be mated in 3 moves then your score could be **"-n 03"**.

- **Fourth** press on the INFO key will show the number of moves made so far. 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) SAVE GAME Key

This function saves a game to memory or erases a game from memory. It allows up to 64 games (from A1, A2, .....H8) to be saved.

a) Press SAVE GAME key to enter save game menu. The LCD will show **"svXX"** where the XX is an empty square. When SAVE GAME is pressed, the display shows **"svb1"** as B1 is the first empty square. The cycle continues from A1-H1, A2-H2, etc to A8-H8.

   The user may enter a square of his choice by using the A1-H8 keys.
   Example: To save a game on C5, press SAVE GAME key then press 'C3' key, the LCD shows **"svc -"**. To complete your square entry press now 'E5' key.

   – Press SAVE GAME key during the cycle to save the game history on the square displayed. The square may be erased by saving a game with no history.

b) Press NEW GAME, SAVE GAME and enter the square that is to be erased. After a square is pressed, the square is displayed on the LCD briefly and the save game menu is exited.

   – Pressing CLEAR key during the cycle will cause the save game function to be terminated. If LEVEL is pressed during LCD cycle then the program exits save game function and enters level function.

**Note:** Save games only works after a new game position. If C5 is a saved game location then the game of this location will be lost forever and be replaced by the new game history.
Example: To **save** a game on C5, press SAVE GAME key and then press key "C3" then "E5".
To **erase** a game on C5, press NEW GAME and then SAVE GAME and "C3" key and "E5".

### 17) LOAD GAME Key

This function loads a game stored in memory.
- Press NEW GAME key and LOAD GAME key to enter load game menu. The LCD will show **"ldXX"** where the XX is a saved game square, supposing square A1 is empty and B1 is a saved game. When LOAD GAME is pressed, the display shows **"ldb1"** as b1 is the first saved game square. The cycle continues showing all squares with saved games.
  The user may enter a square of his choice by using the A1-H8 keys. If E5 is pressed the LCD shows **"lde-"** and waits for the completion of the square.
- Press LOAD GAME key during the cycle and this will load the game currently displayed on the LCD from memory.
- Pressing CLEAR key during the LCD cycle will cause that function to be executed. If LEVEL is pressed during LCD cycle then program exits load game and enters level function.

**Note:** Load game only works at a new game position. You cannot load a game if you are in Set Up mode. To view the stored game use the TRACE FORWARD or TAKE BACK key.

All clock information is saved and restored during LOAD / SAVE GAME Function.

## VI. LEVEL FUNCTIONS (These functions are accessed by first pressing the **LEVEL KEY.**)

### 18) NEXT BEST Key

To activate this function press the LEVEL key and then the NEXT BEST key. This enables the computer to find the next best move in the current position. If no move has been previously played, the display will show **"b EG"**. Otherwise the LCD will show the move to be taken back and then the computer will come up with an alternate move.

This function only works if there is at least one move played in the current game. Pressing this key will cause the computer to find the next best alternate. 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.

### 19) 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.

### 20) RESTORE Key

This function of the NOVAG SAPPHIRE allows you to restore the board position to the very beginning of the game. The computer can store 400 half moves in its memory which normally will allow you to go back to the new game position. If however the game was started from a Set Up position or if more than 400 half moves have been played the game will not be at the new game position. After pressing the RESTORE key the display will show "bEG" to indicate the beginning of the game history.

**Note:** You may use the complementary function key TRACE FORWARD to replay through the entire game. Should you enter a move for your colour you will erase all of the game history.

Please note that, once you press LEVEL → RESTORE, the computer activates the RESTORE function and the game move pointer moves to the beginning of the game history, but you are still in the LEVEL mode, to exit the LEVEL mode and return to normal PLAY mode, press the GO key or TAKE BACK key, then the TRACE FORWARD function works normally.

### 21) RANDOM Key

Every time you switch the computer on, automatically the move with the highest rating is chosen, based on the depth of the 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.

### 22) PRO PRINT Key (this function requires a PC and the NOVAG Distributor)

This function prints the user's programmable opening book across the serial interface.
The Pro Print function can be reached through the LEVEL function:

Press NG key → LEVEL 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.

The user programmable opening book is sent across the serial interface in priority order. The user programmable opening book line with the highest priority is shown first.

### 23) PRO PRIOR 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.
The PRO PRIOR function can be reached through the LEVEL function:

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

No Set Up positions 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 SAVE Key (this function requires a PC and the NOVAG Distributor)

This function saves an opening line in the user programmable openning book. This function is the same as PRO PRIOR function except the opening moves are saved at the lowest priority. The PRO SAVE function can be reached through the LEVEL function:

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

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

**25) PRO 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 LEVEL key and PRO PRIOR key
- Press PRO DELETE twice

No Set Up positions or colour to move changes are allowed before a Pro Delete. The game history exists, the LCD displays "**del?**" and the user is asked to press PRO DELETE again to clear the entire user programmable opening book.

**26) ANALYZE Key (Analyze Game)**

Using this feature you can ask the NOVAG SAPPHIRE 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 which colour you want the computer to 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 analysis information to a PC.

**27) BK SELECT Key (Book Select)**

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 programmable 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, which 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 programmed opening book. The options allow either the factory built in book to be scanned first with the "**noPr**" option, or for the PRO-OP book to be scanned first by selecting the "**Prno**" option.

## VII. OPTION KEYS (* functions require the NOVAG DISTRIBUTOR and a Personal Computer to be useful)

A) **OPT 1:**
First press shows **"opt 1"** on the display. Next, press "A1" through "H8" and you will have access to the following operations:
**Note:** * Functions accessed while in OPTION 1 work with the NOVAG INTERFACE and a presonal computer.

**Key A1** ***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.

**Key B2** ***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.

**Key C3** **Auto/Demo**
Pressing this key allows the user to select either autoplay mode or demonstration mode. Autoplay is shown on LCD as **"aut =**" and demo mode is **"den="**. If either autoplay or demo mode is selected, upon exiting OPTION 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 terminate AUTO or DEMO play.
**Note:** To speed up the opening during AUTO/DEMO or getting to a certain position in the game, press REPLAY and press " → " up to the position you want, then press CLEAR.

**Key D4** ***Human**
Human Mode: pressing this key will show **"hun"** on the LCD and this means the format of the information sent to the interface is more readily useful for the human player.

**Key E5** ***Video**
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.

**Key F6** **Replay**
Pressing this key will cause the current game to go back to the beginning and be played forward. Press CLEAR key to terminate replay. When using with the NOVAG interface, type **"Ctrl-S"** to pause, **"Ctrl-S"** to resume and **"Ctrl-C"** to exit play.

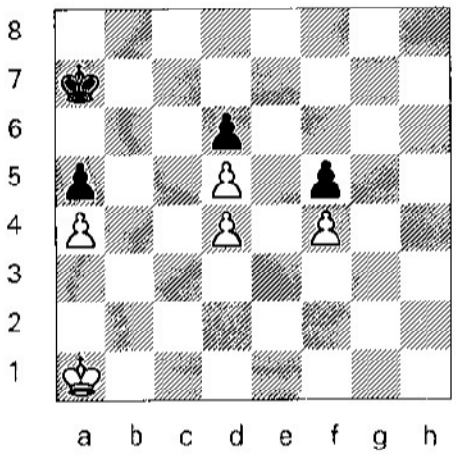
**Key G7** ***Print Game** (immediate - action)
Pressing this key will send the current game to the interface.

**Key H8** ***Print Board** (immediate - action)
Pressing this key will send the current position to the interface.

B) **OPT 2:**
Second press shows **"opt2"** on the display. Next, press "A1" through "H8" and you will have access to the following functions:

**Key A1** **Hash Tables**
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 endgame for example, the following well known end game position. It takes the computer about 28 seconds to find

the correct key move KB1! With has tables turned off this would take perhaps many hours to find! Example:




**Key B2 Selective Search**

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 on should play about 120 rating points stronger than having selective off.

**Key C3 Passive Book**

Turning on passive book will make the computer prefer to play certain opening book lines that are more passive in nature.

**Key D4 Active Book**

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!

**Key E5 Opening Book**

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

**Key F6 Learn**

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.

**Key G7 Extensions**

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.

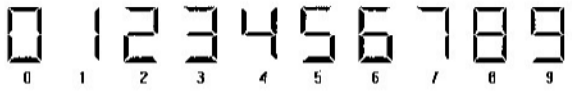
**Key H8 Test**

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 LCD behaves 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 LCD. This completes the features which are available while in the OPTION 2 function. To exit OPTION 2, press the GO key.

## VIII. LCD DISPLAY OF THE NOVAG SAPPHIRE

The LCD display for the NOVAG SAPPHIRE has a four character alphanumeric display. The listed symbols below are used on the display for the NOVAG SAPPHIRE:

1. Figures




2. Letters and symbols

THE DISPLAY

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**

King

Queen

Bishop

Knight

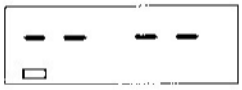
Rook

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:

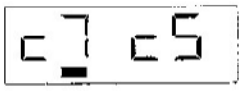
The following are examples of the most important displays of the NOVAG SAPPHIRE.



This display indicates that the NOVAG SAPPHIRE is ready and its your move.

Display after input of the first half move, the location where you wish to move FROM.

Display after input of the destination square that you wish to play TO.



Display of the computer's counter-move.

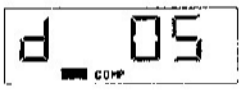
INFO-Display: Shows the total time used so far for Black, while the computer is computing.

INFO-Display: The computer's counter-move.

INFO-Display: The NOVAG SAPPHIRE expects this move after the previous b8 c6.

INFO-Display: On c1 e3 this would be the computer's reply.

INFO-Display: Score for Black currently being computed.



INFO-Display: Number of half moves the SAPPHIRE has searched so far.

INFO-Display: Out of 43 variations there are still 39 to compute.

The piece on square d4 gets captured during Black's moves c5 x d4.

Any illegal move or input will be indicated by the ERROR message.

The NOVAG SAPPHIRE resigns the game.

Shows the announcement for a draw, due to stalemate.

Shows a draw with 3 time repetition of the position.

INFO-Display: Shows that the total time for White is selected and will appear after 1 second.

INFO-Display: Shows the total time used by White so far.

INFO-Display: Shows that the total time for Black is selected and will appear after 1 second.

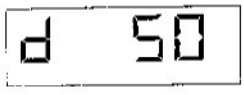
INFO-Display: Shows the total time used for Black so far.

INFO-Display: The display for the number of moves is selected and will appear after 1 second.

INFO-Display: Shows the total number of moves made so far.

INFO-Display: The display for the scoring is selected and will appear after 1 second.

INFO-Display: Position evaluation for White, and it is White to move.

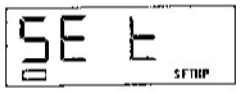



Shows a draw according to the 50 move rule.

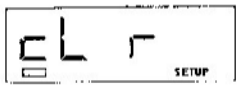
Draw due to insufficient mating material (see F.I.D.E. rules).

The announcement of a checkmate.

The VERIFY-Function is selected and you may verify the position of any piece on the board.




The SET UP-Function is selected and you may remove or add any chess piece to make up a new position.




The use of the CLEAR BOARD key is confirmed.

A Black Rook is set up on square a8 by using the SET UP-Function.

The AUTOPLAY-Function is on and the NOVAG SAPPHIRE will start playing itself after pressing GO.

The demo function is on and the NOVAG SAPPHIRE will start playing itself after pressing GO.

The REFEREE-Function is activated by pressing the REFEREE key.

The SOUND is switched off.

The RANDOM-Function is activated.

The EASY-Mode is activated.

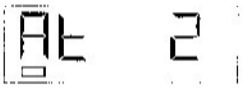
The computer asks into which piece your pawn will be promoted /underpromoted.

The NOVAG SAPPHIRE wishes to promote its pawn which has just moved onto the square a1 and request a Rook in its place.

Shows that the game is set back to the beginning of the game by activating the RESTORE key.

The SET LEVEL key has just been pressed. You will see the selected level after 1 second.

Tournament level 1 has been selected and is now effective.




Average Time playing level 2 has been selected and is now effective.

Sudden Death playing level has been selected and is now effective. Clocks will count down to zero time.

Fixed Depth playing level is selected and now effective. The NOVAG SAPPHIRE will only analyze every move for only 2 half moves.

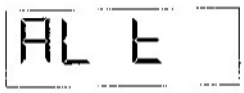
Analysis level 3 is selected and now effective.

Novice playing level 5 is selected and the NOVAG SAPPHIRE will play less strongly.

A mate-in-4 is entered by using the SOLVE MATE- Function.

The last move of the game has been made, there are no other moves stored in the memory.

Black moves from h4 and captures on square g3 and announces check.




The NEXT BEST-Function has been selected and you will be prompted to take back the last move. Computing will then begin.

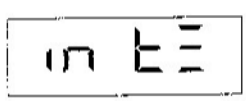
The NOVAG SAPPHIRE announces a mate-in-1, the game is lost for you.

Time out.

The NOVAG SAPPHIRE prompts for your confirmation to delete the user programmable opening books.

Interface autoclocks has been turned on.

You have selected the ANALYZE GAME option for both white and black colour.



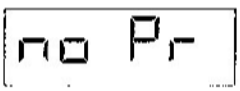

Moves will be sent to the INTERFACE as they are played on the chess board.

INTERFACE VIDEO mode has been selected.

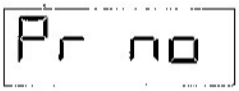
INTERFACE HUMAN mode has been selected.

The built in opening book is selected.

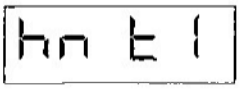
The user programmable opening book is selected.



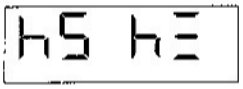
Both the built in BOOK and PRO-OP book will be consulted. The built in book will be looked at first.



Both BOOKs as above but the PRO-OP Book will be consulted first.



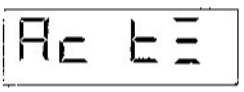
NOVAG SAPPHIRE shows you the first HINT.



Select NOVAG SAPPHIRE's Hash Table Generation Function.

Select NOVAG SAPPHIRE's Selective Search Tactics.

Certain opening book lines which are more PASSIVE in nature have been selected.



Certain opening book lines which are more ACTIVE in nature have been selected.

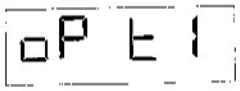
The NOVAG SAPPHIRE will consult the opening Book(s).

The NOVAG SAPPHIRE's Learning mode has been selected.

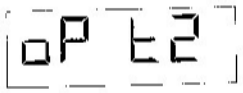
The EXTENSIVE search algorithm will be employed by the NOVAG SAPPHIRE.

To invoke the NOVAG SAPPHIRE's Self-Test Function.

Battery low.




Option 1 function selection.




Option 2 function selection.

Save game.

Load game.

## IX. APPENDIX

### A. Care of the NOVAG chess computer

Dirt or dust can be removed with a soft cloth. Do not use any chemical solvents or water on the set. Any damage caused by their use invalidates the warranty.

Always keep the computer in a dry and cool place (normal room temperature). Avoid exposing the computer to heat, e. g. spot lights, radiators, sunshine etc. as this may lead to permanent damage caused by overheating, which is not covered by the warranty.

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

### B. Trouble shooting list

All NOVAG chess computers are extensively tested before leaving the factory to ensure trouble free operation. However if you encounter problems when using the NOVAG SAPPHIRE please refer to the list below before sending the unit back to your dealer.

1. The computer does not work and the LCD is blank. Please check if your batteries have sufficient charge, always use heavy duty or **alkaline batteries** for reliable performance.

2. The letters on the LCD display are faint and get dimmer as you use the NOVAG SAPPHIRE. The batteries are run down, please change them.

3. The keys do not work and pressing them will bring no response from the NOVAG SAPPHIRE. Please check that the **keyboard lock switch** has not been accidentally left in the LOCK postion. This switch is on the left side panel of the NOVAG SAPPHIRE. When using the computer please ensure that this switch is always set to NORMAL.

4. The NOVAG SAPPHIRE keeps returning error messages (**"er r"**) on entering moves. Please check that your position is correct using the VERIFY function (see section IV. 13.). Or if the NOVAG SAPPHIRE is requesting you to enter a pawn promotion please press one of the piece symbol keys.

5. The NOVAG SAPPHIRE locks up and will not respond to any keypress. Please reset the NOVAG SAPPHIRE by removing its batteries or adaptor. You may now continue using the NOVAG SAPPHIRE normally.

## C. Technical Data and Features

| | |
|---|---|
| • Microprocessor | H8 (RISC Style Processor) |
| • Program Size | 64K Byte ROM, 129K Byte RAM |
| • Hash-Table size | 118K Byte |
| • System Clock Speed | 26.6 Mhz |
| • Power Consumption | 0.45W Max. |
| • Current | 50mA Max. |
| • Battery | 4 x 1.5V UM-4 (AAA type) |
| • Adaptor | 9V DC Rating 100mA (Novag Art.#8210) |
| • LCD display and Information LCD | Yes |
| • Integrated Chess Clock | Yes |
| • Novag Super System Connection | Yes (must be used with NOVAG POWER ADAPTOR) |
| • Slim Size | 80 x 155 x 20 mm |
| • Playing level | 56 |
| • To make a move | Function Keys |
| • Showing Move | LCD |
| • 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 |
| • Setup/Verify Function | Yes |
| • Solve Mate | most mate-in-8 |
| • Mate announcement | up to Mate-in-14 |
| • Depth of Search | 28 ply |
| • Show Depth (in ply) | Yes |
| • Strategy of End game | Yes |
| • Special Learning Function | Learning up to 140 position |
| • Random Generator | Yes |
| • Restore Function | Yes |
| • Reply of Game | Yes |
| • Autoplay | Yes |
| • Shows Score and can Resign | Yes |

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.

NOVAG®

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