

# Instructions

*Mephisto*®

**modular II**

**exclusive II**

**münchen II**

## Contents

- A. General information
  - A.1. The Mephisto family
  - A.2. Advantages of the modular system
- B. Getting started
  - B.1. Preparing for a game
  - B.2. Setting up the pieces
- C. Playing a game against the computer
  - C.1. Making moves
  - C.2. Special moves
  - C.3. Pawn promotion
  - C.4. Correcting moves
  - C.5. Game signals
  - C.6. New game
- D. Communicating with the computer
  - D.1. Advantages of the new dialogue system
  - D.2. The five operation-modes
- E. Setting the level of skill (LEVEL-mode)
  - E.1. The playing levels
  - E.2. Changing the level of skill
- F. Advanced features
  - F.1. Special functions in the LEVEL-mode
  - F.2. Interrupting the thought process
  - F.3. Changing sides
  - F.4. Alternative move (Randomizer)
  - F.5. Monitor mode
  - F.6. Chess-teacher function
  - F.7. Openings library

- G. Modifying or entering positions (POSITION-mode)
  - G.1. Verifying a position
  - G.2. How to delete pieces
  - G.3. Adding pieces
  - G.4. Clearing the board
  - G.5. Side to move
  - G.6. Illegal positions
  - G.7. An example
- H. MEMORY-mode
- I. INFORMATION-mode
  - I.1. Principal main-line
  - I.2. Evaluation of a position
  - I.3. Resigning a game
  - I.4. Depth of calculation and move-counter
  - I.5. Game signals
- K. Four-time-clock
  - K.1. Reflexion time of the current move
  - K.2. Total time
  - K.3. Time control
- L. Chess problems
  - L.1. Solving problems with the computer
  - L.2. Setting problem levels
  - L.3. Alternative solutions
  - L.4. An example
- M. Problems with the computer?
- N. The test program
- O. Technical data and accessories
- P. Summary of instructions

Dear chess friend,

Your MEPHISTO is a product of German technical ingenuity and introduces you to the world of modern chess computers. With it you acquire access to a comprehensive system of games and modules that make up the *MEPHISTO MODULAR SYSTEM*. *Within this family of computers, consisting of the MEPHISTO Modular, the MEPHISTO Exclusive and the MEPHISTO München, practically all system components are interchangeable.*

*The MEPHISTO chess computers are very easy to use. However, before you begin a game it is advisable to read these instructions carefully in order to fully appreciate all the attractive features the computer has to offer. Experienced users will find a summary of the instructions in section P.*

We of the MEPHISTO team wish you many hours of pleasure and success with your new electronic chess partner.

**HEGENER + GLASER AG**

Munich, West Germany

## A. General information

### A.1. *The Mephisto family*

You may be surprised to learn that your MEPHISTO chess computer can be taken apart quite easily. The unit is completely modular and this allows you to upgrade it according to your wishes. For example, when newer and better programs become available you will only have to change the program module, not the entire computer. The process is so simple that you do not even have to send in the set.

The largest component of your MEPHISTO is the magnetic sensor chessboard which the computer uses to register your moves. Each square contains a magnetically sensitive contact which is activated by the magnets built into the base of the chessmen. So when you move a piece from one square to another MEPHISTO automatically registers this move. Each square of the sensor board also contains an LED (a little lamp) which the computer uses to tell you its own moves.

In the **MEPHISTO Modular** the sensor board forms the cover of the main cabinet which contains a battery compartment in the back and a power supply socket and On/Off switch in the right. There are also three slots for modules in the front. The main module contains the heart of your MEPHISTO: the computer with its microprocessor and program memory, 18 control keys and six signal lamps. The second module contains the liquid crystal display (LCD) which the computer uses to communicate with you to give you a variety of useful informations during a game. The third module is empty and its place can be used for future expansions.

If you wish to take a look at all the parts that make up your MEPHISTO you may do so without fear of damaging the unit. Just remember that the computer **must be switched off** before you take it apart. First pull out all three modules and then tilt the front of the sensor board upwards until it

comes free of the cabinet. You will now see the battery compartment which can hold five C-type alkaline batteries (you can insert these now if you wish). Turn over the sensor board and you will see that it has four module connectors in all, three pointing to the front and one to the rear.

To put the computer back together again you must do everything in reverse order. First position the back edge of the sensor board with the studs in place and then tilt it downwards until the board snaps into place (like closing a box).

If you own a **MEPHISTO Exclusive** or **München** the process is slightly different. To remove the modules pull out the drawer in front of the unit as far as it will go, release the plastic catch on the right by pressing it outwards and tilt the frame of the drawer upwards. You can now pull out and insert modules.

In order to insert batteries into the **Exclusive** you must push the drawer in as far as it will go. The battery compartment will become visible in the rear. You will also see the slot for the fourth module on the left. The **MEPHISTO Exclusive**, which contains the same electronic components as the **Modular**, also requires five C-type batteries. (**MEPHISTO München** has no battery compartment). The wooden sensor board of the **Exclusive** or **München** is not detachable.

#### **A.2. Advantages of the modular system**

Most people are right-handed and most computers were built with this in mind. For a left-handed person, however, it may be very inconvenient to press keys located on the right side of the computer. Your **MEPHISTO** offers a unique solution to this problem. You can change the modules around! You may insert the display in the right slot and the keyboard unit

in the left. Or you can have the display in the middle. Try out different arrangements until you find one ideally suited to you.

The modular system has other important advantages. If in the future stronger programs are developed, faster processors become available or there is a demand for a more sophisticated display, then you will not need to buy a whole new computer. By replacing the existing modules you will be able to upgrade your computer for a fraction of the price.

Program enhancements, like special openings libraries, endgame modules and the like, can also be used with your MEPHISTO. Remember that there are two slots free for such additional modules. Thus, whatever the future may bring, MEPHISTO will not become obsolete but will retain its place amongst the strongest and most sophisticated chess computers in the world.

## B. Getting started


### B.1. *Preparing for a game*

We will assume that you have finished examining the computer and have put it back together again. If you want to operate the computer on batteries these **will** have to be correctly inserted. The computer will also operate on house current. Please use only the special adaptors supplied by your dealer. When connecting the power supply you should always observe the following sequence: connect the adaptor first to the computer (the adaptor socket on the right in the **Modular** and on the left in the **Exclusive** or **München** and then to the wall outlet.

Now set up the chess pieces supplied with the computer. Switch the computer on. In the display you will see the word **[PLAY]**, which means that the computer is ready to begin a game. However, before you start making moves please check whether any of the board LEDs are flushing. The next section will tell you what to do if they are.

## ***B.2. Setting up the pieces***

As we have seen the computer recognizes your moves by means of magnetically sensitive switches in each square of the board. If the chessmen are not placed in the middle of their squares then the sensors may not be able to detect them and MEPHISTO will assume that those pieces are missing. It will flash the LEDs of these squares, asking you in effect to replace the missing pieces. The computer will refuse to begin the game until all the chessmen are correctly located on their squares.

Once all the pieces are in place and no board LEDs are flashing you can begin a game. If for some reason the computer fails to respond then you can "reset" it by pressing both the  keys together. This is like switching the set off and on again, only it is much more "computer-like".

When you switch on or reset the computer it is automatically set to level **[LE 1]**. On this level the computer will play very quickly, taking an average of 2-5 seconds to reply to your moves. This should give you a good game and you will have an opportunity to get acquainted with your new computer. In section E you will see how you can change the level of skill to suit your ability or the speed at which you want to play.

## **C. Playing a game against the computer**

### ***C.1. Making moves***

It is high time we get a game started against your MEPHISTO. Let us assume that you have set up the pieces and switched on the computer, which is now sitting there, patiently waiting for your first move.

Lift up a piece. The computer turns on the LED of the square the piece was standing on. Now move the piece to another square. This will light



up for a moment and you will hear a short beep. MEPHISTO has accepted your move.

It is important that you always lift up the pieces and do not slide them across the board, as this might confuse the computer (especially if one of the sensors in the intermediate squares reports a move).

Once your move is entered the computer automatically begins to compute a countermove. If you look at the display you will see a clock which indicates in minutes and seconds the time MEPHISTO is taking for its computations (the built-in chess clock can show you a lot more, as we will see in section K) However, it is quite possible you did not have time to see the clock at all. MEPHISTO has a very extensive openings library and will reply instantly if it knows the variation you are playing.

As soon as the computer has found a reply you will hear a short beep and a board LED will light up. The computer is telling you which piece it wants to move. Lift up this piece and the computer will show you where it must go to. Place the piece on the square indicated. If you look at the display you will also see the coordinates of the move. (e.g. [G8F6]).

## C.2 Special moves

You do not have to worry about captures, castling, "en passant", etc. Just move the pieces in the normal fashion and the computer will recognize your intentions. But remember that when you castle you must move your **King first** (as the laws of chess require). The computer will remind you to move the Rooks as well. If you move the Rook first MEPHISTO will think that was the entire move and not allow you to move the King.

### C.3 Pawn promotion

If one of your Pawns reaches the opposite side of the board it can, as you probably know, be changed into a Queen, Rook, Bishop or Knight. The computer will offer you a choice by flashing four LEDs above the corresponding piece keys. You must press one of these keys to tell the computer which piece you want.

When MEPHSITO promotes a Pawn it will indicate in the display which piece it chooses. You will see **[Pr ]** for promotion followed by one of the following symbols:

**[Pr d]** = Promotion to Queen ("Dame" is German for Queen)

**[Pr T]** = Promotion to Rook ("Turm" means Rook)

**[Pr L]** = Promotion to Bishop ("Läufer" is Bishop)

**[Pr S]** = Promotion to Knight ("Springer" means Knight)

Don't panic, you won't have to learn German in order to play against the computer! After you have moved the computer's Pawn to the opposite back rank you can check the LEDs above the control keys to find out which piece MEPHISTO chooses. You have to confirm the promotion anyway by pressing the key under the flashing LED.

Here's an example: say the computer wants to promote to a Knight. You will see **[Pr S]** in the display and the second lamp from the left, the one above the Knight key, will flash. Press the Knight key to confirm that you have replaced the Pawn with a Knight.

**Please note:** If you do not confirm a Pawn promotion by pressing the appropriate piece key the computer will refuse to continue the game.

#### *C.4 Correcting moves*

If you start to make a move and then decide to move another piece (something that is frowned upon in tournament chess) MEPHISTO will not complain. Just replace the piece and move the other one.

If on the other hand you should attempt to make an illegal move then MEPHISTO will protest more severely. The message **[Err ]** in the display will appear and the computer will refuse to continue the game. At the same time the board lights will tell you where the piece you moved came from. Just move the piece back and play a legal move.

Remember that MEPHISTO knows the rules of chess perfectly well. If you find it difficult to believe that a move is really illegal, it is usually because you are overlooking a check or a pin. Always take a good look at the position before you assume that the computer is being deceitful.

#### *C5 Game signals*

While you are playing a game against the computer you will notice that usually one or more of the LEDs above the keyboard are on. If you are playing White and it is your turn to play, the **White LED** on the far right will be on. When it is the computer's turn (and MEPHISTO is thinking) the **Black LED** will flash.

If the computer puts your King into check this will be indicated by 3 dots between the digits. This also happens when the computer is in check. If a game ends in checkmate you will hear a number of quick beeps and the following message in the display.

**[MAT ]** = Mate

If a game ends in a draw then you also hear the quick beeps and one of the following messages will appear:

[PATT] = Stalemate

[r\_UM] = Draw due to insufficient material

[r\_03] = Draw because of threefold repetition

[r\_50] = Draw because of 50-move-rule

If you play very slowly the computer may also beep, light up the **Clock LED** (that's the one with the clock symbol), and give you the message [TIME]. This means that you have theoretically lost on time. However, you can continue the game by pressing **CL** to clear the display and then making your next move.

### **C.6 New game**

If you want to discontinue a game and start a new one just press both the **RES** keys simultaneously. There is a good reason for two reset keys: one key could be pressed by mistake, a fatal error that would erase the current game from the computer's memory.

## **D. Communicating with the computer**







### **D.1 Advantages of the new dialogue system**

Whenever you are playing with your MEPHISTO you shall be able to give your full attention to your game. This is why MEPHISTO has been designed in a way, where after having switched on the computer and chosen the level of skill, there remains nothing else to do than to move the pieces on the autoresponse board. But MEPHISTO offers more possibilities than just playing a game of chess. You may for example

observe MEPHISTO's calculating process or try to find a solution for a chess-problem. To make the handling easy for you, a dialogue-system has been worked out, which divides all functions into 5 groups. During the game you can see at any moment, even while asking for additional informations, who's turn it is. While MEPHISTO is calculating, the display shows the running time in minutes and seconds and the LED of the computer's colour is flashing. When it is your turn, the display shows MEPHISTO's last move and the LED of your colour lights up.

### *D.2 The five operation-modes*

You have noticed already one of those functions (modes): the PLAY-mode. The following table will show you, which modes you have at your disposal, what they mean and how you put them on. The function-LED's (PLAY, POS, MEM) will always show in which mode you are at any moment.

Mode	Function	Key	Chapter	LED
PLAY-mode	Input/output	 or 2x 	B + E	PLAY
LEVEL-mode	Choice or control of level	* 	D	PLAY
POSITION-mode	Modifying or entering positions	* 	F	POS
MEMORY-mode	Taking back moves,	* 	G	MEM
INFORMATION- mode	Observing the computer's calculations		H	PLAY

This sign (\*) shows you that this function can only be used while it is your turn to move. The letters show you in which chapter you can find the corresponding informations. By entering **CL** you exit any mode back to the PLAY-mode. This is what you would also have to do to if you want to pass over e.g. from the MEMORY into the POSITION-mode.

## E. Setting the level of skill

We already mentioned that when you switch on the computer or press the **RES** keys the level is automatically reset to **[LE 1]**. On this level MEPHISTO will play speed chess, taking an average of 2-5 seconds to reply to your moves. Even at this speed the computer is a pretty strong opponent. However, you can change the initial level to suit your playing style and strength.

Your MEPHISTO has a number of different levels to suit a variety of needs. You can play speed chess, regular tournament games, or postal chess; you can also analyse positions or solve chess problems.

### E.1 The playing levels

The following table gives you the average response times for the 10 playing levels. Remember that just like human beings, the computer gets stronger when it has more time to think. There are also 10 problem solving levels, but we will deal with these separately in section L.

Level	Purpose	Average response time
<b>[LE 1]</b>	Casual game	2-5 sec.
<b>[LE 2]</b>	5 minute game	5 sec. (60 moves in 5 min.)
<b>[LE 3]</b>	10 minute game	10 sec. (60 moves in 10 min.)
<b>[LE 4]</b>	30 minute game	30 sec. (60 moves in 30 min.)

[LE 5]	Fast play 1	1 min. (60 moves in 1 hour)
[LE 6]	Fast play 2	2 min. (60 moves in 2 hours)
[LE 7]	Tournament game 1	3 min. (40 moves in 2 hours)
[LE 8]	Tournament game 2	3 min. 45 sec. (40 moves in 2,5 hours)
[LE 9]	Analysis	10 min.
[LE10]	Postal chess	infinite

The response times per move listed above are average times for all the moves of a game. MEPHISTO may spend considerably longer on individual moves, especially in tactically complicated situations. To compensate for that the computer will play "easy moves" very fast and in fact respond instantaneously in openings it knows well. And it will make every effort to keep within the total time budget for the game. For instance in the tournament level [LE 7] MEPHISTO may take considerably longer than 3 minutes for some of its moves but you can be sure that the computer will make its 40th move before two hours are up.

Another thing you should remember is that while you are pondering over a move MEPHISTO is not sitting there idly but is analysing the position (this feature is sometimes called "permanent brain"). The computer attempts to predict your next move and is working on its response to that move. If the guess was right MEPHISTO may well respond instantaneously, even in a very complicated position. If that happens, don't be surprised. The computer was just *thinking on your time!*

## ***E.2 Changing the level of skill***

Now that you have learned what each level means you will want to know how you can set a specific level. It's really very simple: just press **LEV** at the beginning of a game or when it is your turn to move. In the display you should see the current level setting. Now just press the key with the

level you want (1 - 0) and then **ENT**.

Say you want to play a tournament game (level 7). This is how you do it:

Switch on the computer. Display **[PLAY]**.

Press **LEV**. Display **[LE 1]** (default level).

Press **Gr** and **ENT**.

The tournament level is set and you can begin the game.

If you have any difficulty setting the level you want, press **CL** and begin again. You can also change levels in the middle of a game (but only when it is your turn to move). However, please remember that in this case the computer will reset the clocks to zero.

## F. Advanced features

So far you have learned enough to play chess against the computer to your heart's content. However, MEPHISTO has a number of advanced features that will make your games more enjoyable. In this section we will deal each of these features individually.

### F.1 Special functions in the LEVEL-mode

Beside the choice of level, the LEVEL-mode offers you two additional special functions: to turn the board and to switch off the tone signals. Press 3 times **LEV** and the display shows **[bd -]**. Now press **ENT** (display shows **[bd ]**) and so you have turned around the "internal" board of the computer. Now you can place the black pieces on the ranks 1 and 2, while MEPHISTO will be playing from the top of the board (ranks 7 and 8) with the white pieces. Press **ENT** and MEPHISTO starts the game!

By pressing 4 x **LEV** and then **ENT** (display shows **[Ton-]**) you can switch off the acoustic signals after each move. By the same procedure you can always switch on again the beep tones.



Now let's try to go through the different functions in the LEVEL-mode:

- 1 x **LEV** : Latest selected level, e.g. [LE 1]
- 2 x **LEV** : Problem level [Pr \_]
- 3 x **LEV** : Turn board [bd -]
- 4 x **LEV** : Tone signal off [Ton-]
- 5 x **LEV** : Level ..... etc [LE 1]

As you have registered, the LEVEL-mode has a *rotating* structure.

### F.2 Interrupting the thought process

If the computer is taking too long on a move you can always interrupt its thought process by pressing **ENT**, which causes it to break off its computations and play the best move it has found so far. This is absolutely essential in level [LE10] (infinity mode).



### F.3 Changing sides



At any time during a game you may change sides with the computer, i.e. you can tell it to make the next move for you and take over your side of the game. Say you are playing with the white pieces and it is your turn to move. Press **ENT** and the computer will make the next white move for you. If you now make a move for Black the computer will go on playing for White. The clocks will of course be reset to zero.



To start a *game with the black pieces* reset the computer and press **ENT**. The computer will make the first white move and you can go on playing for Black.

You can change sides as often as you like. By repeatedly pressing **ENT** you can even make the computer *play the entire game against itself*. Just remember to maintain the sequence of moves (white, black, white, black etc.). Otherwise you may generate some very strange games.

#### F.4 Alternative move (Randomizer)

When the computer decides to make a move during a game it beeps and shows you the move on the board and in the display. If you want it to make some other move, *don't touch the piece* on the board but press **CL**  . The computer will recompute the move and try to find something else.

Pressing **CL**   during a game is quite a serious intervention and so MEPHISTO will reset the clocks to zero. And if there is only one good move in the position the computer may stick to its first choice.

The alternative move function is most useful in the opening part of the game when the computer is playing out of its openings library. You can keep pressing **CL**   until the variation you want to play appears.

#### F.5 Monitor mode

Sometimes you may want to enter a whole sequence of moves - for instance the first ten moves of an unusual opening. MEPHISTO has a special *monitor mode* which enables you to do this. Just press **LEV** **MEM** at the beginning of a game or when it is your turn to play. You will see **[Mon ]** in the display. Now press **ENT** and after that you can enter as many moves as you like simply by making them on the board. MEPHISTO will not compute countermoves but just check to see that all the moves you enter are legal. The Black and White LEDs will always tell you

which side moves next. You can also use the monitor mode when playing a game against a friend. In this case MEPHISTO will act as a referee and see that nobody makes illegal moves. Another use of the monitor mode is replaying games from newspapers and chess books. MEPHISTO will ensure that you do not make any mistake and will also provide valuable assistance in your analysis. This is how you analyse a game in monitor mode:

Set the computer to level **[LE 7]** or higher and then enter monitor mode as described above (the entire sequence is **[LEV]** **[G7]** **[ENT]** to set level 7, then **[LEV]** **[MEM]** **[ENT]** to enter monitor mode). Now start making the moves of the game on the board. At some stage you will surely want to analyse a position more carefully. Press **[ENT]** and this will cause MEPHISTO to go out of monitor mode and compute the next move. You can play on against the computer. In this way you are able to experiment with the game, try alternative lines of play and uncover all the tactics involved.

### ***F.6 Chess-teacher function***

The **[←]** key has a special function that especially beginners may find quite useful. Try the following: when it is your turn to play press **[←]** and then pick up one of your pieces. The computer will light up all the squares to which this piece might legally move. You can pick up other pieces to see where they may move. Press **[CL]** to exit this function and resume normal play (or just make your next move).

### ***F.7 Openings library***

MEPHISTO disposes of an extensive openings library with about 1000 main- and side-lines. For the first moves of a game, this is where he takes his chess-knowledge from. So, at the beginning of a game, he would not „invent“ his moves, but look them up in a sort of „book“.

If you would like to know whether MEPHISTO has calculated or looked up a certain move you press **INFO** and **U<sub>1</sub>**, and the display **[M 00]** shows you that this was a theory-move. Also the randomizer may be used within the openings library. So, if you do not like an opening move, you can check by pressing **CL** and **→**, whether MEPHISTO has any alternatives available.

## G. Modifying or entering positions (POSITION-mode)

Your MEPHISTO is not just a chess partner who will play straight games against you. There are a number of other things the computer is very good at: solving chess problems, combinations and studies, or analysing difficult positions very deeply. For this it is essential to be able to enter or modify positions. MEPHISTO's special *position mode* makes this exceptionally simple.

### G.1 Verifying a position

Even though MEPHISTO's advanced sensor board makes misunderstandings rare, it is still important that you are always able to verify the current board position. For that you must go into *verify mode*. Just press one of the piece keys, for instance **AI**, when it is your turn to move. The computer will flash all the squares that white Pawns are located on. In the display you will see the Pawn symbol **[ b ]**.

Now press the Pawn key again. The computer will show you where the black Pawns are supposed to be. In the display you will see **[-b ]**. (Press the Pawn key once more and it will be white Pawns again).

In the same way you can verify the position of the other pieces. Remember that a dash in front of the piece symbol in the display always means the computer is showing you black pieces. When you have finished

checking the position you can continue the game by simply playing your next move. If you want to think before you move and find the flashing squares disturbing you can press **CL** to stop them. The clocks remain unaffected by position verification.

Graphik:

Piece symbols

k	= King	=		
q	= Queen	=		
r	= Rook	=		
b	= Bishop	=		
n	= Knight	=		
p	= Pawn	=		

## G.2 How to delete pieces

If you wish to modify the current board position (e.g. one that has arisen in a game), you must first press the **POS** key. You have now entered position mode which is signaled by the message **[POS ]** in the display. If you now pick up a piece it will be **deleted** from the position in the computer's memory.

Here's an example: say you want to play a handicap game in which MEPHISTO starts with a Rook less. Switch on the computer, press **POS** and then pick up the Rook. Press **CL** and you can start the game, without the Rook.

### G.3 Adding pieces

To add a new piece you must first tell the computer which piece you are adding. Press the appropriate *piece key* (twice if you want to add a black piece) and then place the piece on the board. That's all.

When you are adding a piece you will always see the corresponding piece symbol in the display. A dash in front of the symbol indicates black pieces. After you have finished modifying the position press **CL** to exit POSITION-mode and continue the game. The clocks will be reset to zero.

### G.4 Clearing the board

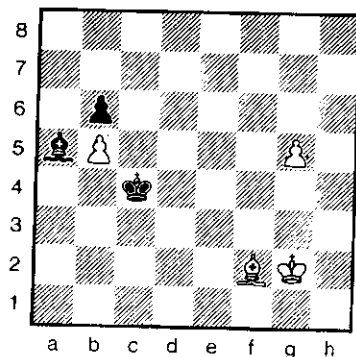
If you wish to set up a completely new position you will want to clear the board of all pieces. This can be done by entering position mode (press **POS**) and then pressing **ENT**. In the display you will see [ [] ], indicating that the computer has deleted all pieces. You can now set up the position by adding pieces as described above.

### G.5 Side to move

When entering a position make sure the computer knows which side has the first move. Before leaving POSITION-mode press **W** or **B** followed by **ENT**. The White or Black LEDs will tell you who has the move.

### G.6 Illegal positions

MEPHISTO will not accept a position that is illegal (display **[Err ]**), e.g. one in which either side has more (or less) than one King, or more than nine Pawns, or where there are Pawns on the first or last ranks. It will also refuse to play on if the side to move can capture the enemy King.



## G.7 An example

Diagram

### White to move

We shall enter this position which is taken from a master game. First reset the computer, then press

**POS** **ENT** to clear the board

**F6** to select white King

Place the white King on the square G2. Now press

**F6** twice to select black King.

Place the black King on C4. The rest is quite obvious:

**C4** and place white Bishop on F2,

**C4** twice and place black Bishop on A5,

**A1** and place white Pawns on B5 and G5,

**A1** twice and place black Pawn on B6,

**M0** White to move, and

**ENT** to enter the position.

The diagram position is now in MEPHISTO's memory and you can play on from it. It is good practice, however, to first *verify the position* as described in section G.1.

Try the following experiment. Set level **[LE 7]** and play with the white pieces against the computer (just enter your first move as usual).

Chances are you will not be able to win. You can take moves back and try various lines. If you do not succeed in finding a win use the memory function (see section H) to return to the original position and allow the computer to play for White. It will show you some pretty surprising moves that tear down Black's defenses.

## H. MEMORY-mode

In serious games of chess you are definitely not allowed to "take back" moves. However, MEPHISTO is quite lenient in this respect. In fact it has a special **memory mode** which makes taking back moves very simple.

To retract moves that have already been played in the game press **MEM** when it is your turn to play. In the display you will see **[MEMO]**. Press **MEM** again and the computer will show you the last move of the game – on the board and in the display. Retract this and the computer will show you the previous one. You can take back as many moves as you like (even all the way to the beginning of the game. In this case you will see **[STA ]** on the display). When you have reached a position from which you would like to resume the game just press **CL** to exit MEMORY mode.

When taking back moves MEPHISTO will always remind you to replace captured pieces. The lights above the piece keys will tell you what piece was captured. When "unpromoting" a piece the computer will remind you to replace it with a Pawn by turning on the light above the Pawn key. **Press this key to confirm the replacement.** This is important as the computer will otherwise refuse to continue the game.

The memory function works in two directions. You can also use it to **replay moves** you have just taken back. To do so press **MEM** again. Now the computer will trace forward (in memory mode pressing **MEM** switches bet-



ween the two tracing directions). If all moves have been replayed MEPHISTO will display **[End ]**. Again you can exit MEMORY mode and resume normal play by pressing **CL**.

## I. INFORMATION-mode

You can use the INFORMATION-mode at any moment of the game, which is not possible with the other functions.

### I.1 Principal main-line

What happens, when you press the **INFO** key? There are two possibilities: if it is your turn nothing will happen, but if MEPHISTO is calculating he will display the best move found until that moment. If the display shows four dashes, this means that MEPHISTO has not found any move yet. During this operation, the colour-LED keeps on flashing to indicate that MEPHISTO is still calculating his move. If you want to have the running time back on the display, simply press **CL**. But there is even more: MEPHISTO has the ability to display on request up to five half-moves (plies) of the principal main-line. To find out how your computer is predicting the following course of the game, you just press **INFO** and **⇌** once for every following move. If you press **INFO** **⇌** while it is your turn, MEPHISTO will give you a hint. And again by pressing **⇌** you can get the whole sequence of moves. If MEPHISTO has found a move in the meantime you can simply continue the game, because this brings you automatically back to PLAY-mode. Of course, you can also exit the INFORMATION-mode at any time by pressing **CL**, thus returning to PLAY-mode. This is for example necessary if you intend to interrupt MEPHISTO's calculations by **ENT**.

### ***1.2 Evaluation of a position***

MEPHISTO will give you an evaluation score of a position, if you press **INFO** and then **A<sub>A1</sub>**. The display then shows you a number, calculated in Pawn-units, which gives you the opinion of the computer about the value of his position. A minus-sign (-) before the number shows that MEPHISTO estimates himself being in disadvantage, no sign before the number means that he has the advantage. If, for example the display would show you **[-1,50]**, MEPHISTO tells you that he is by 1,5 Pawn-units in disadvantage. Beside the evaluation score the display can also show you different messages which you will find in paragraph 1.5.

### ***1.3 Resigning a game***

If the evaluation score shows you a value of **[-9.99]** you have won the game, because this is the way MEPHISTO resigns. On the other hand, when the value goes up as far as **[ 9.99]** you should acknowledge MEPHISTO's superior position and give up the hopeless game.

### ***1.4 Depth of calculation and move-counter***

In addition to the possibility to observe MEPHISTO while computing his moves, you can also see how far he is calculating ahead. By pressing **INFO** and **A<sub>C3</sub>** you get the so-called minimal depth of search. For example **[M 02]** means that MEPHISTO has examined all possible positions as far as two plies (half-moves) ahead. This type of search is also called „brute force“ method.

By entering **INFO** and **A<sub>D4</sub>** you can inform yourself about the number of moves made during this game. At any time you can exit the INFORMATION-mode by pressing **CL** and so go back to PLAY-mode.

### *1.5 Game signals*

[MAT ] = Mate

[PATT] = Stalemate

[r\_50] = Draw because of 50-move-rule

[r\_03] = Draw because of threefold repetition

[r\_UM] = Draw due to insufficient material

[M 2 ] = Mate in two moves




[Pr d] = Promotion to Queen (German: Dame)

[TIME] = Loss on time




[ no ] = No solution (to a chess-problem)

## K. Four-time-clock

### *K.1. Reflexion time of the current move*

As you noticed already, each time you execute your move on the board, the display shows MEPHISTO's time running. Of course you can also regard your chess-clock when it is your move. After entering  and  MEPHISTO tells you how much time he used for his last move. By scrolling forward with  you can see the running time for your current move in minutes and seconds.

### *K.2 Total time*

Pressing the  key again will display the word [SUM ] and MEPHISTO switches to total times. First (after pressing ) he shows his own total time in hours and minutes, and after another  your total time is

displayed. The colour-LED (lighting-up or flushing) always indicates whose turn it is.

By entering **CL** or just playing your move you can always exit back to PLAY-mode.

### *K.3 Time control*

During a game MEPHISTO will monitor your speed of play and warn you if you are moving too slowly. In levels **[LE 2]** to **[LE 9]** the **Clock-LED** will flash to remind you that you are running out of time. If you exceed your time limit for the game (which could be quite recommendable against this strong program) you will hear a number of rapid beeps, the **Clock-LED** will light up and the message **[TIME]** will appear in the display. In this somewhat dramatic fashion MEPHISTO is claiming a win on time. But have no fear, this is a friendly game and so you can continue by pressing **CL** and playing your next move on the board.

## **L. Chess problems**

In newspapers and magazines you will often come across chess problems which require the solver to find a forced mate (against any defence) in a given number of moves. Since MEPHISTO is a highly proficient problem solver this subject justifies a chapter of its own.

### *L.1 Solving problems with the computer*

In chapters E.1 and E.2 we saw how to set the normal playing levels. Apart from these MEPHISTO has another ten special problem levels. These are for solving mates in 1 to 10 moves. In two and three-movers the computer is very fast, seldom taking more than a couple of seconds to find the mate, however complicated the problem may be. Mates in

upto seven moves are generally no great problem for the computer, although the time required increases dramatically with the number of moves. Still, on the whole MEPHISTO is very much faster than most other computers, even those specially programmed to solve chess problems.

### *L.2 Setting problem levels*

To solve a problem you will first have to enter the position as described in section G. Now press the **LEV** key twice. In the display you should see *[Pr\_]*.

In order to tell the computer how many moves to mate press the appropriate number key (1 . . . 0). In the display you will see the corresponding number (e.g. *[Pr 4]*). If this is correct then press **ENT** to return to PLAY-mode.


To start the computer solving the problem press **ENT** (in chess problems it is almost always White to move). As soon as it has found the solution the computer will show you the key move on the board and in the display you will see a mate announcement (e.g. *[ M 4]* for mate in four). You can play black defensive moves to see the entire solution. You can also trace back and try alternative defenses.

If the computer does not find a mate in the required number of moves it will not make a move but display the message *[ no ]*.

If you enter INFORMATION-mode while the computer is looking for a solution you will see the line it is considering and the current depth of search in the display (cf. section I).

### L.3 Alternative solutions

If a chess problem has more than one solution it is generally considered defective. Experts say the problem is "cooked". MEPHISTO can help you to find out whether a problem has a unique solution or if there is an alternative way to mate in the required number of moves.

To check a problem for alternative solutions ("cooks") first allow the computer to solve it as described above. However, *instead* of making the move on the board press **CL** . The computer will resume work and look for an alternative solution. If it finds one it will display this on the board, if not you will get the message [ *no* ]. MEPHISTO will show you up to seven cooks. Problem enthusiasts will find this feature very useful and problem composers can use it to check their problems before publication.

### L.4 An example

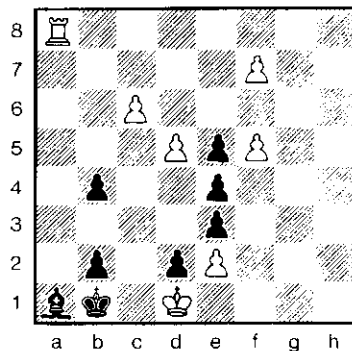
You will probably find out for yourself that MEPHISTO solves ordinary problems which you find in newspapers and magazines with breath-taking speed and accuracy. So we have chosen an exceptionally difficult one to illustrate the computer's abilities. Normally such eight-movers are beyond the scope of chess computers.

Diagram



Lev Nikolaevitch, 1976

**Mate in 8 moves**

Enter this problem into the computer as described in section G. Set problem level [*Pr 8*] (by pressing **LEV** **LEV** **HB** **ENT**) and start MEPHISTO computing. You will not have to wait for very long to see the solution.



In just over six minutes MEPHISTO will show you the key move which is an underpromotion to a Bishop! Remember to press the Bishop key to confirm this when playing through the solution (there is also a second underpromotion on move 6). You can play defensive moves for Black and the computer will show you the entire variation up to mate.

Now let us check the problem for cooks. Go back to the diagram position and let the computer solve the problem again. This time instead of making the move on the board press  . It will take the computer another eight minutes to tell that there is no alternative solution so that the problem is sound.

## M. Problems with the computer?

Have you ever had a serious disagreement with a computer? This can sometimes happen in a chess game. You want to make a perfectly legal move, the computer refuses to accept it. Or it suddenly won't let you take back moves.

In such cases please be patient and look out for a misunderstanding. Do not immediately assume that the computer is not working properly. In the past it has been our experience that only a very small percentage of computers sent in had genuine technical defects. In most cases the problem was that the user had not been sufficiently familiar with the operation of his machine. We therefore implore you to go through these instructions very carefully before concluding that here may be something wrong with the computer. Especially defects that appear "only occasionally" are usually the result of an operator error.

*Here are the most common causes of misunderstandings:*

- 1) One of the pieces is not on the center of the square or missing from

the board. MEPHISTO is telling you to correct the error (by flashing the square) whereas you are trying to make a move. Sometimes a piece may even be standing on the light the computer is flashing!

2) You've been sliding pieces instead of lifting them up and one of the intermediate squares registered a move.

3) You moved the Rook before the King when castling. MEPHISTO registered the Rook's move and rejects the King's move.

4) You are trying to move a piece for the computer while MEPHISTO is still thinking. This can happen when you press **INFO** (see section I) and then forget that the computer is only showing you the move it is currently considering.

5) You have been moving pieces around on the board to analyse the position and then not set them back correctly.

6) You have entered a position without clearing the previous position (see G.4). Or you've entered an illegal position (e.g. more than one white King, Pawn on the first or last rank, King can be captured) and MEPHISTO refuses to play it.

7) When promoting a Pawn you did not confirm which piece you wish to take (see section C.3).

8) When taking back moves you have not or incorrectly replaced a captured piece or you forgot to confirm the "unpromotion" of a Pawn (see section H). On the other hand when tracing forward the computer might be asking you to confirm a Pawn promotion (check the piece LEDs).

Some of these errors may not have immediate consequences and they







can go unnoticed for a while. However when problems arise much later in the game the operator tends to look at the last moves only and assumes that the computer is at fault.












To clear up a misunderstanding it is often best to just **verify the position** (see section G.1). You can also **retract moves** (H) and then trace forward again to find out exactly how a position was reached.

If the problem still persists you can of course make use of our service facilities. Please make a note of exactly how the computer is malfunctioning and enclose this note with the computer when you send it in. This will help us to locate the error quickly and return your set without any delay.

## I. The test program

Your MEPHISTO has been carefully tested in all phases of development and manufacture. Should you suspect that your computer is malfunctioning you may use a special test sequence to check all keys and the display. Please press the keys in exactly the order given and check whether the display is the same as in the following list.

Key	Display
Switch on computer	[PLAY]
 level mode	[LE 1]
 select level 3	[LE 3]
 confirm level	[PLAY]
 position mode	[POS ]

	check white Rooks squares A1 and H1 flashing	[ T ]
	exit position mode	[PLAY]
	level mode	[LE 3]
	monitor mode	[Mon ]
	enter	[PLAY]
—	move Pawn from F2 to F4	[PLAY]
—	move Pawn from E7 to E6	[PLAY]
—	move Pawn from G2 to G4	[PLAY]
	computing for Black announcing mate in 1	[ M 1]
—	move Queen D8 to H4 quick beeps, two LEDs above the keyboard on	[MAT ]
	back to play mode	[PLAY]
 	retract all moves	[STA ]
 	reset computer	[PLAY]

If the above test sequence should at any stage produce a different display please consult your dealer.

## O. Technical data and accessories

Here is some technical data on your MEPHISTO computer:

Microprocessor:	6502
Speed:	4 MHz
Program size:	32 KByte (ROM)
Work space:	4 KByte (RAM)
Strategy:	Full width search with special heuristics for speed chess and problem solving
Levels of skill:	10 playing levels, 10 problem levels
Chess clock:	Four-time-clock
Display:	4 digit LCD, 6 signal LEDs, 64 board LEDs
Take back:	127 moves
Power requirements:	If you operate your computer on mains supply, please use only the special adaptor type supplied by your retailer.

## P. Summary of instructions

These instructions are meant for experienced users. The references in brackets are to sections of the instruction manual.

**Getting started:** Insert batteries or connect adaptor (B.1). Set pieces to the initial position. Switch the computer on.

**Level of skill:** Press **LEV** and one of the keys 1 ... 0 to set playing levels (E.1) or 2x **LEV** and one of the keys 1 ... 0 to select problem level 1-10 (L.2). Press **ENT** to terminate level setting.

**Entering moves:** Make moves on the sensor board, do not slide pieces. When castling move the King first. In promotions confirm choice of piece by pressing the appropriate piece key (C.3).

**Game signals:** *White and Black LEDs* tell you which side to move, if flashing that the computer is thinking for that side. Three dots between digits signals check, *[Err ]* indicates an error. The *Clock LED* flashes to warn you that you are running out of time. Mate and loss on time are signalled by quick beeps. Press **CL** to play on after loss on time (K.3).

**Messages and symbols:**

*[MAT ]* = Mate

*[PATT]* = Stalemate

*[r\_UM]* = Draw (insufficient material)

*[r\_03]* = Draw (threefold repetition)

*[r\_50]* = Draw (50 move rule)

*[TIME]* = Loss on time

**Game information:** Press **INFO** and repeatedly **0** while the computer is thinking for main variation, **A1** for evaluation score, **C3** for depth of search. Press **04** for number of moves. (I.1-4).

**Move now:** Press **ENT** while computer is thinking (F.2).



**New game:** Press **RES RES** simultaneously.


**Game with black pieces:** Press **RES RES** and then **ENT** (F.3).

**Change sides:** Press **ENT** when it is your turn to move (F.3).






**Retracting moves:** Press **MEM** twice. To replay moves press **MEM** again

(toggles trace direction). Remember to replace captured pieces (watch keyboards LEDs) and confirm "unpromotions" to a Pawn by pressing the Pawn key (H).







**Alternative move:** Do not make the move displayed but press   instead (F.4).

**Verify position:** Press piece key once for white pieces, twice for black pieces. Press  to end verification or just make your next move on the board (G.1).

**Piece symbols:**

<i>K</i>	= King	=		
<i>Q</i>	= Queen	=		
<i>R</i>	= Rook	=		
<i>B</i>	= Bishop	=		
<i>N</i>	= Knight	=		
<i>P</i>	= Pawn	=		

**Monitor mode:** Press    to enter monitor mode. You can now enter legal moves. Press  to start the computer working again. (F.5).

**Entering positions:** Press  to enter position mode. Now lifting of a piece deletes it (G.2). To add a piece press the piece key (once for White and twice for Black) and place the piece on the board (G.3). To clear the entire board press   (G.4). Press  or  and  for side to move (G.5).

**Chess problems:** Set problem level (see above or L.2) and press **ENT** to start mate search. If there is no solution you will see [ **no** ] in the display. To find alternative solutions do not make the key move on the board but press **CL** **↔** instead (L.3).

MEPHISTO is a registered trademark of HEGENER + GLASER AG, Munich.  
MEPHISTO computers may be rented out only with permission of the manufacturers.

This document does not constitute a description of goods. Details of the computer  
and its performance are subject to change without notice.

8540