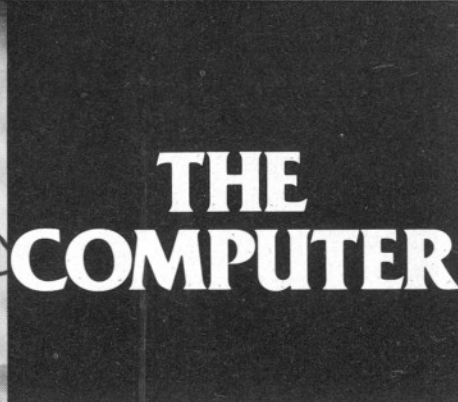


# PM CROWNS



Chess master Shelby Lyman moderates a game between computers Chess Challenger 10 and Boris in New York's famed Marshall Chess Club. The computers both put up furious fights and proved—like humans—a good computer never says die!



## THE COMPUTER



Electronic grandmasters go at it in 75-plus hours of grueling tournament play.

by Shelby Lyman



## CHESS CHAMP

**C**hess-playing computers fill department store showcases throughout the country, their arrays of buttons and glowing red readouts an intimidating sight. Just the thought of a computer that can play chess—that can “think”—seems almost unbelievable.

But play chess they do, and they can play a good game! Will you answer the challenge of man against computer? And, if so, which of the machines is for you? Each of them, in their advertisements, claims to be better than the others. What's the real story?

To find out, we took the four most widely available of these chess-playing think tanks—Boris (\$300 from Chafitz Inc.), Chess Challenger 10 (\$300 from Fidelity Electronics), CompuChess (\$180 from DataCash)

and Chess Champion (\$100 from JS&A)—and pitted them against each other in a real donnybrook of a round-robin chess tournament. We were looking not only for a winner, but for an insight into how these machines really are to play with.

Computers, like humans, think better when given more time. It was possible to have games that would go on literally for days. Instead, we chose to simulate a home environment and allow each machine no more than an average of one minute per move. It seems that our results justified our choice. After the tournament, we handicapped the stronger machines with shorter “think” times. They still defeated their weaker foes.

As shown at right, Boris and Chess

(Please turn to page 284)

	Chess Challenger 10	Boris	CompuChess II	Chess Champion
Chess Challenger 10		1, 1	1, 1	1, 1
Boris	0, 0		1, 1	1, 1
CompuChess II	0, 0	0, 0		1, 1
Chess Champion	0, 0	0, 0	0, 0	

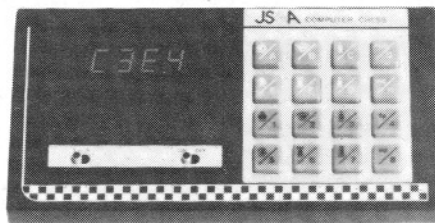
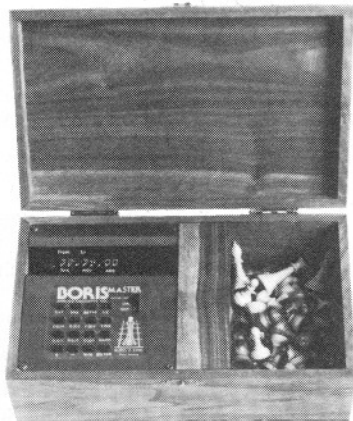
Final Standings: Chess Challenger 6, Boris 4, CompuChess II 2, Chess Champion 0.

This round-robin scorecard is used by cross-referencing the computer players. Note that Boris, for example, won both as White and Black against Chess Champion (1,1) and that Chess Champion lost both of the games it played against CompuChess (0,0). This type of scorecard is standard in many of the actual chess tournaments that are sponsored by the United States Chess Federation (USCF).



Chess Challenger 10 from Fidelity Electronics was declared the winner of the tourney.

Boris (below), from Chafitz, is most personable machine—besides playing a quite respectable game. He delivers some 80 programmed comments, from pleas to outrageous insults.



JS&A's Chess Champion retails at \$100, lowest price of units tested. Though it finished low, it's a fun computer for playing or learning chess.

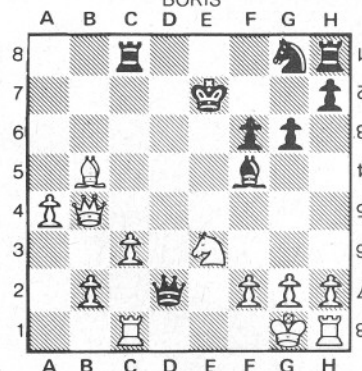


CompuChess, made by Data Cash Systems, can play different variations of chess as well as random middle-game situations.

## DANGER LURKS!

AFTER 24. a5-b4 ch

BORIS



CHES CHALLENGER  
WHAT IS BORIS'S  
ONLY PLAYABLE MOVE?

The following game is a sample of our tournament chess-computer games. The notational system we use is simple—in fact, much simpler than systems used in most chess books.

Each move is described by giving the initial and final square of the piece moved. And each square is described by obvious letter-and-number coordinates. For example, the first move in the game is given as E2-E4. The pawn on the second square, on the E file, moves two squares forward to the fourth square on that same file. Black's answer, D7-D5, similarly means that black's pawn, on the seventh square on the D file, moves two squares to the fifth square on that file.

The next move, E4-D5, represents a capture. The white pawn on the E4 square has gone to the D5 square where it has captured the black pawn. And so on . . .

You will find that the play is energetic and highly tactical. The machines go at each other in a virtual slugfest. But Chess Challenger wins a substantial advantage when it slyly traps Boris's queen. Then, with admirable aggressiveness, it switches to the kingside and mates black's king. Even on the fifth or sixth time around, I found the game fun to play over.

CHALLENGER	BORIS	CHALLENGER	BORIS
1. E2-E4	D7-D5	20. A7-A5ch	D8-E7
2. E4-D5	C7-C6??	21. F1-G1?	F8-H6
3. D5-C6	B8-C6	22. D2-F1	H6-C1
4. G1-F3	C6-D4 <sup>2</sup>	23. A1-C1	B8-C8 <sup>8</sup>
5. F3-D4	D8-D4	24. F1-E3	D6-D2 <sup>9</sup>
6. F1-E2	E7-E5	25. A5-B4ch <sup>10</sup>	E7-F7??
7. C2-C3	D4-E4	26. C1-D1!	D2-D1ch <sup>11</sup>
8. E1-F1? <sup>3</sup>	E4-C6 <sup>4</sup>	27. E3-D1	F5-C2
9. D2-D4	E5-D4	28. D1-E3	C2-F5
10. D1-D4	C8-E6	29. E3-F5	G6-F5
11. B1-D2	F7-F6	30. B5-D7	C8-C7
12. E2-H5ch	G7-G6	31. D7-F5	G8-E7
13. H5-F3	C6-A6ch	32. B4-B3ch	F7-G7
14. F3-E2	B7-B5	33. F5-C2	C7-C6 <sup>12</sup>
15. D4-D3!	A8-B8	34. B3-B4	H8-E8
16. A2-A4!	E6-F5	35. B4-G4ch	G7-H8
17. D3-E3ch	A6-E6	36. G4-H5!	E8-B8?? <sup>13</sup>
18. E2-B5ch	E8-D8	37. H5-H7	mate!
19. E3-A7 <sup>5</sup>	E6-D6 <sup>6</sup>		

1. Boris's characteristic opening gambit.
2. Moving piece again prematurely and thus wasting time.
3. Why not simply castle?
4. Wasting time. Why?
5. The right decision. White can safely take pieces.
6. To protect the threatened rook.
7. Why?
8. Why? A computer move that drives you bananas.
9. Poor Boris doesn't see what's coming.
10. Closing the net by protecting the pawn at B2.
11. What else? The queen is trapped.
12. Why?
13. Boris inexplicably saves the threatened rook, but overlooks the mate.



Challenger 10 were the standout players with Challenger winning the top honors. Just to be sure, we ran a series of games pitting Boris against Chess Challenger again. These scores were even more decisive: Chess Challenger won five out of six games and drew the last one.

Though considered "adult toys" the performance of these computers led us to have more than a grudging respect for them—and we're not alone. Several experts think that Chess Challenger 10 merits a U.S. Federation rating (playing at its Level III) of between 1150 and 1350—which means it could beat approximately 15 percent of America's 30,000 rated chess players. In my opinion, Chess Challenger 10 easily plays better than 90 percent of the

40 million Americans (excluding the tournament players) who know the chess moves.

Though the machines are often touted as challenging to even an experienced player, it is as teaching devices that they excel the most. Through a process of intimidation and punishment, these computers will often improve a human player's tactical ability—at least the novice player will have an opponent who is adept at seeing targets, making sharp attacking moves and defending against obvious "threats." Of course, the machines will make some bloopers but even the weakest of them may be a useful teacher.

I recall a year ago when the parents of a prodigal four-year-old boy bought him a CompuChess I (the

predecessor of the current model). The child, like most children, tended to concentrate on his own moves and overlook his opponent's threats. Though his chess aptitude was high, his practical playing strength needed development. CompuChess provided a good, stable opponent for him. Incidentally, the boy always insisted on another person being in the room with him whenever he played CompuChess!

One of my other chess students purchased a Chess Challenger III for his father (that game also ancestral to the one we tested). "In the beginning," the student told me, "my father had no offense. He made many mistakes and lost every game. But he quickly learned to coordinate his play, often using two or three pieces together in an attack. In two months he was able to win two out of ten games from the computer."

The student himself used his dad's computer: "Though I could beat it eight out of ten games," he explained, "I still enjoyed playing it and it really sharpened my game. I sometimes intentionally give up a few pieces to give it an advantage. You can improve your game by giving it such an advantage as will force you to be resourceful to beat it."

### Helping you choose your move

While all these computers have some similarities they also have many distinguishing characteristics. They are all easy to operate—if you want to move a pawn from D2 to D4 you simply key in D2D4 and hit *play* or *enter*. All of them can accomplish the chess moves of castling, pawn promotion and capturing *en passant*, although such moves are a shade harder to enter into CompuChess and Chess Champion than Boris or Chess Challenger.

Chess Champion has a large, easily read display, but will accept an illegal move if the human makes a mistake. This can lead to impossible game situations.

Chess Challenger and Boris will play either Black or White with equal facility—CompuChess can be made to play White, but only after an awkward session of keyboard entry. Chess Champion has no instructions given to play White.

All the computers have different levels of skill. Higher levels offer better games, but longer "think" times. CompuChess and Chess Challenger have ten levels. Chess Champion has six. Boris, however, is unique in that he has a timer. You

(Please turn to page 286)

### HOW CHESS COMPUTERS THINK

Teaching a computer to play chess—to many computer programmers—is more than a game. Many consider such research and development to be the first step toward realization of machine intelligence.

But it is still a long, uncertain road from machines such as Boris and Chess Challenger

chess computers have different levels of play and why the better-playing levels take longer to move. The more plies ahead the computer looks, the longer it takes to sort the possibilities. Also, we see why the giant computers can usually trounce the little home ones; they are often faster machines with giant memories.

As computers look ahead to evaluate a move they assign various scores to possible board positions. Obviously, a position that loses a knight will be assigned a lower score than one that wins a pawn. The trouble lies in the quiet areas—of deciding the score for controlling the center of the board, for centralizing the king in the end game, for literally dozens of situations where no pieces are lost or exchanged and yet there is a subtle shift in advantage.

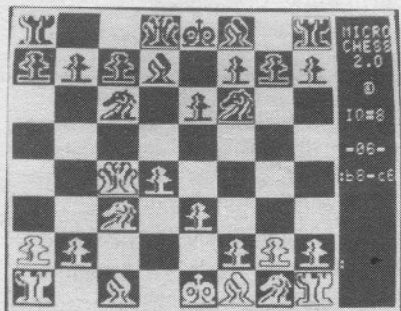
Many authorities agree now that human chess Masters look ahead only four moves in a normal game. Surprisingly, novice chess players also look ahead about the same amount. But a chess Master will tend to make the right move and a novice to foul up.

The answer seems to lie in something called pattern recognition. A chess Master has mental "snapshots" of the various board positions he may come up against. The right move springs to mind; he does not have to fumble. Unlike most chess computers, or novice humans, he quickly recognizes what to do.

Herein seems to lie the answer to programming a metallic world chess champion. Pattern recognition is a tough nut to crack and the best programmers in the world are trying.

Chess Challenger 10, our tourney winner, uses a very primitive form of pattern recognition in the openings. It has been programmed so that—for the first 10 moves or so—it just needs to "look up" the right move.

Future computers may take pattern recognition to the same heights as Bobby Fischer or Anatoly Karpov. Then again, they may not. One thing is sure, computer chess will stay in the forefront of programming and computer development. —Neil Shapiro



Home computers can get in on the action. This is the Apple II display of Personal Software's Microchess program also available for Pet and TRS-80 computers.

ger to *Star Wars* droids like C3PO and R2D2. Before we can make a machine think, we have to know how a human does it.

The game of chess is a prime example of how a computer can be far outclassed—right now—by an ordinary human. When the idea to program a chess-playing computer was first pursued it seemed a deceptively simple chore. Just have the computer evaluate all the possible board positions and pick the best one.

As it turns out, there are so many different board positions that even the fastest, most modern of computers would take a programmer's lifetime to search through them all. Obviously, a way had to be found to cut down the search to a manageable level.

One way, still the way that computers such as Boris and Challenger do it, is to only look a few *plies* ahead (a move being one *ply* or piece moved by Black and another ply by White). So, we can now see why these home

## USE THE SUN TO HEAT YOUR POOL

(Continued from page 138)

tice run. Many dealers not only can call on their own experience, but also have access to computer-stored data of thousands of other installations. Fafco and Grumman distributors, for instance, will feed pool size, shading, climate, desired pool temperatures, length of swimming season, etc. to their computers. The printout reveals feasibility, optimum system design, panel area required and estimated dollar savings over conventional fuels.

A contractor-installed system also means you'll have someone to turn to if the system develops problems. Should you decide to have the work done, get as many references as possible—and check them out. Read the warranty carefully. Some warranties may extend 10 to 15 years—but not cover much except part replacement on a prorated basis. Other warranties, such as the one from Grumman for five years, not only cover materials and workmanship, but also the costs for part removal, reinstallation, labor and shipping.

If you decide to attempt the job yourself, ask to see the installation manual before you buy. Is it clearly written, with easy-to-follow illustrations? I found Fafco and Solex manuals easy to follow.

A 32-page booklet entitled *Solar Pool Heaters and Other Ways to Cut Your Pool Heating Bills*, is a worthwhile investment for the do-it-yourselfer. It's \$2 from Horizon Industries, 12606 Burton St., North Hollywood, Calif. 91605. **PM**

### MANUFACTURER'S LIST

Ac-cello Products, Inc., 30 Alabama Ave., Island Park, N.Y., 11558; Thermo/globes (plastic-ball pool covering)  
 Andray Products, Inc., 23 Centerway, East Orange, N.J., 07017; solar pool cover  
 Bio-energy Systems, Inc., Mountindale Rd., Spring Glen, N.Y., 12483; SolaRoll extrusions, solar pool heating systems  
 Fafco Solar, 235 Constitution Drive, Menlo Park, Calif., 94025; active solar pool heating system  
 Grumman Energy Systems, Inc., 4175 Veterans Memorial Highway, Ronkonkoma, N.Y., 11779; active solar pool heating system  
 Helirotrope General, 3733 Kenora Dr., Spring Valley, Calif., 92077; solar pool electronic control, automatic valve  
 Löf Bros. Solar Appliances, Inc., 1615 Seventeenth St., Denver Colo., 80202, solar pool cover  
 Sealed Air Corp., 2015 Saybrook Ave., Commerce, Calif., 90040; solar pool cover and active solar pool heating system  
 Solar Industries, Inc., Monmouth Airport Industrial Park, Farmingdale, N.J. 07727; solar pool heating system  
 Solex Solar Energy Systems, 187 Billerica Rd., Chelmsford, Mass., 01824; solar pool heating system

## BINOCULARS



**OUR BEST  
SELLER!**

**ONLY  
\$69.95**

**from EDMUND  
SCIENTIFIC**

Bright, clear images...that's what you can expect from these 7 x 50 binoculars. Great for boating, hunting & stadium sports. Fully coated optics, center focusing, neck strap, carry case and a wide 372' field of view at 1000 yards! Backed by our 30-day, money-back guarantee!

© 1979 Edmund Scientific Co.

Ad No. 129



**EDMUND SCIENTIFIC CO.**

Dept. H-10, Edscorp Bldg. Barrington, N.J. 08007

☐ **YES!** Please send me \_\_\_\_\_ 7 x 50 Binoculars priced at \$69.95 each plus \$1.00 service and handling charge. (N.J. residents add 5% state sales tax.)

Enclosed is my ☐ Check ☐ M.O. \$ \_\_\_\_\_

Please charge my ☐ Am. Exp. ☐ Visa ☐ MC

Card No. \_\_\_\_\_

Interbank No. \_\_\_\_\_ Date \_\_\_\_\_

Signature \_\_\_\_\_

Name (print) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

## MAKE EXTRA CASH IN SPARE TIME



**New, All-Gear  
MAGNATRAC**

**Popular,  
Low-  
Cost  
Mini-  
Dozer**

More efficient dozer power and high maneuverability for larger gardens, snow removal, complete landscape projects. Up to 16 hp. Over 30 attachments incl. all garden tools, dozer blade, hydraulic loader. Factory direct savings. Unique, popular, **EASILY ASSEMBLED KIT.** Odd job and resale opportunities are great. Send now, to:

**STRUCK KIT, Dept. PM59 Cedarburg, Wis. 53012**

☐ Catalog showing Crawler Tractor Kit construction & uses (specify Magnatrac or Mini-Dozer) — 50¢. Both Catalogs — 75¢.

☐ Plans for fabricating a Crawler Tractor Kit from local materials (specify Magnatrac or Mini-Dozer) — \$7.00. Both Plans — \$10.00 (refunded on any purchase).

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY, STATE, ZIP \_\_\_\_\_

(DEALER INQUIRIES INVITED)

## COMPUTER CHESS CHAMP

(Continued from page 285)

can play Boris at a wide range of levels by setting his timer from one second to one hundred hours. (There is also a \$400 Boris which runs off rechargeable batteries and has a memory to recall games.)

CompuChess has a special feature called "Survival." The machine will randomly select one out of 1500 possible middle-game positions and play it at whichever level the human asks for with the White pieces.

Boris is especially flexible and easy to use for position verification and position modification because of its "rank display" feature. It will actually show you little pictures of the chessmen and where each is supposed to be on the board.

And let's not forget that, of them all, Chess Challenger is the most gentlemanly opponent. When it is your move he will notify you with a pleasant bleeping sound.

### But is it a buddy?

Many humans, myself included, seem to vacillate between calling one of these machines "he" or "it." You tend to assign human characteristics to the machine—after all, it is your playing partner.

By naming their machine Boris (after a programmer's puppy, we are told), its manufacturer is obviously capitalizing on this human tendency to personify a machine. Boris also talks to you—by displaying about 80 remarks, ranging from "Hooray" and "Ready to resign?" to "I need help" and "Ah, ruthless!"

Human responses to these remarks vary. Some find them delightful, others a nuisance after a few dozen games.

One seven-year-old came to me after bearing the brunt of several jibes by Boris and lamented that "Boris doesn't like me!"

There will be rapid developments in these games and—as programs change and are redeveloped—today's losers may be tomorrow's champs. In fact, new versions of these machines may be offered soon.

One thing for sure—it will be a very long time indeed before any of them can hope to match the play of a human world champion (though one manufacturer's ads imply just that outrageous possibility). What they offer you is entertaining and instructive chess. And, though they may forget themselves and beat you on some occasions (when you have set the play level too high), they can be trusted to keep the distasteful record of your losses a confidential secret! **PM**