performance on the Bench #2 program is mostly a result of the screen handling.

According to Phoenix, the Pfaster-286 has better control of the monochrome screen than the color screen used in these tests. Undoubtedly, even the color performance will be enhanced as the product is more fully developed.

The Pfaster-286 lets you switch between the 80286 microprocessor and the 8088 native to your system using a pair of software programs. You'll probably only want to switch to the slower speed when uncooperative programs look directly at the system clock to time their processing.

The version of the Pfaster-286 that was tested crashed during execution of the *dBASE II* routines in Benchmark Test #4 and thus could not run that benchmark. According to the manufacturer, the problem is a hardware incompatibility between *dBASE II* and the 80286 microprocessor. A hardware modification is being made (and should be complete by the time this story is published) to the Pfaster-286 card to overcome this shortcoming.

Although the benchmark performance of the early version of the Pfaster-286 that was tested suffered from its below-par I/O interfacing, the board will give any PC system a manifold performance improvement. For instance, when the Bench #3 test was run from a VDISK in extended memory, the time fell to 1:32 from the 4:55 scored on floppy disks. That's an impressive speed increase over an IBM PC.

Applied Reasoning Corporation's PC-elevATor

Although still on its shakedown cruise, the PC-elevATor proved to be a very speedy and promising product. Indeed, the 8-MHz 80286 tandem processor can turn your PC into a formidable information processor. Its performance score of 9.1 times faster than the PC was equaled only by the Phoenix Pfaster-286 and beat only by an experimental supersibling from Applied Reasoning loaded with 10-MHz hardware that gave a 16.5 score. (Unfortunately, the availability of that superfast board depends on the supply of high-speed chips from Intel, so it does not figure in the official results.)

The PC-elevATor uses its own, on-board 16-bit memory. Enough space is allowed on the card for four 18-chip banks—in fact, enough space to stuff 2 megabytes of 256K-bit chips on a single card. According to Applied Reasoning, the PC-elevATor supports the 80286 extended memory and will run VDISK there. A socket is also provided for an 80287 numeric coprocessor.

For this board, hardware installation involves nothing more than slicing the PC-elevATor into any full-length expansion slot. However, it should be noted that the early version of the PC-elevATor's installation software was somewhat troublesome. According to the manufacturer, a new menu-driven version is planned soon that will include special provisions for installing the PC-elevATor in conjunction with nonstandard hardware.

Unlike early runs of many personal computer products, the PC-elevATor accelerator board has no hardware patches. Overall, the accompanying software too appears well thought out. The card's screen handling is superb. It kicked throughput up on the color monitor used in the test system without showing any flicker, tears, or jumps.

At the time of this review, several bugs still scampered through the supplied software, however. The most irksome problem I encountered while reviewing the product prevented me from running the prime-number test. Applied Reasoning's PC-elevATor failed to understand a software interrupt issued by compiled BASIC. According to the manufacturer, this prob-

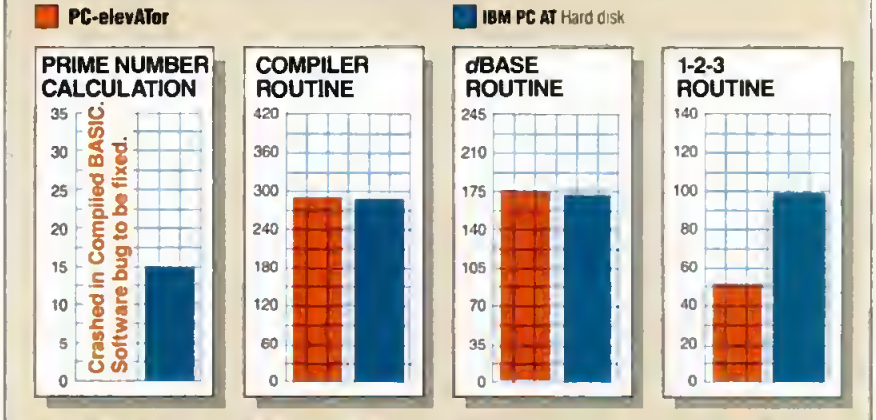
PC FACT FILE

PC-elevATor
Applied Reasoning Corporation
765 Concord St.
Cambridge, MA 02138
(617) 492-0700
List Price: ½-megabyte board, $1,695; 1-megabyte board, $1,995; 2-megabyte board, $2,495
Microprocessor: 80286
Clock Speed: 8 MHz

CIRCLE 669 ON READER SERVICE CARD

PC BENCHMARK

PC-elevATor (Applied Reasoning)



Benchmark Test #2 measures the speed at which the computer can find all the prime numbers between 1 and 50. The table shows the results compared with those of the IBM PC AT.

Benchmark Test #3 assesses the speed of program development in the microprocessor and RAM by way of a two-step, self-timing DOS batch file using the IBM Personal Computer Linker program. Stage 1 takes a 341-line assembly code file (.ASM), converts it to binary code, and link-edits it with other binary files to make an executable (.EXE) file. Stage 2 compiles and links source code to resolve address references and make an executable file.

Benchmark Test #4 for database applications assesses how quickly the machine reads and writes to disk by performing a series of disk-intensive *dBASE II*, Version 2.41 tasks. The self-timing DOS batch file runs a total of six *dBASE* routines on 81 individual database records consisting of 154 bytes each: sorting on a database file (.DBF), indexing on two of the 13 data fields in each record, copying to a temporary database file, setting two indexes on a database file and appending a record, deleting a record, and packing (or removing the data hole from) the file.

Benchmark Test #5 for spreadsheet applications assesses the computational speed and RAM management capabilities of the machine by using a *1-2-3* macro that performs a series of both global and individual worksheet tasks. The macro calculates 500 results, copies 1,000 cells, moves 1,000 cells, deletes 1,000 cells, makes total recalculations of 500 results, and then clears the spreadsheet.

High-Performance Computer Features

Manufacturer	Model	Category	Microprocessor	Clock speed	Ports	Expansion slots
ITT	ITTxtra XP	desktop	80286	6 MHz	1 RS-232 1 parallel 2 COM	5 8-bit 0 16-bit
COMPAQ	Deskpro 286	desktop	80286	8 & 6 MHz	1 RS-232 1 parallel 2 COM	2 8-bit 6 16-bit
COMPAQ	Portable 286	portable	80286	8 & 6 MHz	1 RS-232 1 parallel 2 COM	2 8-bit 6 16-bit
Kaypro	Kaypro 286i	desktop	80286	6 MHz	1 RS-232 2 parallel 4 COM	2 8-bit 6 16-bit
Gulfstream	Professional Computer 88	desktop	8088	4.77 MHz	2 RS-232 1 parallel 4 COM	8 8-bit 0 16-bit
AT&T	AT&T PC 6300	desktop	80286	8 MHz	1 RS-232 1 parallel 2 COM	7 8-bit 0 16-bit
Gulfstream	Professional Computer 286	desktop	80286	8 MHz	0 RS-232 2 parallel 4 COM	8 8-bit 0 16-bit

Turbo Board Features

Manufacturer	Product	Category	Microprocessor	Clock speed	On-card memory: Bus width	On-card memory: Memory chip spaces
Quadram	Quadsprint	replacement	8086	10 MHz	N/A	N/A
Kamerman Labs	Superflight	replacement	8086	10 MHz	16	10*
Orchid	PCturbo 186	tandem	80186	8 MHz	16	36*
Wave Mate	Bullet-286	system board	80286	6 MHz	16	36
Phoenix Computer	Pfaster-286	tandem	80286	8 MHz	16	72*
Applied Reasoning	PC-elevATor	tandem	80286	8 MHz	16	72

*Additional expansion possible through daughterboard.

lem can be repaired with a software modification that newer versions of the product will incorporate.

Conclusion

Any of the performance-enhancing systems examined here will make your old PC's heart throb faster. Which is the best accelerator board? If you are looking for ease of installation and the lowest cost solution, the Quadram Quadsprint would be the best choice for you. Similarly, the easy-to-use yet much faster Wave Mate Bullet-286 is only slightly harder to install and slightly more expensive. On the other hand, if you are on good terms with your personal computer, if you know the intimate details of its life, if you are willing to do more work for its utmost performance, either the Applied Reasoning PC-elevATor or the Phoenix Pfaster-286 will deliver. The best compromise between ease of use and performance gained is offered by the Orchid PCturbo 186. The best turbo board, ultimately, is one that best matches your particular needs. ■