

Software Tools

FOR THE PROFESSIONAL PROGRAMMER

STRIKINGLY STRUCTURED

Structured code
in Pascal,
Modula-2, Ada

The Great CRC
Mystery: Solved

Where to Find
Public-Domain
Ada Software

Data Abstraction
with Modula-2

A Shell for MS DOS

Anna Gimpel
Gimpel Software AAA
3207 Hogarth Lane
Collegeville, PA 19426



38351 16562

SAVE OVER 30% ON OUR GIFT PACKS!
60-DAY MONEY-BACK GUARANTEE

How Borland's Three New Holiday Packs Will Fill Your Stocking Without Emptying Your Piggybank.

Three special packs with dazzling discounts that will help get you into a Holiday mood. You can get some of Turbo, most of Turbo, or all of Turbo—including the two newest members of the Turbo family, Turbo GameWorks™ and Turbo Editor Toolbox™. You also get our unmatched 60-day money-back guarantee, quality products that aren't copy-protected.

TURBO NEW PACK \$95.00.

You get the two exciting new members of the Turbo Pascal family.

- TURBO GAMEWORKS, Chess, Bridge, and Go-Moku, complete with source code and a 200-page manual.
- TURBO EDITOR TOOLBOX, all the building blocks to make your own editors and word processors, complete with source code and a 200-page manual.

TURBO HOLIDAY PACK \$125.00.

You get all three of the Turbo family classics for only \$125.00 (about a 30% discount). Turbo Pascal 3.0 and Turbo Tutor and Turbo Data-Base Toolbox—all for just \$125.00.

- TURBO PASCAL combines the fastest Pascal compiler with an integrated development environment.
- TURBO TUTOR teaches you step-by-step how to use Turbo Pascal with commented source code for all program examples on diskette.
- TURBO DATABASE TOOLBOX offers three problem-solving modules for your Turbo Pascal programs: Turbo Access, Turbo Sort, and GINST, which generates a ready-to-run installation program that lets you forget about adapting your software to specific terminals.

TURBO HOLIDAY JUMBO PACK \$245.00.

This is it—the whole thing, the entire Turbo family including its two newest members. You get:

- Turbo Pascal
- Turbo Tutor
- Turbo GameWorks
- Turbo Graphix Toolbox
- Turbo DataBase Toolbox
- Turbo Editor Toolbox

and you pay only \$245.00 for all six! Which means that you're getting everything at only about \$40 a piece. Quite a holiday deal. (And if you already own one or several members of the Turbo family, be creative—nothing can stop you from buying the Jumbo Pack, picking out the ones you already have and giving the rest as holiday gifts to family and friends. At these prices you can afford to give to others and to yourself.) Speaking of Holidays, this offer lasts until March 31, 1986. (At Borland, we like to make the Holidays last.)



4585 SCOTTS VALLEY DRIVE, SCOTTS VALLEY, CA 95066 PHONE (408) 438-8400 TELEX 172373

Copyright 1985 Borland International BI-1017B

Turbo Pascal and Turbo Tutor are registered trademarks and Turbo DataBase Toolbox, Turbo Graphix Toolbox, Turbo Editor Toolbox, Turbo GameWorks, and MicroStar are trademarks of Borland International, Inc. WordStar is a trademark of MicroPro International Corp. Multi-Mate is a trademark of Multimate International Corp. Microsoft is a registered trademark and Word is a trademark of Microsoft Corp. WordPerfect is a trademark of Satellite Software International.



NEW! TURBO GAMEWORKS \$69.95.

Our new Turbo GameWorks offers games you can play and replay without Turbo Pascal or revise and rewrite with Turbo Pascal 3.0. We give you the source code, the manual, the diskettes and the competitive edge. Chess, Bridge and Go-Moku. State-of-the-art games that let you be player, referee, and rules committee all at once because you have the Turbo Pascal source code. Learn exactly how the games are made—so you can go off and make your own. And Turbo GameWorks is the only quality game you can buy that is not copy-protected. Sold separately, only \$69.95. (Just \$47.50 if you buy the Turbo New Pack.)

NEW! TURBO EDITOR TOOLBOX \$69.95.

Build your own word processor—for only \$69.95! You get ready-to-compile source code, a full-featured WordStar™-like word processor, and a 200-page manual that tells you how to integrate the editor procedures and functions into your programs. With Turbo Editor Toolbox, you can have the best of all word processors. You can make WordStar behave like Multi-Mate. Support windows just like Microsoft's Word. And do it as fast as WordPerfect does it. Incorporate your new "hybrids" into your programs to achieve incredible control and power. Sold separately, only \$69.95. (If you buy the Turbo New Pack, the price drops to just \$47.50.)

Holiday Gift Packs, Turbo GameWorks™ & Turbo Editor Toolbox™

NOT COPY-PROTECTED

Available at better dealers nationwide. Call (800) 556-2283 for the dealer nearest you. To order by Credit Card call (800) 255-8008, CA (800) 742-1133.

Make checks payable to: Borland International.

The holiday packs include an upgrade coupon for both options so you get BCD and 8087 support for \$39.95 (regularly \$55.00).

Carefully describe your computer system!

Mine is: 8-bit 16-bit
I use: PC-DOS MS-DOS
 CP/M-80 CP/M-86

My computer's name and model is: _____

The disk size I use is: 3 1/2" 5 1/4" 8"

Name: _____
Shipping Address: _____
City: _____
State: _____ Zip: _____
Telephone: _____

*Gift Pack
Offers Last
Until March 31,
1986

	Quantity
* Turbo Holiday Jumbo Pack	\$245.00
* Turbo Holiday Pack	\$125.00
* Turbo New Pack	\$95.00
Pascal	\$109.90
Pascal w/8087	\$109.90
Pascal w/BCD	\$124.95
Pascal w/8087 and BCD	\$54.95
Turbo DataBase	\$34.95
Turbo Graphix	\$69.95
Turbo Tutor	\$69.95
Turbo Editor	\$69.95
Turbo GameWorks	\$69.95

These prices include shipping to all U.S. cities. All foreign orders add \$10 per product ordered.

Amount: (CA add 6% tax) _____

Payment: VISA MC Check Bank Draft

Credit Card Expiration Date: _____ / _____

Card # _____

NOTE: Turbo Editor Toolbox and Turbo GameWorks are available for the IBM PC and true-compatibles using Turbo Pascal 3.0 ONLY.

COD's and Purchase Orders will not be accepted by Borland International. California residents: add 6% sales tax. Outside USA: add \$10 and make payment by bank draft, payable in U.S. dollars drawn on a U.S. bank.

Software Tools

FOR THE PROFESSIONAL PROGRAMMER

PARALLEL PROCESSING

Concurrency and
Turbo Pascal

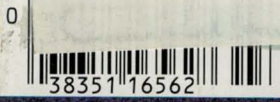
What makes
DOS fast?

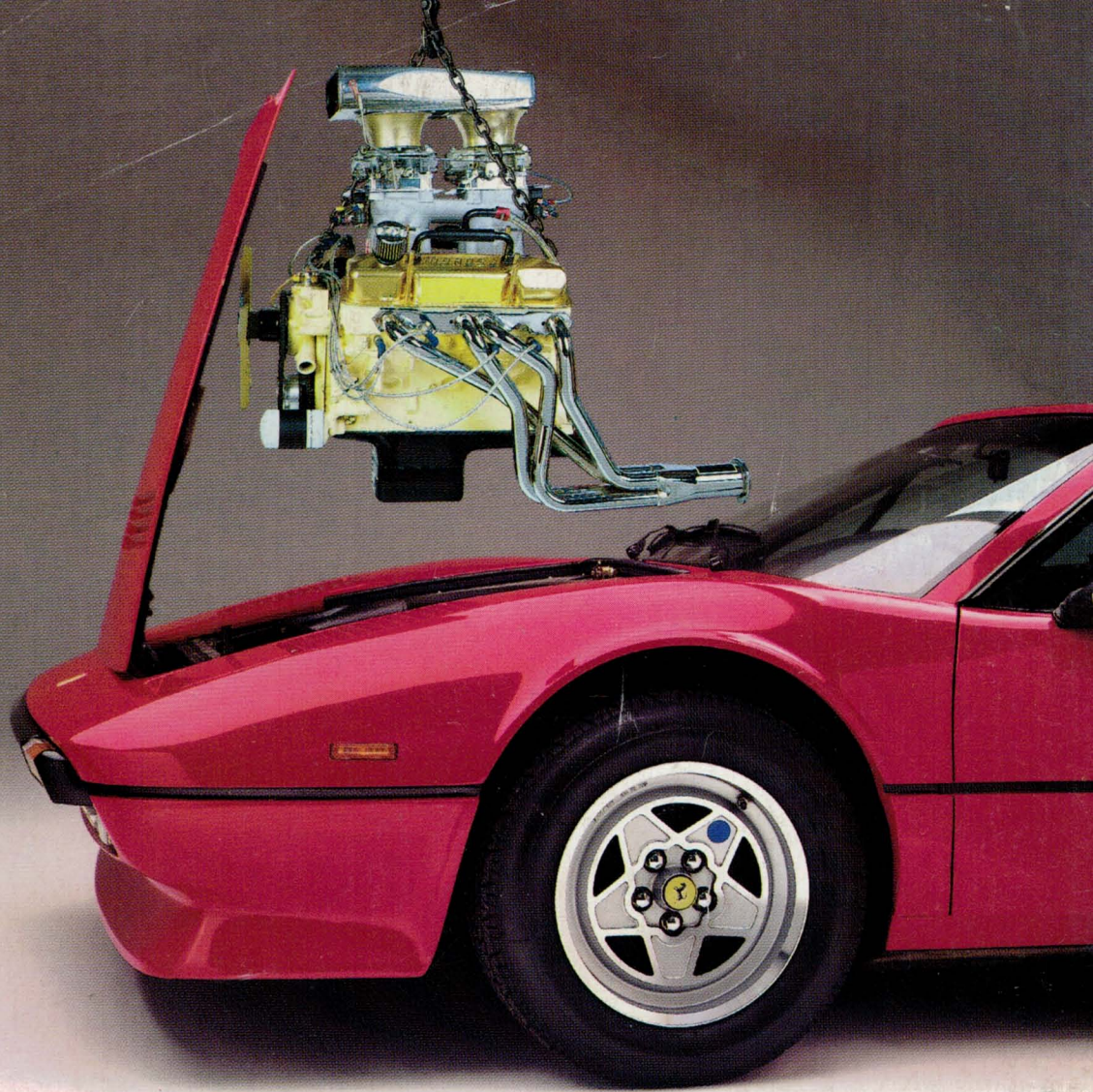
Minimizing arbitrary
functions

MC68000 vs. NS32000



Anna Gimpel
Gimpel Software AAA
3207 Hogarth Lane
Columbia, MO 6426





AT™ Pfantasies for your PC or XT.™

Want better speed and memory on your PC or XT without buying an AT?

You've got it!

Phoenix's new Pfaster™286 co-processor board turns your PC or XT into a high-speed engine 60 percent faster than an AT. Three times faster than an XT. It even supports PCs with third-party hard disks. But that's only the beginning.

You can handle spreadsheets and programs you never thought possible. Set up RAM disks in both 8088 and 80286 memory for linkage editor overlays or super-high-speed disk caching. All with Pfaster286's 1mb of standard RAM, expandable to 2mb, and dual-mode design.

You can develop 8086/186/286 software on your XT faster. Execute 95 percent of the application packages that run on the AT, excluding those that require fancy I/O capabilities your PC or XT hardware just isn't designed to handle. Queue multi-copy, multi-format print jobs for spooling. Or, switch to native 8088 mode to handle



hardware-dependent programs and back again without rebooting. All with Pfaster286's compatible ROM software. And, Pfaster286 does the job unintrusively! No motherboard to exchange. No wires to solder. No chips to pull. Just plug it into a standard card slot, and type the magic word, "PFAST."

If you really didn't want an AT in the first place, just what it could do for you, call or write: Phoenix Computer Products Corp., 320 Norwood Park South, Norwood, MA 02062; (800) 344-7200. In Massachusetts, 617-762-5030.

Programmers' Pfantasies™
by

Phoenix

XT and AT are trademarks of International Business Machines Corporation. Pfaster286 and Programmers' Pfantasies are trademarks of Phoenix Computer Products Corporation. For the Ferrari aficionado: yes, we know this is a rear engine car. We are showing the addition of a second engine to symbolize how Pfaster can be added to your PC or XT to increase performance.

Circle no. 91 on reader service card.

Software Tools

FOR THE PROFESSIONAL PROGRAMMER

SOFTWARE DESIGN FROM THE OUTSIDE IN

Dan Bricklin's
DEMO Program

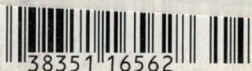
Cryptographer's
Toolbox

EGA Graphics &
Fast PC Graphics

How to Write Memory-
Resident Code



Anna Gimpel
Gimpel Software AAA
3207 Hogarth Lane
Collegeville, PA 19426



HAUPPAUGE

Is Getting A Fast Reputation.



HAUPPAUGE started earning a fast reputation with their 87 Math Pak, the combination of an 87 chip and 87 Software Pak that's been accelerating PC math since 1982.

Next came their racy 287 FAST/5, a math coprocessor module with its own 5MHz clock, speeding up PC/AT math by 25%. (Pictured above.)

Now, Hauppauge Unveils the 287 FAST/8A...

Our newest math coprocessor for the PC/AT, the 287 FAST/8A moves out at 8MHz—doubling the speed of each floating point math operation. The FAST/8A accelerates AutoCad, 1-2-3, Symphony, Turbo Pascal, Framework and more. The FAST/8A also runs in PC/AT compatibles including the Compaq Deskpro 286, Sperry PC/IT and TI Business-Pro computers.

...And the 87 Software Pak Version 6.0

Designed to steal the heart of programmers, the 87 Software Pak supports IBM's BASIC Compiler 1.0 and 2.0, and Microsoft's QuickBASIC, executing math-intensive programs up to 20 times faster! The 87 Software Pak also performs FFT's and Matrix operations. For example, a PC (or PC/XT) with an 87 Chip and 87 Software Pak can perform a 512-point complex FFT in just 1.1 seconds. What's more, a PC/AT with a FAST/8A inverts a 25 by 25 element matrix in under 1 second.

Circle no. 274 on reader service card.

HAUPPAUGE Math Coprocessors

287 FAST/8A 8MHz math coprocessor for PC/AT and compatibles....\$379

287 FAST/5 5MHz math coprocessor for PC/AT and compatibles.....\$249

287 Chip PC/AT math coprocessor—runs at 4MHz in PC/AT.....\$219

87 Chip Math coprocessor for IBM

PC, PC/XT and compatibles\$129

87-2 Chip Math coprocessor for 8MHz PC compatibles...\$195

HAUPPAUGE Math Coprocessor Paks

87 Math Pak V.6.0 87 chip and math coprocessor software support for IBM BASIC Compiler 1.0, 2.0 and Microsoft's QuickBASIC. Plus, Matrix and FFT support, one year of free updates, complete source code and "8087 Applications and Programming"\$279

87 Software Pak V.6.0 Math coprocessor software support as in the 87 Math Pak, but without 87 chip.....\$180

With any Hauppauge math coprocessor\$150

Recalc + Math coprocessor support for 1-2-3 version 1A ..\$ 95.

With any Hauppauge math coprocessor\$ 49

HFT + Complete Hayes Fourier Transform Package\$125

With any Hauppauge math coprocessor\$ 79

The 287 FAST/8 Doubles Your PC/AT's Math Speed!

Help your PC/AT get a fast reputation with Hauppauge's new 287 FAST/8A. Call today, or contact your local computer dealer to learn more about Hauppauge's racy product line. And ask for "87 Q & A," our free booklet on math coprocessors.

Hauppauge Computer Works, Inc.

358 Veterans Memorial Highway, Suite MSI,
Commack, New York, USA 11725 • 516-360-3827

Available at your local computer dealer

Hauppauge

(Pronounced "Ha-pog")

Dr. Dobb's Journal of

#116 JUNE 1986
\$2.95 (3.95 CANADA)

Software Tools

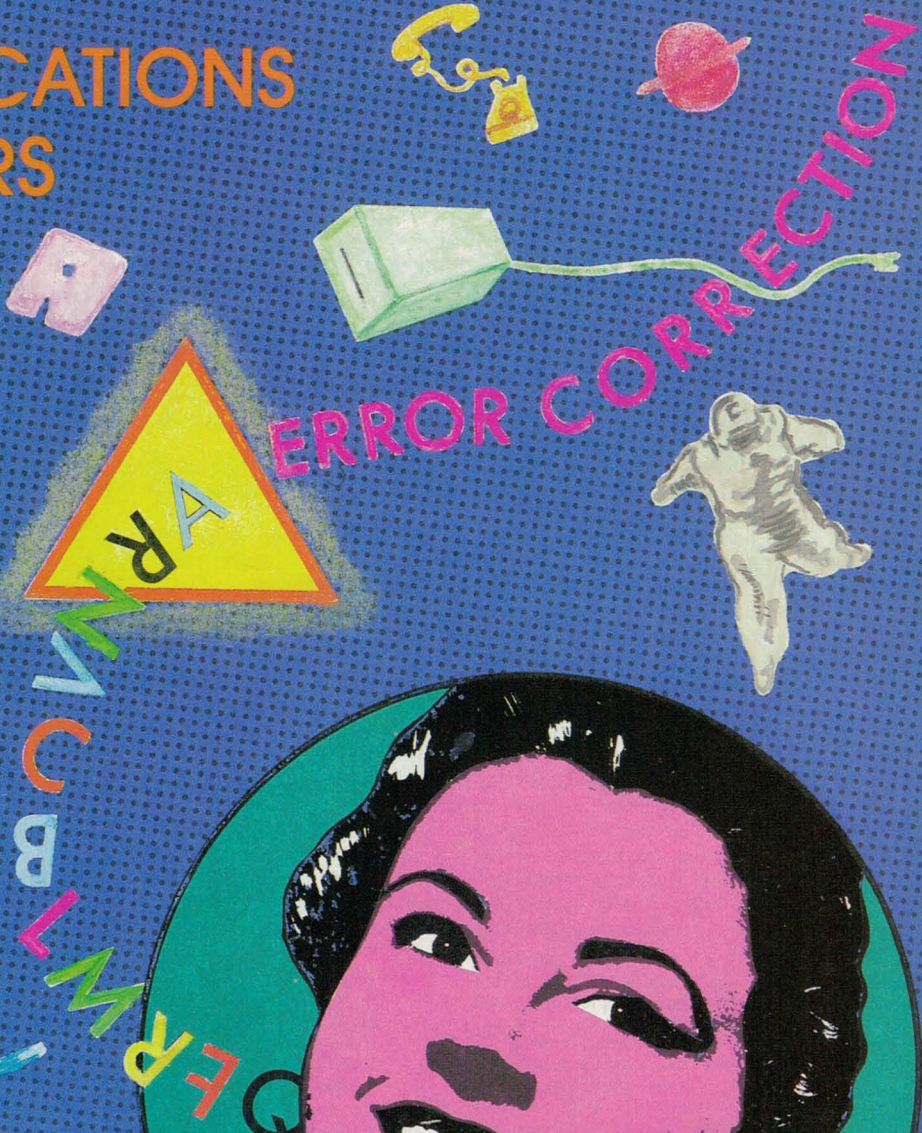
FOR THE PROFESSIONAL PROGRAMMER

TELECOMMUNICATIONS WITHOUT ERRORS

General-Purpose
Sorting

Review: Jef Raskin's
SwyftCard

Structured
Programming



A

ERROR

N

C

B

T

M

W

L

R

Q

DD 080540CERG51869 NOV86
 GEORGE B CZERW 3 DIR
 518 A WILLOW TURN AKM
 MT LAUREL NJ 08054



HAUPPAUGE

Is Getting A Fast Reputation.



HAUPPAUGE started earning a fast reputation with their 87 Math Pak, the combination of an 87 chip and 87 Software Pak that's been accelerating PC math since 1982.

Next came their racy 287 FAST/5, a math coprocessor module with its own 5MHz clock, speeding up PC/AT math by 25%. (Pictured above.)

Now, Hauppauge Unveils the 287 FAST/8A...

Our newest math coprocessor for the PC/AT, the 287 FAST/8A moves out at 8MHz—doubling the speed of each floating point math operation. The FAST/8A accelerates AutoCad, 1-2-3, Symphony, Turbo Pascal, Framework and more. The FAST/8A also runs in PC/AT compatibles including the Compaq Deskpro 286, Sperry PC/IT and TI Business-Pro computers.

...And the 87 Software Pak Version 6.0

Designed to steal the heart of programmers, the 87 Software Pak supports IBM's BASIC Compiler 1.0 and 2.0, and Microsoft's QuickBASIC, executing math-intensive programs up to 20 times faster! The 87 Software Pak also performs FFT's and Matrix operations. For example, a PC (or PC/XT) with an 87 Chip and 87 Software Pak can perform a 512-point complex FFT in just 1.1 seconds. What's more, a PC/AT with a FAST/8A inverts a 25 by 25 element matrix in under 1 second.

Circle no. 274 on reader service card.

HAUPPAUGE Math Coprocessors

287 FAST/8A 8MHz math coprocessor for PC/AT and compatibles....\$379

287 FAST/5 5MHz math coprocessor for PC/AT and compatibles.....\$249

287 Chip PC/AT math coprocessor—runs at 4MHz in PC/AT.....\$219

87 Chip Math coprocessor for IBM

PC, PC/XT and compatibles\$129

87-2 Chip Math coprocessor for 8MHz PC compatibles...\$195

HAUPPAUGE Math Coprocessor Paks

87 Math Pak V.6.0 87 chip and math coprocessor software support for IBM BASIC Compiler 1.0, 2.0 and Microsoft's QuickBASIC. Plus, Matrix and FFT support, one year of free updates, complete source code and "8087 Applications and Programming"\$279

87 Software Pak V.6.0 Math coprocessor software support as in the 87 Math Pak, but without 87 chip.....\$180

With any Hauppauge math coprocessor\$150

Recalc + Math coprocessor support for 1-2-3 version 1A ..\$ 95.

With any Hauppauge math coprocessor\$ 49

HFT + Complete Hayes Fourier Transform Package\$125

With any Hauppauge math coprocessor\$ 79

The 287 FAST/8 Doubles Your PC/AT's Math Speed!

Help your PC/AT get a fast reputation with Hauppauge's new 287 FAST/8A. Call today, or contact your local computer dealer to learn more about Hauppauge's racy product line. And ask for "87 Q & A," our free booklet on math coprocessors.

Hauppauge Computer Works, Inc.

358 Veterans Memorial Highway, Suite MSI,
Commack, New York, USA 11725 • 516-360-3827

Available at your local computer dealer

Hauppauge

(Pronounced "Ha-pog")

Software Tools

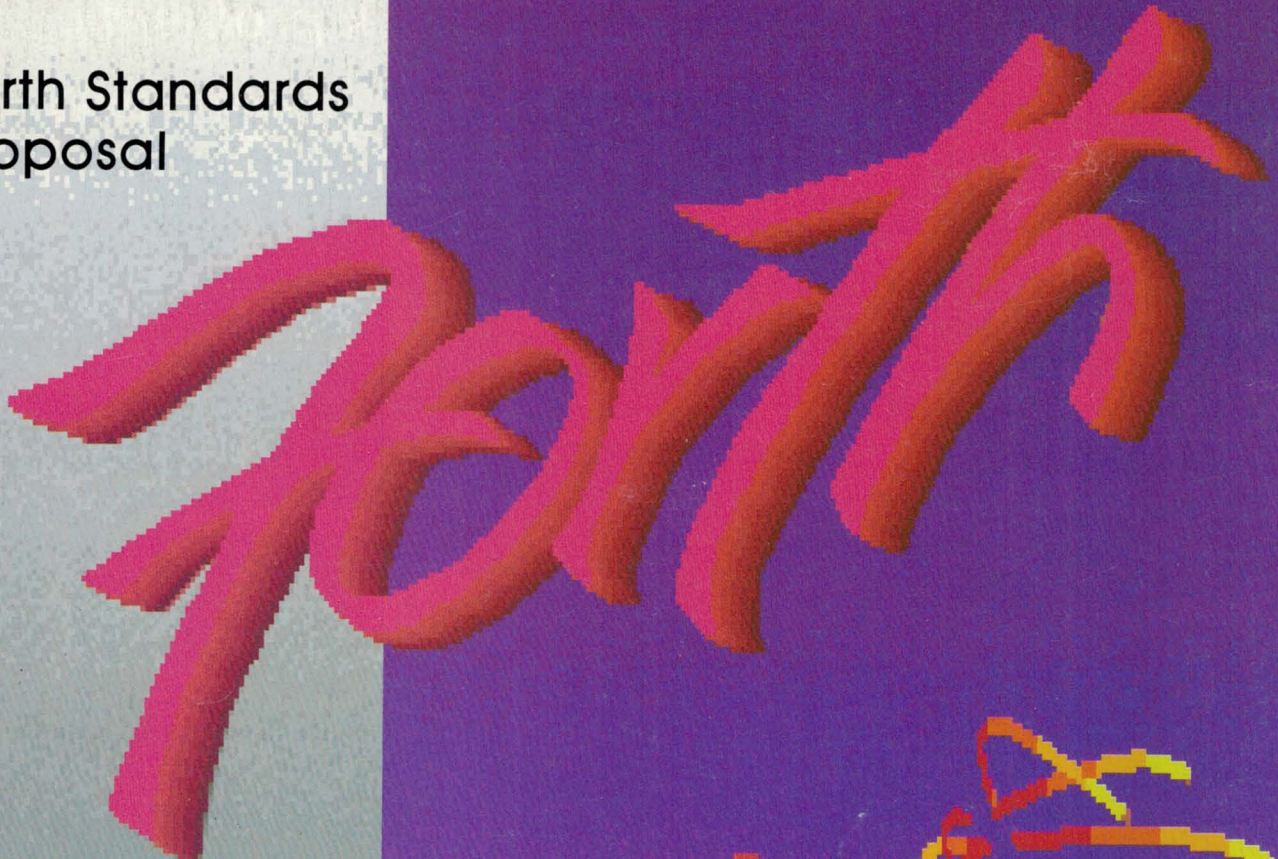
FOR THE PROFESSIONAL PROGRAMMER

Forth Standards
Proposal

Forth in a Bottle

Forth & Extended
Memory

Forth Structured
Programming



Anna Gimpe
el Software AAA
parth Lane
le, PA 19426

HAUPPAUGE

Is Getting A Fast Reputation.



HAUPPAUGE started earning a fast reputation with their 87 Math Pak, the combination of an 87 chip and 87 Software Pak that's been accelerating PC math since 1982.

Next came their racy 287 FAST/5, a math coprocessor module with its own 5MHz clock, speeding up PC/AT math by 25%. (Pictured above.)

Now, Hauppauge Unveils the 287 FAST/8A...

Our newest math coprocessor for the PC/AT, the 287 FAST/8A moves out at 8MHz—doubling the speed of each floating point math operation. The FAST/8A accelerates AutoCad, 1-2-3, Symphony, Turbo Pascal, Framework and more. The FAST/8A also runs in PC/AT compatibles including the Compaq Deskpro 286, Sperry PC/IT and TI Business-Pro computers.

...And the 87 Software Pak Version 6.0

Designed to steal the heart of programmers, the 87 Software Pak supports IBM's BASIC Compiler 1.0 and 2.0, and Microsoft's QuickBASIC, executing math-intensive programs up to 20 times faster! The 87 Software Pak also performs FFT's and Matrix operations. For example, a PC (or PC/XT) with an 87 Chip and 87 Software Pak can perform a 512-point complex FFT in just 1.1 seconds. What's more, a PC/AT with a FAST/8A inverts a 25 by 25 element matrix in under 1 second.

Circle no. 274 on reader service card.

HAUPPAUGE Math Coprocessors

287 FAST/8A 8MHz math coprocessor for PC/AT and compatibles....\$379

287 FAST/5 5MHz math coprocessor for PC/AT and compatibles.....\$249

287 Chip PC/AT math coprocessor—runs at 4MHz in PC/AT.....\$219

87 Chip Math coprocessor for IBM

PC, PC/XT and compatibles\$129

87-2 Chip Math coprocessor for 8MHz PC compatibles...\$195

HAUPPAUGE Math Coprocessor Paks

87 Math Pak V.6.0 87 chip and math coprocessor software support for IBM BASIC Compiler 1.0, 2.0 and Microsoft's QuickBASIC. Plus, Matrix and FFT support, one year of free updates, complete source code and "8087 Applications and Programming"\$279

87 Software Pak V.6.0 Math coprocessor software support as in the 87 Math Pak, but without 87 chip.....\$180

With any Hauppauge math coprocessor\$150

Recalc + Math coprocessor support for 1-2-3 version 1A ..\$ 95

With any Hauppauge math coprocessor\$ 49

HFT + Complete Hayes Fourier Transform Package\$125

With any Hauppauge math coprocessor\$ 79

The 287 FAST/8 Doubles Your PC/AT's Math Speed!

Help your PC/AT get a fast reputation with Hauppauge's new 287 FAST/8A. Call today, or contact your local computer dealer to learn more about Hauppauge's racy product line. And ask for "87 Q & A," our free booklet on math coprocessors.

Hauppauge Computer Works, Inc.

358 Veterans Memorial Highway, Suite MSI,
Commack, New York, USA 11725 • 516-360-3827

Available at your local computer dealer

Hauppauge

(Pronounced "Ha-pog")

Dr. Dobb's Journal of

Software Tools

FOR THE PROFESSIONAL PROGRAMMER

BENCHMARKING C COMPILERS

The Joy of
Conciseness

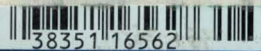
Nearly
Perfect Trees

Generics
in Ada

Real-World
Data Types



Anna Gimpel
Gimpel Software AAA
3207 Hogarth Lane
Collegeville, PA 19426



3835116562

Step-by-step tutorial, demo programs with source code included!

Borland introduces Turbo Prolog, the natural language of Artificial Intelligence.

Prolog is probably the most powerful computer programming language ever conceived, which is why we've made it our *second* language—and "turbocharged" it to create Turbo Prolog.[™]

Our new Turbo Prolog brings supercomputer power to your IBM[®] PC and introduces you step-by-step to the fascinating new world of **Artificial Intelligence**. And does all this for an astounding \$99.95.



Turbo Prolog is to Prolog what Turbo Pascal[®] is to Pascal!

Our Turbo Pascal astonished everyone who thought of Pascal as "just another language." We changed all that—and now Turbo Pascal is the de facto worldwide standard, with hundreds of

thousands of enthusiasts and users in universities, research centers, schools, and with professional programmers, students, and hobbyists.

You can expect at least the same impact from Turbo Prolog, because while Turbo Prolog is the most revolutionary and natural programming language, it is also a complete development environment—just like Turbo Pascal.

Turbo Prolog radically alters and dramatically improves the brave new world of artificial intelligence—and invites you into that fascinating universe for a humanly intelligent \$99.95.

Even if you've never programmed before, our free tutorial will get you started right away

You'll get started right away because we have included a complete step-by-step tutorial as part of the 200-page Turbo Prolog Reference Manual. Our tutorial will take you by the hand and teach you everything you're likely to need to know about Turbo Prolog and artificial intelligence.

For example: once you've completed the tutorial, you'll be able to design your own expert systems utilizing Turbo Prolog's powerful problem-solving capabilities.

Think of Turbo Prolog as a high-speed electronic detective. First you feed it information and teach it rules. Then Turbo Prolog "thinks" the problem through and comes up with all the reasonable answers—almost instantly.

If you think that this is amazing, you just need to remember that Turbo Prolog is a 5th-generation language—and the kind of language that 21st century computers will use routinely. In fact, you can compare Turbo Prolog to

Turbo Pascal the way you could compare Turbo Pascal to machine language.

You get the complete Turbo Prolog programming system for only \$99.95

You get a complete Turbo Prolog development system including:

- The lightning-fast Turbo Prolog incremental compiler and the interactive Turbo Prolog editor.
- The 200-page reference manual which includes the step-by-step Turbo Prolog tutorial.
- The free GeoBase[™] natural query language database including commented source code on disk—ready to compile. GeoBase is a complete database designed and developed around U.S. geography. It includes cities, mountains, rivers, and highways, and comes complete with natural query language. Use GeoBase immediately "as is," or modify it to fit your own interests.

So don't delay—don't waste a second—get Turbo Prolog now. \$99.95 is an amazingly small price to pay to become an immediate authority—an instant expert on artificial intelligence! The 21st century is only one phone call away.

Turbo Prolog 1.0 Technical Specifications Programming System Features

- ✓ **Compiler:** Incremental compiler generating native in-line code and linkable object modules. The linking format is compatible with the PC-DOS linker. Large memory model support. Compiles over 2600 lines per minute on a standard IBM PC.
- ✓ **Interactive Editor:** The system includes a powerful interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code. At run-time, Turbo Prolog programs can call the editor, and view the running program's source code.
- ✓ **Type System:** A flexible object-oriented type system is supported.
- ✓ **Windowing Support:** The system supports both graphic and text windows.
- ✓ **Input/Output:** Full I/O facilities, including formatted I/O, streams, and random access files.
- ✓ **Numeric Ranges:** Integers: -32767 to 32767; Reals: 1E-307 to 1E+308
- ✓ **Debugging:** Complete built-in trace debugging capabilities allowing single stepping of programs.

YES!

 I want the best

Turbo Prolog at only:

\$99.95

To order by phone, or for a dealer nearest you, **Call (800) 255-8008** in CA call (800) 742-1133.

Send me Turbo Prolog at \$ _____

Outside USA add \$10 per copy

CA and MA res. add applicable sales tax \$ _____

Amount enclosed: \$ _____

This price includes shipping to all US cities

Payment: VISA MC Bank Draft Check

Credit card expiration date: ____/____

Card # _____



4585 SCOTTS VALLEY DRIVE
SCOTTS VALLEY, CA 95066
(408) 438-8400 TELEX: 172373

Circle no. 161 on reader service card.

Other Borland Products include Turbo Pascal, Turbo Tutor, Turbo Lightning, Turbo Database Toolbox, Turbo Graphics Toolbox, Turbo Editor Toolbox, Turbo GameWorks, SuperKey, SideKick, SideKick, The Macintosh Office Manager, Reflex, The Analyst, and Traveling SideKick—all of which are registered trademarks or trademarks of Borland International, Inc. or Borland/Analyst, Inc. Turbo Prolog and GeoBase are trademarks and Turbo Pascal is a registered trademark of Borland International, Inc. IBM and AT are registered trademarks of International Business Machines Corp. Copyright: 1986 Borland International. BE-1045D



***NOT COPY PROTECTED
*60-DAY MONEY-BACK GUARANTEE**

Name: _____

Shipping Address: _____

City: _____

State: _____ Zip: _____

Telephone: _____

CODs and purchase orders WILL NOT be accepted by Borland. Outside USA make payment by credit card or International Postal Money Order.

*YES, if within 60 days of purchase this product does not perform in accordance with our claims, please call our customer service department and we will gladly arrange a refund.

** Minimum system requirements:
IBM PC, XT, AT, PCjr,
and true compatibles
384K RAM

Dr. Dobb's Journal of Software Tools

FOR THE PROFESSIONAL PROGRAMMER

SMOOTH ALGORITHMS

Anna Gimpel
Gimpel Software
3207 Hogarth Lane
Collegeville, PA 19426

GENERAL NOTES:
1. KEEP SPEED MACH 2
FROM SMALL ANIMALS
• DO NOT AIR INTAKES,
EMPTY SEPTIC TANKS
OVER POPULATED AREAS.

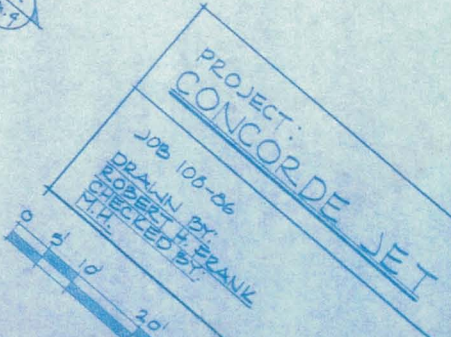
MS-DOS
Directory Traversal

Does Turbo Prolog
Measure Up?

Turbo Boards
Review

Crawling
Memory Test

Radix Sort



Step-by-step tutorial, demo programs with source code included!

Borland introduces Turbo Prolog, the natural language of Artificial Intelligence.

Prolog is probably the most powerful computer programming language ever conceived, which is why we've made it our *second* language—and "turbocharged" it to create Turbo Prolog.[™]

Our new Turbo Prolog brings supercomputer power to your IBM[®] PC and introduces you step-by-step to the fascinating new world of **Artificial Intelligence**. And does all this for an astounding \$99.95.



Turbo Prolog is to Prolog what Turbo Pascal[®] is to Pascal!

Our Turbo Pascal astonished everyone who thought of Pascal as "just another language." We changed all that—and now Turbo Pascal is the de facto worldwide standard, with hundreds of

thousands of enthusiasts and users in universities, research centers, schools, and with professional programmers, students, and hobbyists.

You can expect at least the same impact from Turbo Prolog, because while Turbo Prolog is the most revolutionary and natural programming language, it is also a complete development environment—just like Turbo Pascal.

Turbo Prolog radically alters and dramatically improves the brave new world of artificial intelligence—and invites you into that fascinating universe for a humanly intelligent \$99.95.

Even if you've never programmed before, our free tutorial will get you started right away

You'll get started right away because we have included a complete step-by-step tutorial as part of the 200-page Turbo Prolog Reference Manual. Our tutorial will take you by the hand and teach you everything you're likely to need to know about Turbo Prolog and artificial intelligence.

For example: once you've completed the tutorial, you'll be able to design your own expert systems utilizing Turbo Prolog's powerful problem-solving capabilities.

Think of Turbo Prolog as a high-speed electronic detective. First you feed it information and teach it rules. Then Turbo Prolog "thinks" the problem through and comes up with all the reasonable answers—almost instantly.

If you think that this is amazing, you just need to remember that Turbo Prolog is a 5th-generation language—and the kind of language that 21st century computers will use routinely. In fact, you can compare Turbo Prolog to

Turbo Pascal the way you could compare Turbo Pascal to machine language.

You get the complete Turbo Prolog programming system for only \$99.95

You get a complete Turbo Prolog development system including:

- The lightning-fast Turbo Prolog incremental compiler and the interactive Turbo Prolog editor.
- The 200-page reference manual which includes the step-by-step Turbo Prolog tutorial.
- The free GeoBase[™] natural query language database including commented source code on disk—ready to compile. GeoBase is a complete database designed and developed around U.S. geography. It includes cities, mountains, rivers, and highways, and comes complete with natural query language. Use GeoBase immediately "as is," or modify it to fit your own interests.

So don't delay—don't waste a second—get Turbo Prolog now. \$99.95 is an amazingly small price to pay to become an immediate authority—an instant expert on artificial intelligence! The 21st century is only one phone call away.

Turbo Prolog 1.0 Technical Specifications Programming System Features

- ✓ **Compiler:** Incremental compiler generating native in-line code and linkable object modules. The linking format is compatible with the PC-DOS linker. Large memory model support. Compiles over 2600 lines per minute on a standard IBM PC.
- ✓ **Interactive Editor:** The system includes a powerful interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code. At run-time, Turbo Prolog programs can call the editor, and view the running program's source code.
- ✓ **Type System:** A flexible object-oriented type system is supported.
- ✓ **Windowing Support:** The system supports both graphic and text windows.
- ✓ **Input/Output:** Full I/O facilities, including formatted I/O, streams, and random access files.
- ✓ **Numeric Ranges:** Integers: -32767 to 32767; Reals: 1E-307 to 1E+308
- ✓ **Debugging:** Complete built-in trace debugging capabilities allowing single stepping of programs.

YES!

 I want the best

Turbo Prolog at only:

\$99.95

To order by phone, or for a dealer nearest you, **Call (800) 255-8008** in CA call (800) 742-1133.

Send me Turbo Prolog at \$ _____

Outside USA add \$10 per copy

CA and MA res. add applicable sales tax \$ _____

Amount enclosed: \$ _____

This price includes shipping to all US cities

Payment: VISA MC Bank Draft Check

Credit card expiration date: ____/____

Card #

You must have an IBM or true compatible running DOS 2.0 or later. **

My computer's name and model is: _____

The disk size I use is: 3 1/2" 5 1/4"

***NOT COPY PROTECTED
*60-DAY MONEY-BACK GUARANTEE**

Name: _____

Shipping Address: _____

City: _____

State: _____ Zip: _____

Telephone: _____

CODs and purchase orders WILL NOT be accepted by Borland. Outside USA make payment by credit card or International Postal Money Order.

*YES, if within 60 days of purchase this product does not perform in accordance with our claims, please call our customer service department and we will gladly arrange a refund.

** Minimum system requirements:

IBM PC, XT, AT, PCjr, and true compatibles

384K RAM



Vive la différence

4585 SCOTTS VALLEY DRIVE
SCOTTS VALLEY, CA 95066
(408) 438-8400 TELEX: 172373

Circle no. 161 on reader service card.

Other Borland Products include Turbo Pascal, Turbo Tutor, Turbo Lightning, Turbo Database Toolbox, Turbo Graphics Toolbox, Turbo Editor Toolbox, Turbo GameWorks, SuperKey, SideKick, SideKick, The Macintosh Office Manager, Reflex, The Analyst, and Traveling SideKick—all of which are registered trademarks or trademarks of Borland International, Inc. or Borland/Analyst, Inc. Turbo Prolog and GeoBase are trademarks and Turbo Pascal is a registered trademark of Borland International, Inc. IBM and AT are registered trademarks of International Business Machines Corp. Copyright: 1986 Borland International. BE-1045D



Dr. Dobb's Journal of

Software Tools

FOR THE PROFESSIONAL PROGRAMMER

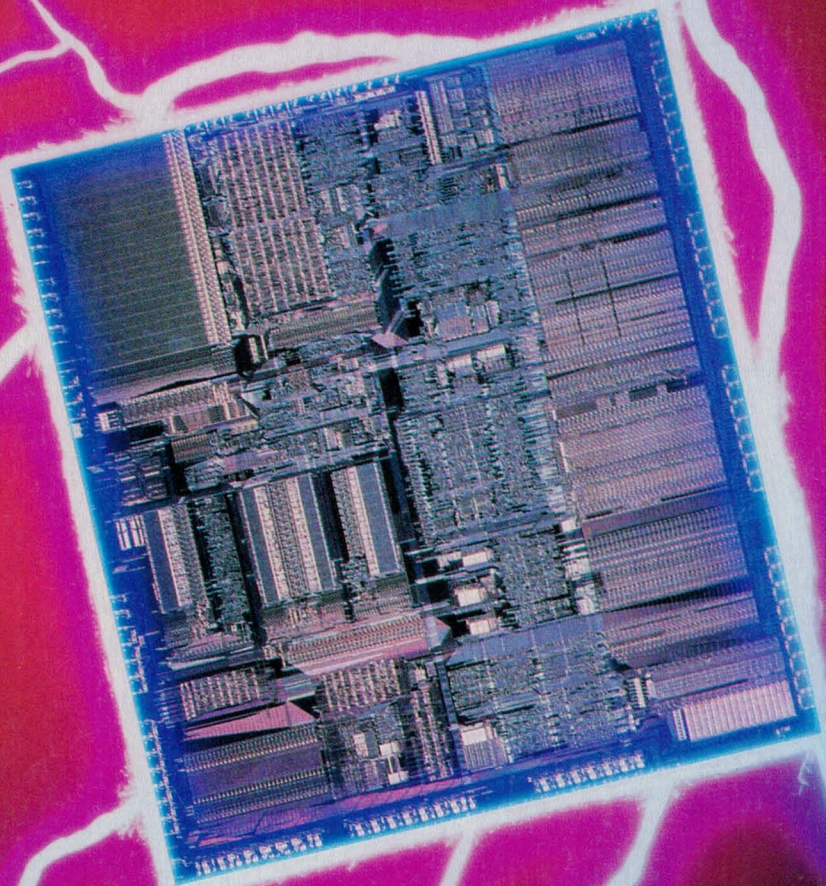
80386 PROGRAMMING

MS-DOS
File Browsing

Converting
to the 320xx

Modula-2
Compiler Review

Factoring
in Forth



Anna Gimpel
Gimpel Software
3207 Hogarth Lane
Collegeville
PA 19426



0

Step-by-step tutorial, demo programs with source code included!

Borland introduces Turbo Prolog, the natural language of Artificial Intelligence.

Prolog is probably the most powerful computer programming language ever conceived, which is why we've made it our *second* language—and "turbocharged" it to create Turbo Prolog.[™]

Our new Turbo Prolog brings supercomputer power to your IBM[®] PC and introduces you step-by-step to the fascinating new world of **Artificial Intelligence**. And does all this for an astounding \$99.95.



Turbo Prolog is to Prolog what Turbo Pascal[®] is to Pascal!

Our Turbo Pascal astonished everyone who thought of Pascal as "just another language." We changed all that—and now Turbo Pascal is the de facto worldwide standard, with hundreds of

thousands of enthusiasts and users in universities, research centers, schools, and with professional programmers, students, and hobbyists.

You can expect at least the same impact from Turbo Prolog, because while Turbo Prolog is the most revolutionary and natural programming language, it is also a complete development environment—just like Turbo Pascal.

Turbo Prolog radically alters and dramatically improves the brave new world of artificial intelligence—and invites you into that fascinating universe for a humanly intelligent \$99.95.

Even if you've never programmed before, our free tutorial will get you started right away

You'll get started right away because we have included a complete step-by-step tutorial as part of the 200-page Turbo Prolog Reference Manual. Our tutorial will take you by the hand and teach you everything you're likely to need to know about Turbo Prolog and artificial intelligence.

For example: once you've completed the tutorial, you'll be able to design your own expert systems utilizing Turbo Prolog's powerful problem-solving capabilities.

Think of Turbo Prolog as a high-speed electronic detective. First you feed it information and teach it rules. Then Turbo Prolog "thinks" the problem through and comes up with all the reasonable answers—almost instantly.

If you think that this is amazing, you just need to remember that Turbo Prolog is a 5th-generation language—and the kind of language that 21st century computers will use routinely. In fact, you can compare Turbo Prolog to

Turbo Pascal the way you could compare Turbo Pascal to machine language.

You get the complete Turbo Prolog programming system for only \$99.95

You get a complete Turbo Prolog development system including:

- The lightning-fast Turbo Prolog incremental compiler and the interactive Turbo Prolog editor.
- The 200-page reference manual which includes the step-by-step Turbo Prolog tutorial.
- The free GeoBase[™] natural query language database including commented source code on disk—ready to compile. GeoBase is a complete database designed and developed around U.S. geography. It includes cities, mountains, rivers, and highways, and comes complete with natural query language. Use GeoBase immediately "as is," or modify it to fit your own interests.

So don't delay—don't waste a second—get Turbo Prolog now. \$99.95 is an amazingly small price to pay to become an immediate authority—an instant expert on artificial intelligence! The 21st century is only one phone call away.

Turbo Prolog 1.0 Technical Specifications Programming System Features

- ✓ **Compiler:** Incremental compiler generating native in-line code and linkable object modules. The linking format is compatible with the PC-DOS linker. Large memory model support. Compiles over 2600 lines per minute on a standard IBM PC.
- ✓ **Interactive Editor:** The system includes a powerful interactive full-screen text editor. If the compiler detects an error, the editor automatically positions the cursor appropriately in the source code. At run-time, Turbo Prolog programs can call the editor, and view the running program's source code.
- ✓ **Type System:** A flexible object-oriented type system is supported.
- ✓ **Windowing Support:** The system supports both graphic and text windows.
- ✓ **Input/Output:** Full I/O facilities, including formatted I/O, streams, and random access files.
- ✓ **Numeric Ranges:** Integers: -32767 to 32767; Reals: 1E-307 to 1E+308
- ✓ **Debugging:** Complete built-in trace debugging capabilities allowing single stepping of programs.

YES!

 I want the best

Turbo Prolog at only:

\$99.95

To order by phone, or for a dealer nearest you, **Call (800) 255-8008** in CA call (800) 742-1133.

Send me Turbo Prolog at \$ _____

Outside USA add \$10 per copy

CA and MA res. add applicable sales tax \$ _____

Amount enclosed: \$ _____

This price includes shipping to all US cities

Payment: VISA MC Bank Draft Check

Credit card expiration date: ____/____

Card #

You must have an IBM or true compatible running DOS 2.0 or later. ** My computer's name and model is: _____

The disk size I use is: 3 1/2" 5 1/4"

***NOT COPY PROTECTED
*60-DAY MONEY-BACK GUARANTEE**

Name: _____

Shipping Address: _____

City: _____

State: _____ Zip: _____

Telephone: _____

CCDs and purchase orders WILL NOT be accepted by Borland. Outside USA make payment by credit card or International Postal Money Order.

*YES, if within 60 days of purchase this product does not perform in accordance with our claims, please call our customer service department and we will gladly arrange a refund.

** Minimum system requirements: IBM PC, XT, AT, PCjr, and true compatibles 384K RAM



Vive la différence

4585 SCOTTS VALLEY DRIVE
SCOTTS VALLEY, CA 95066
(408) 438-8400 TELEX: 172373

Circle no. 161 on reader service card.

Other Borland Products include Turbo Pascal, Turbo Tutor, Turbo Lightning, Turbo Database Toolbox, Turbo Graphics Toolbox, Turbo Editor Toolbox, Turbo GameWorks, SuperKey, SideKick, SideKick, The Macintosh Office Manager, Reflex, The Analyst, and Traveling SideKick—all of which are registered trademarks or trademarks of Borland International, Inc. or Borland/Analystics, Inc. Turbo Prolog and GeoBase are trademarks and Turbo Pascal is a registered trademark of Borland International, Inc. IBM and AT are registered trademarks of International Business Machines Corp. Copyright: 1986 Borland International. BE-1045D

