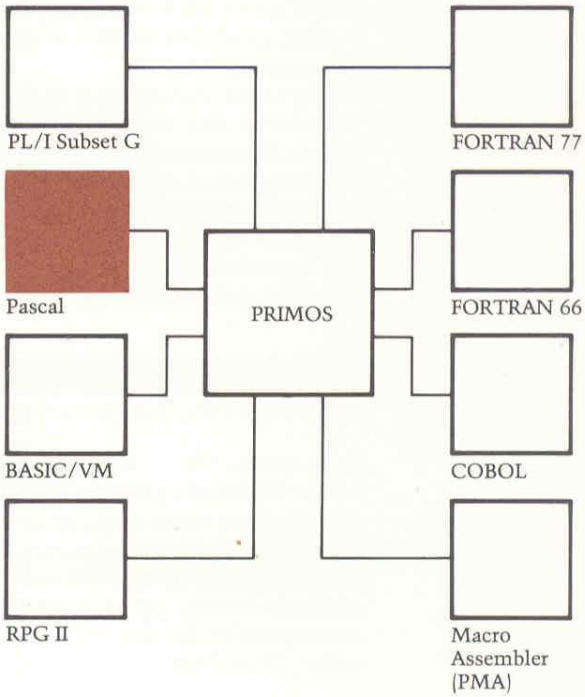
Product Bulletin

PRIME

Pascal

Features

- Based upon the draft proposed ANSI standard with additional extensions for user convenience.
- Program development support for Prime's Source-Level Debugger.
- Facilities for separate compilation of program units.
- Unique global and local optimization for efficient object code.
- Object and file format compatible with other Prime software.
- Up to 32 million bytes of private program space per user for procedure code and data.
- Shared and re-entrant code generated for improved memory utilization in a multi-user environment.
- Utilizes high-level instruction set, virtual memory and 32-bit architecture of Prime 50 Series systems.
- Full communication networking capabilities of Prime systems.



Description

Prime Pascal is a multi-purpose structured language offering globally optimized object code. It features exceptional program development facilities in a multi-user, multi-lingual programming environment. Additionally, Prime Pascal provides the facilities for modular program design, increasing programmer productivity and simplifying code maintenance. Pascal's performance characteristics make it an excellent language for system, commercial and scientific applications as well as for the more traditional academic environments.

Prime Pascal is based upon the draft proposed ANSI standard. It exploits the full power of the PRIMOS® operating system, which provides users with such mainframe capabilities as virtual memory, 32-bit architecture, advanced communication networking and large program size. Since Pascal is object-compatible with other Prime languages, users' existing Prime language investment is never lost. It shares a common calling convention, allowing programs and libraries written in other Prime languages to be accessed by Pascal.

Application Flexibility

Pascal is well known for its instructional utility in educational environments. Many universities use Pascal as their principal teaching language. Student programmers find it easy to learn with because of its clear syntax and logical organization. In addition, Pascal provides an excellent training tool for structured programming, as it offers powerful control structure and strong data typing.

The same features that make Pascal popular in the educational environment promote its performance in commercial applications. Structured program design simplifies program development and maintenance, particularly in programming tasks of shared responsibilities. Both system and application programmers will find Pascal a powerful and efficient language to work with.

Interactive Program Development

In an interactive, multi-user environment, such as the PRIMOS operating system, concurrent development of an application by a group of programmers is often a prerequisite. To meet the needs of such an environment, Prime Pascal supports bottom-up program design through extensions to the standard for modular programming. This allows a large program to be broken down into a number of smaller modules, each of which can be compiled, edited and debugged independently. Once the development of each of the modules is complete, all pieces can be linked together to form the entire package—often requiring only a fraction of the time and cost needed to develop the same application using a top-down method.

With the Prime Source-Level Debugger, Pascal users can step through the source code and exert interactive control over all aspects of program performance. This includes the ability to set or clear breakpoints/tracepoints on any statement, examine or modify any variable values, evaluate expressions, execute single statements, and trace executions at will. These features enable both students and experts to develop programs in the shortest possible time. And, the Source-Level Debugger also supports FORTRAN 77, FORTRAN 66 and PL/I-G. These unique generic capabilities simplify operation in multi-lingual programming environments.

Prime Compatibility

The Prime "software first" philosophy offers Pascal users many distinct advantages. Pascal runs on all multi-user Prime systems, assuring complete upward and downward program compatibility among all central processors. Because program migration is fully bidirectional, users can develop programs on any system supported by the PRIMOS operating system, and run them on any other Prime system.

Pascal shares common call conventions with other Prime languages, including PL/I-G, FORTRAN 77, FORTRAN 66, and COBOL. Programs written in any of these languages can be linked with Pascal, usually without modification. Thus, program development time can be decreased by utilizing existing routines written in other compatible Prime languages. In addition, file format compatibility provides common access to data regardless of the routine's source language.

Compiler Efficiency

The unique design philosophy behind Prime Pascal includes both local and global optimization for object efficiency. Prime Pascal uses sophisticated flow analysis techniques to optimize across entire program units, as well as locally within statements and expressions. These techniques also reduce program space requirements.

Global optimization can be user-disabled for ultimate compilation speed during the development phase of a program. Some of the fundamental optimization steps of Prime Pascal include:

- global elimination of common sub-expressions using dominance relations
- near optimal allocation of frequently referenced quantities to registers, both in straight-line code and within loops
- separation of invariant computations from within loops
- relational branch optimization
- in-line generation of many intrinsic functions
- compile time evaluation of expressions with constant operands and absorption of constant subscript expressions

Prime firmware and hardware design also promote Pascal efficiency. The broad repertoire of the high-level instruction set is augmented by both stack-oriented and register-oriented addressing modes. A hardware process exchange facility provides event-driven process scheduling and dispatching without need for PRIMOS operating system intervention. As a result of optimization and design features, Pascal performs as a superb production language in the Prime environment.

Prime System Performance

The sophisticated design of Prime hardware and software offers high performance capabilities normally outside the reach of minicomputer systems. The virtual memory and embedded design of the PRIMOS operating system are complemented by efficient time scheduling, memory management, and procedure data sharing. Data communications is optimized for performance under real-world, multi-user demands. The Prime Distributed Processing Terminal Executive (DPTX), and PRIMENET™ networking software allow users to construct complex communications networks to suit their individual needs. With this state-of-the-art Pascal, users not only benefit from high performance, they also draw upon the full support of a system engineered for total software integration.

Reserved Words

AND
ARRAY
BEGIN
CASE
CONST
DIV
DO
DOWNTO
ELSE
END
EXTERN*
FILE
FOR
FUNCTION
GOTO
IF
IN
LABEL
MOD
NIL
NOT
OF
OR
OTHERWISE*
PACKED
PROCEDURE
PROGRAM
RECORD
REPEAT
SET
THEN
TO
TYPE
UNTIL
VAR
WHILE
WITH
%INCLUDE*

Standard Identifiers

Types:
BOOLEAN, CHAR, INTEGER, REAL, TEXT

Procedures:
DISPOSE, NEW, CLOSE*, RESET, REWRITE, GET, PUT, READ, WRITE, READLN, WRITELN, PAGE

*Extensions to the draft proposed ANSI standard

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