digital™

# Software Product Description

**PRODUCT NAME: DEC Ada Version 3.4 for DIGITAL UNIX® Systems** **SPD 45.89.03**

## DESCRIPTION

This Software Product Description includes the following two products:

- DEC Ada Version 3.4 for DIGITAL UNIX Systems
- DEC Ada Version 3.4 Professional Development Option for DIGITAL UNIX Systems

DEC Ada for DIGITAL UNIX (formerly called DEC OSF/1) is Digital Equipment Corporation's validated implementation of the full ANSI/MIL-STD-1815A-1983 Ada Language. As a result of meeting the ANSI standard, DEC Ada also conforms to the Federal Information Processing Standard (FIPS-119). The DEC Ada compiler runs on the DIGITAL UNIX operating system and generates highly optimized, shareable, and position-independent code.

Ada is a powerful, general-purpose language that supports many modern programming practices. The language was designed as the result of a competition sponsored by the United States Department of Defense. The purpose of the competition was to define a language suitable for programming-embedded computer systems. Among the requirements for the language were features that would reduce software costs by increasing maintainability, evolvability, reliability, and portability.

Ada provides a modular structure for programs by allowing separate compilation of program units, as well as providing strong typing, tasking, exception handling, and other standard language features that are supported across implementations. Ada provides a number of features that make it suitable for a variety of applications from general systems to real-time applications.

### Ada Language Features

- Strong Typing — An object (variable) of a given type may take on only those values that are appropriate to that type, and only certain predefined operations may be performed to data of that type. Because type checking is done at compile time, strong typing ensures that any errors associated with incorrect data types are detected at compile time.

- Data Abstraction — Also known as information hiding, data abstraction hides implementation details while providing users with mechanisms for using the implementation. Abstraction enables the user to focus on important characteristics while ignoring underlying details. Ada provides various levels of abstraction through features such as private data types and packages.

- Concurrent Processing — For many applications, it is important that a program be conceived of as a number of parallel activities, rather than serial activities. Most high-order languages provide little or no support for handling such parallel or concurrent activities. They rely on facilities of the host operating system. Ada uses tasks to enable parallel activities to be programmed directly within the language.

- Separate Compilation — Ada's separate compilation feature enables a programmer to divide a large program into compilation units that may be compiled at different times. When a unit is compiled, the DEC Ada program library manager records information about that unit and other related units. This feature is unlike separate compilation features in other languages, where little information about separately-compiled modules is maintained.

- Generic Definitions — A generic unit is a template from which specific instances can be made at compile time. In many cases, the logic of an algorithm or a set of operations is independent of the specific type of the values being manipulated. However, in a strongly-typed language such as Ada, all types must be defined at compile time. Generic definitions enable the user to define a general algorithm or set of related operations and then create a specific instance of that algorithm or set of operations for each type to which the algorithm or operations must apply.

- Exception Handling — In many operations, especially embedded computer systems, it is critical that a system recover quickly and efficiently from error conditions. Ada provides the ability to raise and to handle exceptions. It includes predefined exceptions and permits the user to define exceptions. When an exception occurs in a DEC Ada program, normal processing is abandoned and control passes to the exception handler.

**DEC Ada Components and Special System-Related Features:**

- Ada compiler fully conforming to ANSI/MIL-STD-1815A-1983. For details see the *DEC Ada Language Reference Manual*.

- Ada program library manager that provides support for programming teams through:

  — Program libraries that can be shared by many programmers

  — Powerful search list model for program libraries. This permits the following:

    * The relationships among program libraries can be changed easily.

    * Individual programmers can establish different views of program library relationships.

  — Automatic recompilation of obsolete compilation units

  — Ability to share compiled Ada code either by reference or by copy

- DEC Ada tasking support based on POSIX-compliant threads. Each DEC Ada task runs as a POSIX thread with thread scheduling provided by the DIGITAL UNIX Operating System.

- Debugging capability provided through DIGITAL Ladebug and dbx, including support for debugging tasking programs and mixed DEC Ada and non-Ada code.

- Strongly-typed DEC Ada bindings that provide interfaces for the following versions of X Window System™ and Motif® routines:

  — X Window System Versions 11R4, 11R5, and 11R6 X Windows

  — Motif Versions 1.1.3 and 1.2

- Support for the POSIX Ada Language Interface bindings as required by IEEE Standard 1003.5.

- Support for the ISO Math Library packages GENERIC_PRIMITIVE_FUNCTIONS and GENERIC_ELEMENTARY_FUNCTIONS.

- Support for passive tasking and pragma PASSIVE, that can significantly improve the performance of rendezvous in programs. A task rendezvous (consisting of an entry call to a passive task) is accomplished with no contex switching overhead. Instead, the accept body is executed in the context of the task making the entry call.

- Support for running DEC Ada tasks within the same program on multiple processors. If running on a DIGITAL UNIX system that supports Symmetric Multiprocessing (SMP), DEC Ada multitasking applications automatically take advantage of SMP.

- Integration with the DIGITAL UNIX Operating System including:

  — Conformance to the DIGITAL UNIX calling standard, which allows DEC Ada code to call and be called by code written in other languages, as well as to call DIGITAL UNIX system routines

  — The ability to access files that DEC Ada cannot open, such as inherited files and pipes

  — The ability to link DEC Ada main programs with foreign code and link foreign main programs with DEC Ada code

  — The ability to share data with non-Ada code through pointers and direct references to memory locations

- System-Dependent Facilities — Different systems vary in such characteristics as the size of storage units, memory size, and the smallest and largest integer values supported. DEC Ada provides the predefined package SYSTEM to define system-related constants and to represent system-dependent information.

- Representation clauses that allow the user to tailor the representation of data to suit a particular system. DEC Ada provides:

  — Length clauses that specify the amount of storage associated with a type

  - — Enumeration representation clauses that specify the internal codes for the literals of enumeration types
  - — Record representation clauses that specify the layout of a record type, such as the order, position, and size of record components
  - — Address clauses that specify required addresses in storage for objects, imported subprograms, or single entries
- DEC Ada provides a number of pragmas (compiler directives) that allow various system-related parameters to be set and changed and to control mixed-language programming.
- Comprehensive diagnostic messages with references to the *DEC Ada Language Reference Manual*. This features helps the new DEC Ada users.

### *DEC Ada Professional Development Option for DIGITAL UNIX Systems*

The DEC Ada Professional Development Option is a separately-licensed option that is available with DEC Ada on DIGITAL UNIX Systems. The DEC Ada Professional Development Option includes the following capabilities:

- Smart recompilation — This feature can significantly reduce the number of recompilations that are needed to rebuild a DEC Ada program after some compilation units change. Smart recompilation allows the compiler to propagate changes quickly through a system, eliminating up to 100% of the usual recompilations.
- Program Library File-Block Caching — This feature minimizes the actual amount of disk input-output that must be performed by using an in-memory cache of file blocks. As a result, the elapsed time for compilations is significantly reduced.
- Quick Link — This feature can significantly reduce, during incremental program development, the time to relink a large DEC Ada program after changes to a small number of program units.

The DEC Ada Professional Development Option is designed so that it is compatible with libraries that are created without the DEC Ada Professional Development Option and libraries created with a previous version of DEC Ada. Once a program library is created, DEC Ada programmers do not need to change any of their development procedures to benefit from the DEC Ada Professional Development Option.

## HARDWARE REQUIREMENTS

*Processors Supported*

AlphaServer 300 Products
AlphaServer 400 Products
AlphaServer 800 Products

AlphaServer 1000 Products
AlphaServer 1000A Products
AlphaServer 1200 Products
AlphaServer 2000 Products
AlphaServer 2100 Products
AlphaServer 2100A Products
AlphaServer 4000 Products
AlphaServer 4100 Products
AlphaServer 8200 Products
AlphaServer 8400 Products

AlphaStation 200 Products
AlphaStation 250 Products
AlphaStation 255 Products
AlphaStation 400 Products
AlphaStation 500 Products
AlphaStation 600 Products
AlphaStation 600A Products

DEC 2000 Models 300, 500

DEC 3000 Models 300, 300L, 300X, 300LX
DEC 3000 Models 400, 400S
DEC 3000 Models 500, 500S, 500X
DEC 3000 Models 600, 600S
DEC 3000 Model 700
DEC 3000 Models 800, 800S
DEC 3000 Model 900

DEC 4000 Model 600 Products
DEC 4000 Model 700 Products

DEC 7000 Model 600 Products
DEC 7000 Model 700 Products

DIGITAL Personal Workstation 433au
DIGITAL Personal Workstation 500au
DIGITAL Personal Workstation 533au
DIGITAL Personal Workstation 600au

### Disk Space Requirements (Block Cluster Size = 1)

Disk space required for installation:

| | |
|---|---|
| Root file system: | /0 KB |
| Other file systems: | /usr 36,900 KB |
| | /tmp 0 KB |
| | /var 0 KB |

Disk space required for use (permanent):

| | |
|---|---|
| Root file system: | /0 KB |
| Other file systems: | /usr 36,900 KB |
| | /var 0 KB |

These counts refer to the disk space required on the system disk. The sizes are approximate; actual sizes may vary depending on the user's system environment, configuration, and software options.

## SOFTWARE REQUIREMENTS

*DEC Ada for DIGITAL UNIX Systems*

- DIGITAL UNIX Operating System (SPD 41.61.xx), Versions 4.0B, 4.0C, or 4.0D
- Developers' Toolkit for DIGITAL UNIX (SPD 44.36.xx), Versions 4.0B, 4.0C, or 4.0D

*DEC Ada Professional Development Option for DIGITAL UNIX Systems*

- DEC Ada Version 3.4 for DIGITAL UNIX Systems
- DIGITAL UNIX Operating System (SPD 41.61.xx), Versions 4.0B, 4.0C, or 4.0D
- Developers' Toolkit for DIGITAL UNIX (SPD 44.36.xx), Versions 4.0B, 4.0C, or 4.0D

## OPTIONAL SOFTWARE

- DEC FUSE for DIGITAL UNIX Systems

DEC FUSE for DIGITAL UNIX Systems is a DIGITAL integrated development environment, based on UNIX commands and utilities and features a Motif user interface.

**Note:** DEC FUSE Ada Support is included in DEC FUSE for DIGITAL UNIX Systems and does not require a separate license.

For more information on DEC FUSE for DIGITAL UNIX Systems refer to the Software Product Description (SPD 44.71.xx).

## GROWTH CONSIDERATIONS

The minimum hardware/software requirements for any future version of this product may be different from the requirements for the current version.

## DISTRIBUTION MEDIA

This product is available only on the DIGITAL CD–ROM Software Library for DIGITAL UNIX Layered Products.

## ORDERING INFORMATION

*DEC Ada for DIGITAL UNIX Systems*

Software Licenses:

Concurrent Use: QL-0HMAM-3B

Personal Use: QL-0HMAM-2B

Unlimited System Use: QL-0HMA*-**

Software Media: QA-054AA-H8

Software Documentation: QA-0HMAA-GZ

Software Product Services: QT-0HMA*-**

*DEC Ada Professional Development Option for DIGITAL UNIX Systems*

Software Licenses:

Concurrent Use: QL-0VSAM-3B

Personal Use: QL-0VSAM-2B

Unlimited System Use: QL-0VSA*-**

Read Before Installation Letter: QA-0VSAA-GZ

Software Product Services: QT-0VSA*-**

**Note:** The Software Documentation kit (order number QA-0VSAA-GZ contains only the *Read Before Installing* letter and *must be ordered* (at no cost) with all licenses for DEC Ada Professional Development Option for DIGITAL UNIX Systems.

The DEC Ada Professional Development Option for DIGITAL UNIX Systems binaries are provided with the DEC Ada binaries. Purchase of a DEC Ada Professional Development Option for DIGITAL UNIX Systems License (QL-0VSA*-**) enables use of this capability.

* Denotes variant fields. For additional information on available licenses, services, and media, refer to the appropriate price book.

## SOFTWARE LICENSING

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This layered product offers Concurrent Use, Unlimited System Use, and Personal Use basis licensing.

## SOFTWARE PRODUCT SERVICES

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The previous information is valid at time of release. Please contact your local DIGITAL office for the most up-to-date information.