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1985 November 8



U.S. DEPARTMENT OF COMMERCE/National Bureau of Standards



Ada

FIPS PUB 119

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1985

U.S. DEPARTMENT OF COMMERCE, Malcolm Baldrige, *Secretary*  
NATIONAL BUREAU OF STANDARDS, Ernest Ambler, *Director*

## Foreword

The Federal Information Processing Standards Publication Series of the National Bureau of Standards is the official publication relating to standards adopted and promulgated under the provisions of Public Law 89-306 (Brooks Act) and under Part 6 of Title 15, Code of Federal Regulations. These legislative and executive mandates have given the Secretary of Commerce important responsibilities for improving the utilization and management of computers and automatic data processing in the Federal Government. To carry out the Secretary's responsibilities, the NBS, through its Institute for Computer Sciences and Technology, provides leadership, technical guidance, and coordination of Government efforts in the development of guidelines and standards in these areas.

Comments concerning Federal Information Processing Standards Publications are welcomed and should be addressed to the Director, Institute for Computer Sciences and Technology, National Bureau of Standards, Gaithersburg, MD 20899.

James H. Burrows, *Director*  
Institute for Computer Sciences and Technology

## Abstract

This publication announces the adoption of American National Standard Reference Manual for the Ada\* Programming Language, ANSI/MIL-STD-1815A-1983, as a Federal Information Processing Standard (FIPS). The American National Standard Ada, ANSI/MIL-STD-1815A-1983, specifies the form and meaning of program units written in Ada. The purpose of the standard is to promote portability of Ada programs for use on a variety of data processing systems. The standard is for use by implementors as the reference authority in developing compilers, interpreters, or other forms of high level language processors, and by other computer professionals who need to know the precise syntactic and semantic rules of the standard.

\* Ada is a registered trademark of the U.S. Government, Ada Joint Program Office.

Key words: Federal Information Processing Standard; Ada/registered trademark of U.S. Government, Ada Joint Program Office; programming language standards; software; standards conformance.

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## Federal Information Processing Standards Publication 119

1985 November 8

Announcing the Standard for

Ada



Federal Information Processing Standards Publications are issued by the National Bureau of Standards pursuant to Section 111(f)(2) of the Federal Property and Administrative Services Act of 1949, as amended, Public Law 89-306 (79 Stat. 1127), Executive Order 11717 (38 FR 12315, dated May 11, 1973), and Part 6 of Title 15 Code of Federal Regulations (CFR).

1. **Name of Standard.** Ada (FIPS PUB 119).
2. **Category of Standard.** Software Standard, Programming Language.
3. **Explanation.** This publication announces the adoption of American National Standard Reference Manual for the Ada\* Programming Language, ANSI/MIL-STD-1815A-1983, as a Federal Information Processing Standard (FIPS). The American National Standard Ada, ANSI/MIL-STD-1815A-1983, specifies the form and meaning of program units written in Ada. The purpose of the standard is to promote portability of Ada programs for use on a variety of data processing systems. The standard is for use by implementors as the reference authority in developing compilers, interpreters, or other forms of high level language processors; and by other computer professionals who need to know the precise syntactic and semantic rules of the standard.
4. **Approving Authority.** Secretary of Commerce.
5. **Maintenance Agency.** U.S. Department of Commerce, National Bureau of Standards (Institute for Computer Sciences and Technology).
6. **Cross Index.** American National Standard Reference Manual for the Ada Programming Language, ANSI/MIL-STD-1815A-1983.
7. **Related Documents.**
  - a. Federal Information Resources Management Regulation 201-8.1, Federal ADP and Telecommunications Standards.
  - b. NBS Special Publication 500-117, Selection and Use of General-Purpose Programming Languages.
8. **Objectives.** Federal standards for high level programming languages permit Federal departments and agencies to exercise more effective control over the production, management, and use of the Government's information resources. The primary objectives of Federal programming language standards are:
  - to encourage more effective utilization and management of programmers by insuring that programming skills acquired on one job are transportable to other jobs, thereby reducing the cost of programmer re-training;
  - to reduce the cost of program development by achieving the increased programmer productivity that is inherent in the use of high level programming languages;
  - to reduce the overall software costs by making it easier and less expensive to maintain programs and to transfer programs among different computer systems, including replacement systems;
  - to protect the existing software assets of the Federal Government by insuring to the maximal feasible extent that Federal programming language standards are technically sound and that subsequent revisions are compatible with the installed base.

Government-wide attainment of the above objectives depends upon the widespread availability and use of comprehensive and precise standard language specifications.

\*Ada is a registered trademark of the U.S. Government, Ada Joint Program Office.

## 9. Applicability.

a. Federal standards for high level programming languages should be used for computer applications and programs that are either developed or acquired for government use. FIPS Ada is one of the high level programming language standards provided for use by all Federal departments and agencies. FIPS Ada is suitable for use in programming the following applications:

- those involving control of real-time processes or parallel processing;
- very large systems, for which correct modularization is crucial;
- systems with requirements for very high reliability;
- systems which are to be developed with reusable software packages.

b. The use of FIPS high level programming languages is strongly recommended when one or more of the following situations exist:

- It is anticipated that the life of the program will be longer than the life of the presently utilized equipment.
- The application or program is under constant review for updating of the specifications, and changes may result frequently.
- The application is being designed and programmed centrally for a decentralized system that employs computers of different makes, models and configurations.
- The program will or might be run on equipment other than that for which the program is initially written.
- The program is to be understood and maintained by programmers other than the original ones.
- The advantages of improved program design, debugging, documentation and intelligibility can be obtained through the use of this high level language regardless of interchange potential.
- The program is or is likely to be used by organizations outside the Federal Government (i.e., State and local governments, and others).

c. The standard for Ada adopted herein (ANSI/MIL-STD-1815A-1983) does not allow conforming implementations to extend the language. Representation clauses and implementation-dependent features (see sec. 13 and appendix F of the standard), whose semantics may differ among processors, should be used only when the needed operation or function cannot reasonably be implemented with the portable features alone. Although implementation-dependent features can be very useful, it should be recognized that their use may make the interchange of programs and future conversion to a revised standard or replacement processor more difficult and costly.

d. It is recognized that programmatic requirements may be more economically and efficiently satisfied through the use of statistical and numerical software packages. The use of any facility should be considered in the context of system life, system cost, data integrity, and the potential for data sharing.

e. Programmatic requirements may be also more economically and efficiently satisfied by the use of automatic program generators. However, if the final output of a program generator is an Ada source program, then the resulting program should conform to the conditions and specifications of FIPS Ada.

**10. Specifications.** FIPS Ada specifications are the language specifications contained in American National Standard Reference Manual for the Ada Programming Language, ANSI/MIL-STD-1815A-1983.

The ANSI/MIL-STD-1815A-1983 document specifies the form of a program written in Ada, the effect of translating and executing a program unit, the manner in which program units are combined to form Ada programs, predefined program units that must be supplied, permissible variations from the standard, and violations of the standard that must be and those not required to be detected by a conforming implementation.

The standard does not specify limits on the size or complexity of programs, the results when the rules of the standard fail to establish an interpretation, the means of supervisory control of programs, or the means of transforming programs for processing.

**11. Implementation.** The implementation of FIPS Ada involves three areas of consideration: acquisition of Ada processors, interpretation of FIPS Ada, and validation processors.

**11.1 Acquisition of Ada Processors.** This publication becomes effective May 1, 1986. Ada processors acquired for Federal use after this date should implement FIPS Ada. Conformance to FIPS Ada should be considered whether Ada processors are developed internally, acquired as part of an ADP system procurement, acquired by separate procurement, used under an ADP leasing arrangement, or specified for use in contracts for programming services.

A transition period provides time for industry to produce Ada processors conforming to the standard. The transition period begins on the effective date and continues for one year (1) thereafter. The provisions of this publication apply to orders placed after the effective date.

**11.2 Interpretation of FIPS Ada.** This FIPS PUB includes two parts: (1) the announcement portion (this document only), which contains the applicability and implementation provisions of FIPS Ada; and (2) the technical language specifications, which are contained in ANSI/MIL-STD-1815A-1983.

Resolution of questions regarding the announcement portion of FIPS Ada will be provided by NBS. Questions concerning this part of FIPS Ada should be addressed to:

Director  
Institute for Computer Sciences and Technology  
ATTN: Ada Interpretation  
National Bureau of Standards  
Gaithersburg, MD 20899

The responsibility for the resolution of questions concerning the technical language specifications part of FIPS Ada (i.e., ANSI/MIL-STD-1815A-1983) is assigned to the Ada Joint Program Office, which is the sponsor of the ANSI standard. All questions concerning the meaning of FIPS language specifications should be addressed to:

Director  
Ada Joint Program Office  
3D139 (400 A/N) The Pentagon  
Washington, DC 20301

**11.3 Validation of Ada Processors.** The General Services Administration (GSA), through its Federal Software Management Support Center (FSMSC), provides a service for the purpose of validating the conformance to this standard of compilers offered for Federal procurement. The validation system reports the nature of any deviations that are detected. This service is offered on a reimbursable basis. Further information about the validation service can be obtained from the FSMSC which is located at 5203 Leesburg Pike, Suite 1100, Falls Church, VA 22041-3467 (703-756-6156).

**12. Where to Obtain Copies.** Copies of this publication are for sale by the National Technical Information Service, U.S. Department of Commerce, Springfield, VA 22161. (Sale of the included specifications document is by arrangement with the American National Standards Institute.) When ordering, refer to Federal Information Processing Standards Publication 119 (FIPSPUB119), and title. Payment may be made by check, money order, or deposit account.



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## *Periodical*

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## Selected Subjects

### National Bureau of Standards

#### NOTICES

Information processing standards, Federal:  
Ada programming language; correction, 18924

### National Bureau of Standards

[Docket No. 50839-5139]

#### Federal Information Processing Standard 119, Ada Programming Language

**AGENCY:** National Bureau of Standards,  
Commerce.

**ACTION:** Final notice; correction.

**SUMMARY:** In FR Doc. 85-26706, appearing on pages 46472-46474, in the issue of Friday, November 8, 1985, a portion of a sentence was inadvertently omitted which is now being added as shown below.

On page 46474, first column, section 11.1 *Acquisition of Ada Processors* which continues into the middle column on that page, the concluding paragraph in section 11.1 should read as follows:

"A transition period provides time for industry to produce Ada processors conforming to the standard. The transition period begins on the effective date and continues for one year (1) thereafter. The provisions of this publication apply to orders placed after the effective date; however, an Ada language processor not conforming to FIPS Ada may be acquired for interim use during the transition period."

**FOR FURTHER INFORMATION CONTACT:**  
Ms. Mabel Vickers, Center for  
Programming Science and Technology,  
Institute for Computer Sciences and  
Technology, National Bureau of  
Standards, Gaithersburg, MD 20899,  
(301) 921-2431.

Dated: May 20, 1986.

Ernest Ambler,

Director.

[FR Doc. 86-11638 Filed 5-22-86; 8:45 am]

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U. S. DEPARTMENT OF COMMERCE  
NATIONAL BUREAU OF STANDARDS  
INSTITUTE FOR COMPUTER SCIENCES AND TECHNOLOGY  
Gaithersburg, MD 20899

CHANGE NO.

1

DATE OF CHANGE

1986 May 30

FIPS PUB. NO.

119

**FIPS PUBLICATION CHANGE NOTICE**

TITLE OF PUBLICATION

FIPS PUB 119, Ada Programming Language

This office has a record of your interest in receiving changes to the above FIPS PUB. The change(s) indicated below have been provided by the Maintenance Agency for this publication and will be included in the next published revision to this FIPS PUB. Questions or requests for additional information should be addressed to the Maintenance Agency:

Department of Commerce  
National Bureau of Standards  
Institute for Computer Sciences and Technology  
Gaithersburg, MD 20899

CHANGE ITEM(S)

Attached is a reprint from the May 23, 1986 FEDERAL REGISTER which corrects concluding paragraph in section 11.1, Acquisition of Ada Processors. This correction becomes an integral part of the FIPS PUB 119 and, as such, is considered to be included whenever reference is made to the publication.

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