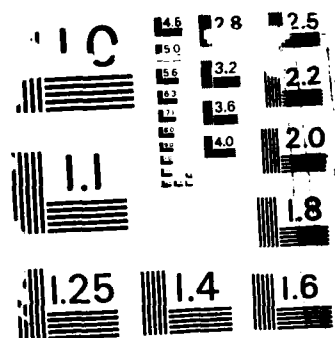AD-A191 637   ADA (TRADE NAME) COMPILER VALIDATION SUMMARY REPORT: 1/1
GOULD INC APLEX ADA..(U) AERONAUTICAL SYSTEMS DIV
WRIGHT-PATTERSON AFB OH ADA VALIDATI..   21 MAY 87

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AD-A191 637

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

See Attached

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EXECUTIVE SUMMARY

This Validation Summary Report (VSR) summarizes the results and conclusions of validation testing performed on the APLEX® Ada Compiler, Version 1.0, using Version 1.8 of the Ada® Compiler Validation Capability (ACVC). The APLEX Ada Compiler is hosted on a Gould PowerNode Model 9080 operating under UTX/32, Version 2.0. Programs processed by this compiler may be executed on a Gould PowerNode Model 6080 having no operating system.

On-site testing was performed 18 May 1987 through 21 May 1987 at Gould, Inc. in Ft. Lauderdale FL, under the direction of the Ada Validation Facility (AVF), according to Ada Validation Organization (AVO) policies and procedures. The AVF identified 2102 of the 2399 tests in ACVC Version 1.8 to be processed during on-site testing of the compiler. The 19 tests withdrawn at the time of validation testing, as well as the 278 executable tests that make use of floating-point precision exceeding that supported by the implementation, were not processed. After the 2102 tests were processed, results for Class A, C, D, and E tests were examined for correct execution. Compilation listings for Class B tests were analyzed for correct diagnosis of syntax and semantic errors. Compilation and link results of Class L tests were analyzed for correct detection of errors. There were 63 of the processed tests determined to be inapplicable. The remaining 2039 tests were passed.

The results of validation are summarized in the following table:

RESULT	CHAPTER												TOTAL
	2	3	4	5	6	7	8	9	10	11	12	14	
Passed	93	204	280	239	161	97	135	262	107	32	217	212	2039
Failed	0	0	0	0	0	0	0	0	0	0	0	0	0
Inapplicable	23	121	140	8	0	0	4	0	23	0	1	21	341
Withdrawn	0	5	5	0	0	1	1	2	4	0	1	0	19
TOTAL	116	330	425	247	161	98	140	264	134	32	219	233	2399

The AVF concludes that these results demonstrate acceptable conformity to ANSI/MIL-STD-1815A Ada.

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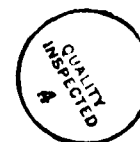
AVF Control Number: 76.0687
87-03-09-GOU

Ada® COMPILER
VALIDATION SUMMARY REPORT:
Gould, Inc.
APLEX® Ada Compiler, Version 1.0
Gould PowerNode Model 9080 Host
and
Gould PowerNode Model 6080 Target

Completion of On-Site Testing:
21 May 1987

Prepared By:
Ada Validation Facility
ASD/SCOL
Wright-Patterson AFB OH   45433-6503

Prepared For:
Ada Joint Program Office
United States Department of Defense
Washington, D.C.

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Ada® Compiler Validation Summary Report:

Compiler Name: APLEX℗ Ada Compiler, Version 1.0
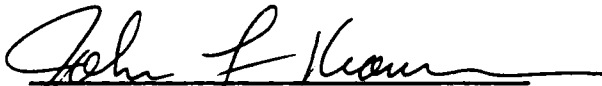
Host: Gould PowerNode Model 9080   Target: Gould PowerNode Model 6080
        under UTX/32, Version 2.0   (Bare Machine)

Testing Completed 21 May 1987 Using ACVC 1.8

This report has been reviewed and is approved.

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EXECUTIVE SUMMARY

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CHAPTER 1

INTRODUCTION

This Validation Summary Report (VSR) describes the extent to which a specific Ada compiler conforms to the Ada Standard, ANSI/MIL-STD-1815A. This report explains all technical terms used within it and thoroughly reports the results of testing this compiler using the Ada Compiler Validation Capability (ACVC). An Ada compiler must be implemented according to the Ada Standard, and any implementation-dependent features must conform to the requirements of the Ada Standard. The Ada Standard must be implemented in its entirety, and nothing can be implemented that is not in the Standard.

Even though all validated Ada compilers conform to the Ada Standard, it must be understood that some differences do exist between implementations. The Ada Standard permits some implementation dependencies--for example, the maximum length of identifiers or the maximum values of integer types. Other differences between compilers result from characteristics of particular operating systems, hardware, or implementation strategies. All of the dependencies observed during the process of testing this compiler are given in this report.

The information in this report is derived from the test results produced during validation testing. The validation process includes submitting a suite of standardized tests, the ACVC, as inputs to an Ada compiler and evaluating the results. The purpose of validating is to ensure conformity of the compiler to the Ada Standard by testing that the compiler properly implements legal language constructs and that it identifies and rejects illegal language constructs. The testing also identifies behavior that is implementation dependent but permitted by the Ada Standard. Six classes of tests are used. These tests are designed to perform checks at compile time, at link time, and during execution.

INTRODUCTION

1.1 PURPOSE OF THIS VALIDATION SUMMARY REPORT

This VSR documents the results of the validation testing performed on an
Ada compiler. Testing was carried out for the following purposes:

- To attempt to identify any language constructs supported by the
  compiler that do not conform to the Ada Standard

- To attempt to identify any unsupported language constructs
  required by the Ada Standard

- To determine that the implementation-dependent behavior is allowed
  by the Ada Standard

Testing of this compiler was conducted by SofTech, Inc., under the
direction of the AVF according to policies and procedures established by
the Ada Validation Organization (AVO). On-site testing was conducted from
18 May 1987 through 21 May 1987 at Gould, Inc. in Ft. Lauderdale FL.

1.2 USE OF THIS VALIDATION SUMMARY REPORT

Consistent with the national laws of the originating country, the AVO may
make full and free public disclosure of this report. In the United States,
this is provided in accordance with the "Freedom of Information Act" (5
U.S.C. #552). The results of this validation apply only to the computers,
operating systems, and compiler versions identified in this report.

The organizations represented on the signature page of this report do not
represent or warrant that all statements set forth in this report are
accurate and complete, or that the subject compiler has no nonconformities
to the Ada Standard other than those presented. Copies of this report are
available to the public from:

> Ada Information Clearinghouse
> Ada Joint Program Office
> OUSDRE
> The Pentagon, Rm 3D-139 (Fern Street)
> Washington DC 20301-3081

or from:

> Ada Validation Facility
> ASD/SCOL
> Wright-Patterson AFB OH 45433-6503

Questions regarding this report or the validation test results should be directed to the AVF listed above or to:

> Ada Validation Organization
> Institute for Defense Analyses
> 1801 North Beauregard Street
> Alexandria VA 22311

1.3 REFERENCES

1. Reference Manual for the Ada Programming Language, ANSI/MIL-STD-1815A, FEB 1983.

2. Ada Validation Organization: Policies and Procedures, Ada Joint Program Office, 1 January 1987.

3. Ada Compiler Validation Capability Implementers' Guide, SofTech, Inc., DEC 1984.

1.4 DEFINITION OF TERMS

ACVC
:   The Ada Compiler Validation Capability. A set of programs that evaluates the conformity of a compiler to the Ada language specification, ANSI/MIL-STD-1815A.

Ada Standard
:   ANSI/MIL-STD-1815A, February 1983.

Applicant
:   The agency requesting validation.

AVF
:   The Ada Validation Facility. In the context of this report, the AVF is responsible for conducting compiler validations according to established policies and procedures.

AVO
:   The Ada Validation Organization. In the context of this report, the AVO is responsible for setting procedures for compiler validations.

Compiler
:   A processor for the Ada language. In the context of this report, a compiler is any language processor, including cross-compilers, translators, and interpreters.

Failed test
:   A test for which the compiler generates a result that demonstrates nonconformity to the Ada Standard.

Host
:   The computer on which the compiler resides.

Inapplicable A test that uses features of the language that a compiler is
test   not required to support or may legitimately support in a way
              other than the one expected by the test.

Passed test   A test for which a compiler generates the expected result.

Target   The computer for which a compiler generates code.

Test   A program that checks a compiler's conformity regarding a
              particular feature or features to the Ada Standard. In the
              context of this report, the term is used to designate a
              single test, which may comprise one or more files.

Withdrawn   A test found to be incorrect and not used to check conformity
test   to the Ada language specification. A test may be incorrect
              because it has an invalid test objective, fails to meet its
              test objective, or contains illegal or erroneous use of the
              language.

1.5 ACVC TEST CLASSES

Conformity to the Ada Standard is measured using the ACVC.   The ACVC
contains both legal and illegal Ada programs structured into six test
classes: A, B, C, D, E, and L. The first letter of a test name identifies
the class to which it belongs. Class A, C, D, and E tests are executable,
and special program units are used to report their results during
execution.   Class B tests are expected to produce compilation errors.
Class L tests are expected to produce link errors.

Class A tests check that legal Ada programs can be successfully compiled
and execution. However, no checks are performed during execution to see if
the test objective has been met. For example, a Class A test checks that
reserved words of another language (other than those already reserved in
the Ada language) are not treated as reserved words by an Ada compiler.   A
Class A test is passed if no errors are detected at compile time and the
program executes to produce a PASSED message.

Class B tests check that a compiler detects illegal language usage.   Class
B tests are not executable. Each test in this class is compiled and the
resulting compilation listing is examined to verify that every syntax or
semantic error in the test is detected. A Class B test is passed if every
illegal construct that it contains is detected by the compiler.

Class C tests check that legal Ada programs can be correctly compiled and
executed.   Each Class C test is self-checking and produces a PASSED,
FAILED, or NOT APPLICABLE message indicating the result when it is
executed.

Class D tests check the compilation and execution capacities of a compiler.
Since there are no capacity requirements placed on a compiler by the Ada
Standard for some parameters--for example, the number of identifiers

permitted in a compilation or the number of units in a library--a compiler may refuse to compile a Class D test and still be a conforming compiler. Therefore, if a Class D test fails to compile because the capacity of the compiler is exceeded, the test is classified as inapplicable. If a Class D test compiles successfully, it is self-checking and produces a PASSED or FAILED message during execution.

Each Class E test is self-checking and produces a NOT APPLICABLE, PASSED, or FAILED message when it is compiled and executed. However, the Ada Standard permits an implementation to reject programs containing some features addressed by Class E tests during compilation. Therefore, a Class E test is passed by a compiler if it is compiled successfully and executes to produce a PASSED message, or if it is rejected by the compiler for an allowable reason.

Class L tests check that incomplete or illegal Ada programs involving multiple, separately compiled units are detected and not allowed to execute. Class L tests are compiled separately and execution is attempted. A Class L test passes if it is rejected at link time--that is, an attempt to execute the main program must generate an error message before any declarations in the main program or any units referenced by the main program are elaborated.

Two library units, the package REPORT and the procedure CHECK_FILE, support the self-checking features of the executable tests. The package REPORT provides the mechanism by which executable tests report PASSED, FAILED, or NOT APPLICABLE results. It also provides a set of identity functions used to defeat some compiler optimizations allowed by the Ada Standard that would circumvent a test objective. The procedure CHECK_FILE is used to check the contents of text files written by some of the Class C tests for chapter 14 of the Ada Standard. The operation of these units is checked by a set of executable tests. These tests produce messages that are examined to verify that the units are operating correctly. If these units are not operating correctly, then the validation is not attempted.

The text of the tests in the ACVC follow conventions that are intended to ensure that the tests are reasonably portable without modification. For example, the tests make use of only the basic set of 55 characters, contain lines with a maximum length of 72 characters, use small numeric values, and place features that may not be supported by all implementations in separate tests. However, some tests contain values that require the test to be customized according to implementation-specific values--for example, an illegal file name. A list of the values used for this validation is provided in Appendix C.

A compiler must correctly process each of the tests in the suite and demonstrate conformity to the Ada Standard by either meeting the pass criteria given for the test or by showing that the test is inapplicable to the implementation. The applicability of a test to an implementation is considered each time the implementation is validated. A test that is inapplicable for one validation is not necessarily inapplicable for a subsequent validation.

INTRODUCTION

Any test that was determined to contain an illegal language construct or an
erroneous language construct is withdrawn from the ACVC and, therefore, is
not used in testing a compiler. The tests withdrawn at the time of
validation are given in Appendix D.

CHAPTER 2

CONFIGURATION INFORMATION

2.1 CONFIGURATION TESTED

The candidate compilation system for this validation was tested under the following configuration:

Compiler: APLEX Ada Compiler, Version 1.0

ACVC Version: 1.8

Certificate Number: 870518W1.08054

Host Computer:

Machine:	Gould PowerNode Model 9080
Operating System:	UTX/32, Version 2.0
Memory Size:	16 megabytes

Target Computer:

Machine:	Gould PowerNode Model 6080
Operating System:	None
Memory Size:	16 megabytes

Communications Network: Ethernet local area network

The host and target computers are connected to an Ethernet local area network. The target system console terminal is replaced by a model CS-1 Communications Server manufactured by Bridge Communications Inc. This server is connected to the Ethernet and allows target system control (reset, program load, etc.) to be commanded from the host system. ACVC test load modules are transferred via the Ethernet controllers to a disc on the target system.

CONFIGURATION INFORMATION

2.2 IMPLEMENTATION CHARACTERISTICS

One of the purposes of validating compilers is to determine the behavior of
a compiler in those areas of the Ada Standard that permit implementations
to differ. Class D and E tests specifically check for such implementation
differences.   However, tests in other classes also characterize an
implementation. This compiler is characterized by the following
interpretations of the Ada Standard:

. Capacities.

   The compiler correctly processes tests containing loop statements
   nested to 65 levels, block statements nested to 65 levels, and
   recursive procedures separately compiled as subunits nested to 17
   levels.   It correctly processes a compilation containing 723
   variables in the same declarative part. (See tests D55A03A..H (8
   tests), D56001B, D64005E..G (3 tests), and D29002K.)

. Universal integer calculations.

   An implementation is allowed to reject universal integer
   calculations having values that exceed SYSTEM.MAX_INT.   This
   implementation does not reject such calculations and processes
   them correctly.   (See tests D4A002A, D4A002B, D4A004A, and
   D4A004B.)

. Predefined types.

   This implementation does not support additional predefined types
   in the package STANDARD. (See tests B86001C and B86001D.)

. Based literals.

   An implementation is allowed to reject a based literal with a
   value exceeding SYSTEM.MAX_INT during compilation, or it may raise
   NUMERIC_ERROR or CONSTRAINT_ERROR during execution.   This
   implementation raises NUMERIC_ERROR during execution. (See test
   E24101A.)

. Array types.

   An implementation is allowed to raise NUMERIC_ERROR or
   CONSTRAINT_ERROR for an array having a 'LENGTH that exceeds
   STANDARD.INTEGER'LAST and/or SYSTEM.MAX_INT.

   A packed BOOLEAN array having a 'LENGTH exceeding INTEGER'LAST
   raises NUMERIC_ERROR when the array type is declared. (See test
   C52103X.)

A packed two-dimensional BOOLEAN array with more than INTEGER'LAST components raises NUMERIC_ERROR when the array type is declared. (See test C52104Y.)

A null array with one dimension of length greater than INTEGER'LAST may raise NUMERIC_ERROR or CONSTRAINT_ERROR either when declared or assigned. Alternatively, an implementation may accept the declaration. However, lengths must match in array slice assignments. This implementation raises NUMERIC_ERROR when the array type is declared. (See test E52103Y.)

In assigning one-dimensional array types, the expression appears to be evaluated in its entirety before CONSTRAINT_ERROR is raised when checking whether the expression's subtype is compatible with the target's subtype. In assigning two-dimensional array types, the expression does not appear to be evaluated in its entirety before CONSTRAINT_ERROR is raised when checking whether the expression's subtype is compatible with the target's subtype. (See test C52013A.)

. Discriminated types.

During compilation, an implementation is allowed to either accept or reject an incomplete type with discriminants that is used in an access type definition with a compatible discriminant constraint. This implementation accepts such subtype indications. (See test E38104A.)

In assigning record types with discriminants, the expression appears to be evaluated in its entirety before CONSTRAINT_ERROR is raised when checking whether the expression's subtype is compatible with the target's subtype. (See test C52013A.)

. Aggregates.

In the evaluation of a multi-dimensional aggregate, the order in which choices are evaluated and index subtype checks are made appears to depend upon the aggregate itself. (See tests C43207A and C43207B.)

In the evaluation of an aggregate containing subaggregates, all choices are not evaluated before being checked for identical bounds. (See test E43212B.)

All choices are evaluated before CONSTRAINT_ERROR is raised if a bound in a nonnull range of a nonnull aggregate does not belong to an index subtype. (See test E43211B.)

- Functions.

  An implementation may allow the declaration of a parameterless function and an enumeration literal having the same profile in the same immediate scope, or it may reject the function declaration. If it accepts the function declaration, the use of the enumeration literal's identifier denotes the function. This implementation rejects the declaration. (See test E66001D.)

- Representation clauses.

  The Ada Standard does not require an implementation to support representation clauses. If a representation clause is not supported, then the implementation must reject it. While the operation of representation clauses is not checked by Version 1.8 of the ACVC, they are used in testing other language features. This implementation accepts 'SIZE and 'STORAGE_SIZE for tasks; it rejects 'STORAGE_SIZE for collections and 'SMALL clauses. Enumeration representation clauses, including those that specify noncontiguous values, appear not to be supported. (See tests C55B16A, C87B62A, C87B62B, C87B62C, and BC1002A.)

- Pragmas.

  The pragma INLINE is not supported for functions or procedures. (See tests CA3004E and CA3004F.)

- Input/output.

  The package SEQUENTIAL_IO cannot be instantiated with unconstrained array types and record types with discriminants. The package DIRECT_IO cannot be instantiated with unconstrained array types and record types with discriminants without defaults. (See tests AE2101C, AE2101H, CE2201D, CE2201E, and CE2401D.)

  An existing text file can be opened in OUT_FILE mode and can be created in both OUT_FILE and IN_FILE modes. (See test EE3102C.)

  Only one internal file can be associated with each external file for text I/O, sequential I/O, and direct I/O. (See tests CE2107A..F (6 tests) and CE3111A..E (5 tests).)

  Temporary sequential files and direct files are given a name. Temporary files given names are not deleted when they are closed. (See tests CE2108A and CE2108C.)

. Generics.

Generic subprogram declarations and bodies cannot be compiled in separate compilations. (See test CA2009F.)

Generic package declarations and bodies cannot be compiled in separate compilations. (See tests CA2009C and BC3205D.)

CHAPTER 3

TEST INFORMATION

3.1 TEST RESULTS

Version 1.8 of the ACVC contains 2399 tests. When validation testing of APLEX Ada Compiler was performed, 19 tests had been withdrawn. The remaining 2380 tests were potentially applicable to this validation. The AVF determined that 341 tests were inapplicable to this implementation, and that the 2039 applicable tests were passed by the implementation.

The AVF concludes that the testing results demonstrate acceptable conformity to the Ada Standard.

3.2 SUMMARY OF TEST RESULTS BY CLASS

RESULT	TEST CLASS						TOTAL
	A	B	C	D	E	L	
Passed	67	860	1053	17	11	31	2039
Failed	0	0	0	0	0	0	0
Inapplicable	2	7	315	0	2	15	341
Withdrawn	0	7	12	0	0	0	19
TOTAL	69	874	1380	17	13	46	2399

3.3 SUMMARY OF TEST RESULTS BY CHAPTER

RESULT	2	3	4	5	6	7	8	9	10	11	12	14	TOTAL
						CHAPTER							
Passed	93	204	280	239	161	97	135	262	107	32	217	212	2039
Failed	0	0	0	0	0	0	0	0	0	0	0	0	0
Inapplicable	23	121	140	8	0	0	4	0	23	0	1	21	341
Withdrawn	0	5	5	0	0	1	1	2	4	0	1	0	19
TOTAL	116	330	425	247	161	98	140	264	134	32	219	233	2399

3.4 WITHDRAWN TESTS

The following 19 tests were withdrawn from ACVC Version 1.8 at the time of this validation:

C32114A	C41404A	B74101B	BC3204C
B33203C	B45116A	C87B50A	
C34018A	C48008A	C92005A	
C35904A	B49006A	C940ACA	
B37401A	B4A010C	CA3005A..D (4 tests)	

See Appendix D for the reason that each of these tests was withdrawn.

3.5 INAPPLICABLE TESTS

Some tests do not apply to all compilers because they make use of features that a compiler is not required by the Ada Standard to support. Others may depend on the result of another test that is either inapplicable or withdrawn. The applicability of a test to an implementation is considered each time a validation is attempted. A test that is inapplicable for one validation attempt is not necessarily inapplicable for a subsequent attempt. For this validation attempt, 341 tests were inapplicable for the reasons indicated:

- C34001D, B52004E, B55B09D, and C55B07B use SHORT_INTEGER which is not supported by this compiler.

- C34001E, B52004D, B55B09C, and C55B07A use LONG_INTEGER which is not supported by this compiler.

- C34001F and C35702A use SHORT_FLOAT which is not supported by this compiler.

- C34001G and C35702B use LONG_FLOAT which is not supported by this compiler.

- C52008B declares a record type with four discriminants of type integer and having default values. The type may be used in the declaration of unconstrained objects, but the size of these objects exceeds the maximum object size of this implementation, and NUMERIC_ERROR is raised.

- C55B16A makes use of an enumeration representation clause containing noncontiguous values which is not supported by this compiler.

- B86001D requires a predefined numeric type other than those defined by the Ada language in package STANDARD. There is no such type for this implementation.

- C86001F redefines package SYSTEM, but TEXT_IO is made obsolete by this new definition in this implementation and the test cannot be executed since the package REPORT is dependent on the package TEXT_IO.

- C87B62B..C (2 tests) use length clauses which are not supported by this compiler. The length clauses 'STORAGE_SIZE for access types and 'SMALL are rejected during compilation.

- BA1011C, CA1012A, CA2009C, CA2009F, LA5008A..H (8 tests), LA5008J, LA5008M, LA5008N, and BC3205D compile generic specifications and bodies in separate compilations which is not supported by this compiler.

- CA3004E, EA3004C, and LA3004A use INLINE pragma for procedures which is not supported by this compiler.

- CA3004F, EA3004D, and LA3004B use INLINE pragma for functions which is not supported by this compiler.

- LA5008I and LA5008K are inapplicable because, in this implementation, a generic unit is made obsolete by the recompilation of a unit on which the generic body (but not the specification) depends. Since this implementation does not support separate compilation of generic unit specifications and bodies, a generic specification must be considered obsolete whenever the body is found to be obsolete. These tests should report at link time that the body of a generic unit is obsolete. However, a compile-time error message reports that the generic unit is obsolete.

TEST INFORMATION

- AE2101C, CE2201D, and CE2201E use an instantiation of package
  SEQUENTIAL_IO with unconstrained array types which is not
  supported by this compiler.

- AE2101H and CE2401D use an instantiation of package DIRECT_IO witn
  unconstrained array types which is not supported by this compiler.

- CE2107A..F (6 tests), CE2110B, CE2111D, CE2111H, CE3111A..E (5
  tests), CE3114B, and CE3115A are inapplicable because multiple
  internal files cannot be associated with the same external file.
  The proper exception is raised when multiple access is attempted.

- The following 278 tests require a floating-point accuracy that
  exceeds the maximum of 6 supported by the implementation:

  C24113C..Y (23 tests)   C35708C..Y (23 tests)   C45421C..Y (23 tests)
  C35705C..Y (23 tests)   C35802C..Y (23 tests)   C45424C..Y (23 tests)
  C35706C..Y (23 tests)   C45241C..Y (23 tests)   C45521C..Z (24 tests)
  C35707C..Y (23 tests)   C45321C..Y (23 tests)   C45621C..Z (24 tests)

3.6 SPLIT TESTS

If one or more errors do not appear to have been detected in a Class B test
because of compiler error recovery, then the test is split into a set of
smaller tests that contain the undetected errors. These splits are then
compiled and examined. The splitting process continues until all errors
are detected by the compiler or until there is exactly one error per split.
Any Class A, Class C, or Class E test that cannot be compiled and executed
because of its size is split into a set of smaller subtests that can be
processed.

Splits were required for six Class B tests:

        BA3006A   BA3007B   BA3008B
        BA3006B   BA3008A   BA3013A

3.7 ADDITIONAL TESTING INFORMATION

3.7.1 Prevalidation

Prior to validation, a set of test results for ACVC Version 1.8 produced by
the APLEX Ada Compiler was submitted to the AVF by the applicant for
review. Analysis of these results demonstrated that the compiler
successfully passed all applicable tests, and that the compiler exhibited
the expected behavior on all inapplicable tests.

3.7.2 Test Method

Testing of the APLEX Ada Compiler using ACVC Version 1.8 was conducted on-site by a validation team from the AVF. The configuration consisted of a Gould PowerNode Model 9080 host operating under UTX/32, Version 2.0, and a Gould PowerNode Model 6080 target having no operating system. The host and target computers were linked via Ethernet local area network.

A magnetic tape containing all tests except for withdrawn tests and tests requiring unsupported floating-point precisions was taken on-site by the validation team for processing. Tests that make use of implementation-specific values were customized before being written to the magnetic tape. Tests requiring splits during the prevalidation testing were included in their split form on the magnetic tape.

The contents of the magnetic tape were loaded directly onto the host computer. The test files were renamed so that the file extension was '.ada' for every file. Gould reorganized the test files into a directory structure understood by the Gould automated testing utilities. After the test files were loaded to disk, the full set of tests was compiled and linked on the Gould PowerNode Model 9080, and all executable tests were run on the Gould PowerNode Model 6080. Object files were linked on the host computer, and executable images were transferred to the target computer via Ethernet. The target console was connected directly to the CS-1 Communications Server, which was connected to the host computer. Test results were sent to the console and relayed to the host computer via the CS-1 Communications Server. The results were then written to a file for printing from the host computer.

The compiler was tested using command scripts provided by Gould, Inc. and reviewed by the validation team. The following options were in effect for testing:

Option	Effect
+listing	Causes a listing file to be produced
+raise	Causes internal exceptions within the compiler to be propagated to the user
+list_name	Name of the listing file

Test output, compilation listings, and job logs were captured on magnetic tape and archived at the AVF. The listings examined on-site by the validation team were also archived.

TEST INFORMATION

3.7.3 Test Site

The validation team arrived at Gould, Inc. in Ft. Lauderdale FL on 18 May
1987, and departed after testing was completed on 21 May 1987.

APPENDIX A

DECLARATION OF CONFORMANCE

Gould, Inc. has submitted the following declaration of
conformance concerning the APLEX Ada Compiler.

DECLARATION OF CONFORMANCE

Compiler Implementor: Gould, Inc.
Ada®Validation Facility: ASD/SCOL, Wright-Patterson AFB, OH
Ada Compiler Validation Capability (ACVC) Version: 1.8

Base Configuration

Base Compiler Name: APLEX Ada Compiler   Version: 1.0
Host Architecture ISA: Gould PowerNode Model 9080   .
OS&VER #: UTX/32, Version 2.0
Target Architecture ISA: Gould PowerNode Model 6080
OS&VER #: No operating system

Implementor's Declaration

I, the undersigned, representing TeleSoft, Inc., have implemented no
deliberate extensions to the Ada Language Standard ANSI/MIL-STD-1815A
in the compiler(s) listed in this declaration. I declare that Gould
Inc. is the owner of record of the Ada language compiler(s) listed
above and, as such, is responsible for maintaining said compiler(s) in
conformance to ANSI/MIL-STD-1815A. All certificates and registrations
for Ada language compiler(s) listed in this declaration shall be made
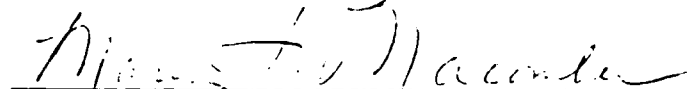only in the owner's corporate name.

_____   Date:____5/__/_____
TeleSoft, Inc.
Ray Parra, Director of Contracts/Legal

Owner's Declaration

I, the undersigned, representing Gould Inc., take full responsibility
for implementation and maintenance of the Ada compiler(s) listed
above, and agree to the public disclosure of the final Validation
Summary Report. I further agree to continue to comply with the Ada
trademark policy, as defined by the Ada Joint Program Office. I
declare that all of the Ada language compilers listed, and their
host/target performance are in compliance with the Ada Language
Standard ANSI/MIL-STD-1815A.

_____   Date:_____
Gould Inc.
Mary F. Macomber, Manager, Major Corporate Agreements

_____

®Ada is a registered trademark of the United States Government
 (Ada Joint Program Office).

APPENDIX B

APPENDIX F OF THE Ada STANDARD

The only allowed implementation dependencies correspond to implementation-dependent pragmas, to certain machine-dependent conventions as mentioned in chapter 13 of MIL-STD-1815A, and to certain allowed restrictions on representation clauses. The implementation-dependent characteristics of the APLEX Ada Compiler, Version 1.0, are described in the following sections which discuss topics in Appendix F of the Ada Language Reference Manual (ANSI/MIL-STD-1815A). Implementation-specific portions of the package STANDARD are also included in this appendix.

```
package STANDARD is

    ...

    type INTEGER is range -2_147_483_648 .. 2_147_483_647;

    type FLOAT is digits 6 range -7.23698E+75 .. 7.23698E+75;

    type DURATION is delta 2#1.0#E-14 range -86_400.0 .. +86_400.0;

    ...

end STANDARD;
```

1. Implementation Dependent Pragmas

    There is one implementation-defined pragma, COMMENT. It has the form:

    >   pragma COMMENT (<string_literal>);

    It may only appear within a compilation unit and has the effect of embedding the given
    sequence of characters in the object code of the compilation unit.

2. Implementation Dependent Attributes

    There are no implementation dependent attributes.

3. Specification of Package SYSTEM

```
-- Pragma Comment("This is an unpublished work written by TeleSoft");
-- Pragma Comment("Copyright 1984, 1985 TeleSoft.  All rights
   reserved");
--
--       Change History.
--
-- ps 2.02.85 Original version
-- ps 2.09.85 Additions for tasking support
-- ps 3.05.85 Modification for 32 bit integer support
-- ps 3.18.85 Added system.subprogram_value
-- ps 3.26.85 Modified Priority to be range 1..1 to fix PAR 1684
-- ps 5.17.85 Modified definitions for delta and fine_delta to use
--            be type float instead of integer.
-- ps 6.19.85 Amended definition of "fine_delta" to be an exact
--            binary number.
-- ps 6.27.85 Amended the definition of "priority" to be non-null
--


With Gould_names:
package System is

  Pragma Elaborate(Gould_names);

  type Address is private;

  type Name     is (Gould_UTX, Gould_MPX, Gould_BMA);
  System_Name  : constant name := Name'Val (Gould_names.sys_name);

  Storage_Unit : constant := 8;
  Memory_Size  : constant:= 2**24-1;

  -- System-Dependent Declarations

  subtype byte             is integer range         0 .. 2** 8-1;
  subtype integer_16       is integer range   -2**15 .. 2**15-1;
  subtype integer_32       is integer; -- range -2**31 .. 2**31-1;
```

```
      -- System_Dependent Named Numbers:

      Min_Int              :   constant  := -2**31;
      Max_Int              :   constant  := +2**31-1;
      Max_Digits           :   constant  := 6;
      Max_Mantissa         :   constant  := 31;
      Fine_delta           :   constant  := 1.0 / (2.0**(Max_Mantissa - 1));
      Tick                 :   constant  := 1.0 / (2.0 ** 14);


      -- Other System_Dependent Declarations
      Max_Object_Size    :   CONSTANT   := Max_Int;
      Max_Record_Count   :   CONSTANT   := Max_Int;
      Max_Text_Io_Count  :   CONSTANT   := Max_Int-1;
      Max_Text_Io_Field  :   CONSTANT   := 1000;

      subtype Priority is integer range 0 .. 255;



      Null_address   :   constant address;

      type reg_array is array (0..7) of integer_32;

      type subprogram_value is record
                               base_regs:   reg_array;
                        end record;

private

   type Address is new integer_32;
   Null_address : constant address := 0;

end System;

package body system is

begin
   null;
end;

Package Gould_names is

   Function Sys_name return integer;

end Gould_names;


Package Body Gould_names is

   Function Sys_name return integer is
   begin
      Return 2;
   end;

end Gould_names;
```

4. Restrictions on Representation Clauses

   The Compiler supports the following representation clauses:

   Length Clauses: for tasks 'STORAGE_SIZE (LRM 13.2(c))
   Length Clauses: for the attribute 'SIZE (LRM 13.2(a))
   Address Clauses: for objects (LRM 13.5)

5. Implementation dependent naming conventions

   There are no implementation-generated names denoting implementation
   dependent components.

6. Expressions that appear in address specifications are interpreted as
   the first storage unit of the object.

7. Restrictions on Unchecked Conversions

   Unchecked conversions are allowed between variables of types (or
   subtypes) T1 and T2 provided that 1) they have the same static size,
   2) they are not unconstrained array types, and 3) they are not
   private (unless they are subtypes of or are derived from a private
   type SYSTEM.ADDRESS).

8. I/O Package Characteristics

   Instantiations of DIRECT_IO and SEQUENTIAL_IO are supported with the
   following exceptions:

     * Unconstrained array types.
     * Unconstrained types with discriminates without default
       values.

     * In DIRECT_IO the type COUNT is defined as follows:

          type COUNT is range 0..2_147_483_647;

     * In TEXT_IO the type COUNT is defined as follows:

          type COUNT is range 0..2_147_483_646;

     * In TEXT_IO the subtype FIELD is defined as follows:

          subtype FIELD is INTEGER range 0..1000;

APPENDIX C

TEST PARAMETERS

Certain tests in the ACVC make use of implementation-dependent values, such as the maximum length of an input line and invalid file names. A test that makes use of such values is identified by the extension .TST in its file name. Actual values to be substituted are represented by names that begin with a dollar sign. A value must be substituted for each of these names before the test is run. The values used for this validation are given below.

Name and Meaning	Value
$BIG_ID1 Identifier the size of the maximum input line length with varying last character.	(1..199 => 'A', 200 => '1')
$BIG_ID2 Identifier the size of the maximum input line length with varying last character.	(1..199 => 'A', 200 => '2')
$BIG_ID3 Identifier the size of the maximum input line length with varying middle character.	(1..100 | 102..200 => 'A', 101 => '3')
$BIG_ID4 Identifier the size of the maximum input line length with varying middle character.	(1..100 | 102..200 => 'A', 101 => '4')
$BIG_INT_LIT An integer literal of value 298 with enough leading zeroes so that it is the size of the maximum line length.	(1..197 => '0', 198..200 => "298")

TEST PARAMETERS

Name and Meaning	Value
$BIG_REAL_LIT A real literal that can be either of floating- or fixed-point type, has value 690.0, and has enough leading zeroes to be the size of the maximum line length.	(1..194 => '0', 195..200 => "69.0E1")
$BLANKS A sequence of blanks twenty characters fewer than the size of the maximum line length.	(1..180 => ' ')
$COUNT_LAST A universal integer literal whose value is TEXT_IO.COUNT'LAST.	2_147_483_645
$EXTENDED_ASCII_CHARS A string literal containing all the ASCII characters with printable graphics that are not in the basic 55 Ada character set.	"abcdefghijklmnopqrstuvwxyz" & "!$%?@[\]^`{}~"
$FIELD_LAST A universal integer literal whose value is TEXT_IO.FIELD'LAST.	1000
$FILE_NAME_WITH_BAD_CHARS An illegal external file name that either contains invalid characters, or is too long if no invalid characters exist.	"X}]!/@%#$^&~Y"
$FILE_NAME_WITH_WILD_CARD_CHAR An external file name that either contains a wild card character, or is too long if no wild card character exists.	(1..257 => 'A')
$GREATER_THAN_DURATION A universal real value that lies between DURATION'BASE'LAST and DURATION'LAST if any, otherwise any value in the range of DURATION.	100_000.0
$GREATER_THAN_DURATION_BASE_LAST The universal real value that is greater than DURATION'BASE'LAST, if such a value exists.	10_000_000.0

Name and Meaning	Value
$ILLEGAL_EXTERNAL_FILE_NAME1 An illegal external file name.	"BAD_CHARACTER%/*^"
$ILLEGAL_EXTERNAL_FILE_NAME2 An illegal external file name that is different from $ILLEGAL_EXTERNAL_FILE_NAME1.	(1..257 => 'A')
$INTEGER_FIRST The universal integer literal expression whose value is INTEGER'FIRST.	-2_147_483_648
$INTEGER_LAST The universal integer literal expression whose value is INTEGER'LAST.	2_147_483_647
$LESS_THAN_DURATION A universal real value that lies between DURATION'BASE'FIRST and DURATION'FIRST if any, otherwise any value in the range of DURATION.	-100_000.0
$LESS_THAN_DURATION_BASE_FIRST The universal real value that is less than DURATION'BASE'FIRST, if such a value exists.	-10_000_000.0
$MAX_DIGITS The universal integer literal whose value is the maximum digits supported for floating-point types.	6
$MAX_IN_LEN The universal integer literal whose value is the maximum input line length permitted by the implementation.	200
$MAX_INT The universal integer literal whose value is SYSTEM.MAX_INT.	2_147_483_647

TEST PARAMETERS

Name and Meaning	Value
$NAME A name of a predefined numeric type other than FLOAT, INTEGER, SHORT_FLOAT, SHORT_INTEGER, LONG_FLOAT, or LONG_INTEGER if one exists, otherwise any undefined name.	LONG_LONG_INTEGER
$NEG_BASED_INT A based integer literal whose highest order nonzero bit falls in the sign bit position of the representation for SYSTEM.MAX_INT.	16#FFFFFFFE#
$NON_ASCII_CHAR_TYPE An enumerated type definition for a character type whose literals are the identifier NON_NULL and all non-ASCII characters with printable graphics.	(NON_NULL)

APPENDIX D

WITHDRAWN TESTS

Some tests are withdrawn from the ACVC because they do not conform to the
Ada Standard. The following 19 tests had been withdrawn at the time of
validation testing for the reasons indicated. A reference of the form
"AI-ddddd" is to an Ada Commentary.

- C32114A: An unterminated string literal occurs at line 62.

- B33203C: The reserved word "IS" is misspelled at line 45.

- C34018A: The call of function G at line 114 is ambiguous in the
  presence of implicit conversions.

- C35904A: The elaboration of subtype declarations SFX3 and SFX4
  may raise NUMERIC_ERROR instead of CONSTRAINT_ERROR as expected in
  the test.

- B37401A: The object declarations at lines 126 through 135 follow
  subprogram bodies declared in the same declarative part.

- C41404A: The values of 'LAST and 'LENGTH are incorrect in the _if_
  statements from line 74 to the end of the test.

- B45116A: ARRPRIBL1 and ARRPRIBL2 are initialized with a value of
  the wrong type—PRIBOOL_TYPE instead of ARRPRIBOOL_TYPE—at line
  41.

- C48008A: The assumption that evaluation of default initial values
  occurs when an exception is raised by an allocator is incorrect
  according to AI-00397.

- B49006A: Object declarations at lines 41 and 50 are terminated
  incorrectly with colons, and _end_ _case_; is missing from line 42.

- B4A010C: The object declaration in line 18 follows a subprogram
  body of the same declarative part.

- B74101B: The <u>begin</u> at line 9 causes a declarative part to be treated as a sequence of statements.

- C87B50A: The call of "/=" at line 31 requires a use clause for package A.

- C92005A: The "/=" for type PACK.BIG_INT at line 40 is not visible without a use clause for the package PACK.

- C940ACA: The assumption that allocated task TT1 will run prior to the main program, and thus assign SPYNUMB the value checked for by the main program, is erroneous.

- CA3005A..D (4 tests): No valid elaboration order exists for these tests.

- BC3204C: The body of BC3204C0 is missing.

END

DATE

FILMED

6-1988

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