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Ada COMPILER
VALIDATION SUMMARY REPORT:
Certificate Number: 921119W1.11299
IBM Canada Ltd.
XL Ada/6000, Internal Development Version
RISC System/6000, model 7013-520 under AIX, 3.2

Prepared By:
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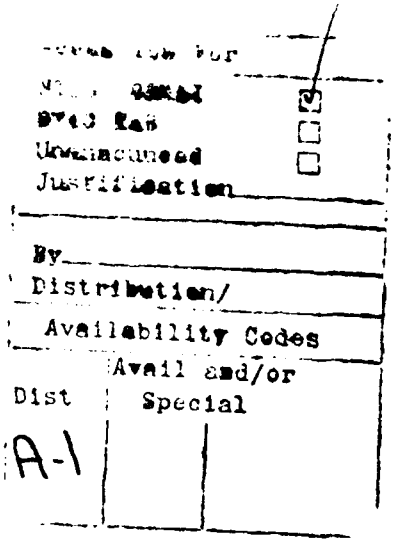

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Certificate Information

The following Ada implementation was tested and determined to pass ACVC 1.11. Testing was completed on 19 November 1992.

Compiler Name and Version: XL Ada/6000, Internal Development Version

Host Computer System: RISC System/6000, model 7013-520 under AIX, 3.2

Target Computer System: RISC System/6000, model 7013-520 under AIX, 3.2

Customer Agreement Number: 92-08-25-IBM

See section 3.1 for any additional information about the testing environment.

As a result of this validation effort, Validation Certificate 921119W1.11299 is awarded to IBM Canada Ltd.. This certificate expires 2 years after ANSI/MIL-STD-1815B is approved by ANSI.

This report has been reviewed and is approved.

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DECLARATION OF CONFORMANCE

Customer: IBM Canada Ltd.

Ada Validation Facility: Wright Patterson AVF
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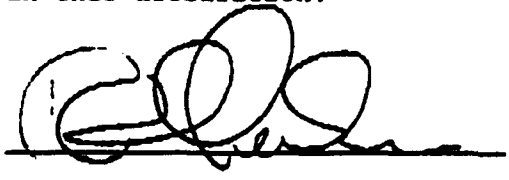
ACVC Version: 1.11

Ada Implementation:

Compiler Name and Version:	XL Ada/6000 Internal Development Version
Host Computer System:	RISC System/6000, model 7013-520, AIX 3.2
Target Computer System:	RISC System/6000, model 7013-520, AIX 3.2

Customer's Declaration

I, the undersigned, representing IBM Canada Ltd., declare that IBM Canada Ltd. has no knowledge of deliberate deviations from the Ada Language Standard ANSI/MIL-STD-1815A or the ISO 8652-1987 standard in the implementation listed in this declaration.



Date: 11/19/92

Bob Gerber
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CHAPTER 1

INTRODUCTION

The Ada implementation described above was tested according to the Ada Validation Procedures [Pro90] against the Ada Standard [Ada83] using the current Ada Compiler Validation Capability (ACVC). This Validation Summary Report (VSR) gives an account of the testing of this Ada implementation. For any technical terms used in this report, the reader is referred to [Pro90]. A detailed description of the ACVC may be found in the current ACVC User's Guide [UG89].

1.1 USE OF THIS VALIDATION SUMMARY REPORT

Consistent with the national laws of the originating country, the Ada Certification Body 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 implementation has no nonconformities to the Ada Standard other than those presented. Copies of this report are available to the public from the AVF which performed this validation or from:

National Technical Information Service
5285 Port Royal Road
Springfield VA 22161

Questions regarding this report or the validation test results should be directed to the AVF which performed this validation or to:

Ada Validation Organization
Computer and Software Engineering Division
Institute for Defense Analyses
1801 North Beauregard Street
Alexandria VA 22311-1772

1.2 REFERENCES

[Ada83] Reference Manual for the Ada Programming Language, ANSI/MIL-STD-1815A, February 1983 and ISO 8652-1987.

[Pro90] Ada Compiler Validation Procedures, Version 2.1, Ada Joint Program Office, August 1990.

[UG89] Ada Compiler Validation Capability User's Guide, 21 June 1989.

1.3 ACVC TEST CLASSES

Compliance of Ada implementations is tested by means of the ACVC. The ACVC contains a collection of test 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. Class B and class L tests are expected to produce errors at compile time and link time, respectively.

The executable tests are written in a self-checking manner and produce a PASSED, FAILED, or NOT APPLICABLE message indicating the result when they are executed. Three Ada library units, the packages REPORT and SPPRT13, and the procedure CHECK_FILE are used for this purpose. The package REPORT 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 package SPPRT13 is used by many tests for Chapter 13 of the Ada Standard. 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 REPORT and CHECK_FILE is checked by a set of executable tests. If these units are not operating correctly, validation testing is discontinued.

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 all violations of the Ada Standard are detected. Some of the class B tests contain legal Ada code which must not be flagged illegal by the compiler. This behavior is also verified.

Class L tests check that an Ada implementation correctly detects violation of the Ada Standard involving multiple, separately compiled units. Errors are expected at link time, and execution is attempted.

In some tests of the ACVC, certain macro strings have to be replaced by implementation-specific values — for example, the largest integer. A list of the values used for this implementation is provided in Appendix A. In addition to these anticipated test modifications, additional changes may be required to remove unforeseen conflicts between the tests and implementation-dependent characteristics. The modifications required for this implementation are described in section 2.3.

For each Ada implementation, a customized test suite is produced by the AVF. This customization consists of making the modifications described in the preceding paragraph, removing withdrawn tests (see section 2.1), and possibly removing some inapplicable tests (see section 2.2 and [UG89]).

In order to pass an ACVC an Ada implementation must process each test of the customized test suite according to the Ada Standard.

1.4 DEFINITION OF TERMS

Ada Compiler	The software and any needed hardware that have to be added to a given host and target computer system to allow transformation of Ada programs into executable form and execution thereof.
Ada Compiler Validation Capability (ACVC)	The means for testing compliance of Ada implementations, consisting of the test suite, the support programs, the ACVC user's guide and the template for the validation summary report.
Ada Implementation	An Ada compiler with its host computer system and its target computer system.
Ada Joint Program Office (AJPO)	The part of the certification body which provides policy and guidance for the Ada certification system.
Ada Validation Facility (AVF)	The part of the certification body which carries out the procedures required to establish the compliance of an Ada implementation.
Ada Validation Organization (AVO)	The part of the certification body that provides technical guidance for operations of the Ada certification system.
Compliance of an Ada Implementation	The ability of the implementation to pass an ACVC version.
Computer System	A functional unit, consisting of one or more computers and associated software, that uses common storage for all or part of a program and also for all or part of the data necessary for the execution of the program; executes user-written or user-designated programs; performs user-designated data manipulation, including arithmetic operations and logic operations; and that can execute programs that modify themselves during execution. A computer system may be a stand-alone unit or may consist of several inter-connected units.

Conformity	Fulfillment by a product, process, or service of all requirements specified.
Customer	An individual or corporate entity who enters into an agreement with an AVF which specifies the terms and conditions for AVF services (of any kind) to be performed.
Declaration of Conformance	A formal statement from a customer assuring that conformity is realized or attainable on the Ada implementation for which validation status is realized.
Host Computer System	A computer system where Ada source programs are transformed into executable form.
Inapplicable test	A test that contains one or more test objectives found to be irrelevant for the given Ada implementation.
ISO	International Organization for Standardization.
LRM	The Ada standard, or Language Reference Manual, published as ANSI/MIL-STD-1815A-1983 and ISO 8652-1987. Citations from the LRM take the form "<section>.<subsection>:<paragraph>."
Operating System	Software that controls the execution of programs and that provides services such as resource allocation, scheduling, input/output control, and data management. Usually, operating systems are predominantly software, but partial or complete hardware implementations are possible.
Target Computer System	A computer system where the executable form of Ada programs are executed.
Validated Ada Compiler	The compiler of a validated Ada implementation.
Validated Ada Implementation	An Ada implementation that has been validated successfully either by AVF testing or by registration [Pro90].
Validation	The process of checking the conformity of an Ada compiler to the Ada programming language and of issuing a certificate for this implementation.
Withdrawn test	A test found to be incorrect and not used in conformity testing. A test may be incorrect because it has an invalid test objective, fails to meet its test objective, or contains erroneous or illegal use of the Ada programming language.

CHAPTER 2

IMPLEMENTATION DEPENDENCIES

2.1 WITHDRAWN TESTS

The following tests have been withdrawn by the AVO. The rationale for withdrawing each test is available from either the AVO or the AVF. The publication date for this list of withdrawn tests is 2 August 1991.

E28005C	B28006C	C32203A	C34006D	C35508I	C35508J
C35508M	C35508N	C35702A	C35702B	B41308B	C43004A
C45114A	C45346A	C45612A	C45612B	C45612C	C45651A
C46022A	B49008A	B49008B	A74006A	C74308A	B83022B
B83022H	B83025B	B83025D	C83026A	B83026B	C83041A
B85001L	C86001F	C94021A	C97116A	C98003B	BA2011A
CB7001A	CB7001B	CB7004A	CC1223A	BC1226A	CC1226B
BC3009B	BD1B02B	BD1B06A	AD1B08A	BD2A02A	CD2A21E
CD2A23E	CD2A32A	CD2A41A	CD2A41E	CD2A87A	CD2B15C
BD3006A	BD4008A	CD4022A	CD4022D	CD4024B	CD4024C
CD4024D	CD4031A	CD4051D	CD5111A	CD7004C	ED7005D
CD7005E	AD7006A	CD7006E	AD7201A	AD7201E	CD7204B
AD7206A	BD8002A	BD8004C	CD9005A	CD9005B	CDA201E
CE2107I	CE2117A	CE2117B	CE2119B	CE2205B	CE2405A
CE3111C	CE3116A	CE3118A	CE3411B	CE3412B	CE3607B
CE3607C	CE3607D	CE3812A	CE3814A	CE3902B	

2.2 INAPPLICABLE TESTS

A test is inapplicable if it contains test objectives which are irrelevant for a given Ada implementation. Reasons for a test's inapplicability may be supported by documents issued by the ISO and the AJPO known as Ada Commentaries and commonly referenced in the format AI-ddddd. For this implementation, the following tests were determined to be inapplicable for the reasons indicated; references to Ada Commentaries are included as appropriate.

The following 201 tests have floating-point type declarations requiring more digits than SYSTEM.MAX_DIGITS:

C24113L..Y (14 tests)	C35705L..Y (14 tests)
C35706L..Y (14 tests)	C35707L..Y (14 tests)
C35708L..Y (14 tests)	C35802L..Z (15 tests)
C45241L..Y (14 tests)	C45321L..Y (14 tests)
C45421L..Y (14 tests)	C45521L..Z (15 tests)
C45524L..Z (15 tests)	C45621L..Z (15 tests)
C45641L..Y (14 tests)	C46012L..Z (15 tests)

The following 20 tests check for the predefined type LONG_INTEGER; for this implementation, there is no such type:

C35404C	C45231C	C45304C	C45411C	C45412C
C45502C	C45503C	C45504C	C45504F	C45611C
C45613C	C45614C	C45631C	C45632C	B52004D
C55B07A	B55B09C	B86001W	C86006C	CD7101F

C35713B, C45423B, B86001T, and C86006H check for the predefined type SHORT_FLOAT; for this implementation, there is no such type.

C35713D and B86001Z check for a predefined floating-point type with a name other than FLOAT, LONG_FLOAT, or SHORT_FLOAT; for this implementation, there is no such type.

C45531M..P and C45532M..P (8 tests) check fixed-point operations for types that require a SYSTEM.MAX_MANTISSA of 47 or greater; for this implementation, MAX_MANTISSA is less than 47.

C45624A..B (2 tests) check that the proper exception is raised if MACHINE_OVERFLOWS is FALSE for floating point types and the results of various floating-point operations lie outside the range of the base type; for this implementation, MACHINE_OVERFLOWS is TRUE.

B86001Y uses the name of a predefined fixed-point type other than type DURATION; for this implementation, there is no such type.

CA2009C and CA2009F check whether a generic unit can be instantiated before its body (and any of its subunits) is compiled; this implementation creates a dependence on generic units as allowed by AI-00408 and AI-00506 such that the compilation of the generic unit bodies makes the instantiating units obsolete. (See section 2.3.)

LA3004A..B, EA3004C..D, and CA3004E..F (6 tests) check pragma INLINE for procedures and functions; this implementation does not support pragma INLINE.

CD1009C checks whether a length clause can specify a non-default size for a floating-point type; this implementation does not support such sizes.

CD2A84A, CD2A84E, CD2A84I..J (2 tests), and CD2A84O use length clauses to specify non-default sizes for access types; this implementation does not support such sizes.

BD8001A, BD8003A, BD8004A..B (2 tests), and AD8011A use machine code insertions; this implementation provides no package MACHINE_CODE.

The tests listed in the following table check that USE_ERROR is raised if the given file operations are not supported for the given combination of mode and access method; this implementation supports these operations.

Test	File Operation	Mode	File Access Method
CE2102D	CREATE	IN_FILE	SEQUENTIAL_IO
CE2102E	CREATE	OUT_FILE	SEQUENTIAL_IO
CE2102F	CREATE	INOUT_FILE	DIRECT_IO
CE2102I	CREATE	IN_FILE	DIRECT_IO
CE2102J	CREATE	OUT_FILE	DIRECT_IO
CE2102N	OPEN	IN_FILE	SEQUENTIAL_IO
CE2102O	RESET	IN_FILE	SEQUENTIAL_IO
CE2102P	OPEN	OUT_FILE	SEQUENTIAL_IO
CE2102Q	RESET	OUT_FILE	SEQUENTIAL_IO
CE2102R	OPEN	INOUT_FILE	DIRECT_IO
CE2102S	RESET	INOUT_FILE	DIRECT_IO
CE2102T	OPEN	IN_FILE	DIRECT_IO
CE2102U	RESET	IN_FILE	DIRECT_IO
CE2102V	OPEN	OUT_FILE	DIRECT_IO
CE2102W	RESET	OUT_FILE	DIRECT_IO
CE3102E	CREATE	IN_FILE	TEXT_IO
CE3102F	RESET	Any Mode	TEXT_IO
CE3102G	DELETE	--------	TEXT_IO
CE3102I	CREATE	OUT_FILE	TEXT_IO
CE3102J	OPEN	IN_FILE	TEXT_IO
CE3102K	OPEN	OUT_FILE	TEXT_IO.

The following 16 tests check operations on sequential, direct, and text files when multiple internal files are associated with the same external file and one or more are open for writing; USE_ERROR is raised when this association is attempted.

CE2107B..E	CE2107G..H	CE2107L	CD2110B	CE2110D
CE2111D	CE2111H	CE3111B	CE3111D..E	CE3114B
CE3115A				

CE2203A checks that WRITE raises USE_ERROR if the capacity of an external sequential file is exceeded; this implementation cannot restrict file capacity.

CE2403A checks that WRITE raises USE_ERROR if the capacity of an external direct file is exceeded; this implementation cannot restrict file capacity.

CE3304A checks that SET_LINE_LENGTH and SET_PAGE_LENGTH raise USE_ERROR if they specify an inappropriate value for the external file; there are no inappropriate values for this implementation.

CE3413B checks that PAGE raises LAYOUT_ERROR when the value of the page number exceeds COUNT'LAST; for this implementation, the value of COUNT'LAST is greater than 150000, making the checking of this objective impractical.

2.3 TEST MODIFICATIONS

Modifications (see section 1.3) were required for 21 tests.

The following tests were split into two or more tests because this implementation did not report the violations of the Ada Standard in the way expected by the original tests.

B71001Q	BA1001A	BA2001C	BA2001E	BA3006A	BA3006B
BA3007B	BA3008A	BA3008B	BA3013A		

C52008B was graded passed by Test Modification as directed by the AVO. This test uses a record type with discriminants with defaults; this test also has array components whose length depends on the values of some discriminants of type INTEGER. On compilation of the type declaration, this implementation raises NUMERIC_ERROR as it attempts to calculate the maximum possible size for objects of the type. Although this behavior is a violation of the Ada standard, the AVO ruled that the implementation be accepted for validation in consideration of intended changes to the standard to allow for compile-time detection of run-time error conditions. The test was modified to constrain the subtype of the discriminants. Line 16 was modified to declare a constrained subtype of INTEGER, and discriminant declarations in lines 17 and 25 were modified to use that subtype; the lines are given below:

```
16   SUBTYPE SUBINT IS INTEGER RANGE  0 .. 127;
17   TYPE REC1(D1,D2 : SUBINT) IS

25   TYPE REC2(D1,D2,D3,D4 : SUBINT := 0) IS
```

CA2009C and CA2009F were graded inapplicable by Evaluation Modification as directed by the AVO. These tests contain instantiations of a generic unit prior to the compilation of that unit's body; as allowed by AI-00408 and AI-00506, the compilation of the generic unit bodies makes the compilation unit that contains the instantiations obsolete.

BC3204C and BC3205D were graded passed by Processing Modification as directed by the AVO. These tests check that instantiations of generic units with unconstrained types as generic actual parameters are illegal if the generic bodies contain uses of the types that require a constraint. However, the generic bodies are compiled after the units that contain the instantiations, and this implementation creates a dependence of the instantiating units on the generic units as allowed by AI-00408 and AI-00506 such that the compilation of the generic bodies makes the instantiating units obsolete—no errors are detected. The processing of these tests was modified by re-compiling the obsolete units; all intended errors were then detected by the compiler.

CD1009I, CD2A21C, CD2A24A, CD2A31A, CD2A31B, and CD2A31C were graded passed by Evaluation Modification as directed by the AVO. These tests use instantiations of the support procedure LENGTH_CHECK, which uses Unchecked_Conversion according to the interpretation given in AI-00590. The AVO ruled that this interpretation is not binding under ACVC 1.11; the tests are ruled to be passed if they produce Failed messages only from the instances of LENGTH_CHECK—i.e, the allowed Report.Failed messages have the general form:

```
" * CHECK ON REPRESENTATION FOR <TYPE_ID> FAILED."
```

CHAPTER 3

PROCESSING INFORMATION

3.1 TESTING ENVIRONMENT

The Ada implementation tested in this validation effort is described adequately by the information given in the initial pages of this report.

For technical and sales information about this Ada implementation, contact:

Peter Moogk
IBM Canada Lab
844 Don Mills Road
North York, Ontario
CANADA

Testing of this Ada implementation was conducted at OC Systems Inc. in Fairfax VA by a validation team from the AVF.

3.2 SUMMARY OF TEST RESULTS

An Ada Implementation passes a given ACVC version if it processes each test of the customized test suite in accordance with the Ada Programming Language Standard, whether the test is applicable or inapplicable; otherwise, the Ada Implementation fails the ACVC [Pro90].

For all processed tests (inapplicable and applicable), a result was obtained that conforms to the Ada Programming Language Standard.

The list of items below gives the number of ACVC tests in various categories. All tests were processed, except those that were withdrawn because of test errors (item b; see section 2.1), those that require a floating-point precision that exceeds the implementation's maximum precision (item e; see section 2.2), and those that depend on the support of a file system — if none is supported (item d). All tests passed, except those that are listed in sections 2.1 and 2.2 (counted in items b and f, below).

a) Total Number of Applicable Tests	3777	
b) Total Number of Withdrawn Tests	95	
c) Processed Inapplicable Tests	97	
d) Non-Processed I/O Tests	0	
e) Non-Processed Floating-Point Precision Tests	201	
f) Total Number of Inapplicable Tests	298	(c+d+e)
g) Total Number of Tests for ACVC 1.11	4170	(a+b+f)

3.3 TEST EXECUTION

A magnetic tape containing the customized test suite (see section 1.3) was taken on-site by the validation team for processing. The contents of the magnetic tape were loaded directly onto the host computer.

After the test files were loaded onto the host computer, the full set of tests was processed by the Ada implementation.

The tests were compiled and linked on the host computer system, as appropriate. The executable images were transferred to the target computer system by the communications link described above, and run. The results were captured on the host computer system.

Testing was performed using command scripts provided by the customer and reviewed by the validation team. See Appendix B for a complete listing of the processing options for this implementation. It also indicates the default options. The options invoked explicitly for validation testing during this test were:

Option/Switch	Effect
-qsource	produces a compiler listing
-v	provides status messages
-b BIND_NAME	binds the object into an executable with BIND_NAME as the main unit.
-m	binds the object into an executable with the first compilation unit in the file as the main unit.

Test output, compiler and linker 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.

APPENDIX A

MACRO PARAMETERS

This appendix contains the macro parameters used for customizing the ACVC. The meaning and purpose of these parameters are explained in [UG89]. The parameter values are presented in two tables. The first table lists the values that are defined in terms of the maximum input-line length, which is the value for $MAX_IN_LEN—also listed here. These values are expressed here as Ada string aggregates, where "V" represents the maximum input-line length.

Macro Parameter	Macro Value
$MAX_IN_LEN	200 -- Value of V
$BIG_ID1	(1..V-1 => 'A', V => '1')
$BIG_ID2	(1..V-1 => 'A', V => '2')
$BIG_ID3	(1..V/2 => 'A') & '3' & (1..V-1-V/2 => 'A')
$BIG_ID4	(1..V/2 => 'A') & '4' & (1..V-1-V/2 => 'A')
$BIG_INT_LIT	(1..V-3 => '0') & "298"
$BIG_REAL_LIT	(1..V-5 => '0') & "690.0"
$BIG_STRING1	'"' & (1..V/2 => 'A') & '"'
$BIG_STRING2	'"' & (1..V-1-V/2 => 'A') & '1' & '"'
$BLANKS	(1..V-20 => ' ')
$MAX_LEN_INT_BASED_LITERAL	"2:" & (1..V-5 => '0') & "11:"
$MAX_LEN_REAL_BASED_LITERAL	"16:" & (1..V-7 => '0') & "F.E:"

```
$MAX_STRING_LITERAL    '"' & (1..V-2 => 'A') & '"'
```

The following table lists all of the other macro parameters and their respective values.

Macro Parameter	Macro Value
$ACC_SIZE	32
$ALIGNMENT	4
$COUNT_LAST	2_147_483_646
$DEFAULT_MEM_SIZE	268_435_456
$DEFAULT_STOR_UNIT	8
$DEFAULT_SYS_NAME	AIX_6000
$DELTA_DOC	2#1.0#E-31
$ENTRY_ADDRESS	ENTRY0'ADDRESS
$ENTRY_ADDRESS1	ENTRY1'ADDRESS
$ENTRY_ADDRESS2	ENTRY2'ADDRESS
$FIELD_LAST	1000
$FILE_TERMINATOR	' '
$FIXED_NAME	NO_SUCH_FIXED_TYPE
$FLOAT_NAME	NO_SUCH_FLOAT_TYPE
$FORM_STRING	""
$FORM_STRING2	"CANNOT_RESTRICT_FILE_CAPACITY"
$GREATER_THAN_DURATION	100_000.0
$GREATER_THAN_DURATION_BASE_LAST	137_073.0
$GREATER_THAN_FLOAT_BASE_LAST	1.0E308
$GREATER_THAN_FLOAT_SAFE_LARGE	3.0E38

```
$GREATER_THAN_SHORT_FLOAT_SAFE_LARGE
                        1.0E308

$HIGH_PRIORITY          255

$ILLEGAL_EXTERNAL_FILE_NAME1
                        /NODIRECTORY/FILENAME

$ILLEGAL_EXTERNAL_FILE_NAME2
                        /NODIRECTORY2/FILENAME

$INAPPROPRIATE_LINE_LENGTH
                        -1

$INAPPROPRIATE_PAGE_LENGTH
                        -1

$INCLUDE_PRAGMA1        PRAGMA INCLUDE ("A28006D1.ADA")

$INCLUDE_PRAGMA2        PRAGMA INCLUDE ("B28006E1.ADA")

$INTEGER_FIRST          -2147483648

$INTEGER_LAST           2147483647

$INTEGER_LAST_PLUS_1    2_147_483_648

$INTERFACE_LANGUAGE     FORTRAN

$LESS_THAN_DURATION     -100_000.0

$LESS_THAN_DURATION_BASE_FIRST
                        -131_073.0

$LINE_TERMINATOR        ASCII.LF

$LOW_PRIORITY           0

$MACHINE_CODE_STATEMENT
                        NULL;

$MACHINE_CODE_TYPE      NO_SUCH_TYPE

$MANTISSA_DOC           31

$MAX_DIGITS             15

$MAX_INT                 2147483647

$MAX_INT_PLUS_1         2_147_483_648

$MIN_INT                 -2147483648

$NAME                   SHORT_SHORT_INTEGER
```

MACRO PARAMETERS

$NAME_LIST	AIX_6000
$NAME_SPECIFICATION1	/thor/preval/work/ctests/X2120A
$NAME_SPECIFICATION2	/thor/preval/work/ctests/X2120B
$NAME_SPECIFICATION3	/thor/preval/work/ctests/X3119A
$NEG_BASED_INT	16#F000000E#
$NEW_MEM_SIZE	268_435_456
$NEW_STOR_UNIT	8
$NEW_SYS_NAME	AIX_6000
$PAGE_TERMINATOR	ASCII.FF
$RECORD_DEFINITION	NEW INTEGER;
$RECORD_NAME	NO_SUCH_MACHINE_CODE_TYPE
$TASK_SIZE	32
$TASK_STORAGE_SIZE	32768
$TICK	0.00006
$VARIABLE_ADDRESS	VARIABLE'ADDRESS
$VARIABLE_ADDRESS1	VARIABLE1'ADDRESS
$VARIABLE_ADDRESS2	VARIABLE2'ADDRESS
$YOUR_PRAGMA	EXPORT

APPENDIX B

COMPILATION SYSTEM OPTIONS

The compiler options of this Ada implementation, as described in this Appendix, are provided by the customer. Unless specifically noted otherwise, references in this appendix are to compiler documentation and not to this report.

```
IBM AIX XL Ada Compiler/6000 - Internal Development Version

Usage:
   xla  [ Option | File ]...
  where File can be:
     - an Ada source file
  (for archive or object files, use -i)
  where Option can be:
    -b UnitName: bind and link the specified UnitName
    -e         : do not produce an executable file.
    -G         : do partial optimization.
    -h         : display information about the ada command
    -i FileName: include archive or object file FileName when binding
    -I         : read a list of files to compile from standard input
    -L Library : use this library list file.
    -m         : compile and bind the last unit as the main program.
    -o FileName: specify the name of the executable.
    -O         : produce fully optimized code.
    -p         : turn on execution profiling option.
    -q         : -qlist      - provide object listing
               : -qsource    - provide source listing
    -g         : code is to be debugged
    -S         : suppress run-time checks for Ada exceptions
    -u         : unlock the working sublibrary
    -v         : verbose - display informative messages.
    -#         : don't actually compile
    -V Pages   : specify the number of 1K memory pages to be used.
  Some temporary options:
    -H         : see if I have xla installed correctly
    -DESTROY   : destroy the currently installed xla (remove all xla files)
```

APPENDIX C

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 the Ada Standard, and to certain allowed restrictions on representation clauses. The implementation-dependent characteristics of this Ada implementation, as described in this Appendix, are provided by the customer. Unless specifically noted otherwise, references in this Appendix are to compiler documentation and not to this report. Implementation-specific portions of the package STANDARD, which are not a part of Appendix F, are:

```
package STANDARD is
   ..........
   type INTEGER is range -2147483648 .. 2147483647;
   type SHORT_INTEGER is range -32768 .. 32767;
   type SHORT_SHORT_INTEGER is range -128 .. 127;

   type FLOAT is digits 6 range -3.4028E+38 .. 3.40282E+38;
   type LONG_FLOAT is digits 15 range -1.79769313486232E+308 ..
                                                  1.79769313486232E+308;

   type DURATION is delta 2**(-14) range -86400.0 .. 86400.0;
   ..........
end STANDARD;
```

Appendix F. Implementation-Dependent Characteristics

The Ada language definition allows for certain target dependencies in a controlled manner. This appendix, called Appendix F as prescribed in the Ada Language Reference, describes implementation-dependent characteristics of the AIX Ada/6000 compiler running under the AIX operating system Version 3.

Implementation-Defined Pragmas

Implementation dependent pragmas are:

```
pragma COMMENT(String_Literal);
```

Imbeds String_Literal into object code.

```
pragma IMAGES(Enumeration_Type, immediate | deferred);
```

Generates a table of images for the enumeration type. deferred causes the table to be generated only if the enumeration type is used in a compilation unit.

```
pragma INTERFACE_INFORMATION
  (Interfaced_Subprogram_Name, Link_Name);
```

When used in conjunction with pragma INTERFACE, provides access to any routine whose name can be specified by an Ada string literal.

```
pragma OS_TASK (Priority);
```

Appears within the declaration for a task or task type (in the same context as pragma PRIORITY), and causes the task or task type to be placed into a separate AIX process. The priority value is of type SYSTEM.PRIORITY, and is not currently acted upon. To maintain upward compatibility, always use a 0 for this parameter.

```
pragma NO_SUPPRESS(Condition_Name);
```

Prevents checks for a specified condition from being suppressed. It has the same scope as pragma SUPPRESS.

```
pragma PRESERVE_LAYOUT (Record_Type);
```

Prevents the compiler from re-ordering record components. It must occur in a declarative region, following the declaration of the record type to which it is applied.

```
pragma SUPPRESS_ALL;
```

Suppresses all error checks, including elaboration checks. It has the same scope as pragma SUPPRESS.

```
pragma EXPORT(object, String_Literal, Language);
```

Makes the named object visible to other programs. The object can be

a procedure or a function or a data object. The string_literal is the name the linker will make global. The Language must be C, FORTRAN, or Assembler, all of which have the same effect.

Predefined Pragmas

Supported pragmas are INTERFACE, ELABORATE, SUPPRESS, PACK, PAGE, LIST, INLINE, SHARED, and PRIORITY.

Pragma INTERFACE supports the interface languages C, FORTRAN, OLD_STYLE_C, and ASSEMBLY.

Unrecognized and unsupported pragmas are ignored with the appropriate warning message.

Representation Clauses

Supported representation clauses include:

Length clauses

Enumeration representation clauses, except for Boolean types

Record representation clauses

Address clauses, including those for interrupt entries.

Records are aligned by default on 32-bit boundaries. You can use a representation clause to force them to be aligned on 64-bit boundaries.

Restrictions on Unchecked Conversion

The only restriction on unchecked conversion is that the two types (or subtypes) A and B must be the same size.

Package System

The package SYSTEM has the following characteristics:

```
package SYSTEM is
  type NAME is (AIX_6000);
  SYSTEM_NAME : constant NAME := AIX_6000;
  MEMORY_SIZE : constant := 268_435_456;
  STORAGE_UNIT : constant := 8;
  MIN_INT : constant := -(2**31);
  MAX_INT   : constant := (2 ** 31) -1;
  MAX_DIGITS  : constant := 15;
  MAX_MANTISSA : constant := 31;
  TICK : constant := 6.00000E-05;
  type ADDRESS is private;
  NULL_ADDRESS : constant ADDRESS;
  FINE_DELTA  : constant := 1.0 / (2 ** MAX_MANTISSA);
  subtype PRIORITY is INTEGER range 0..255;
```

```
  function LABEL (NAME : STRING) return ADDRESS;
END System;
```

Representation Attributes

All defined representation attributes shall be supported.

Implementation-Generated Names

There are no implementation-generated names denoting implementation-dependent components. Component names generated by the compiler shall not interfere with programmer-defined names.

Implementation-Dependent Characteristics of the I/O Packages

Packages SEQUENTIAL_IO, DIRECT_IO, and TEXT_IO are supported.

Package LOW_LEVEL_IO is not supported.

Unconstrained array types and unconstrained types with discriminants may be instantiated for I/O.

Filenames can contain any ascii character except ASCII.NUL.

In TEXT_IO, the type FIELD is defined as follows:

```
subtype Field is integer range 0..1000;
```

In TEXT_IO, the type COUNT is defined as follows:

```
type Count is range 0..2_147_483_646;
```

Form Parameters for File Operations

Section 14.2 of the Language Reference describes the Ada functions for manipulating files. As stated in that section, the form string parameter allows you to set file protections when you create a file. The details of file protections and privileges under the AIX operating system are described under the chmod call in the AIX Calls and Subroutines Reference for IBM RISC System/6000 (SC23-2198).

The form string is interpreted in the following way:

The form string consists of a series of substrings, separated by blanks.

The substrings are not case sensitive.

The order of the substrings does not matter.

Some substrings control the file protection settings.

Some substrings enable special AIX behavior for file opening.

The list of recognized substrings is contained in User's Guide.

Predefined Numeric Types

The current specification of package STANDARD includes:

```
type SHORT_SHORT_INTEGER
  is range -128 .. 127;

type SHORT_INTEGER
  is range -32768 .. 32767;

type INTEGER is
  range -2147483648 .. 2147483647;

type FLOAT is
  digits 6 range -3.40282E+38 .. 3.40282E+38;

type LONG_FLOAT is
  digits 15 range
   -1.79769313486232E+308 .. 1.79769313486232E+308;

type DURATION is
  delta 2**(-14) range -86400.0 .. 86400.0;
```

```
SHORT_SHORT_INTEGER

 First  = -128

 Last   = 127

 Size   = 8

SHORT_INTEGER

 First  = -32768

 Last   = 32767

 Size   = 16

INTEGER

 First  = -2147483648

 Last   = 2147483647

 Size   = 32

FLOAT

 Digits = 6
```

```
 Emax    = 84
 Epsilon          = 9.53674E-07
 Large   = 1.93428E+25
 Machine_Emax     = 128
 Machine_Emin     = -125
 Machine_Mantissa          = 24
 Machine_Overflows         = TRUE
 Machine_Radix    = 2
 Machine_Rounds   = TRUE
 Mantissa         = 21
 Safe_Emax        = 125
 Safe_Large       = 4.25353E+37
 Safe_Small       = 1.17549E-38
 Size    = 32
 Small   = 2.58494E-26
LONG_FLOAT
 Digits = 15
 Emax    = 204
 Epsilon          = 8.88178419700125E-16
 Large   = 2.57110087081438E+61
 Machine_Emax     = 1024
 Machine_Emin     = -1021
 Machine_Mantissa          = 53
 Machine_Overflows         = TRUE
 Machine_Radix    = 2
 Machine_Rounds   = TRUE
```

```
   Mantissa       = 51
   Size    = 64
   Safe_Emax      = 1021
   Safe_Large     = 2.24711641857789E+307
   Safe_Small     = 2.22507385850720E-308
   Small  = 1.94469227433161E-62
DURATION
   Delta  = 2**(-14)
   First  = -86400.0
   Last   = 86400.0
   Machine_Overflows      = FALSE
   Machine_Rounds = FALSE
```

Restrictions on Machine Code Insertions

Machine code insertions are not supported.