Appendix B: VMS Extensions

Introduction

This appendix lists the VMS extensions to FORTRAN that are supported by the iWarp FORTRAN compiler. Following each extension is a reference to the section in the DEC document *Programming in VAX FORTRAN*, September 1984, that describes the extension.

Extensions

Format

1. Comments may be indicated by C, !, or * in column one [5.4.3.1].
2. Comments may be indicated by ! anywhere in the statement field [5.4.3.1].
3. The continuation convention of a TAB followed by a digit 1 to 9 is supported [5.4.4].
4. A D in column one indicates a debug statement. Multi-line debug statements must use the continuation indicator [3.2.3.5, 5.4.3.2].

Statements

1. The following statements are supported:
   - `ACCEPT` [11.7]
   - `TYPE` [11.8]
   - `ENCODE` [A.1]
   - `DECODE` [A.1]
   - `DEFINE FILE` [A.2]
   - `FIND` [A.3]
   - `DO WHILE` [9.3.2, 9.4]
   - `DO ENDDO` [9.3.2, 9.4]
   - Extended `PARAMETER` statement with additional operators and functions [8.11, A.4]
   - `VOLATILE` [8.16]
2. The following OPTIONS statements will do tests supported on the iWarp system [3.5.2]:
   - `/NOEXTEND_SOURCE`
   - `/EXTEND_SOURCE`
   - `/NOF77`
   - `/F77`
   - `/NOCHECK`
   - `/CHECK`

3. The following OPTIONS statements are recognized but have no effect on the program [3.5.2]:
   - `/NOI4`
   - `/I4`
   - `/NOG_FLOATING`
   - `/G_FLOATING`
4. `DATA` statements are allowed in any order among specification statements for the initialization of program variables of the repeated form `[,]nlist/clist/` [8.3].
5. `INCLUDE` statement syntax allows the file name as a string literal, allowing all legal UNIX filename characters to be recognized [3.3, 3.5.1].
6. Full `OPEN` statement syntax is supported [13.1], but only the following options are supported:
   - `DEFAULTFILE=`
   - `ORGANIZATION=SEQUENTIAL`
   - `RECORDTYPE=FIXED`
   - `RECORDTYPE=VARIABLE`
   - `RECORDTYPE=STREAM`
   - `DISPOSE=KEEP`
   - `DISPOSE=SAVE`
   - `DISPOSE=DELETE`

   The following options are ignored:
   - `CARRIAGECONTROL`
   - `DEFAULTLINE`
   - `ORGANIZATION`
   - `RECORDTYPE`
   - `DISPOSE`
7. The `DEFAULTFILE=`*option* on `OPEN` and `INQUIRE` is supported, but the value of *option* must be a valid UNIX directory name [13.3].
8. The `CLOSE` [13.18] statement supports the following options:
   - `DISP=DELETE`
   - `DISP=SAVE`
   - `DISP=KEEP`

Data Types

The following are supported:

1. BYTE data type (see logical*1) [8.4.1]
2. Hollerith typeless constants [6.2.1]
3. Initialization in type declaration statements [8.4]

Variables and Records

The following are supported:

1. ANSI(REC=*n*) and IBM('*n*) forms of relative record specification.
2. A *n size qualifier on function names and variable declaration.
3. Declaration of multi-field structure templates. Unlike VMS FORTRAN 77, there may be gaps between fields of structures and records to ensure that objects will be aligned upon natural machine boundaries to maximize performance.
4. Declaration of multi-field record data with DATA initializations [14.2].
5. Declaration of multi-field unions with initializations [8.15.3].
6. Logical types used in integer expressions [6.3.4].
7. Logical operators applied bitwise to integer operands [6.3.4].
8. CHAR variables initialized with integer values.
9. Implicit conversion to integer of non-integer expressions in integer context.

Functions and Subroutines

1. The following system subroutines are supported:
   - DATE
   - IDATE
   - ERRSNS
   - EXIT
   - SECNDS
   - TIME
   - RAN
2. %VAL( ),%REF( ), %LOC( ) build-in functions are supported. Note that PCO will not optimize functions which contain calls to %LOC( ) [10.1.2, 10.1.2.1, 10.1.2.2].
3. Degree-style trigonometric functions are supported.

Identifiers

The following identifier extensions are supported:

1. Identifiers containing dollar sign ($) and underscore (_) in names.
2. Identifiers up to 31 characters long.

Other Extensions

The following are supported:

1. Literals:
   - octal integer literals: `'nnn'O` (octal).
   - hexadecimal integer literals: `'nnn'X` (hexadecimal).
   - radix 50 literals [B.3].
2. Static and `COMMON` storage are initialized to zero if not explicitly specified. Under user control, PCO can promote static variables to automatic on a per file basis. In this case, initialization to zero will not take place.
3. Mixed-character and non-character data in `COMMON` statements. All non-character data is aligned on word boundaries, except INTEGER*2, which is aligned to half-word boundaries.
4. Mixed-character and non-character variables in `EQUIVALENCE` statements.
5. Improperly aligned double-precision numbers are allowed and will not be flagged as errors. Run-time system event handlers, supplied by Intel, will complete the access in software, allowing the program to run. The program will run slowly, however.
6. The following edit descriptors and properties are supported:
   - `H` edit descriptor on input with the forms `nHc...c` [12.2.9.2, 12.8].
   - `Q` edit descriptor [12.2.12.1, 12.8].
   - $ edit descriptor [12.2.12.2, 12.8].
   - `O` (octal) and `Z` (hexadecimal) edit descriptors match data type [12.2.10].
   - Default widths for `IOZLFEDGA` edit descriptors match the data type [12.2.10].
   - The comma (,) can be used to separate fields for free-format input in the `IOZLFEDGA` format items [12].
7. File buffering done in the FORTRAN runtime system, not the iWarp RTS.
8. Namelist [8.10, 11.4.1.3, 11.5.1.3].
9. Ampersand (&) can be used instead of asterisk (*) for alternate returns.
10. Single subscript in `EQUIVALENCE` of multi-dimensional array.
11. `.XOR.` operator [6.3.4].