

Subject: Minor change in M4 to allow different-rank views of array objects  
 From: Van Snyder  
 References: 00-255, 00-337

## 1 Edits

Edits refer to 00-007r3. Page and line numbers are displayed in the margin. Absent other instructions, a page and line number or line number range implies all of the indicated text is to be replaced by immediately following text, while a page and line number followed by + (-) indicates that immediately following text is to be inserted after (before) the indicated line. Remarks for the editor are noted in the margin, or appear between [ and ] in the text.

|                                              |                                                                                                                                                                                                                                                                                |                  |
|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| R736 <i>bounds-spec</i>                      | <b>is</b> <i>lower-bound</i> : [ <i>upper-bound</i> ]                                                                                                                                                                                                                          | 139:5            |
| Constraint:                                  | If <i>upper-bound</i> is specified for any dimension of <i>pointer-object</i> it shall be specified for all dimensions.                                                                                                                                                        | 139:12+          |
| [Editor:                                     | “The” ⇒ “If an <i>upper-bound</i> is specified, the <i>target</i> shall have rank one; otherwise, the”.]                                                                                                                                                                       | 139:17           |
| If an <i>upper-bound</i>                     | is specified, the size of the <i>target</i> shall not be less than the size of the <i>pointer-object</i> . The elements of the target of <i>pointer-object</i> , in array element order (6.2.2.2), are the first SIZE( <i>pointer-object</i> ) elements of the <i>target</i> . | 140:11+<br>New ¶ |
| [Editor:                                     | “The” ⇒ “If no <i>upper-bound</i> is specified, the”.]                                                                                                                                                                                                                         | 140:12           |
| <b>NOTE 7.49</b> <sup>1</sup> / <sub>3</sub> |                                                                                                                                                                                                                                                                                | 140:37+          |

It is possible to obtain high-rank views of (parts of) rank-one objects by specifying upper bounds in pointer assignment statements (7.5.2). Consider the following example, in which a matrix is under consideration. The matrix is stored as a rank-one object in MYDATA because its diagonal is needed for some reason – the diagonal cannot be gotten as a single object from a rank-two representation. The matrix is represented as a rank-two view of MYDATA.

```

real, target :: MYDATA ( NR*NC )      ! An automatic array
real, pointer :: MATRIX ( :, : )      ! A rank-two view of MYDATA
real, pointer :: VIEW_DIAG ( : )
MATRIX( 1:NR, 1:NC ) => MYDATA        ! The MATRIX view of the data
VIEW_DIAG => MYDATA( 1::NR+1 )        ! The diagonal of MATRIX

```

Rows, columns or blocks of the matrix can be accessed as sections of MATRIX.