ภาคผนวก

เนื้อหา	หน้า

Conventions Used in this Manual

[ ]	Brackets enclose an optional part of a general format. When they enclose vertically stacked entries, brackets indicate that only one entry can be selected.
{ }	Braces indicate that you must select one (but no more than one) of the enclosed entries.
{| |}	Choice indicators allow you to select one or more of the enclosed entries. However, none can be used more than once.
• • •	Ellipses allow repetition of a part of the format.
.	Periods are required where shown in the format.
PICTURE IS char-string	Uppercase words not underlined are optional words; for example, IS.
PICTURE IS char-string	Underlined uppercase words are key or required words; for example, **PICTURE.**
PICTURE IS char-string	Lowercase words are generic terms supplied by the programmer; for example, char-string.
+ − < > = * ** / \	These special-character words are not underlined in the general formats but are required where they appear.

Logging On to a VAX/VMS System

Press the RETURN key. The system will prompt you for your name and password:

```
Username: { enter your username }
Password: { enter your password }
```

Logging Off of a VAX/VMS System

```
$    LO[GOUT]
```

Getting Help from the VAX/VMS System

```
$    HELP [subject]
```

Examples:

- To get help for the VAX COBOL compiler enter:

  HELP COBOL

- To get help for COBOL run-time errors enter:

  HELP COBOL ERRORS

VMS File Specification

A fully qualified file specification, or file-spec, lets your COBOL program uniquely identify a file or device. The file-spec format is as follows:

```
node::device:[directory]filename.type;ver
```

where:

node — is a name that identifies the location of a system in a network.

device — is a unique hardware device name with the format:

```
ddcu:
```

where:

- dd is a mnemonic for device type
- c is a controller designation
- u is a unit number

directory — is a file that contains the identification and location of your files. You must enclose directory names in square brackets ([ ]) or angle brackets (< >).

filename — is a field that, combined with the file type and version number, identifies files in directories.

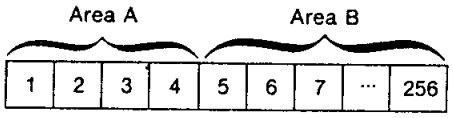
type — identifies a file by its contents and is preceded by a period (.). For example, the file type of an executable image is usually EXE, and the file type for a VAX COBOL source program is COB.

ver — is a number (between 1 and 32767) assigned to different versions of the same file. If you duplicate a file name and type the same directory, the system increments the version number by one. You must insert a semicolon or period before the version number.

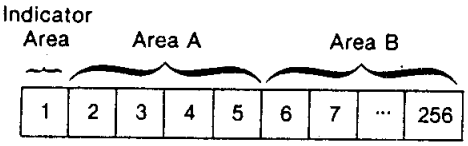
COBOL Coding Format

Terminal Format

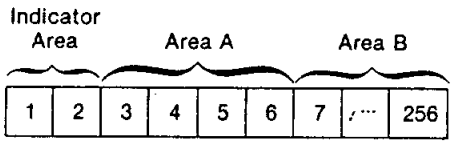
Format 1: For a source line that does not include an Indicator Area character



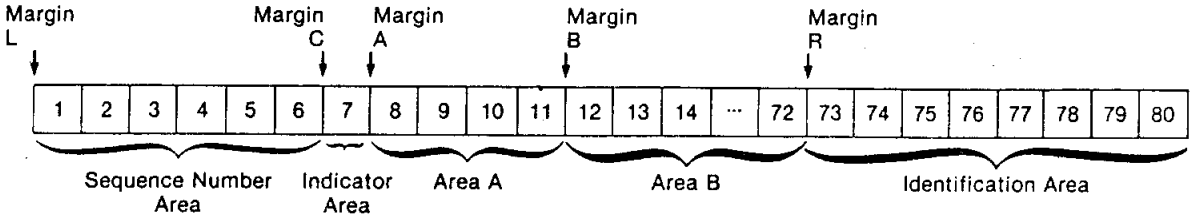
Format 2: For a source line that contains either the -, *, or / character in the Indicator Area



Format 3: For a conditional compilation line that is to contain a backslash (\) in column 1 and an alphabetic character in column 2



ANSI Format



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COBOL Coding Format (Cont.)

Format Legend:

Margin L	Immediately to the left of the leftmost character position.
Margin C	Between character positions 6 and 7.
Margin A	Between character positions 7 and 8.
Margin B	Between character positions 11 and 12.
Margin R	Between character positions 72 and 73.
Sequence Number Area	The six character positions between Margin L and Margin C. The contents can be any character(s) from the computer character set. The compiler does not check the uniqueness of the contents. However, it does check for the ascending sequence of the contents, if the compiler command line includes the /SEQUENCE_CHECK qualifier.

Indicator Area

The character in this position directs the compiler to interpret the source line in one of the following ways:

Character	Source Line Interpretation
space ( )	Default. The compiler processes the line as normal COBOL text.
hyphen (-)	Continuation line. The compiler processes the line as a continuation of the previous source line.
asterisk (*)	Comment line. The compiler ignores the contents of the line. However, the source line appears on the program listing.
slash (/)	New listing page. The compiler treats the line as a comment line. However, it advances the program listing to the top of the next page before printing the line.
A-Z, a-z	Conditional compilation line. The compiler processes the line as normal COBOL text if you specify either: 1) the DEBUGGING MODE clause in the SOURCE-COMPUTER paragraph, or 2) the /CONDITIONALS compiler command line qualifier. If you specify neither, the compiler processes this line as a comment line.

COBOL Coding Format (Cont.)

Area A	Area A contains division headers, section headers, paragraph headers, paragraph-names, level indicators, and certain level-numbers.
Area B	Area B contains all other COBOL text.
Identification Area	The eight character positions immediately following Margin R. The compiler ignores the contents of the identification area. However, the contents appear on the source program listing.

Creating a COBOL Source Program

EDIT file-spec
or
CREATE file-spec

By using either of these commands you create a file in which you can code a VAX COBOL source program.

Compiling, Linking, and Running Command Lines

COBOL [/COBOL-qualifier] . . . { file-spec [/COBOL-qualifier] . . . ,} . . .

LINK [/LINK-qualifier] . . . { file-spec [/LINK-file-qualifier] . . . ,} . . .

RUN has two formats:

Format 1: Running an Image

Places your COBOL program (image) into execution in the process.

RUN [/DEBUG | /NODEBUG] file-spec

Format 2: Running a Process

Creates a subprocess or a detached process to execute a specified image.

RUN { /RUN-process-qualifier } . . . file-spec

COBOL-Qualifiers

COBOL-qualifier	Default
/[NO]ANSI_FORMAT	/NOANSI_FORMAT
/[NO]AUDIT[=string-list]	/NOAUDIT
/[NO]CHECK[=(ALL,[NO]PERFORM,[NO]BOUNDS,NONE)]	/NOCHECK
/[NO]CONDITIONALS[=conditional-line-selector-list]	/NOCONDITIONALS
/[NO]COPY_LIST	/NOCOPY_LIST
/[NO]CROSS_REFERENCE[=(ALPHABETICAL,DECLARED)]	/NOCROSS_REFERENCE
/[NO]DEBUG[=(ALL,[NO]SYMBOLS,[NO]TRACEBACK,NONE)]	/DEBUG=TRACEBACK
/[NO]FIPS[=74]	/NOFIPS
/[NO]LIST[=file-spec]	/NOLIST(interactive) /LIST (batch)
/[NO]MACHINE_CODE	/NOMACHINE_CODE
/[NO]MAP[=(ALPHABETICAL,DECLARED)]	/NOMAP
/[NO]OBJECT[=file-spec]	/OBJECT
/[NO]SEQUENCE_CHECK	/NOSEQUENCE_CHECK
/[NO]STANDARD[=PDP11,SYNTAX]	/NOSTANDARD
/[NO]TRUNCATE	/NOTRUNCATE
/[NO]WARNINGS[=(ALL,[NO]STANDARD, [NO]INFORMATION,[NO]OTHER,NONE)]	/WARNINGS=OTHER

LINK-Qualifiers

BRIEF
/[NO]CROSS_REFERENCE
/[NO]DEBUG[=file-spec]
/[NO]EXECUTABLE[=file-spec]
/FULL
/[NO]MAP[=file-spec]
/[NO]TRACEBACK
/[NO]USERLIB

Common LINK-File-Qualifiers

/INCLUDE=module-name[, . . .]
/LIBRARY
/OPTIONS

RUN-Process-Qualifiers

/[NO]ACCOUNTING
/AST_LIMIT=quota
/[NO]AUTHORIZE
/BUFFER_LIMIT=quota
/DELAY=delta-time
/ERROR=file-spec
/FILE_LIMIT=quota
/INPUT=file-spec
/INTERVAL=delta-time
/IO_BUFFERED=quota
/IO_DIRECT=quota
/MAILBOX=unit
/MAXIMUM_WORKING_SET=quota
/OUTPUT=file-spec
/PAGE_FILE=quota
/PRIORITY=n
/PRIVILEGES=(privilege[, . . .])
/PROCESS_NAME=process-name
/QUEUE_LIMIT=quota
/[NO]RESOURCE_WAIT
/SCHEDULE=absolute-time
/[NO]SERVICE_FAILURE
/SUBPROCESS_LIMIT=quota
/[NO]SWAPPING
/TIME_LIMIT=limit
/UIC=uic
/WORKING_SET=default

VAX COBOL Source Program General Format

```
  identification-division
[ environment-division ]
[ data-division ]
[ procedure-division ]
[ source-program ] ...
[ end-program-header ]
```

Identification Division Format

```
IDENTIFICATION DIVISION.
PROGRAM-ID. program-name [ IS { | INITIAL | } PROGRAM ]
                         { | COMMON  | }
[ AUTHOR. [ comment-entry ] ... ]
[ INSTALLATION. [ comment-entry ] ... ]
[ DATE-WRITTEN. [ comment-entry ] ... ]
[ DATE-COMPILED. [ comment-entry ] ... ]
[ SECURITY. [ comment-entry ] ... ]
```

ENVIRONMENT DIVISION

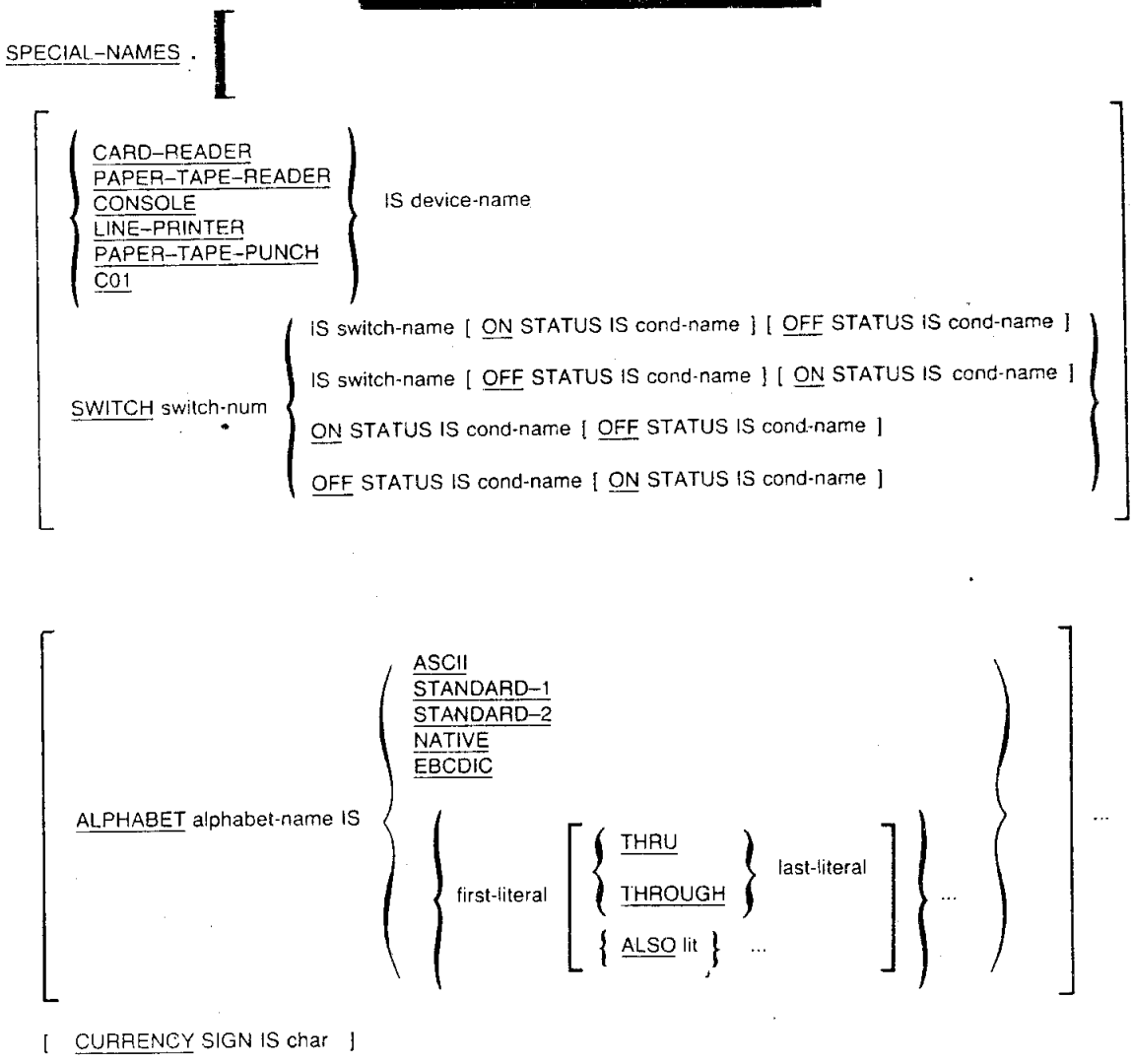
Environment Division Format

```
[ ENVIRONMENT DIVISION.

  [ CONFIGURATION SECTION.
  [ SOURCE-COMPUTER.  [ source-computer-entry ] ]
  [ OBJECT-COMPUTER.  [ object-computer-entry ] ]
  [ SPECIAL-NAMES.  [ special-names-entry ] ] ]

  [ INPUT-OUTPUT SECTION.
    FILE-CONTROL.  { file-control-entry } ...
  [ I-O-CONTROL.  [ input-output-control-entry ] ] ] ]
```

Configuration Section Entries

```
SOURCE-COMPUTER. [ { VAX-11          } [ WITH DEBUGGING MODE ] ]
                 [ { computer-type   }                        ]

OBJECT-COMPUTER. [ { VAX-11          } ]
                 [ { computer-type   } ]
                 [ MEMORY SIZE integer { WORDS      } ]
                 [                     { CHARACTERS } ]
                 [                     { MODULES    } ]
                 [ PROGRAM COLLATING SEQUENCE IS alphabet-name ]
                 [ SEGMENT-LIMIT IS segment-number ] ]
```

ENVIRONMENT DIVISION



SPECIAL-NAMES . (Cont.)

```
[ SYMBOLIC CHARACTERS { { { symbolic-char } ... { IS  } { char-val } ... } ...
                              { ARE }
  [ DECIMAL-POINT IS COMMA ] . ]                    [ IN alphabet-name ] } ... ]
```

Input-Output Section Entries

FILE-CONTROL.

Format 1 – Sequential File

```
SELECT [ OPTIONAL ] file-name
    ASSIGN TO file-spec

[ RESERVE reserve-num [ AREA  ] ]
                      [ AREAS ]
[ [ ORGANIZATION IS ] SEQUENTIAL ]
[ BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS    } ]
                                                 { CHARACTERS }
[ CODE-SET IS alphabet-name ]
[ PADDING CHARACTER IS pad-char ]
[ RECORD DELIMITER IS STANDARD-1 ]
[ ACCESS MODE IS SEQUENTIAL ]
[ FILE STATUS IS file-stat ] .
```

Format 2 – Relative File

```
SELECT [ OPTIONAL ] file-name
    ASSIGN TO file-spec
[   RESERVE reserve-num [ AREA  ]  ]
                       [ AREAS ]
[ ORGANIZATION IS ] RELATIVE
[   BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS    } ]
                                                   { CHARACTERS }
[ RECORD DELIMITER IS STANDARD-1 ]

[   ACCESS MODE IS { SEQUENTIAL [ RELATIVE KEY IS rel-key ]                  } ]
                   { { RANDOM  } RELATIVE KEY IS rel-key                     }
                   { { DYNAMIC }                                             }
[ FILE STATUS IS file-stat ]
```

Format 3 – Indexed File

```
SELECT [ OPTIONAL ] file-name
    ASSIGN TO file-spec
[   RESERVE reserve-num [ AREA  ]  ]
                       [ AREAS ]
```

Format 3 - Indexed File (Cont.)

```
[ ORGANIZATION IS ] INDEXED
[ BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS / CHARACTERS } ]
[ RECORD DELIMITER IS STANDARD-1 ]
[ ACCESS MODE IS { SEQUENTIAL / RANDOM / DYNAMIC } ]
[ RECORD KEY IS rec-key ]
[ ALTERNATE RECORD KEY IS alt-key [ WITH DUPLICATES ] ] ...
[ FILE STATUS IS file-stat ] .
```

Format 4 – Sort or Merge File

```
SELECT file-name ASSIGN TO file-spec .
```

Format 5 – Report File

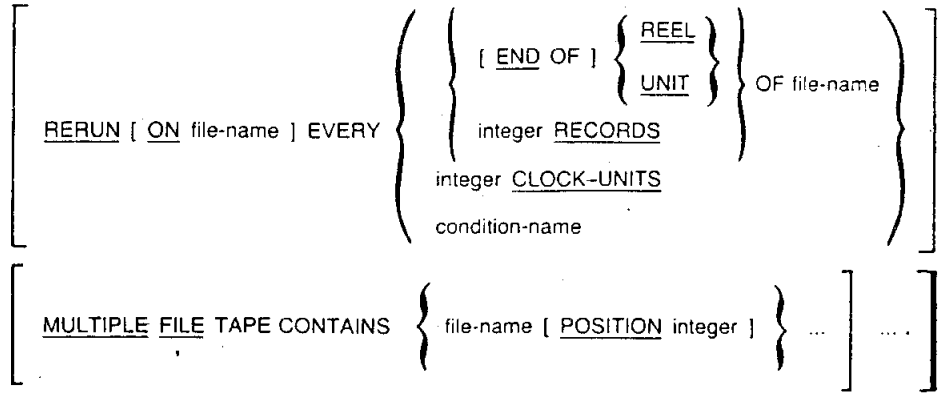
```
SELECT file-name
    ASSIGN TO file-spec
[ RESERVE reserve-num [ AREA / AREAS ] ]
[ [ ORGANIZATION IS ] SEQUENTIAL ]
```

Format 5 - Report File (Cont.)

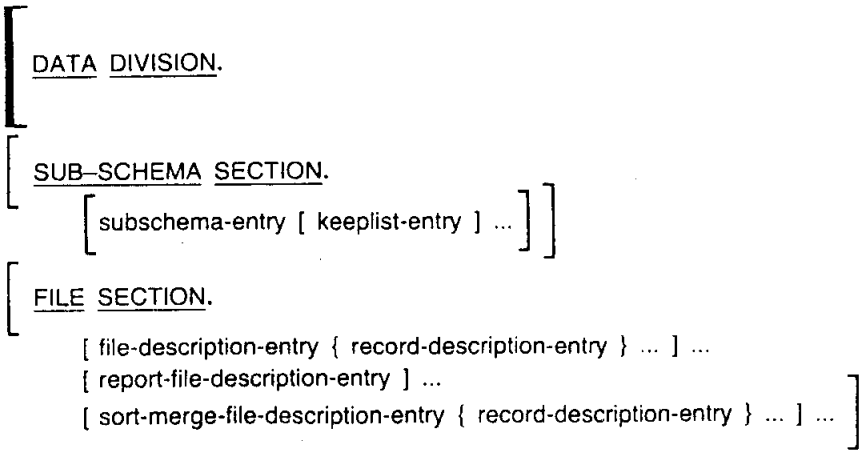
```
[ BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS    } ]
                                                 { CHARACTERS }
[ CODE-SET IS alphabet-name ]
[ PADDING CHARACTER IS pad-char ]
[ RECORD DELIMITER IS STANDARD-1 ]
[ ACCESS MODE IS SEQUENTIAL ]
[ FILE STATUS IS file-stat ] .

I-O-CONTROL . [
```

```
[ APPLY { DEFERRED-WRITE
        | EXTENSION extend-amt
        | FILL-SIZE
        | LOCK-HOLDING
        | MASS-INSERT
        | [ CONTIGUOUS ]
          [ CONTIGUOUS-BEST-TRY ]  PREALLOCATION preall-amt
        | PRINT-CONTROL
        | WINDOW window-ptrs
        } ... ON { file-name } ... ]

[ SAME [ RECORD ]
       [ SORT ]
       [ SORT-MERGE ]  AREA FOR { same-area-file } { same-area-file } ... ] ...
```

I-O-CONTROL . (Cont.)



Data Division Format



Data Division Format (Cont.)

```
[ WORKING-STORAGE SECTION.
      [ record-description-entry ] ... ]
[ LINKAGE SECTION.
      [ record-description-entry ] ... ]
[ REPORT SECTION.
      [ report-description-entry { report-group-description-entry } ... ] ... ]
```

Data Division Entries

Subschema entry:

DB subschema-name WITHIN schema-name [FOR database-name] .

Keeplist entry:

LD keeplist-name [LIMIT IS integer] .

File description entries:

Format 1 – Sequential File

```
FD file-name
  [ IS EXTERNAL ]
  [ IS GLOBAL ]
  [ BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS / CHARACTERS } ]
  [ RECORD { CONTAINS [ shortest-rec TO ] longest-rec CHARACTERS
           / IS VARYING IN SIZE [ FROM shortest-rec ] [ TO longest-rec ] CHARACTERS
                                                  [ DEPENDING ON depending-item ] } ]

  [ LABEL { RECORDS ARE / RECORD IS } { STANDARD / OMITTED } ]
  [ VALUE OF ID IS file-spec ]
  [ DATA { RECORDS ARE / RECORD IS } { rec-name } ... ]
  [ LINAGE IS { page-size } LINES [ WITH FOOTING AT footing-line ]
                                  [ LINES AT TOP top-lines ] [ LINES AT BOTTOM bottom-lines ] ]
  [ CODE-SET IS alphabet-name ]
  [ [ ACCESS MODE IS ] SEQUENTIAL ]
  [ FILE STATUS IS file-stat ] .
```

Format 2 – Relative File

```
FD file-name
    [ IS EXTERNAL ]
    [ IS GLOBAL ]

[ BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS      } ]
                                                 { CHARACTERS }

[ RECORD { CONTAINS [ shortest-rec TO ] longest-rec CHARACTERS                                  } ]
         { IS VARYING IN SIZE [ FROM shortest-rec ] [ TO longest-rec ] CHARACTERS               }
                                                    [ DEPENDING ON depending-item ]

[ LABEL { RECORDS ARE } { STANDARD } ]
        { RECORD IS   } { OMITTED  }

[ VALUE OF ID IS file-spec ]

[ DATA { RECORDS ARE } { rec-name } ... ]
       { RECORD IS   }

[ [ ACCESS MODE IS ] { SEQUENTIAL [ RELATIVE KEY IS rel-key ]                                  } ]
                     { { RANDOM  } RELATIVE KEY IS rel-key                                     }
                     { { DYNAMIC }                                                             }

[ FILE STATUS IS file-stat ]
```

Format 3 – Indexed File

```
FD  file-name
    [ IS EXTERNAL ]
    [ IS GLOBAL ]
    [ BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS / CHARACTERS } ]
    [ RECORD { CONTAINS [ shortest-rec TO ] longest-rec CHARACTERS
             / IS VARYING IN SIZE [ FROM shortest-rec ] [ TO longest-rec ] CHARACTERS
               [ DEPENDING ON depending-item ] } ]

    [ LABEL { RECORDS ARE / RECORD IS } { STANDARD / OMITTED } ]
    [ VALUE OF ID IS file-spec ]
    [ DATA { RECORDS ARE / RECORD IS } { rec-name } ... ]
    [ [ ACCESS MODE IS ] { SEQUENTIAL / RANDOM / DYNAMIC } ]
      RECORD KEY IS rec-key
    [ ALTERNATE RECORD KEY IS alt-key [ WITH DUPLICATES ] ]
    [ FILE STATUS IS file-stat ] .
```

Format 4 – Report File

```
FD  file-name
    [ IS EXTERNAL ]
    [ IS GLOBAL ]
    [ BLOCK CONTAINS [ smallest-block TO ] blocksize { RECORDS / CHARACTERS } ]
    [ RECORD { CONTAINS [ shortest-rec TO ] longest-rec CHARACTERS
             / IS VARYING IN SIZE [ FROM shortest-rec ] [ TO longest-rec ] CHARACTERS
               [ DEPENDING ON depending-item ] } ]
    [ LABEL { RECORDS ARE / RECORD IS } { STANDARD / OMITTED } ]
    [ VALUE OF ID IS file-spec ]
    [ [ ACCESS MODE IS ] SEQUENTIAL ]
    { REPORT IS / REPORTS ARE } { report-name } ...
    [ CODE-SET IS alphabet-name ]
    [ FILE STATUS IS file-stat ] .
```

Sort-Merge file description entry:

```
SD  file-name
    [ RECORD { CONTAINS [ shortest-rec TO ] longest-rec CHARACTERS
             { IS VARYING IN SIZE [ FROM shortest-rec ] [ TO longest-rec ] CHARACTERS
             {                                          [ DEPENDING ON depending-item ] } ]
    [ DATA { RECORDS ARE } { rec-name } ... ]
           { RECORD IS   }
```

Report description entry:

```
RD  report-name
    [ IS GLOBAL ]
    [ CODE report-code ]

[ { CONTROL IS  } { { control-name } ...          } ]
  { CONTROLS ARE } {   FINAL [ control-name ] ... }

[ PAGE [ LIMIT IS  ] page-size [ LINE  ]
       [ LIMITS ARE ]          [ LINES ]

       [ HEADING heading-line ]
       [ FIRST DETAIL first-detail-line ]
       [ LAST DETAIL last-detail-line ]
       [ FOOTING footing-line ] ]
```

Record description entries:

Format 1

```
level-number  [ data-name ]
              [ FILLER ]

    [ REDEFINES other-data-item ]  .
    [ IS EXTERNAL ]
    [ IS GLOBAL ]
    [ { PICTURE } IS character-string ]
      { PIC     }

    [ [ USAGE IS ] { COMPUTATIONAL   } ]
                   { COMP            }
                   { COMPUTATIONAL-1 }
                   { COMP-1          }
                   { COMPUTATIONAL-2 }
                   { COMP-2          }
                   { COMPUTATIONAL-3 }
                   { COMP-3          }
                   { DISPLAY         }
                   { INDEX           }
                   { POINTER         }

    [ [ SIGN IS ] { LEADING  } [ SEPARATE CHARACTER ] ]
                  { TRAILING }
```

Record description entries (Cont.)

```
[ OCCURS table-size TIMES
    [ { ASCENDING  } KEY IS { key-name } ... ] ...
      { DESCENDING }
    [ INDEXED BY { ind-name } ... ]
  OCCURS min-times TO max-times TIMES DEPENDING ON depending-item
    [ { ASCENDING  } KEY IS { key-name } ... ] ...
      { DESCENDING }
    [ INDEXED BY { ind-name } ... ] ]

[ { SYNCHRONIZED } [ LEFT  ] ]
  { SYNC         }   RIGHT

[ { JUSTIFIED } RIGHT ]
  { JUST      }

[ BLANK WHEN ZERO ]

[ VALUE IS { lit                      } ]
           { EXTERNAL external-name   }
           { REFERENCE data-name      }
```

Record description entries (Cont.)

Format 2

66 new-name RENAMES rename-start [{ THRU | THROUGH } rename-end]

Format 3

88 condition-name { VALUE IS | VALUES ARE } { { EXTERNAL external-name | REFERENCE data-name | low-val } [{ THRU | THROUGH } { EXTERNAL external-name | REFERENCE data-name | high-val }] }

Report group description entries:

Format 1

Of [group-data-name]

[LINE NUMBER IS { line-num [ON NEXT PAGE] | PLUS line-num-plus }]

[NEXT GROUP IS { next-group-line-num | PLUS next-grou&line-num-plus | NEXT PAGE }]

Report group description entries (Cont.)

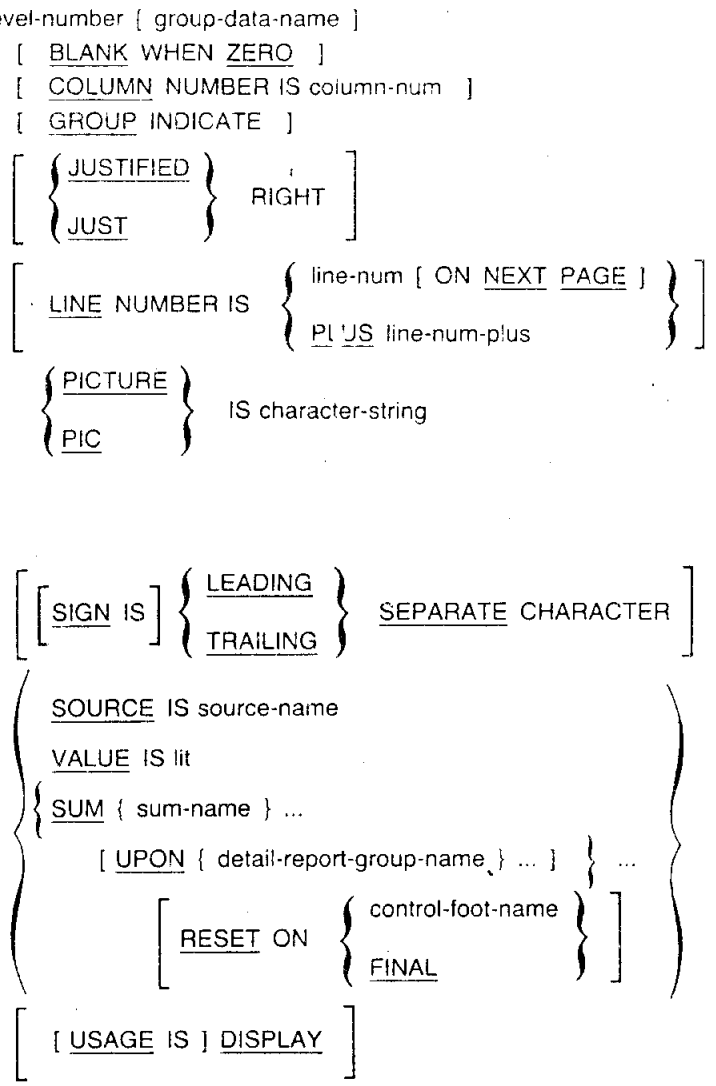
```
           ⎧ { REPORT HEADING }                                          ⎫
           ⎪ { RH             }                                          ⎪
           ⎪ { PAGE HEADING }                                            ⎪
           ⎪ { PH           }                                            ⎪
           ⎪ { CONTROL HEADING }   { control-head-name }                 ⎪
           ⎪ { CH              }   { FINAL             }                 ⎪
TYPE IS    ⎨ { DETAIL }                                                  ⎬
           ⎪ { DE     }                                                  ⎪
           ⎪ { CONTROL FOOTING }   { control-foot-name }                 ⎪
           ⎪ { CF              }   { FINAL             }                 ⎪
           ⎪ { PAGE FOOTING }                                            ⎪
           ⎪ { PF           }                                            ⎪
           ⎪ { REPORT FOOTING }                                          ⎪
           ⎩ { RF             }                                          ⎭

[ [ USAGE IS ] DISPLAY ] .
```

Format 2

```
level-number [ group-data-name ]

[ LINE NUMBER IS { line-num [ ON NEXT PAGE ] } ]
[                { PLUS line-num-plus        } ]

[ [ USAGE IS ] DISPLAY ] .
```

Report group description entries (Cont.)

Format 3



Procedure Division Format

Format 1

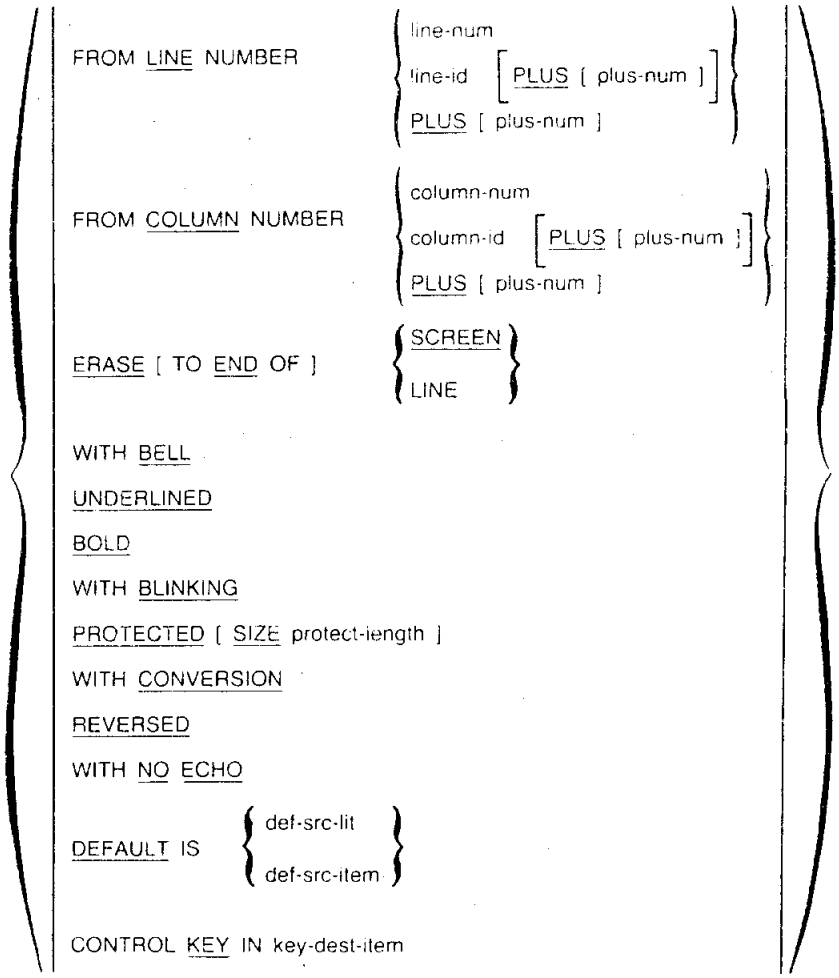
```
[ PROCEDURE DIVISION [ USING { data-name } ... ] [ GIVING identifier ] .

[ DECLARATIVES.

{ section-name SECTION [ segment-number ] . declarative-sentence

[ paragraph-name. [ sentence ] ... ] ... } ...

  END DECLARATIVES. ]

{ section-name SECTION [ segment-number ] .

[ paragraph-name. [ sentence ] ... ] ... } ... ]
```

Format 2

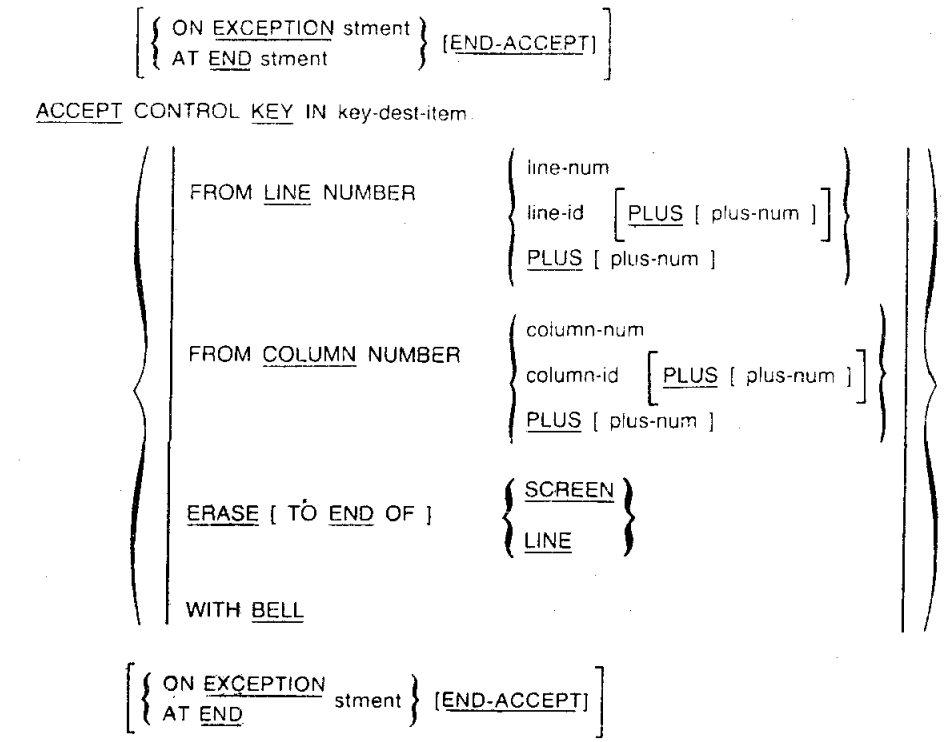
```
[ PROCEDURE DIVISION [ USING { data-name } ... ] [ GIVING identifier ] .

[ paragraph-name. [ sentence ] ... ] ... ]
```

Procedure Division Statements

ACCEPT dest-item



Procedure Division Statements (Cont.)

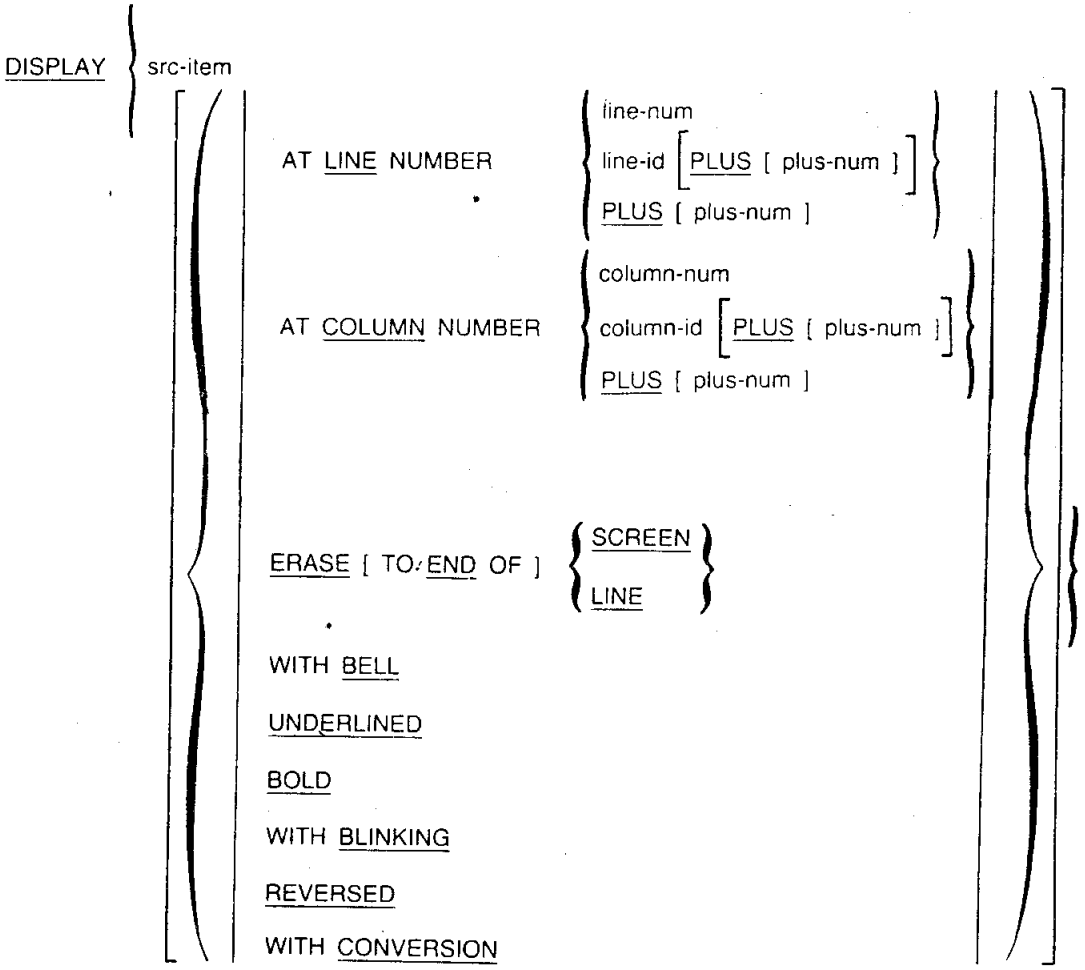


Procedure Division Statements (Cont.)

```
ACCEPT dest-item [ FROM input-source ] [ AT END stment [ END-ACCEPT ] ]

                            { DATE        }
ACCEPT dest-item FROM       { DAY         }
                            { DAY-OF-WEEK }
                            { TIME        }

ADD { num } ... TO { rsult [ ROUNDED ] } ...  [ ON SIZE ERROR stment [ END-ADD ] ]

ADD { num } { num }...GIVING { rsult [ ROUNDED ] } ... [ ON SIZE ERROR stment [ END-ADD ] ]

    { CORRESPONDING }
ADD {               } grp-1 TO grp-2 [ ROUNDED ] [ON SIZE ERROR stment [ END-ADD ]]
    { CORR          }

ALTER { proc TO [ PROCEED TO ] new-proc } ...

CALL prog-name
  [         { { { [ BY REFERENCE ] }              } }   [ { { BY REFERENCE }              } ]     ]
  [ USING   { { { BY CONTENT       } { arg } ...  } }   [ { { BY CONTENT   } { arg } ...  } ] ... ]
  [         { { { BY DESCRIPTOR    }              } }   [ { { BY DESCRIPTOR}              } ]     ]
  [         { { { BY VALUE         }              } }   [ { { BY VALUE     }              } ]     ]
  [         { OMITTED                               }   [ OMITTED                           ]     ]

     [ GIVING function-res ]  [ ON { EXCEPTION } stment [ END-CALL ] ]
                              [    { OVERFLOW  }                      ]
```

```
CANCEL { prog-name } ...

        {            [ { REEL }  [ FOR REMOVAL    ] ]   }
        {            [ { UNIT }  [ WITH NO REWIND ] ]   }
CLOSE   { file-name  [                              ]   } ...
        {            [          { NO REWIND }       ]   }
        {            [  WITH    {           }       ]   }
        {            [          { LOCK      }       ]   }

COMMIT [ RETAINING ] [ ON ERROR stment [ END-COMMIT ] ]

COMPUTE { rsult [ ROUNDED ] } ... = arithmetic-expression
   [ ON SIZE ERROR stment [ END-COMPUTE ] ]

                                  { { set-name } ... }
CONNECT [ record-name ] TO        {                  }
                                  { ALL              }

   [              [ { | REALM                          | } ]            ]
   [              [ { | RECORD                         | } ]            ]
   [ RETAINING    [ { | SET [ set name ] ...           | } ]  CURRENCY  ]
   [              [ { | { set-name } ...               | } ]            ]

   [ ON ERROR stment [ END-CONNECT ] ]

CONTINUE

DELETE file-name RECORD  [ INVALID KEY stment [ END-DELETE ] ]
```

```
DISCONNECT [ record-name ] FROM { { set-name } ... } [ ON ERROR stment [ END-DISCONNECT ] ]
                                { ALL              }

DISPLAY { src-item } ... [ UPON output-dest ] [ WITH NO ADVANCING ]
```



DIVIDE srcnum INTO { rsult [ROUNDED] } ...
  [ON SIZE ERROR stment [END-DIVIDE]]

DIVIDE srcnum INTO srcnum GIVING { rsult [ROUNDED] } ...
  [ON SIZE ERROR stment [END-DIVIDE]]

DIVIDE srcnum BY srcnum GIVING { rsult [ROUNDED] } ...
  [ON SIZE ERROR stment [END-DIVIDE]]

DIVIDE srcnum INTO srcnum GIVING rsult [ROUNDED] REMAINDER remaind
  [ON SIZE ERROR stment [END-DIVIDE]]

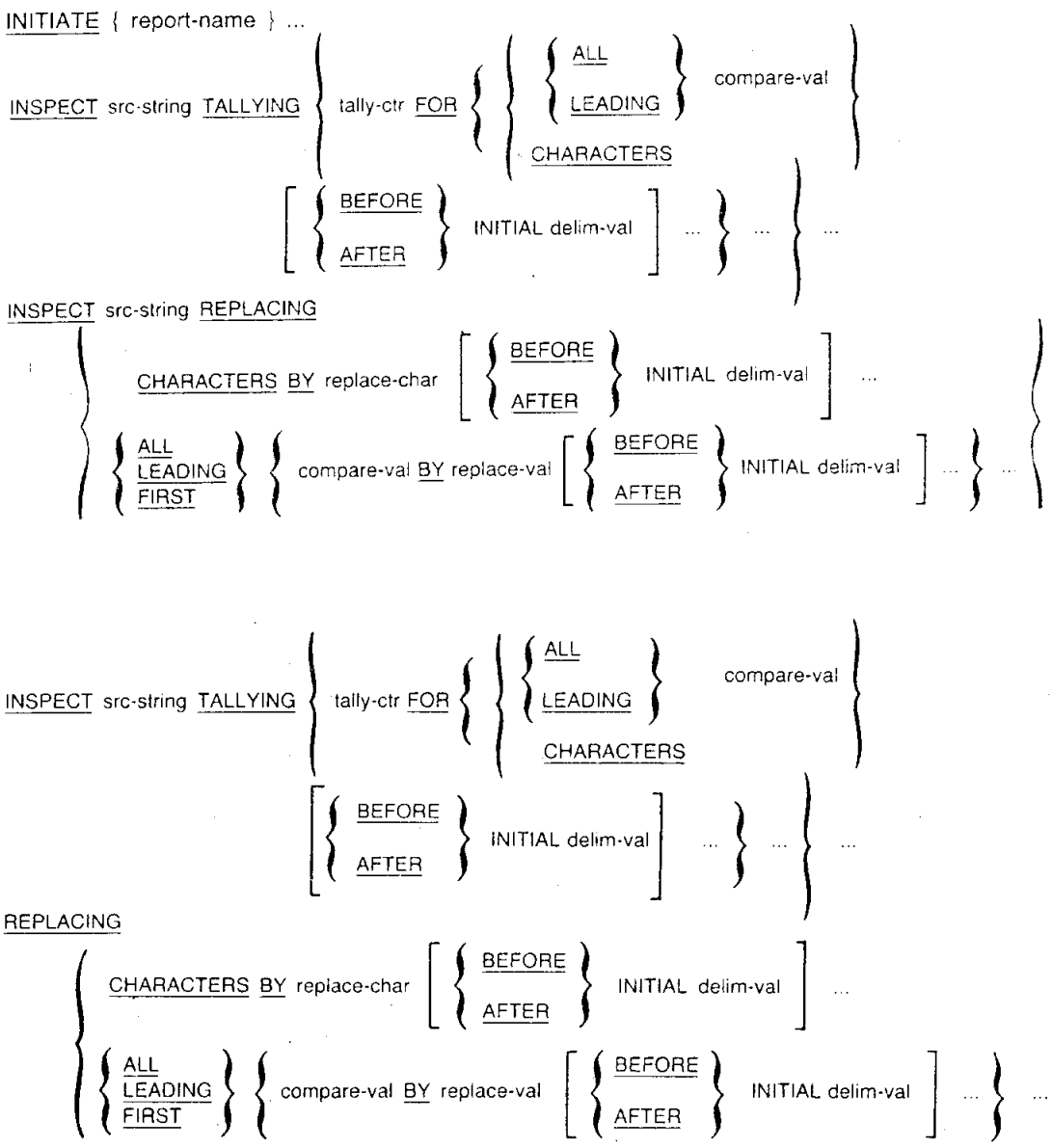
DIVIDE srcnum BY srcnum GIVING rsult [ROUNDED] REMAINDER remaind
  [ON SIZE ERROR stment [END-DIVIDE]]

ERASE [ALL] [record-name] [ON ERROR stment [END-ERASE]]

```
EVALUATE { subj-item | TRUE | FALSE } ...
  { { WHEN { ANY | cond | TRUE | FALSE | [ NOT ] { obj-item [ { THRU | THROUGH } obj-item ] } } ... } ... stment-1 }
  [ WHEN OTHER stment-2 ]
  [ END-EVALUATE ]

EXIT [PROGRAM]
EXIT.
```

```
FETCH database-record
  [FOR UPDATE]
    [ RETAINING [ { | { REALM | RECORD | SET [ set-name ] ... } | { set-name } ... } ] CURRENCY ]
    [ { AT END stment | ON ERROR stment } [ END-FETCH ] ]

FIND database-record
  [FOR UPDATE]
    [ RETAINING [ { | { REALM | RECORD | SET [ set-name ] ... } | { set-name } ... } ] CURRENCY ]
    [ { AT END stment | ON ERROR stment } [ END-FIND ] ]
```

```
FIND ALL keeplist-name [record-name] [ WITHIN { realm-name } ]
                                              { set-name  }

     [ USING { rec-key } ... ]
     [ WHERE { bool-expres } ]  [FOR UPDATE]

     [ { AT END stment    } { END-FIND } ]
     [ { ON ERROR stment  }             ]

FREE { database-key-id                                    } [ ON ERROR stment [ END-FREE ] ]
     { ALL [ FROM { keeplist-name } ... ]                 }

GENERATE report-item


GET [ record-name                ] [ ON ERROR stment [ END-GET ] ]
    [ { record-item } ...        ]

GO TO [ proc-name ]

GO TO { proc-name } ... DEPENDING ON num

IF condition THEN { { stment-1 } ... } [ ELSE { stment-2 } ... [ END-IF ] ]
                  { NEXT SENTENCE     } [ ELSE NEXT SENTENCE               ]
                                        [ END-IF                           ]

INITIALIZE { fld-name } ... [ REPLACING { ALPHABETIC           } DATA BY val ]
                            { ALPHANUMERIC                     }
                            { NUMERIC                          }
                            { ALPHANUMERIC-EDITED              }
                            { NUMERIC-EDITED                   }
```


INITIATE { report-name } ...
INSPECT src-string TALLYING
tally-ctr FOR
ALL
LEADING
CHARACTERS
compare-val
BEFORE
AFTER
INITIAL delim-val
INSPECT src-string REPLACING
CHARACTERS BY replace-char
ALL
LEADING
FIRST
compare-val BY replace-val
INSPECT src-string TALLYING
tally-ctr FOR
ALL
LEADING
CHARACTERS
compare-val
BEFORE
AFTER
INITIAL delim-val
REPLACING
CHARACTERS BY replace-char
ALL
LEADING
FIRST
compare-val BY replace-val
BEFORE
AFTER
INITIAL delim-val

```
INSPECT src-string CONVERTING compare-chars TO convert-chars [ { BEFORE } INITIAL delim-val ]
                                                              { AFTER  }

KEEP [ database-key-id ] USING destination-keeplist [ ON ERROR stment [ END-KEEP ] ]

MERGE mergefile { ON { DESCENDING } KEY { mergekey } ... } ...
                {    { ASCENDING  }                       }
                [ COLLATING SEQUENCE IS alpha ]
                  USING   infile  { infile } ...
                { OUTPUT PROCEDURE IS first-proc [ { THRU    } end-proc ] }
                {                                 { THROUGH }          }
                { GIVING { outfile } ...                               }

MODIFY [ record-name    ]
       [ { record-item } ... ]
       [ RETAINING [ { REALM                  } ] CURRENCY ]
                   [ { RECORD                 } ]          ]
                   [ { SET [ set-name ] ... } ]            ]
                   [ { set-name } ...         ]            ]
       [ ON ERROR stment [ END-MODIFY ] ]

MOVE { src-item } TO { dest-item } ...
     { lit      }

MOVE { CORRESPONDING } src-item TO dest-item
     { CORR          }
```

```
MULTIPLY srcnum BY { rsult [ ROUNDED ] } ... [ ON SIZE ERROR stment [ END-MULTIPLY ] ]

MULTIPLY srcnum BY srcnum GIVING { rsult [ ROUNDED ] } ...
    [ ON SIZE ERROR stment [ END-MULTIPLY ] ]
```

Report Writer

```
       { OUTPUT { file-name [ WITH NO REWIND ] } ... }
OPEN   {                                             } ...
       { EXTEND { file-name } ...                    }
```

Sequential, Relative, Indexed

```
       ( { INPUT  } {                                 [            { NO OTHERS                     } ] }     )
       ( {        } { file-name [ WITH NO REWIND ]    [ ALLOWING   { { READERS | WRITERS | UPDATERS } } ] } ... )
       ( { OUTPUT } {                                 [            { ALL                           } ] }     )
OPEN   (                                                                                                   ) ...
       ( { EXTEND } {              [            { NO OTHERS                     } ] }                        )
       ( {        } { file-name    [ ALLOWING   { { READERS | WRITERS | UPDATERS } } ] } ...                 )
       ( { I-O    } {              [            { ALL                           } ] }                        )
```

```
PERFORM [ first-proc [ { THRU    } end-proc ] ] [ stment END-PERFORM ]
        [              { THROUGH }            ]

PERFORM [ first-proc [ { THRU    } end-proc ] ] repeat-count TIMES [ stment END-PERFORM ]
        [              { THROUGH }            ]

PERFORM [ first-proc [ { THRU    } end-proc ] ] [ WITH TEST { BEFORE } ] UNTIL cond
        [              { THROUGH }            ]           { AFTER  }
        [ stment END-PERFORM ]

PERFORM [ first-proc [ { THRU    } end-proc ] ] [ WITH TEST { BEFORE } ]
        [              { THROUGH }            ]           { AFTER  }
          VARYING var FROM init BY increm UNTIL cond
        [ AFTER var FROM init BY increm UNTIL cond ] ...
        [ stment END-PERFORM ]

READ file-name [ NEXT ] RECORD [ INTO dest-item ] [ REGARDLESS OF LOCK                    ]
                                                  [ ALLOWING { UPDATERS  } ]
                                                             { READERS   }
                                                             { NO OTHERS }

  [ AT END stment [ END-READ ] ]
```

```
READ file-name RECORD [ INTO dest-item ] [ REGARDLESS OF LOCK
                                         | ALLOWING { UPDATERS
                                                    | READERS
                                                    | NO OTHERS } ]
     [ KEY IS key-name ]
     [ INVALID KEY stment [ END-READ ] ]

READY [ realm-name ] ...
   [ USAGE-MODE IS { { CONCURRENT
                     | EXCLUSIVE
                     | PROTECTED
                     | BATCH }   [ { RETRIEVAL
                                   | UPDATE } ]
                   | { RETRIEVAL
                     | UPDATE }  [ { CONCURRENT
                                   | EXCLUSIVE
                                   | PROTECTED
                                   | BATCH } ] } ]

     [WITH WAIT]
   [ ON ERROR stment [ END-READY ] ]

RECONNECT [ record-name ] WITHIN { { set-name } ...
                                 | ALL }

   [ RETAINING [ { | { REALM
                     | RECORD
                     | SET [ set-name ] ...
                     | { set-name } } } ]  CURRENCY ]
   [ ON ERROR stment [ END-RECONNECT ] ]

RELEASE rec [ FROM src-area ]

RETURN smrg-file RECORD [ INTO dest-area ] AT END stment [ END-RETURN ]
```

REWRITE rec-name [FROM src-item] [ALLOWING NO OTHERS]
[INVALID KEY stment [END-REWRITE]]

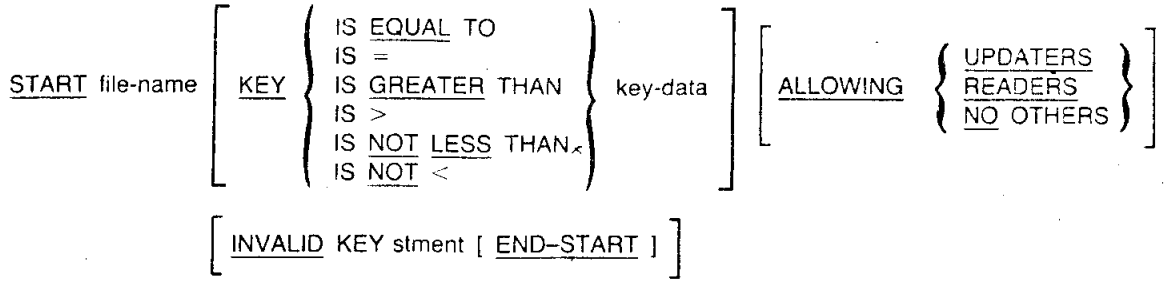
ROLLBACK [ON ERROR stment [END-ROLLBACK]]

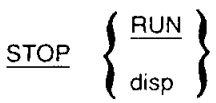
SEARCH src-table [VARYING pointr] [AT END stment]
{ WHEN cond { stment / NEXT SENTENCE } } ... [END-SEARCH]

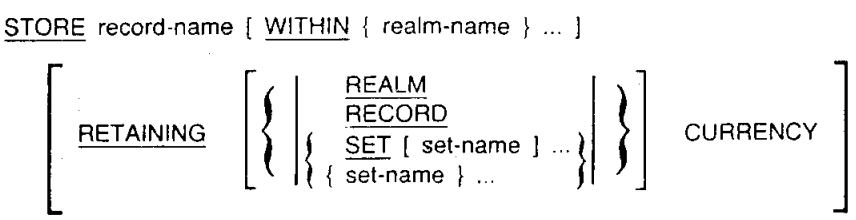
SEARCH ALL src-table [AT END stment] WHEN { elemnt { IS EQUAL TO / IS = } arg / cond-name }
[AND { elemnt { IS EQUAL TO / IS = } arg / cond-name }] ... { stment / NEXT SENTENCE } [END-SEARCH]

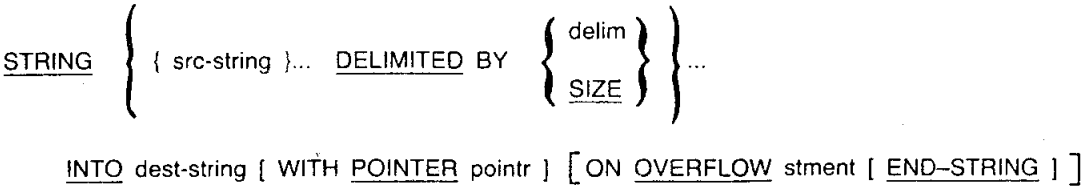
SET { rsult } ... TO val

```
SET { indx } ... { UP BY   } increm
                 { DOWN BY }

SET { cond-name } ... TO TRUE

SET { { switch-name } ... TO { ON  } } ...
                             { OFF }

SET pointer-id TO REFERENCE OF identifier

SET status-code-id TO { SUCCESS }
                      { FAILURE }

SORT sortfile { ON { DESCENDING } KEY { sortkey } ... } ...
              {    { ASCENDING  }                     }

[ WITH DUPLICATES IN ORDER ]

[ COLLATING SEQUENCE IS alpha ]

{ INPUT PROCEDURE IS first-proc [ { THRU    } end-proc ] }
{                               { THROUGH } ]          }
{ USING { infile } ...                                 }

{ OUTPUT PROCEDURE IS first-proc [ { THRU    } end-proc ] }
{                                { THROUGH } ]          }
{ GIVING { outfile } ...                                }
```


START file-name
KEY
IS EQUAL TO
IS =
IS GREATER THAN
IS >
IS NOT LESS THAN
IS NOT <
key-data
ALLOWING
UPDATERS
READERS
NO OTHERS
INVALID KEY stment [END-START]


STOP
RUN
disp


STORE record-name [WITHIN { realm-name } ...]
RETAINING
REALM
RECORD
SET [set-name] ...
{ set-name } ...
CURRENCY
[ON ERROR stment [END-STORE]]


STRING
{ src-string }... DELIMITED BY
delim
SIZE
INTO dest-string [WITH POINTER pointr] [ON OVERFLOW stment [END-STRING]]

```
SUBTRACT { num } ... FROM { rsult [ ROUNDED ] } ...
                                        [ ON SIZE ERROR stment [ END-SUBTRACT ] ]

SUBTRACT { num } ... FROM num GIVING { rsult [ ROUNDED ] } ...
                                        [ ON SIZE ERROR stment [ END-SUBTRACT ] ]

SUBTRACT { CORRESPONDING } grp-1 FROM grp-2 [ ROUNDED ]
         { CORR          }
                                        [ ON SIZE ERROR stment [ END-SUBTRACT ] ]

SUPPRESS PRINTING

TERMINATE { report-name } ...
```

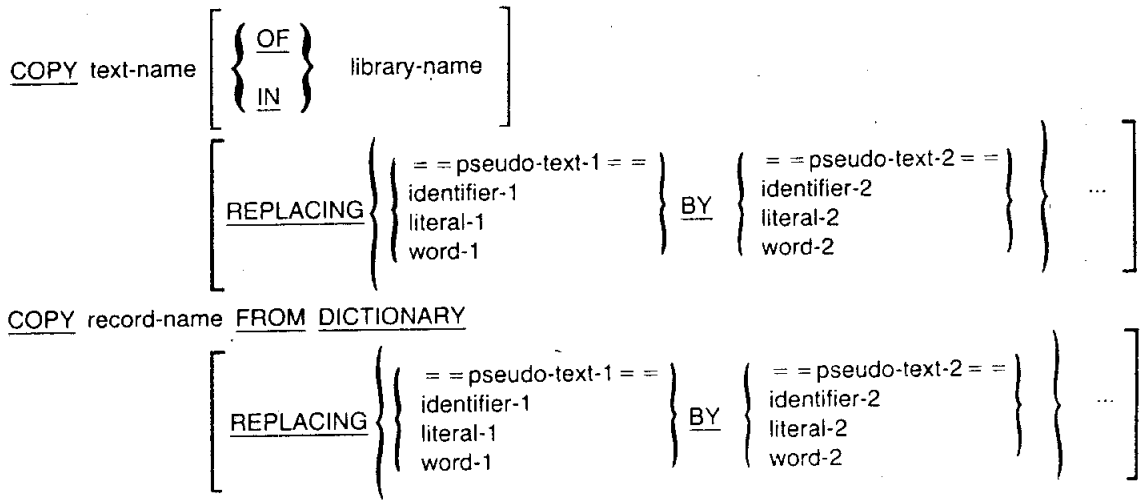
```
UNLOCK file-name [ RECORD             ]
                 [ ALL RECORDS        ]

UNSTRING src-string [ DELIMITED BY [ ALL ] delim [ OR [ ALL ] delim ] ... ]
                    INTO { dest-string [ DELIMITER IN delim-dest ] [ COUNT IN countr ] } ...
                    [ WITH POINTER pointr ]
                    [ TALLYING IN tally-ctr ]
                    [ ON OVERFLOW stment [ END-UNSTRING ] ]
```

```
USE [ GLOBAL ] AFTER STANDARD { EXCEPTION } PROCEDURE ON { {file-name}... }
                              { ERROR     }               { INPUT       }
                                                          { OUTPUT      }
                                                          { I-O         }
                                                          { EXTEND      }

USE [ GLOBAL ] BEFORE REPORTING group-data-name .

USE [ GLOBAL ] FOR DB-EXCEPTION [ ON { { DBMS-exception-condition } ... } ] .
                                     { OTHER                              }

WRITE rec-name [ FROM src-item ] [ ALLOWING NO OTHERS ]

    [ { BEFORE } ADVANCING { { advance-num [ LINE  ] } }
      { AFTER  }           { {               [ LINES ] } }
                           { { top-name }                 }
                           { { PAGE     }                 }

    [ AT { END-OF-PAGE } stment [ END-WRITE ] ]
         { EOP         }

  WRITE rec-name [ FROM src-item ] [ ALLOWING NO OTHERS ]
        [ INVALID KEY stment [ END-WRITE ] ]
```

END PROGRAM Header:

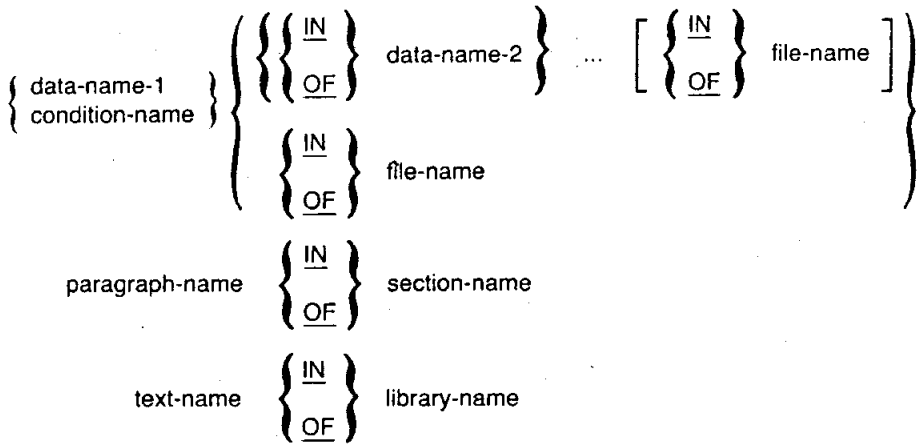
```
END PROGRAM program-name .
```

COPY STATEMENT

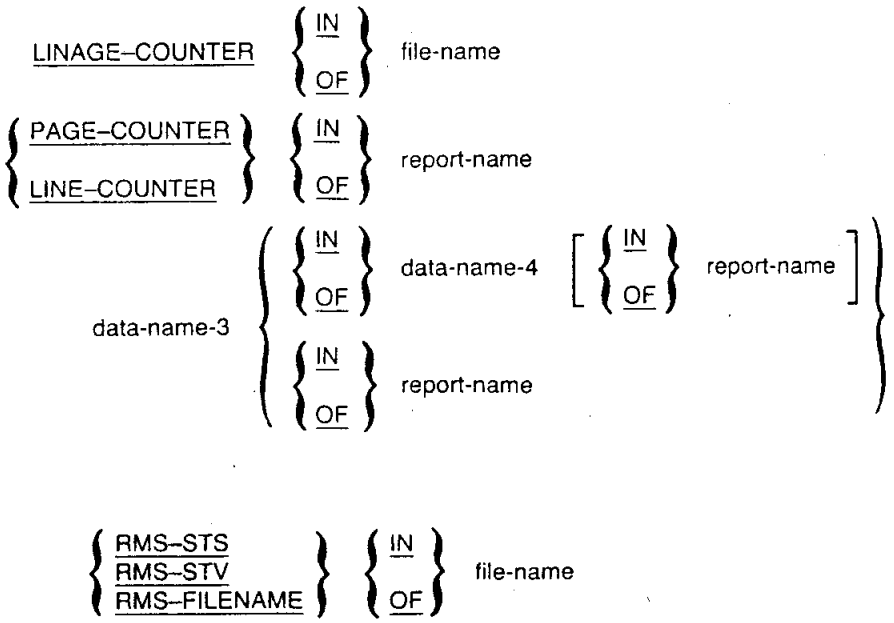


Miscellaneous Formats

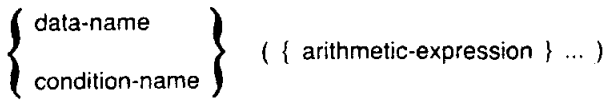
Qualification:



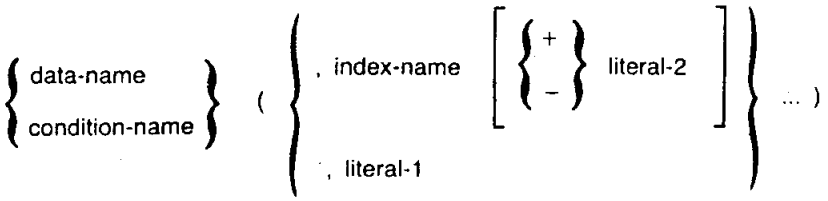
Qualification (Cont)



Subscripting:



Indexing:



Reference modification:

data-name (leftmost-character-position : [length])

Identifier:

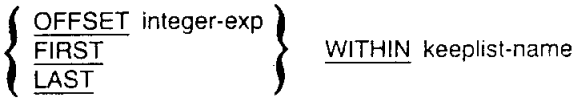
data-name [qualification] [subscripting] [reference modification]

data-name [qualification] [indexing] [reference modification]

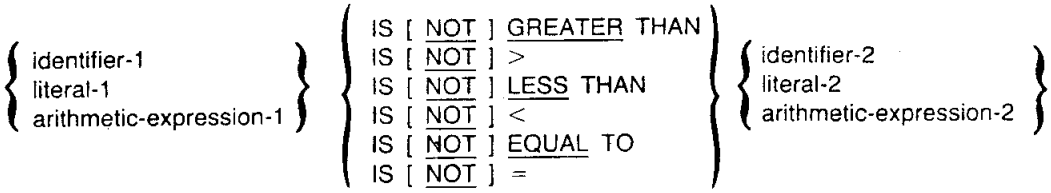
Database key identifier:

Currency Indicator Access

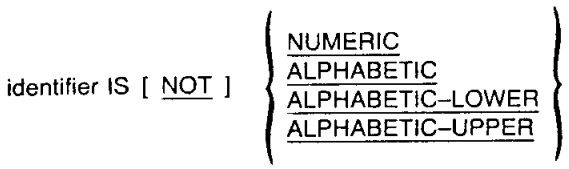
Keeplist Access



Relation condition:



Class condition:



Switch-status and condition-name condition:

condition-name

Sign condition:

arithmetic-expression IS [NOT] { POSITIVE / NEGATIVE / ZERO }

Tenancy condition:

[NOT] [set-name] { OWNER / MEMBER / TENANT }

Member condition:

[set-name IS] [NOT] EMPTY

Database key condition:

database-key IS [NOT] { ALSO database-key / NULL / WITHIN keeplist-name }

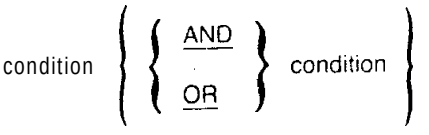
Success/failure condition:

status-code-id IS { SUCCESS / FAILURE }

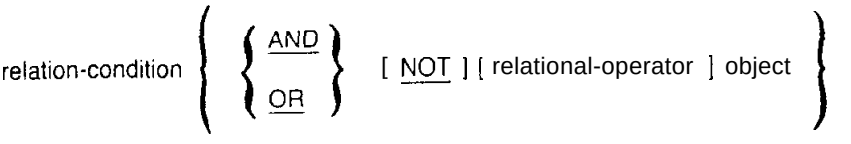
Negated simple condition:

NOT simple-condition

Combined condition:



Abbreviated combined relation condition:



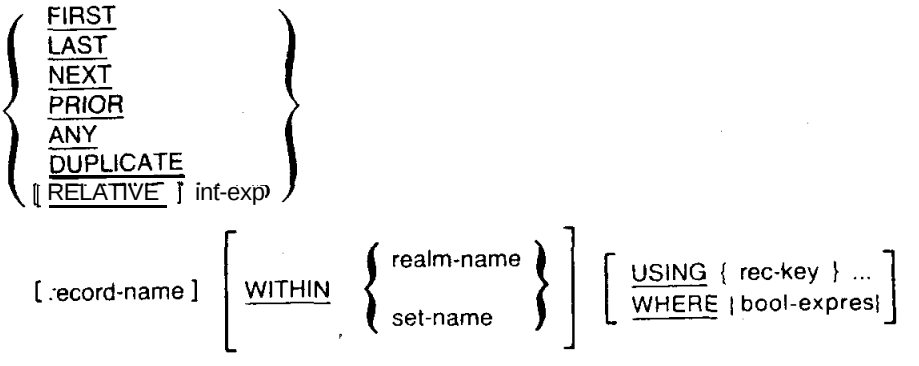
Database key identifier access:

database-key-identifier

Database set owner access:

OWNER WITHIN set-name

Database record search access:

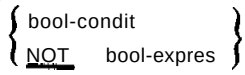


Database record search access (Cont.)

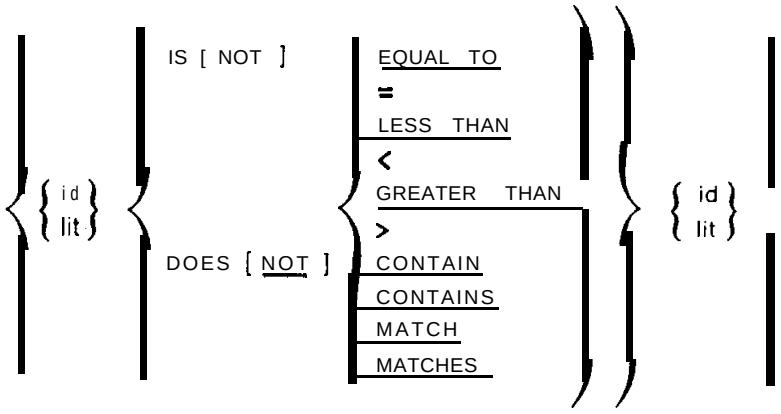
bool-expres:

bool-alt:

simp-bool-rel:



bool-condit



FROM option:

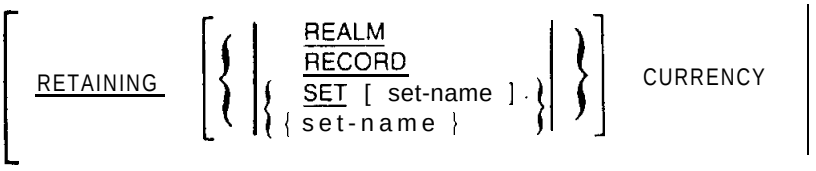
record-name FROM identifier

FROM { keeplist-name }

INTO option:

file-name INTO identifier

RETAINING option:



Segmentation:

section-name SECTION [segment-number] .

AT END option:

AT END stment

ON ERROR option:

ON ERROR stment

INVALID KEY option:

INVALID KEY stment

PICTURE Clause Characters

Data Characters

A	Alphabetic character
X	Alphanumeric character
9	Numeric character

Operation Symbols

S	Sign
V	Assumed decimal point location
P	Assumed decimal point scaling position

Replacement Characters

Z	Leading zeros replaced by spaces
*	Leading zeros replaced by * (check protection symbol)

Insertion Characters

$	Dollar sign; floating when more than one (dollar sign may be replaced by currency sign defined in SPECIAL NAMES paragraph)
B	Space character
0	Zero
I	Slash character
	Comma character
	Period character
+	Plus sign when item is positive, minus when negative; floating when more than one
	Minus sign when item is negative, blank when positive; floating when more than one
CR	Credit symbol when item is negative; blank when positive
DB	Debit symbol when item is negative; blank when positive

Figurative Constants

ZERO, ZEROS, ZEROES	Represents the value zero, or one or more of the character "0", depend,"? on context.
SPACE, SPACES	Represents one or more of the space character.
HIGH-VALUE. HIGH-VALUES	Represents one or more of the character with the highest ordinal position in the program collating sequence.
LOW-VALUE, LOW-VALUES	Represents one or more of the character with the lowest ordinal position in the program collating sequence.
QUOTE, QUOTES	Represents one or more of the quotation mark character ('').
ALL literal	Represents one or more occurrences of the string of character; comprising the literal.
symboliccharacter	Represents one or more of the character specified as the value of symbolic-character.

FILE STATUS Key Values

FILE STATUS	Input-output Statements	File Organization	Access Mode	Meaning
00	All	All	All	Successful
02	REWRITE WRITE	Ind	All	Created duplicate alternate key
05	OPEN	All	All	Optional file not present
13	READ	All	Seq	No next logical record (at end)
15	READ	All	Seq	Optional tile not present (at end)
16	READ	All	Seq	No valid next record (at end)
21	REWRITE	Ind	Seq	Primary key changed after READ
21	WRITE	Ind	Seq	Attempted "onascending key value (invalid key)
22	REWRITE	Ind	All	Duplicate alternate key (invalid key)
22	WRITE	Ind, Rel	Ran	Duplicate key (invalid key)

FILE STATUS Key Values (Cont.)

FILE STATUS	Input-Output Statements	File Organization	Access Mode	Meaning
23	DELETE READ REWRITE START	Ind, Rel	Ran	Record not in file (invalid key)
24	WRITE	Rel	All	Boundary violation (invalid key)
25	READ START	Ind, Rel	Ran	Optional file not present (invalid key)
30	All	All	All	All other permanent errors
34	WRITE	Seq	Seq	Boundary violation
90	All	All	All	Record locked by another user
91	OPEN	All	All	File locked by another program
92	DELETE READ REWRITE START WRITE	All	All	Record locked by another program
93	DELETE REWRITE	All	Seq	No previous READ or START
93	UNLOCK	All	All	No current Record
94	CLOSE	All	All	File never opened or already closed
94	OPEN	All	All	File already open or closed with lock, or the current program's data description and/or relative location of an index key does not match the file's description of that index key
94	DELETE READ REWRITE START UNLOCK WRITE	All	All	File not open, or incompatible open mode
95	OPEN	All	All	No file space on device
97	OPEN	All	All	File not found
98	CLOSE	All	All	Any other CLOSE error

SET SOURCE [/MODULE=modname] dirname[,dirname...]	Directs the debugger in locating source files by overriding selected field(s) in the full file specification of the original (at compile time) source file(s).
SET MODULE module-name [, module-name]...	Places the symbols defined in module-name program-name) into the symbol table.
SET MODULE/ALL	Places all symbols into the symbol table.
SHOW MODULE	Displays the names of the modules whose symbols are currently in the symbol table.
CANCEL MODULE module-name [, module-name]...	Removes a module's symbols from the active symbol table.
SET SCOPE path-name [, path-name]	Specifies the default module.
SHOW SCOPE	Displays the current default module name.
CANCEL SCOPE	Cancels the current default module name.
%LINE n	Specifies the line number (n) on the program source listing (also called the location).
SET BREAK location [DO (DEBUG commands)]	Specifies: (1) the location in the module where the debugger is to suspend program execution, and (2) an optional debugger command.
SHOW BREAK	Displays all breakpoints currently set in the program.
CANCEL BREAK/ALL	Removes all breakpoints.
CANCEL BREAK location	Removes the breakpoint from the specified location.
SET TRACE location	Specifies the location in the module where the Debugger is to temporarily suspend program execution so that it can display location information.

Debugging COBOL Programs (Cont.)

SHOW TRACE	Displays the program locations of current tracepoints.
CANCEL TRACE/ALL	Removes all tracepoints.
CANCEL TRACE location	Removes the tracepoint from the location.
SET WATCH identifier	Suspends program execution, reports the identifier's old and new contents, and reports the location of the instruction causing the change.
SHOW WATCH	Displays current watchpoints.
CANCEL WATCH/ALL	Removes all watchpoints.
CANCEL WATCH identifier	Removes the watchpoint from identifier.
GO [location]	Resumes program execution, either at the current location or another location.
STEP [n]	Continues execution at the current location for a specified number (n) of source program lines — default for (n) is 1.
SHOW CALLS [n]	Displays information about the current (n) levels of nested calls — default for (n) is all levels.
EXIT	Ends the debugging session.
EXAMINE [location]	Displays the contents of location.
DEPOSIT location = value	Replaces the contents of location with value.
SET STEP SOURCE	Displays the source line when you: (1) STEP to the line, or (2) reach a breakpoint or watchpoint.
SET STEP NOSOURCE	Suppresses the SET STEP SOURCE command.
TYPE [[modname\ ] line-number [: line-number] [,[modname\ ] line-number [: line-number] ...]]	Displays one or more source program lines.

Special Registers

Name	Size	Used With	Description
DB-CONDITION	S9(9) COMP	VAX DBMS	A database exception condition register that indicates the return status (success/exception) of a COBOL Data Manipulation Language statement.
DB-CURRENT-RECORD-NAME	X(31)	VAX DBMS	A database exception condition register that names the record type of the current record of the run unit.
DB-CURRENT-RECORD-ID	S9(4) COMP	VAX DBMS	A database exception condition register that identifies the User ID number (UID) of the record type of the current record of the run unit.
LINAGE-COUNTER	S9(9) COMP	Linage Files	Names a line counter when a File Description entry contains a LINACE clause. Its value is the number of the current line within the page body.
LINE-COUNTER	9(6) COMP	Report Writer	Its value is the number of the current line within a page (see PAGE-COUNTER).
PAGE-COUNTER	9(6) COMP	Report Writer	Its value is the number of the current page of a report.
RMS-STS	S9(9) COMP	VAX RMS	Contains the primary RMS return-status value of an I/O operation (RMS-STV is the secondary).
RMS-STV	S9(9) COMP	VAX RMS	Contains the secondary RMS return-status value of an I/O operation (RMS-STS is the primary).
RMS-FILENAME	X(255)	VAX RMS	Contains the complete VAX RMS file specification for the filename.

Reserved Words

ACCEPT
ACCESS
ADD
ADVANCING
AFTER
ALL
ALLOWING
ALPHABET
ALPHABETIC
ALPHABETIC-LOWER
ALPHABETIC-UPPER
ALPHANUMERIC
ALPHANUMERIC-EDITED
ALSO
ALTER
ALTERNATE
AND
ANY

BOOLEAN
BOTTOM
BY

CALL
CANCEL
CD
CF
CH
CHARACTER
CHARACTERS
CLOCK-UNITS
CLOSE
COBOL
CODE
CODE-SET
COLLATING
COLUMN
COMMA

CONCURRENT
CONFIGURATION
CONNECT
CONTAIN
CONTAINS
CONTENT
CONTINUE
CONTROL
CONTROLS
CONVERSION
CONVERTING
COPY
CORR
CORRESPONDING
COUNT
CURRENCY
CURRENT

DEBUG-LENGTH
DEBUG-LINE
DEBUG-NAME
DEBUG-NUMERIC-CONTENTS
DEBUG-SIZE
DEBUG-START
DEBUG-SUB
DEBUG-SUB-1
DEBUG-SUB-2
DEBUG-SUB-3
DEBUG-SUB-ITEM
DEBUG-SUB-N
DEBUG-SUB-NUM
DEBUGGING
DECIMAL-POINT
DECLARATIVES
DEFAULT
DELETE

APPLY
ARE
AREA
AREAS
ASCENDING
ASSIGN
AT
AUTHOR

BATCH
BEFORE
BEGINNING
BELL
BIT
BITS
BLANK
BLINKING
BLOCK
BOLD

COMMIT
COMMON
COMMUNICATION
COMP
COMP-1
COMP-2
COMP-3
COMP-4
COMP-5
COMP-6
COMPUTATIONAL
COMPUTATIONAL-1
COMPUTATIONAL-2
COMPUTATIONAL-3
COMPUTATIONAL-4
COMPUTATIONAL-5
COMPUTATIONAL-6
COMPUTE

DATA
DATE
DATE-COMPILED
DATE-WRITTEN
DAY
DAY-OF-WEEK
DB
DB-ACCESS-CONTROL-KEY
DB-CONDITION
DB-CURRENT-RECORD-ID
DB-CURRENT-RECORD-NAME
DB-EXCEPTION
DB-RECORD-NAME
DB-SET-NAME
DB-STATUS
DE
DEBUG-CONTENTS
DEBUG-ITEM

DELIMITED
DELIMITER
DEPENDING
DESCENDING
DESCRIPTOR
DESTINATION
DETAIL
DICTIONARY
DISABLE
DISCONNECT
DISPLAY
DISPLAY-6
DISPLAY-7
DISPLAY-9
DIVIDE
DIVISION
DOES
DOWN

Reserved Words (Cont.)

DUPLICATE
DUPLICATES
DYNAMIC

ECHO
EGI
ELSE
EMI
EMPTY
ENABLE
END
END-ACCEPT
END-ADD
END-CALL
END-COMMIT
END-COMPUTE
END-CONNECT
END-DELETE
END-DISCONNECT
END-DIVIDE
END-ERASE
END-EVALUATE
END-FETCH
END-FIND
END-FINISH
END-FREE
END-GET
END-IF
END-KEEP
END-MODIFY
END-MULTIPLY
END-OF-PAGE
END-PERFORM
END-READ
END-READY
END-RECEIVE
END-RECONNECT
END-RETURN
END-REWRITE
END-ROLLBACK
END-SEARCH
END-START
END-STORE
END-STRING
END-SUBTRACT
END-UNSTRING
END-WRITE
ENDING
ENTER
ENVIRONMENT
EOP
EQUAL
EQUALS
ERASE
ERROR
ESI
EVALUATE
EVERY
EXCEEDS
EXCEPTION
EXCLUSIVE
EXIT
EXOR
EXTEND
EXTERNAL

FAILURE
FALSE
FD
FETCH
FILE
FILE-CONTROL
FILLER
FINAL
FIND
FINISH
FIRST
FOOTING
FOR
FREE
FROM

GENERATE
GET
GIVING
GLOBAL
GO
GREATER
GROUP

HEADING
HIGH-VALUE
HIGH-VALUES
I-O
I-O-CONTROL
IDENTIFICATION
IF
IN
INCLUDING
INDEX
INDEXED
INDICATE
INITIAL
INITIALIZE
INITIATE
INPUT
INPUT-OUTPUT
INSPECT
INSTALLATION
INTO
INVALID
IS
JUST
JUSTIFIED

KEEP
KEY

LABEL
LAST
LD
LEADING
LEFT
LENGTH
LESS
LIMIT
LIMITS
LINAGE
LINAGE-COUNTER
LINE
LINE-COUNTER
LINES
LINKAGE
LOCALLY
LOCK
LOW-VALUE
LOW-VALUES

MATCH
MATCHES
MEMBER
MEMBERSHIP
MEMORY
MERGE
MESSAGE
MODE
MODIFY
MODULES
MOVE
MULTIPLE
MULTIPLY

Reserved Words (Cont.)

NATIVE
NEGATIVE
NEXT
NO
NON-NULL
NOT
NULL
NUMBER
NUMERIC
NUMERIC-EDITED

OBJECT-COMPUTER
OCCURS
OF
OFF
OFFSET
OMITTED
ON
ONLY

PLUS
POINTER
POSITION
POSITIVE
PRINTING
PRIOR
PROCEDURE
PROCEDURES
PROCEED
PROGRAM
PROGRAM-ID
PROTECTED
PURGE

QUEUE
QUOTE
QUOTES

RANDOM
RD

REMAINDER
REMOVAL
RENAMES
REPLACE
REPLACING
REPORT
REPORTING
REPORTS
RERUN
RESERVE
RESET
RETAINING
RETRIEVAL
RETURN
REVERSED
REWIND
REWRITE
RF

SENTENCE
SEPARATE
SEQUENCE
SEQUENCE-NUMBER
SEQUENTIAL
SET
SETS
SIGN
SIZE
SORT
SORT-MERGE
SOURCE
SOURCE-COMPUTER
SPACE
SPACES
SPECIAL-NAMES
STANDARD
STANDARD-1

OPEN
OPTIONAL
OR
ORDER
ORGANIZATION
OTHER
OTHERS
OUTPUT
OVERFLOW
OWNER

PADDING
PAGE
PAGE-COUNTER
PERFORM
PF
PH
PIC
PICTURE

READ
READERS
READY
REALM
REALMS
RECEIVE
RECONNECT
RECORD
RECORD-NAME
RECORDS
REDEFINES
REEL
REFERENCE
REFERENCE-MODIFIER
REFERENCES
REGARDLESS
RELATIVE
RELEASE

RH
RIGHT
RMS-FILENAME
RMS-STS
RMS-STV
ROLLBACK
ROUNDED
RUN

SAME
SCREEN
SD
SEARCH
SECTION
SECURITY
SEGMENT
SEGMENT-LIMIT
SELECT
SEND

STANDARD-2
START
STATUS
STOP
STORE
STRING
SUB-QUEUE-1
SUB-QUEUE-2
SUB-QUEUE-3
SUB-SCHEMA
SUBTRACT
SUCCESS
SUM
SUPPRESS
SYMBOLIC
SYNC
SYNCHRONIZED

Reserved Words (Cont.)

TABLE
TALLYING
TAPE
TENANT
TERMINAL
TERMINATE
TEST
TEXT
THAN
THEN
THROUGH
THRU
TIME
TIMES
TO
TOP
TRAILING
TRUE
TYPE
UNDERLINED
UNEQUAL
UNIT
UNLOCK
UNSTRING
UNTIL
UP
UPDATE
UPDATERS
UPON
USAGE
USAGE-MODE
USE
USING
VALUE
VALUES
VARYING
WAIT
WHEN
WHERE
WITH
WITHIN
WORDS
WORKING-STORAGE
WRITE
WRITERS
ZERO
ZEROES
ZEROS
-
_
*
**
>
<
=

COBOL Statement Categories

VAX COBOL statements are categorized by verb type and format:

Type	Category	Verb (Format)
Compiler-Directing	Compiler-Directing	COPY USE
Conditional	Conditional	ACCEPT (AT END or ON EXCEPTION) ADD (SIZE ERROR) CALL (EXCEPTION or OVERFLOW) COMMIT (ON ERROR) COMPUTE (SIZE ERROR) CONNECT (ON ERROR) DELETE (INVALID KEY) DISCONNECT (ON ERROR) DIVIDE (SIZE ERROR) ERASE (ON ERROR) EVALUATE

COBOL Statement Categories (Cont.)

Type	Category	Verb (Format)
Conditional	Conditional	FETCH (AT END or ON ERROR) FIND (AT END or ON ERROR) FREE (ON ERROR) GET (ON ERROR) IF KEEP (ON ERROR) MODIFY (ON ERROR) MULTIPLY (SIZE ERROR) READ (AT END or INVALID KEY) READY (ON ERROR) RECONNECT (ON ERROR) RETURN REWRITE (INVALID KEY) ROLLBACK (ON ERROR) SEARCH START (INVALID KEY) STORE (ON ERROR)

Type	Category	Verb (Format)
Conditional	Conditional	STRING (OVERFLOW) SUBTRACT (SIZE ERROR) UNSTRING (OVERFLOW) WRITE (INVALID KEY or END-OF-PAGE)

COBOL Statement Categories (Cont.)

Type	Category	Verb (Format)
Imperative	Arithmetic	ADD (1) COMPUTE (1) DIVIDE (1) INSPECT (TALLYING) MULTIPLY (1) SUBTRACT (1)
	Data-Movement	ACCEPT (DATE, DAY, DAY-OF-WEEK or TIME) INITIALIZE INSPECT (REPLACING or CONVERTING) MOVE SET (TO TRUE) STRING (5) UNSTRING (5)
	Ending	STOP

Type	Category	Verb (Format)
Imperative	Input-Output	ACCEPT (identifier or CONTROL KEY IN identifier) CLOSE DELETE (3) DISPLAY OPEN READ REWRITE (3) SET (TO ON or TO OFF) START (3) STOP (literal) UNLOCK WRITE (6)
	Inter-Program-Communication	CALL (2) CANCEL

COBOL Statement Categories (Cont.)

Type	Category	Verb (Format)
Imperative	Procedure-Branching	ALTER CALL CONTINUE EXIT GO TO PERFORM
	Table-Handling	SEARCH SET (TO, UP BY, or DOWN BY)
	Ordering	MERGE RELEASE RETURN SORT
	Report Writing	GENERATE INITIATE SUPPRESS TERMINATE

Type	Category	Verb (Format)
Imperative	Database	COMMIT (7) CONNECT (7) DISCONNECT (7) ERASE (7) FETCH (8) FIND (8) FREE (7) GET (7) KEEP (7) MODIFY (7) READY (7) RECONNECT (7) ROLLBACK (7) STORE (7)

COBOL Statement Categories (Cont.)

Type	Category	Verb (Format)
Imperative	Delimited-Scope	ACCEPT (END-ACCEPT) ADD (END-ADD) CALL (END-CALL) COMMIT (END-COMMIT) COMPUTE (END-COMPUTE) CONNECT (END-CONNECT) DELETE (END-DELETE) DISCONNECT (END-DISCONNECT) DIVIDE (END-DIVIDE) ERASE (END-ERASE) EVALUATE (END-EVALUATE) FETCH (END-FETCH) FIND (END-FIND) FREE (END-FREE) GET (END-GET) IF (END-IF)

Type	Category	Verb (Format)
Imperative	Delimited-Scope	KEEP (END-KEEP) MODIFY (END-MODIFY) MULTIPLY (END-MULTIPLY) PERFORM (END-PERFORM) READ (END-READ) READY (END-READY) RECONNECT (END-RECONNECT) RETURN (END-RETURN) REWRITE (END-REWRITE) ROLLBACK (END-ROLLBACK) SEARCH (END-SEARCH) START (END-START) STORE (END-STORE) STRING (END-STRING) SUBTRACT (END-SUBTRACT) UNSTRING (END-UNSTRING) WRITE (END-WRITE)

LEGEND:

(1) Without the optional SIZE ERROR phrase
(2) Without the optional EXCEPTION or OVERFLOW phrase
(3) Without the optional INVALID KEY phrase
(4) Without the optional AT END or INVALID KEY phrase
(5) Without the optional OVERFLOW phrase
(6) Without the optional INVALID KEY or END-OF-PAGE phrase
(7) Without the optional ON ERROR phrase
(8) Without the optional AT END or ON ERROR phrase

COBOL Data Types

The way a data item is represented in the Data Division of a COBOL program determines whether it will be stored as an integer, floating-point, packed decimal, display numeric, or character-string (text) data type. The following tables: (a) match COBOL Data Description entries with their corresponding VAX data types, and (b) show the allocated storage in bytes for the entry.

For example, a data item described as PIC S9(4) USAGE IS DISPLAY SIGN IS TRAILING would be stored in four bytes of storage as a right overpunch value.

Note

DISPLAY is the default USAGE for numeric, alphabetic, and alphanumeric data items. Thus, the specification USAGE IS DISPLAY is optional for display numeric, alphabetic, and alphanumeric data types.

Unscaled Data Items and Corresponding VAX Data Types

Unscaled Data Item			VAX Standard Data Type
PICTURE Clause	USAGE Clause	Allocated Storage in Bytes	
PIC S9(n) [n < = 18]	USAGE IS DISPLAY	n	Right overpunch
PIC S9(n) [n < = 18]	USAGE IS DISPLAY SIGN IS TRAILING	n	Right overpunch
PIC S9(n) [n < = 18]	USAGE IS DISPLAY SIGN IS LEADING	n	Left overpunch
PIC S9(n) [n < = 18]	USAGE IS DISPLAY SIGN IS TRAILING SEPARATE	n+1	Right separate
PIC S9(n) [n < = 18]	USAGE IS DISPLAY SIGN IS LEADING SEPARATE	n+1	Left separate
PIC 9(n) [n < = 18]	USAGE IS DISPLAY	n	Unsigned numeric
PIC 9(n) [n < = 4]	USAGE IS COMP	2	Word integer*
PIC 9(n) [5 < = n < = 9]	USAGE IS COMP	4	Longword integer*
PIC 9(n) [10 < = n < = 18]	USAGE IS COMP	8	Quadword integer*

Unscaled Data Items and Corresponding VAX Data Types (Cont.)

Unscaled Data Item			VAX Standard Data Type
PICTURE Clause	USAGE Clause	Allocated Storage in Bytes	
PIC S9(n) [n < = 4]	USAGE IS COMP	2	Word integer
PIC S9(n) [5 < = n < = 9]	USAGE IS COMP	4	Longword integer
PIC S9(n) [10 < = n < = 18]	USAGE IS COMP	8	Quadword integer
N/A	USAGE IS INDEX	4	Longword integer
N/A	USAGE IS POINTER	4	Longword integer

Unscaled Data Item			VAX Standard Data Type
PICTURE Clause	USAGE Clause	Allocated Storage in Bytes	
N/A	USAGE IS COMP-1	4	F_floating
N/A	USAGE IS COMP-2	8	D_floating
PIC S9(n) [n < = 18]	USAGE IS COMP-3	(n+1)/2 rounded up	Packed decimal
PIC 9(n) [n < = 18]	USAGE IS COMP-3	(n+1)/2 rounded up	Packed decimal*
PIC X(n) [n < = 65,535]	USAGE IS DISPLAY	n	ASCII Text
PIC A(n) [n < = 65,535]	USAGE IS DISPLAY	n	ASCII Text

Scaled Data Items and VAX Data Types

Scaled Data Item			VAX Standard Data Type
PICTURE Clause	**USAGE Clause**	**Storage Allocated in Bytes**	
PIC S9(n)V9(s) [(n+s) < = 18]	USAGE IS DISPLAY	n+s	Right (trailing) overpunch
PIC S9(n)V9(s) [(n+s) < = 18]	USAGE IS DISPLAY SIGN IS TRAILING	n+s	Right (trailing) overpunch
PIC S9(n)V9(s) [(n+s) < = 18]	USAGE IS DISPLAY SIGN IS LEADING	n+s	Left (leading) overpunch
PIC S9(n)V9(s) [(n+s) < = 18]	USAGE IS DISPLAY SIGN IS TRAILING SEPARATE	n+s+1	Right (trailing) separate

Scaled Data Item			VAX Standard Data Type
PICTURE Clause	**USAGE Clause**	**Storage Allocated in Bytes**	
PIC S9(n)V9(s) [(n+s) < = 18]	USAGE IS DISPLAY SIGN IS LEADING SEPARATE	n+s+1	Left (leading) separate
PIC 9(n)V9(s) [(n+s) < = 18]	USAGE IS DISPLAY	n+s	Unsigned numeric
PIC 9(n)V9(s) [(n+s) < = 4]	USAGE IS COMP	2	Word integer*
PIC 9(n)V9(s) [5 < = (n+s) < = 9]	USAGE IS COMP	4	Longword integer*
PIC 9(n)V9(s) [10 < = (n+s) < = 18]	USAGE IS COMP	8	Quadword integer*

Scaled Data Items and VAX Data Types (Cont.)

Scaled Data Item			VAX Standard Data Type
PICTURE Clause	USAGE Clause	storage Allocated in Bytes	
PIC S9(n)V9(s) [(n+s) < = 4]	USAGE IS COMP	2	Word integer
PIC S9(n)V9(s) [5 < = (n+s) < = 9]	USAGE IS COMP	4	Longword integer
PIC S9(n)V9(s) [10 < = (n+s) < = 18]	USAGE IS COMP	8	Quadword integer
PIC 9(n)V9(s) [(n+s) < = 18]	USAGE IS COMP-3	(n+s+1)/2 rounded up	Packed decimal'
PIC S9(n)V9(s) [(n+s) < = 18]	USAGE IS COMP-3	(n+s+1)/2 rounded up	Packed decimal

Legend:

* The generated code treats this data type as a signed operand in all contexts, except when it is a receiving-field operand. In this case, the compiler stores the absolute value of the data type.

N/A Not Applicable

Character Sets

Position	Character	ASCII Dec	ASCII Hex	EBCDIC Dec	EBCDIC Hex	NATIVE Dec	NATIVE Hex
001	NUL	000	00	000	00	000	00
002	SOH	001	01	001	01	001	01
003	STX	002	02	002	02	002	02
004	ETX	003	03	003	03	003	03
005	EOT	004	04	055	37	004	04
006	ENQ	005	05	045	2D	005	05
007	ACK	006	06	046	2E	006	06
008	BEL	007	07	047	2F	007	07
009	BS	008	08	022	16	008	08
010	HT	009	09	005	05	009	09
011	LF	010	0A	037	25	010	0A
012	VT	011	0B	011	0B	011	0B
013	FF	012	0C	012	0C	012	0C
014	CR	013	0D	013	0D	013	0D
015	SO	014	0E	014	0E	014	0E
016	SI	015	0F	015	0F	015	0F
017	DLE	016	10	016	10	016	10
018	DC1	017	11	017	11	017	11
019	DC2	018	12	018	12	018	12
020	DC3	019	13	019	13	019	13
021	DC4	020	14	060	3C	020	14
022	NAK	021	15	061	3D	021	15
023	SYN	022	16	050	32	022	16
024	ETB	023	17	038	26	023	17
025	CAN	024	18	024	18	024	18
026	EM	025	19	025	19	025	19
027	SUB	026	1A	063	3F	026	1A
028	ESC	027	1B	039	27	027	1B
029	FS	028	1C	028	1C	028	1C
030	GS	029	1D	029	1D	029	1D
031	RS	030	1E	030	1E	030	1E
032	US	031	1F	031	1F	031	1F
033	space	032	20	064	40	032	20
034	!	033	21	079	4F	033	21
035	"	034	22	127	7F	034	22
036	#	035	23	124	7C	035	23
037	$	036	24	091	5B	036	24
038	%	037	25	108	6C	037	25
039	&	038	26	080	50	038	26
040	'	039	27	126	7E	039	27
041	(	040	28	077	4D	040	28
042	)	041	29	093	5D	041	29
043	*	042	2A	092	5C	042	2A
044	+	043	2B	078	4E	043	2B
045	,	044	2C	107	6B	044	2C
046	–	045	2D	096	60	045	2D
047	.	046	2E	075	4D	046	2E
048	/	047	2F	097	61	047	2F

Character Sets (Cont.)

		ASCII		EBCDIC		NATIVE	
Position	Character	Dec	Hex	Dec	Hex	Dec	Hex
049	0	048	30	240	F0	048	30
050	1	049	31	241	F1	049	31
051	2	050	32	242	F2	050	32
052	3	051	33	243	F3	051	33
053	4	052	34	244	F4	052	34
054	5	053	35	245	F5	053	35
055	6	054	36	246	F6	054	36
056	7	055	37	246	F7	055	37
057	8	056	38	248	F8	056	38
058	9	057	39	249	F9	057	39
059	:	058	3A	123	7B	058	3A
060	;	059	3B	094	6E	059	3B
061	<	060	3C	076	4C	060	3C
062	=	061	3D	126	7E	061	3D
063	>	062	3E	110	6E	062	3E
064	?	063	3F	111	6F	063	3F
065	@	064	40	125	7D	064	40
066	A	065	41	193	C1	065	41
067	B	066	42	194	C2	066	42
068	C	067	43	195	C3	067	43
069	D	068	44	196	C4	068	44
070	E	069	45	197	C5	069	45
071	F	070	46	198	C6	070	46
072	G	071	47	199	C7	071	47
073	H	072	48	200	C8	072	48
074	I	073	49	201	C9	073	49
075	J	074	4A	209	D1	074	4A
076	K	075	4B	210	D2	075	4B
077	L	076	4C	211	D3	076	4C
078	M	077	4D	212	D4	077	4D
079	N	078	4E	213	D5	078	4E
080	O	079	4F	214	D6	079	4F
081	P	080	50	215	D7	080	50
082	Q	081	51	216	D8	081	51
083	R	082	52	217	D9	082	52
084	S	083	53	226	E2	083	53
085	T	084	54	227	E3	084	54
086	U	085	55	228	E4	085	55
087	V	086	56	229	E5	086	56
088	W	087	57	230	E6	087	57
089	X	088	58	231	E7	088	58
090	Y	089	59	232	E8	089	59
091	Z	090	5A	233	E9	090	5A
092	[	091	5B	074	4A	091	5B
093	\	092	5C	224	E0	092	5C
094	]	093	5D	090	5A	093	5D
095	^	094	5E	095	5F	094	5E
096	_	095	5F	109	6D	095	5F
097		096	60	121	79	096	60
098	a	097	61	129	81	097	61
099	b	098	62	130	82	098	62
100	c	099	63	131	83	099	63
101	d	100	64	132	84	100	64
102	e	101	65	133	85	101	65
103	f	102	66	134	86	102	66
104	g	103	67	135	87	103	67

Character Sets (Cont.)

Position	Character	ASCII Dec	ASCII Hex	EBCDIC Dec	EBCDIC Hex	NATIVE Dec	NATIVE Hex
105	h	104	68	136	88	104	68
106	i	105	69	137	89	105	69
107	j	103	6A	145	91	106	6A
108	k	107	6B	146	92	107	6B
109	l	108	6C	147	93	108	6C
110	m	109	6D	148	94	109	6D
111	n	110	6E	149	95	110	6E
112	o	111	6F	150	96	111	6F
113	p	112	70	151	97	112	70
114	q	113	71	152	98	113	71
115	r	114	72	153	99	114	72
116	s	115	73	162	A2	115	73
117	t	116	74	163	A3	116	74
118	u	117	75	164	A4	117	75
119	v	118	76	165	A5	118	76
120	w	119	77	166	A6	119	77
121	x	120	78	167	A7	120	78
122	y	121	79	168	A8	121	79
123	z	122	7A	169	A9	122	7A
124	{	123	7B	192	C0	123	7B
125	|	124	7C	106	6A	124	7C
126	}	125	7D	208	D0	125	7D
127	~	126	7E	161	A1	126	7E
128	DEL	127	7F	007	07	127	7F

Character Sets (Cont.)

Position	Character	ASCII Dec	ASCII Hex	EBCDIC Dec	EBCDIC Hex	NATIVE Dec	NATIVE Hex
129						128	80
130						129	81
131						130	82
132						131	83
133						132	84
134						133	85
135						134	86
136						135	87
137						136	88
138						137	89
139						138	8A
140						139	8B
141						140	8C
142						141	8D
143						142	8E
144						143	8F
145						144	90
146						145	91
147						146	92
148						147	93
149						148	94
150						149	95
151						150	96
152						151	97
153						152	98
154						153	99
155						154	9A
156						155	9B
157						156	9C
158						157	9D
159						158	9E
160						159	9F
161						160	A0
162						161	A1
163						162	A2
164						163	A3
165						164	A4
166						165	A5
167						166	A6
168						167	A7
169						168	A8
170						169	A9
171						170	AA
172						171	AB
173						172	AC
174						173	AD
175						174	AE
176						175	AF
177						176	B0
178						177	B1
179						178	B2
180						179	B3
181						180	B4
182						181	B5
183						182	B6
184						183	B7

Character Sets (Cont.)

Position	Character	ASCII Dec	ASCII Hex	EBCDIC Dec	EBCDIC Hex	NATIVE Dec	NATIVE Hex
185						184	B8
186						185	B9
187						186	BA
188						187	BB
189						188	BC
190						189	BD
191						190	BE
192						191	BF
193						192	C0
194						193	C1
195						194	C2
196						195	C3
197						196	C4
198						197	C5
199						198	C6
200						199	C7
201						200	C8
202						201	C9
203						202	CA
204						203	CB
205						204	CC
206						205	CD
207						206	CE
208						207	CF
209						208	D0
210						209	D1
211						210	D2
212						211	D3
213						212	D4
214						213	D5
215						214	D6
216						215	D7
217						216	D8
218						217	D9
219						218	DA
220						219	DB
221						220	DC
222						221	DD
223						222	DE
224						223	DF

Character Sets (Cont.)

Position	Character	ASCII Dec	ASCII Hex	EBCDIC Dec	EBCDIC Hex	NATIVE Dec	NATIVE Hex
225						224	E0
226						225	E1
227						226	E2
228						227	E3
229						228	E4
230						229	E5
231						230	E6
232						231	E7
233						232	E8
234						233	E9
235						234	EA
236						235	EB
237						236	EC
238						237	ED
239						238	EE
240						239	EF
241						240	F0
242						241	F1
243						242	F2
244						243	F3
245						244	F4
246						245	F5
247						246	F6
248						247	F7
249						248	F8
250						249	F9
251						250	FA
252						251	FB
253						252	FC
254						253	FD
255						254	FE
256						255	FF

VAX/VMS
DCL Commands and Lexical Functions
Order No. AA-Z003A-TE

September 1984

digital equipment corporation · maynard, massachusetts

Quick reference information on all VAX/VMS DCL commands and lexical functions. For complete descriptions, see the *VAX/VMS DCL Dictionary*.

symbol-name :=[=] string
symbol-name[offset,size] :=[=] replacement-string

@file-spec [p1 [p2 [... p8]]]
  /OUTPUT=file-spec

ACCOUNTING file-spec[,...]
  /[NO]ACCOUNT=(["-",]account-name[,...])
  /[NO]ADDRESS=(["-",]node-address[,...]) /[NO]BEFORE[=time] /[NO]BINARY
  /[NO]ENTRY=(["-",]queue-entry-number[,...]) /[NO]FULL
  /[NO]IDENTIFICATION=(["-",]pid[,...]) /[NO]IMAGE=(["-",]image-name[,...])
  /[NO]JOB=(["-",]job-name[,...]) /[NO]LOG
  /[NO]NODE=(["-",]node-name[,...]) /[NO]OUTPUT[=file-spec]
  /[NO]OWNER=(["-",]owner-pid[,...]) /[NO]PRIORITY=(["-",]priority[,...])
  /[NO]PROCESS=(["-",]process-type[,...])
  /[NO]QUEUE=(["-",]queue-name[,...]) /[NO]REJECTED[=file-spec]
  /[NO]REMOTE_ID=(["-",]remote-id[,...]) /[NO]REPORT[=(report-item[,...])]
  /[NO]SINCE[=time] /[NO]SORT[=(["-"]sort-item[,...])]
  /[NO]STATUS=(["-",]exit-status[,...]) /[NO]SUMMARY=(summary-item[,...])
  /[NO]TERMINAL=(["-",]terminal-name[,...]) /[NO]TITLE[=title]
  /[NO]TYPE=(["-",]record-type[,...]) /[NO]UIC=(["-",]uic[,...])
  /[NO]USER=(["-",]user-name[,...])

ALLOCATE device-name[:][,...] [logical-name[:]]
  /[NO]LOG /[NO]TYPE=device-type

ANALYZE/CRASH_DUMP file-spec
  /SYMBOLS[=file-spec]

ANALYZE/DISK_STRUCTURE device-name:
  /[NO]CONFIRM /[NO]LIST[=file-spec] /[NO]READ_CHECK /[NO]REPAIR
  /USAGE[=file-spec]

ANALYZE/ERROR_LOG [file-spec[,...]]
  /BEFORE[=date-time] /[NO]BINARY[=file-spec] /BRIEF
  /ENTRY[=(start:dec-value[,end:dec-value])]
  /EXCLUDE=(device or entry-type[,...]) /[NO]FULL /INCLUDE=(device or
  entry-type[,...]) /[NO]LOG /OUTPUT[=file-spec] /REGISTER_DUMP
  /REJECTED[=file-spec] /SID_REGISTER[=%Xhex-value] /SINCE[=date-time]
  /STATISTICS /SUMMARY[=summary-type[,...]]

ANALYZE/IMAGE file-spec [,...]
  /[NO]INTERACTIVE /OUTPUT=file-spec
 (Positional Qualifiers)
  /FIXUP_SECTION /GST /HEADER /PATCH_TEXT

ANALYZE/MEDIA device
  /BAD_BLOCKS[=list] /[NO]EXERCISE[=(FULL,[NO]KEEP,PATTERN=(value[,...]))]
  /[NO]LOG /OUTPUT[=file-spec] /[NO]RETRY /SHOW[=([NO]BEFORE,[NO]AFTER)]

ANALYZE/OBJECT file-spec[,...]
  /[NO]INTERACTIVE /OUTPUT[=file-spec]
 (Positional Qualifiers)
  /DBG /EOM /GSD /INCLUDE[=(module[,...])] /LNK /MHD /TBT /TIR

ANALYZE/PROCESS_DUMP dump-file
  /FULL /[NO]IMAGE[=image-name] /[NO]INTERACTIVE /MISCELLANEOUS
  /OUTPUT[=file-spec] /RELOCATION

ANALYZE/RMS_FILE file-spec[,...]
/CHECK /FDL /INTERACTIVE /[NO]OUTPUT[=file-spec] /STATISTICS /SUMMARY

ANALYZE/SYSTEM

APPEND input-file-spec[,...] output-file-spec
/BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED
/EXCLUDE=(file-spec[,...]) /EXPIRED /[NO]LOG /MODIFIED /SINCE[=time]
(Positional Qualifiers)
/ALLOCATION=n /[NO]CONTIGUOUS /EXTENSION=n /[NO]NEW_VERSION
/PROTECTION=(code) /[NO]READ_CHECK /[NO]WRITE_CHECK

ASSIGN equivalence-name[,...] logical-name[:]
/EXECUTIVE_MODE /GROUP /JOB /[NO]LOG
/NAME_ATTRIBUTES[=(keyword[,...])] /PROCESS
/SUPERVISOR_MODE /SYSTEM /TABLE=name /USER_MODE
(Positional Qualifier)
/TRANSLATION_ATTRIBUTES[=(keyword[,...])]

ASSIGN/MERGE target-queue[:] source-queue[:]

ASSIGN/QUEUE queue-name[:] logical-queue-name[:]

ATTACH [process-name]
/IDENTIFICATION=pid

BACKUP input-specifier output-specifier
/BRIEF /COMPARE /DELETE /FAST /FULL /IGNORE=option /IMAGE
/INCREMENTAL /[NO]INITIALIZE /JOURNAL[=file-spec] /LIST[=file-spec]
/[NO]LOG /PHYSICAL /RECORD /[NO]TRUNCATE /VERIFY /VOLUME=n

(Input File Selection Qualifiers)
/BACKUP /BEFORE=time /CONFIRM /CREATED /EXCLUDE=(file-spec[,...])
/EXPIRED /MODIFIED /OWNER_UIC=[uic] /SINCE=time
(Input Save Set Qualifiers)
/[NO]CRC /[NO]REWIND /SAVE_SET /SELECT=(file-spec[,...])
(Output File Qualifiers)
/NEW_VERSION /OVERLAY /OWNER_UIC[=option] /REPLACE
(Output Save Set Qualifiers)
/BLOCK_SIZE=n /COMMENT=string /[NO]CRC /DENSITY=n /GROUP_SIZE=n
/LABEL=(string[,...]) /OWNER_UIC=[uic] /PROTECTION[=(code)] /[NO]REWIND
/SAVE_SET

CANCEL [process-name]
/IDENTIFICATION=pid

CLOSE logical-name[:]
/ERROR=label /[NO]LOG

CONNECT virtual-terminal-name
/[NO]CONTINUE /[NO]LOGOUT

CONTINUE

CONVERT input-file-spec[,...] output-file-spec
/[NO]APPEND /[NO]CREATE /[NO]EXCEPTIONS_FILE[=file-spec] /[NO]EXIT
/[NO]FAST_LOAD /FDL file-spec /[NO]FILL_BUCKETS /[NO]FIXED_CONTROL /KEY=n
/MERGE /[NO]PAD[=[b]x] /PROLOG=n /[NO]READ_CHECK /[NO]SHARE /[NO]SORT
/[NO]STATISTICS /[NO]TRUNCATE /WORK_FILES[=n] /[NO]WRITE_CHECK

CONVERT/RECLAIM file-spec
/[NO]STATISTICS

COPY input-file-spec[,...] output-file-spec
/BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONCATENATE /[NO]CONFIRM
/CREATED /EXCLUDE=(file-spec[,...]) /EXPIRED /[NO]LOG /MODIFIED
/SINCE[=time]
(Positional Qualifiers)
/ALLOCATION=n /[NO]CONTIGUOUS /EXTENSION=n /[NO]OVERLAY
/PROTECTION=(code) /[NO]READ_CHECK /[NO]REPLACE /[NO]TRUNCATE /VOLUME=n
/[NO]WRITE CHECK

CREATE file-spec[,...]
/[NO]LOG /OWNER_UIC=uic /PROTECTION=(code) /VOLUME=n

CREATE/DIRECTORY directory-spec[,...]
/[NO]LOG /OWNER_UIC[=option] /PROTECTION=(code) /VERSION_LIMIT=n
/VOLUME=n

CREATE/FDL=fdl-file-spec [file-spec]
/[NO]LOG

CREATE/NAME_TABLE table-name
/ATTRIBUTES[=(keyword[,...])] /EXECUTIVE_MODE /[NO]LOG
/PARENT_TABLE=table /PROTECTION[=code] /QUOTA=bytes /SUPERVISOR_MODE
/USER_MODE

DEALLOCATE device-name[:]
/ALL

DEASSIGN [logical-name[:]]
/ALL /EXECUTIVE_MODE /GROUP /JOB /PROCESS /SUPERVISOR_MODE /SYSTEM
/TABLE=name /USER_MODE

DEASSIGN/QUEUE logical-queue-name[:]

DEBUG

$ DECK
/DOLLARS[=string]

DEFINE logical-name equivalence-name[,...]
/EXECUTIVE_MODE /GROUP /JOB /[NO]LOG /NAME_ATTRIBUTES[=(keyword[,...])]
/PROCESS /SUPERVISOR_MODE /SYSTEM /TABLE=name /USER_MODE
(Positional Qualifier)
/TRANSLATION_ATTRIBUTES[=(keyword[,...])]

DEFINE/CHARACTERISTIC characteristic-name characteristic-number

DEFINE/FORM form-name form-number
/DESCRIPTION=string /LENGTH=n /MARGIN=(option[,...])
/[NO]SETUP[=(module[,...])] /[NO]SHEET_FEED /STOCK=string /[NO]TRUNCATE
/WIDTH=n /[NO]WRAP

DEFINE/KEY key-name equivalence-string
/[NO]ECHO /[NO]ERASE
/[NO]IF_STATE[=(state-name,...)] /[NO]LOCK_STATE /[NO]LOG
/[NO]SET_STATE[=state-name] /[NO]TERMINATE

DELETE file-spec[,...]
/BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED /[NO]ERASE
/EXCLUDE=(file-spec[,...]) /EXPIRED /[NO]LOG /MODIFIED /SINCE[=time]

DELETE/CHARACTERISTIC characteristic-name

DELETE/ENTRY=(entry-number[,...]) queue-name[:]

DELETE/FORM form-name

DELETE/KEY [key-name]
/ALL /[NO]LOG /[NO]STATE[=state-name[,...]]

DELETE/QUEUE queue-name[:]

DELETE/SYMBOL [symbol-name]
/ALL /GLOBAL /LOCAL /LOG

DEPOSIT location=data[,...]
/ASCII /BYTE /DECIMAL /HEXADECIMAL /LONGWORD /OCTAL /WORD

DIFFERENCES master-file-spec [revision-file-spec]
/COMMENT_DELIMITER[=(delimiter[,...])] /IGNORE=(option[,...]) /MATCH=size
/MAXIMUM_DIFFERENCES=n /MERGED[=n] /MODE=(radix[,...]) /[NO]NUMBER
/OUTPUT[=file-spec] /PARALLEL[=n] /SEPARATED[=(input-file[,...])] /SLP
/WIDTH=n /WINDOW=size
(Positional Qualifier)
/CHANGE_BAR[=(format[,...])]

DIRECTORY [file-spec[,...]]
/ACL /BACKUP /BEFORE[=time] /BRIEF /BY_OWNER[=uic] /COLUMNS=n /CREATED
/[NO]DATE[=option] /EXCLUDE=(file-spec[,...]) /EXPIRED /FILE_ID /FULL

/GRAND_TOTAL /[NO]HEADING /MODIFIED /[NO]OUTPUT=file-spec /[NO]OWNER
/PRINTER /[NO]PROTECTION /SECURITY /SELECT=(keyword[,...]) /SINCE[=time]
/[NO]SIZE[=option] /TOTAL /[NO]TRAILING /VERSIONS=n
/WIDTH=(keyword[,...])

DISCONNECT
/[NO]CONTINUE

DISMOUNT device-name[:]
/ABORT /CLUSTER /UNIT /[NO]UNLOAD

DUMP file-spec [,...]
/ALLOCATED /BLOCKS[=(option[,...])] /BYTE /DECIMAL /FILE_HEADER
/[NO]FORMATTED /HEADER /HEXADECIMAL /LONGWORD /NUMBER[=n] /OCTAL
/OUTPUT[=file-spec] /PRINTER /RECORDS[=(option[,...])] /WORD

EDIT/ACL file-spec
/[NO]JOURNAL[=file-spec] /KEEP=(option[,...]) /MODE=option /OBJECT=type
/[NO]RECOVER[=file-spec]

EDIT/EDT file-spec
/[NO]COMMAND[=command-file] /[NO]CREATE /[NO]JOURNAL[=journal-file]
/[NO]OUTPUT[=output-file] /[NO]READ_ONLY /[NO]RECOVER

EDIT/FDL file-spec
/ANALYZE=file-spec /CREATE /DISPLAY=graph-option /EMPHASIS=tuning-bias
/GRANULARITY=n /[NO]INTERACTIVE /NUMBER_KEYS=n /OUTPUT=file-spec
/PROMPTING=prompt-option /RESPONSES=responses-option
/[NO]SCRIPT[=script-title]

EDIT/SUM input-file
/HEADER /LISTING[=file-spec] /OUTPUT[=file-spec]
(Positional Qualifier)
/UPDATE[=(update-file-spec[,...])]

EDIT/TECO [file-spec] or **EDIT/TECO/EXECUTE**=command-file [argument]
/[NO]COMMAND[=command-file] /[NO]CREATE /[NO]OUTPUT[=output-file]
/[NO]READ_ONLY

$ EOD

$ EOJ

EXAMINE location[:location]
/ASCII /BYTE /DECIMAL /HEXADECIMAL /LONGWORD /OCTAL /WORD

EXCHANGE [verb] [file-spec] [file-spec]
/[NO]MESSAGES

EXIT [status-code]

F$... (See Lexical Functions.)

GOTO label

HELP [keyword . ..]
/[NO]INSTRUCTIONS /[NO]LIBLIST /[NO]LIBRARY[=file-spec]
/[NO]OUTPUT[=file-spec] /[NO]PAGE /[NO]PROMPT
/[NO]USERLIBRARY[=(table[,...])]

IF expression THEN [$] command

INITIALIZE device-name[:] volume-label
/[NO]ERASE /OWNER_UIC=uic /PROTECTION=code
(Qualifiers for Magnetic Tapes)
/DENSITY=density-value /LABEL-option /OVERRIDE=(option[,...])
(Qualifiers for Disks)
/ACCESSED=n /BADBLOCKS=(area,[...]) /CLUSTER_SIZE=n
/DATA_CHECK[=(option[,...])] /DIRECTORIES=n /EXTENSION=n
/FILE_PROTECTION=code /GROUP /HEADERS=n /[NO]HIGHWATER
/INDEX=position /MAXIMUM_FILES=n /[NO]SHARE /STRUCTURE=level
/SYSTEM /USER_NAME=string /[NO]VERIFIED /WINDOWS=n

INITIALIZE/QUEUE queue-name[:]
/BASE_PRIORITY=n /[NO]BATCH /[NO]BLOCK_LIMIT=([lowlim,]uplim)
/[NO]CHARACTERISTICS[=(characteristic[,...])] /CPUDEFAULT=time
/CPUMAXIMUM=time /[NO]DEFAULT[=(option[,...])] /[NO]DISABLE_SWAPPING
/[NO]ENABLE_GENERIC /FORM=type /[NO]GENERIC[=(queue-name[,...])]
/JOB-LIMIT-n /[NO]LIBRARY[=file-name] /ON=[node::][device[:]]
/OWNER_UIC=uic /[NO]PROCESSOR[=filename] /PROTECTION=(code)
/[NO]RETAIN[=option] /SCHEDULE=[NO]SIZE /[NO]SEPARATE[=(option[,...])]
/[NO]START /[NO]TERMINAL /WSDEFAULT=n /WSEXTENT=n /WSQUOTA=n

INQUIRE symbol-name [prompt-string]
/GLOBAL /LOCAL /[NO]PUNCTUATION

Login Procedure <CTRL/C> or <CTRL/Y> or <RETURN>
/CLI=command-language-interpreter /[NO]COMMAND[=file-spec]
/DISK=device-name[:] /TABLES=(command-table[,...])

LOGOUT
/BRIEF /FULL /[NO]HANGUP

MACRO file-spec[,...]
(Positional Qualifiers)
/[NO]CROSS_REFERENCE[=(function[,...])] /[NO]DEBUG[=option]
/DISABLE=(function[,...]) /ENABLE=(function[,...]) /LIBRARY
/[NO]LIST[=file-spec] /[NO]OBJECT[=file-spec]
/[NO]SHOW[=(function[,...])] /UPDATE[=(update-file-spec[,...])]

MAIL [file-spec] [recipient-name]
/SUBJECT="text" /EDIT=[(send,reply=extract,forward)] /SELF

MERGE input-file-specljnput-file-specZ[,...] output-file-spec
/[NO]CHECK-SEQUENCE /COLLATING-SEQUENCE=sequence /[NO]DUPLICATES
/KEY=(field[,...]) /SPECIFICATION /[NO]STABLE /[NO]STATISTICS
(Input File Qualifier)
/FORMAT=(file-attribute[,...])
(Output File Qualifiers)
/ALLOCATION=n /BUCKET_SIZE=n /CONTIGUOUS /FORMAT=(record-format[,...])
/INDEXED-SEQUENTIAL /OVERLAY /RELATIVE /SEQUENTIAL

MESSAGE file-spec[,...]
/[NO]FILE_NAME=file-spec /[NO]LIST[=file-spec] /[NO]OBJECT[=file-spec]
/[NO]SYMBOLS /[NO]TEXT

MONITOR [class-name[,...]]
/BEGINNING=time /BY-NODE /[NO]COMMENT="string" /[NO]DISPLAY[=file-spec]
/ENDING=time /FLUSH_INTERVAL=seconds /[NO]INPUT[(=file-spec,...)]
/INTERVAL=seconds /[NO]RECORD[=file-spec] /[NO]SUMMARY[=file-spec]
/VIEWING_TIME=seconds
(Class-name Qualifiers)
/ALL /AVERAGE /[NO]CPU /CURRENT /ITEM /MAXIMUM /MINIMUM /[NO]PERCENT
/TOPBIO /TOPCPU /TOPDIO /TOPFAULT
(Class Names)
ALL-CLASSES DECNET DISK DLOCK FCP FILE-SYSTEM-CACHE IO
LOCK MODES PAGE POOL PROCESSES SCS STATES SYSTEM

MOUNT device-name[:][,...] [volume-label[,...]] [logical-name[:]]
/[NO]ASSIST /COMMENT="string" /DATA_CHECK[=(option[,...])] /FOREIGN
/[NO]MESSAGE /OVERRIDE=(option[,...]) /OWNER-UIC-uic /PROCESSOR=option
/PROTECTION=code /[NO]UNLOAD /[NO]WRITE
(Qualifiers for Disks)
/ACCESSED=n /BIND=volume-set-name /[NO]CACHE=(option[,...]) /CLUSTER
/EXTENSION=n /GROUP /[NO]MOUNT_VERIFICATION /[NO]QUOTA /[NO]SHARE /SYSTEM
/WINDOWS=n
(Qualifiers for Tapes)
/[NO]AUTOMATIC /BLOCKSIZE=n /DENSITY=n /[NO]HDR3 /INITIALIZE=CONTINUATION
/[NO]LABEL /RECORDSIZE=n

ON condition THEN [$] command

OPEN logical-name[:] file-spec
/APPEND /ERROR=label /READ /SHARE[=option] /WRITE

$ PASSWORD [password]

PATCH file-spec
/ABSOLUTE /JOURNAL[=file-spec] /NEW-VERSION /OUTPUT[=file-spec]
/UPDATE[=(eco-level[,...])] /VOLUME[=n]

PHONE [phone-command]
/[NO]SCROLL /SWITCH_HOOK="character" /VIEWPORT_SIZE=n

PRINT file-spec[,...]
/AFTER=time /[NO]BACKUP /[NO]BEFORE[=time] /[NO]BY_OWNER[=uic]
/CHARACTERISTICS=(characteristic[,...]) /[NO]CONFIRM /[NO]CREATED
/DEVICE=queue-name[:] /[NO]EXCLUDE=(file-spec[,...]) /[NO]EXPIRED
/FORM=type /[NO]HOLD /[NO]IDENTIFY /JOB_COUNT=n /[NO]LOWERCASE
/[NO]MODIFIED INAME=job-name /NOTE=string /[NO]NOTIFY /OPERATOR=string
/PARAMETERS=(parameter[,...]) /PRIORITY=n /QUEUE=queue-name[:] /REMOTE
/[NO]RESTART /[NO]SINCE[=time] /USER=username
(Positional Qualifiers)
/[NO]BURST[=keyword] /COPIES=n /[NO]DELETE /[NO]FEED /[NO]FLAG[=keyword]
/[NO]HEADER /PAGES=([lowlim,]uplim) /[NO]PASSALL /SETUP=module[,...]
/[NO]SPACE /[NO]TRAILER[=keyword]

PURGE [file-spec[,...]]
/BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED /[NO]ERASE
/EXCLUDE=(file-spec[,...]) /EXPIRED /KEEP=n /[NO]LOG /MODIFIED
/SINCE[=time]

READ logical-name(:) symbol-name
/DELETE /END_OF_FILE=label /ERROR=label /INDEX=n /KEY=string
/MATCH=option /NOLOCK /PROMPT=string /[NO]TIME_OUT=n

RECALL (command-specifier]
/ALL

RENAME input-file-spec[....] output-file-spec
/BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED
/EXCLUDE=(file-spec[,...]) /EXPIRED /[NO]LOG /MODIFIED /[NO]NEW_VERSION
/SINCE[=time]

REPLY ["message-text"]
/ABORT=identification-number /ALL /BELL /BLANK-TAPE=identification-number
/DISABLE[=(keyword[,...])] /ENABLE[=(keyword[,...])]
/INITIALIZE_TAPE=identification-number /[NO]LOG
/NODE[=(VAXcluster-node[,...])] /NO[NOTIFY]
/PENDING=identification-number /SHUTDOWN /STATUS
/TERMINAL=(terminal-name[,...]) ITO=identification-number /URGENT
/USERNAME[=(username[,...])]

REQUEST "message-text"
/REPLY /TO[=(operator[,...])]

RUN file-spec
/[NO]DEBUG

```
RUN file-spec
    /[NO]ACCOUNTING /AST LIMIT quota /[NO]AUTHORIZE /BUFFER LIMIT quota
    /DELAY =delta-time /[NO]DETACHED /[NO]DUMP /ENQUEUE_LIMIT quota
    /ERROR=file-spec /EXTENT quota /FILE LIMIT =quota /INPUT file-spec
    /INTERVAL delta-time /IO BUFFERED quota /IO_ DIRECT quota
    /JOB TABLE QUOTA quota /MAILBOX unit
    /MAXIMUM WORKING SET quota /OUTPUT file-spec /PAGE_ FILE quota /PRIORITY n
    /PRIVILEGES (privilege[, ]) /PROCESS NAME process-name
    /QUEUE _LIMIT quota /[NO]RESOURCE WAIT /SCHEDULE absolute-time
    /[NO]SERVICE FAILURE /SUBPROCESS LIMIT=quota /[NO]SWAPPING
    /TIME _LIMIT limit /UIC uic /WORKING SET default

RUNOFF file-spec[... ]
    /FORM S I Z E n /[NO]LOG /[NO]PAUSE /[NO]SIMULATE
  (Positional Qualifiers)
    /BACKSPACE /[NO]BOLD[=n] /[NO]CHANGE BARS[ "character"] /CONTENTS
    /[NO]DEBUG[ (option[, .])] /DEVICE (option[, ]) /[NO]DOWN[ n ] / I N D E X
    /[NO]INTERMEDIATE[ =file-spec] /'MESSAGES =(option[, ])
    /[NO]OUTPUT[ =file-spec] /PAGES string /[NO]RIGHT[ n]
    /SEPARATE UNDERLINE[ "character"] /[NO]SEQUENCE
    /[NO]UNDERLINE CHARACTER: "character"] /VARIANT string

RUNOFF/CONTENTS file-spec[,...] or file-spec[ + ]
    /[NO]BOLD /DEEPEST HEADER n /[NO]IDENTIFICATION /[NO]INDENT /[NO]LOG
    /[NO]OUTPUT[ =file-spec] /PAGE NUMBERS=(option[, .]) /REQUIRE file-spec
    /[NO]SECTION_NUMBERS /[NO]UNDERLINE

RUNOFF/INDEX file-spec[ ] or file-spec[ + ..]
    /[NO]IDENTIFICATION /LINES_PER _PAGE =n /[NO]LOG /[NO]OUTPUT[ file-spec]
    /[NO]PAGE N U M B E R S option /[NO]REQUIRE =file-spec /[NO]RESERVE n


SEARCH file-spec[ ] search-string[, ]
    /[NO]EXACT /E X C L U D E (file-spec[, ]) /F O R M A T =option /[NO]HEADING
    /[NO]LOG / M A T C H option /[NO]NUMBERS /[NO]OUTPUT[ file-spec]
    /[NO]REMAINING /[NO]WINDOW[ (n1,n2)]

SET option
  (Options)
    ACCOUNTING ACL AUDIT BROADCAST CARD _READER CLUSTER/QUORUM COMMAND
    [NO]CONTROL DAY DEFAULT DEVICE DEVICE/SERVED DIRECTORY FILE FILE/ACL HOST
    HOST/DTE KEY LOGINS MAGTAPE MESSAGE [NO]ON OUTPUT RATE PASSWORD PRINTER
    PROCESS PROMPT PROTECTION PROTECTION/DEFAULT PROTECTION/DEVICE QUEUE
    QUEUE/ENTRY RESTART VALUE RMS DEFAULT TERMINAL TIME UIC [NO]VERIFY VOLUME
    WORKING. SET

SET ACCOUNTING
    /DISABLE (keyword], j) /ENABLE (keyword[,...]) /NEW FILE

SET ACL object-name
    /ACL[ (ace[,.. ])] /AFTER =ace /BEFORE[ =time] /BY OWNER[ uic]
    /[NO]CONFIRM /C R E A T E D /DELETE /E D I T /EXCLUDE[ (object-spec[, ..])]
    /[NO]JOURNAL[ file-spec] / K E E P option
    /LIKE (OBJECT TYPE type,OBJECT NAME name) /[NO]LOG /MODE [NO]PROMPT
    /NEW /OBJECT TYPE type /[NO]RECOVER[ file-spec] / R E P L A C E (ace[, ])
    /SINCE] time]

SET AUDIT
    /ALARM /DISABLE =(keyword[, ]) /ENABLE=(keyword[, ])
```

```
SET CARD-READER device-name[:]
    1026 /029 /[NO]LOG

SET CLUSTER/QUORUM[=quorum-value]

SET COMMAND [file-spec[,...]]
    /DELETE=(verb[,...]) /[NO]LISTING[=file-spec] /OBJECT[=file-spec]
    /[NO]OUTPUT[=file-spec] /REPLACE /TABLE[=filespec]

SET [NO]CONTROL[=(T,Y)]

SET DAY
    /DEFAULT /[NO]LOG /PRIMARY /SECONDARY

SET DEFAULT device-name[:]

SET DEVICE device-name[:]
    /ACL /[NO]AVAILABLE /[NO]DUAL_PORT /[NO]ERROR_LOGGING /[NO]LOG
    /[NO]SPOOLED[=(queue-name[:],intermediate-disk-name[:])]

SET DEVICE/[NO]SERVED
    /[NO]WRITE

SET DIRECTORY directory-spec[,...]
    /ACL /BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED
    /EXCLUDE=(file-spec[,...]) /EXPIRED /[NO]LOG /MODIFIED /OWNER_UIC[=uic]
    /SINCE[=time] /VERSION_LIMIT[=n]

SET FILE file-spec[,...]
    /[NO]BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED
    /DATA_CHECK[=([NO]READ,[NO]WRITE)] /END-OF-FILE /ENTER=new-file-spec
    /ERASE_ON_DELETE /EXCLUDE=(file-spec[,...]) /[NO]EXPIRATION_DATE[=date]
    /EXTENSION[=n] /GLOBAL_BUFFER=n /[NO]LOG /NODIRECTORY /OWNER_UIC[=uic]
    /PROTECTION[=(code)] /REMOVE /SINCE[=time] /TRUNCATE /UNLOCK
    /VERSION_LIMIT[=n]

SET FILE/ACL[=(ace[,...])] file-spec[,...]
    /AFTER=ace /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED
    /DELETE /EDIT /EXCLUDE=(file-spec[,...]) /[NO]JOURNAL[=file-spec]
    /KEEP /LIKE=file-spec /[NO]LOG /MODE=[NO]PROMPT /NEW
    /[NO]RECOVER[=file-spec] /REPLACE=(ace[,...]) /SINCE[=time]

SET HOST node-name
    /[NO]LOG[=file-spec]

SET HOST/DTE
    /DIAL=(NUMBER:number[,MODEM_TYPE:modem-type])

SET KEY
    /[NO]LOG /[NO]STATE[=state-name]

SET LOGINS
    /INTERACTIVE[=n]

SET MAGTAPE device-name[:]
    /DENSITY-density /END-OF-FILE /[NO]LOG /[NO]LOGSOFT /REWIND /SKIP-option
    /UNLOAD

SET MESSAGE [file-spec]
    /[NO]AUTHENTICATION /[NO]SEVERITY /[NO]TEXT
```

```
SET   OUTPUT-RATE[=delta-time]

SET [NO]ON

SET PASSWORD
    /GENERATE[=value] /SECONDARY /SYSTEM

SET PRINTER printer-name[:]
    /[NO]CR /[NO]FALLBACK /[NO]FF /LA11 /LA180 /[NO]LOWERCASE /[NO]LOG /LP11
    /PAGE=n /[NO]PASSALL /[NO]PRINTALL /[NO]TAB /[NO]TRUNCATE / U N K N O W N
    /[NO]UPPERCASE /WIDTH=n /[NO]WRAP

SET PROCESS [process-name]
    /[NO]DUMP /IDENTIFICATION=pid /NAME=string /PRIORITY=n
    /PRIVILEGES=(privilege[,...]) /[NO]RESOURCE-WAIT /RESUME /[NO]SUSPEND
    /[NO]SWAPPING

SET PROMPT[=string]
    /[NO]CARRIAGE_CONTROL

SET PROTECTION[=(code)] file-spec[,...]
    /[NO]CONFIRM /[NO]LOG
  (Positional   Qualifier)
    /PROTECTION=(code)

SET PROTECTION[=(code)]/DEFAULT

SET PROTECTION[=code]/DEVICE device-name[:]
    /OWNER_UIC=uic


SET QUEUE queue-name]:]
    /BASE_PRIORITY=n /[NO]BLOCK_LIMIT=([lowlim,]uplim)
    /[NO]CHARACTERISTICS[=(characteristic[,...])] /CPUDEFAULT=time
    /CPUMAXIMUM=time /[NO]DEFAULT[=(option[,...])] /[NO]DISABLE-SWAPPING
    /[NO]ENABLE_GENERIC /FORM=type /JOB_LIMIT=n
    /OWNER_UIC=uic /PROTECTION=(code) /[NO]RETAIN[=option]
    /SCHEDULE=[NO]SIZE /[NO]SEPARATE[=(option[,...])] /WSDEFAULT=n
    /WSEXTENT=n /WSQUOTA=n

SET QUEUE/ENTRY=entry-number queue-name[:]
    /AFTER=time /[NO]BURST /[NO]CHARACTERISTICS=(characteristic[,...])
    /CLI=file-spec /COPIES=n /CPUTIME=n /[NO]FEED /[NO]FLAG /FORM=type
    /[NO]HEADER /[NO]HOLD /JOB_COUNT=n /[NO]KEEP /[NO]LOG_FILE=filespec
    /[NO]LOWERCASE /NAME=job-name /NOCHECKPOINT /NODELETE /NOTE=string
    /[NO]NOTIFY /OPERATOR=string /PAGES=([lower,]upper) /[NO]PARAMETERS
    /[NO]PASSALL /[NO]PRINTER[=queue-name] /PRIORITY=n /RELEASE
    /REQUEUE=queue-name[:] /[NO]RESTART /SETUP=module[,...] /[NO]SPACE
    /[NO]TRAILER /WSDEFAULT=n /WSEXTENT=n /WSQUOTA=n

SET   RESTART-VALUE=string

SET   RMS-DEFAULT
    /BLOCK_COUNT=count /BUFFER_COUNT=count / D I S K /EXTEND_QUANTITY=n
    /INDEXED /MAGTAPE /NETWORK-BLOCK-COUNT=count /PROLOG=n /RELATIVE
    /SEQUENTIAL /SYSTEM /UNIT_RECORD
```

SET TERMINAL [device-name[:]]
/[NO]ADVANCED_VIDEO /[NO]ALTYPEAHD /[NO]ANSI_CRT /APPLICATION_KEYPAD
/[NO]AUTOBAUD /[NO]BLOCK_MODE /[NO]BRDCSTMBX /[NO]BROADCAST
/CRFILL[=formula] /[NO]DEC_CRT[=(value1,value2)]
/DEVICE_TYPE=terminal-type /[NO]DIALUP
/[NO]DISCONNECT /[NO]DISMISS /[NO]DMA /[NO]ECHO /[NO]EDIT_MODE
/[NO]EIGHT_BIT /[NO]ESCAPE /[NO]FALLBACK /FRAME=n /[NO]FORM /[NO]FULLDUP
/[NO]HALFDUP /[NO]HANGUP /[NO]HARDCOPY /[NO]HOSTSYNC /INQUIRE /INSERT
/[NO]INTERACTIVE /LFFILL[=formula] /[NO]LINE_EDITING /[NO]LOCAL_ECHO
/[NO]LOWERCASE /[NO]MODEM /NUMERIC_KEYPAD /OVERSTRIKE /PAGE[=n]
/[NO]PARITY[=option] /[NO]PASTHRU /PERMANENT /[NO]PRINTER_PORT
/PROTOCOL_DDCMP /[NO]READSYNC /[NO]REGIS /[NO]SCOPE /[NO]SECURE_SERVER
/[NO]SET_SPEED /[NO]SIXEL_GRAPHICS /[NO]SOFT_CHARACTERS /SPEED=rate
/[NO]SYSPASSWORD /[NO]TAB /[NO]TTSYNC /[NO]TYPE_AHEAD /UNKNOWN
/[NO]UPPERCASE /WIDTH=n /[NO]WRAP

SET TIME[=time]

SET UIC uic

SET [NO]VERIFY[=([NO]PROCEDURE, [NO]IMAGE)]

SET VOLUME device-spec[:][,...]
/ACCESSED[=n] /DATA_CHECK[=(option[,...])] /[NO]ERASE_ON_DELETE
/EXTENSION[=n] /FILE_PROTECTION=(code) /[NO]HIGHWATER_MARKING
/LABEL=volume-label /[NO]LOG /[NO]MOUNT_VERIFICATION /OWNER_UIC[=uic]
/PROTECTION=(code) /RETENTION=(min[,max]) /[NO]UNLOAD
/USER_NAME[=user-name] /WINDOWS[=n]

SET WORKING_SET
/[NO]ADJUST /EXTENT=n /LIMIT=n /[NO]LOG /QUOTA=n

SHOW option
(Options)
ACCOUNTING ACL AUDIT BROADCAST CLUSTER CPU DEFAULT DEVICES DEVICES/SERVED
ERROR KEY LOGICAL MAGTAPE MEMORY NETWORK PRINTER PROCESS PROTECTION QUEUE
QUEUE/CHARACTERISTICS QUEUE/FORM QUOTA RMS_DEFAULT STATUS SYMBOL SYSTEM
TERMINAL [DAY]TIME TRANSLATION USERS WORKING_SET

SHOW ACCOUNTING
/[NO]OUTPUT[=file-spec]

SHOW ACL
/OBJECT_TYPE=type

SHOW AUDIT
/[NO]OUTPUT[=file-spec]

SHOW BROADCAST
/[NO]OUTPUT[=file-spec]

SHOW CLUSTER
/BEGINNING=time /CONTINUOUS /ENDING=time /INTERVAL=seconds
/[NO]OUTPUT[=file-spec] /REPORT=report-type

SHOW CPU

SHOW DEFAULT

SHOW DEVICES [device-name[:]]
/ALLOCATED /BRIEF /FILES /FULL /MOUNTED /OUTPUT[=file-spec] /[NO]SYSTEM
/WINDOWS

SHOW DEVICES/SERVED
/ALL /COUNT /[NO]OUTPUT[=file-spec] /RESOURCE /HOST

SHOW ERROR
/FULL /[NO]OUTPUT[=file-spec]

SHOW KEY [key-name]
/ALL /[NO]BRIEF /DIRECTORY /[NO]FULL /[NO]STATE[=(state-name[,...])]

SHOW LOGICAL [logical-name[:]]
/ACCESS_MODE=mode /ALL /[NO]DESCENDANTS /GROUP /JOB
/[NO]OUTPUT[=file-spec] /PROCESS /[NO]STRUCTURE /SYSTEM /TABLE=name

SHOW MAGTAPE device-name[:]
/[NO]OUTPUT[=file-spec]

SHOW MEMORY
/ALL /FILES /FULL /[NO]OUTPUT[=file-spec] /PHYSICAL_PAGES /POOL /SLOTS

SHOW NETWORK
/[NO]OUTPUT[=file-spec]

SHOW PRINTER device-name[:]
/[NO]OUTPUT[=file-spec]

SHOW PROCESS [process-name]
/ACCOUNTING /ALL /CONTINUOUS /IDENTIFICATION=pid /MEMORY
/[NO]OUTPUT[=file-spec] /PRIVILEGES /QUOTAS /SUBPROCESSES

SHOW PROTECTION

SHOW QUOTA
/DISK[=device-name[:]] /USER=uic

SHOW QUEUE [queue-name]
/ALL /BATCH /BRIEF /DEVICE /FULL /[NO]OUTPUT[=file-spec]

SHOW QUEUE/CHARACTERISTICS [characteristic-name]
/[NO]OUTPUT[=file-spec]

SHOW QUEUE/FORM [form-name]
/BRIEF /FULL /[NO]OUTPUT[=file-spec]

SHOW RMS_DEFAULT
/[NO]OUTPUT[=file-spec]

SHOW STATUS

SHOW SYMBOL [symbol-name]
/ALL /GLOBAL /LOCAL /[NO]LOG

SHOW SYSTEM
/BATCH /FULL /NETWORK /[NO]OUTPUT[=file-spec] /PROCESS /SUBPROCESS

SHOW TERMINAL [device-name[:]]
/[NO]OUTPUT[=file-spec] /PERMANENT

SHOW [DAY]TIME

SHOW TRANSLATION logical-name
/TABLE=name

SHOW USERS [username]
/[NO]OUTPUT[=file-spec]

SHOW WORKING_SET
/[NO]OUTPUT[=file-spec]

SORT input-file-spec[,...] output-file-spec
/COLLATING_SEQUENCE sequence /[NO]DUPLICATES /KEY=(field[,...])
/PROCESS type /SPECIFICATION[=file-spec] /[NO]STABLE /[NO]STATISTICS
/WORK_FILES=n
(Input File Qualifier)
/FORMAT=(file-attribute[,...])
(Output File Qualifiers)
/ALLOCATION=n /BUCKET_SIZE=n /CONTIGUOUS /FORMAT=(record-format[,...])
/INDEXED /SEQUENTIAL /OVERLAY /RELATIVE /SEQUENTIAL

SPAWN [command-string]
/[NO]CARRIAGE_CONTROL /[NO]CLI[=cli] /INPUT=file-spec /[NO]KEYPAD
/[NO]LOG /[NO]LOGICAL_NAMES /[NO]NOTIFY /OUTPUT=file-spec
/PROCESS=subprocess-name /[NO]PROMPT[=string] /[NO]SYMBOLS
/[NO]TABLE[=command-table] /[NO]WAIT

START/CPU

START/QUEUE queue-name[:]
/ALIGN=n /BACKWARD=n /BASE_PRIORITY=n /[NO]BATCH /[NO]BLOCK_LIMIT=([l,]u)
/BUFFER_COUNT=n /[NO]CHARACTERISTICS=(characteristic[,...])
/CPUDEFAULT=t /CPUMAXIMUM=t /[NO]DEFAULT=(option[,...])
/[NO]DISABLE_SWAPPING /[NO]ENABLE_GENERIC /EXTEND_QUANTITY=n
/FORM type /FORWARD=n /[NO]GENERIC[=(queue-name[,...])] /JOB_LIMIT=n
/NEXT /ON [node::][device[:]] /OWNER_UIC=uic /[NO]PROCESSOR=filename
/PROTECTION (code) /[NO]RETAIN[=option] /SEARCH="search-string"
/[NO]SEPARATE=(option[,...]) /[NO]TERMINAL /TOP_OF_FILE /WSDEFAULT=n
/WSEXTENT=n /WSQUOTA=n

START/QUEUE/MANAGER [file-spec]
/[NO]NEW_VERSION

STOP [process-name]
/IDENTIFICATION=pid

STOP/CPU

STOP/QUEUE queue-name[:]

STOP/QUEUE/ABORT queue-name[:]

STOP/QUEUE/ENTRY entry-number queue-name[:]

STOP/QUEUE/MANAGER

STOP/QUEUE/NEXT queue-name[:]

STOP/QUEUE/REQUEUE[=queue-name] queue-name[:] -or-
STOP/QUEUE/ENTRY entry-number/REQUEUE[=queue-name]
/ENTRY=entry-number /HOLD /PRIORITY=n

SUBMIT file-spec[,...]
/AFTER=time /[NO]BACKUP /[NO]BEFORE[=time] /[NO]BY_OWNER[=uic]
/CHARACTERISTICS=(characteristic[,...]) /CLI=file-spec /[NO]CONFIRM
/CPUTIME=option /[NO]CREATED /[NO]EXCLUDE=(file-spec[,...]) /[NO]EXPIRED
/[NO]HOLD /[NO]IDENTIFY /[NO]KEEP /[NO]LOG_FILE[=file-spec] /[NO]MODIFIED
/NAME=job-name /[NO]NOTIFY /PARAMETERS=(parameter[,...])
/[NO]PRINTER[=queue-name] /PRIORITY=n /QUEUE=queue-name[:] /REMOTE
/[NO]RESTART /[NO]SINCE[=time] /USER=username /WSDEFAULT=n /WSEXTENT=n
/WSQUOTA=n
(Positional Qualifier)
/[NO]DELETE

SYNCHRONIZE [job-name]
/ENTRY=entry-number /QUEUE=queue-name[:]

TYPE file-spec[,...]
/BACKUP /BEFORE[=time] /BY_OWNER[=uic] /[NO]CONFIRM /CREATED
/EXCLUDE=(file-spec[,...]) /EXPIRED /MODIFIED /[NO]OUTPUT=file-spec
/[NO]PAGE /SINCE[=time]

UNLOCK file-spec[,...]
/[NO]CONFIRM /[NO]LOG

WAIT delta-time

WRITE logical-name expression[,...]
/ERROR=label /SYMBOL /UPDATE

Compiler Diagnostics

When the VAX COBOL compiler detects an error, a diagnostic message is generated by the compiler and is displayed online.

Some compile time error messages need more explanation than can be provided online. This appendix contains those diagnostic messages that require additional detail.

If the compiler detects an error, it displays the erroneous source line, an error pointer, possibly an asterisk, and an error message. An asterisk immediately preceding the error message means further diagnostic information about a compile time error is found in this appendix.

Compiler command line qualifiers can suppress informational and warning messages (see the /WARNINGS qualifier in the Part I, Chapter 3 for diagnostic options). Error messages are written to SYS$ERROR and, if a listing is specified, embedded in the listing file.

The format of the error message is:

```
%COBOL-a-ERROR bbb,(c) * ddd
```

where:

%COBOL — identifies a VAX COBOL compiler-generated error.

a — identifies the severity code. The compiler classifies errors by these severity codes (from least to greatest severity):

- I — Information — To get these messages, use the /WARNINGS, /WARNINGS=INFORMATION, or /STANDARD=PDP11 command qualifier. These messages convey observational or advisory information. However, they may indicate program errors that you might want to correct.
- IE — Information — To get these messages, use the /WARNINGS, /WARNINGS=STANDARD, or /STANDARD=SYNTAX command qualifier. These messages are informational and indicate that you have used a DIGITAL-defined COBOL language feature. This feature may not be transportable to other COBOL implementations.

W Warning — Warnings indicate an error condition for which the compiler can take corrective action. Check this action to make sure it is what you wanted. Otherwise, the program might produce unexpected results.

E Error — Error messages indicate error conditions that are not fatal, but are usually not executable by the compiler. The compiler still creates an object file, but the program might not properly execute. Therefore, you should correct the error and recompile the program.

F Severe Error — A severe error indicates that the compiler cannot take any corrective action or create an object file. Therefore, you must correct the error and recompile the program.

bbb indicates the diagnostic error message number listed in this appendix.

c (Error Pointer Reference) references the error message to the closest approximation to where the error occurred.

* indicates diagnostic information is found in the compile time diagnostic appendix.

ddd indicates the diagnostic error message. A brief description of the error identified by the error pointer.

The selected VAX COBOL compiler error numbers, severity codes, and messages are:

Number	Code	Message
033	E	***Integer value is outside valid range — results are undefined.**
		The value is: 1) greater than that allowed by RMS, 2) not less than 2**31, or 3) equal to zero. The compiler truncates the value, and the results are undefined.
054	E	***VALUE and condition-names invalid with subordinate JUSTIFIED, SYNCHRONIZED, or non-DISPLAY usage.**
		The compiler accepts the VALUE clause.
061	E	***Missing level 01 or 77 entry before this item.**
		If the current item is a condition-name, the compiler ignores the definition; otherwise, the compiler treats the current item as an 01 level item.
091	E	***Incorrect data-name in REDEFINES clause.**
		The compiler assumes the correct data-name, if possible. Otherwise, the clause is ignored.

209 F ***Invalid ADVANCING operand.**

The operand must be: 1) PAGE, 2) a mnemonic-name, 3) an unsigned integer data item, or 4) an unsigned integer literal.

291 F ***READ statement required for OPEN I-O on file.**

The program opens the file in I-O mode, but does not contain a READ statement. A DELETE or REWRITE operation on a sequentially accessed file requires a previously executed READ or START statement.

388 F ***Node <CDD-node-name> is an invalid CDD object.**

The dictionary object is corrupt. A required VAX CDD entry was not found. You must reinsert the definition into the dictionary.

391 E ***CDD OCCURS data-item initialization invalid in COBOL — value ignored.**

This VAX CDD entry is incompatible with VAX COBOL. An item in COBOL with an OCCURS clause cannot have a VALUE clause. The compiler ignores the initial value attribute in this dictionary entry.

392 F ***CDD error at node <CDD-node-name>.**

The dictionary object is corrupt. A required VAX CDD entry was not found. You must reinsert the record definition into the dictionary.

397 F ***CDD record containing symbolic literals invalid in COBOL.**

This VAX CDD entry is incompatible with VAX COBOL. The COBOL language does not define symbolic literals. You must do one of the following:

- Redefine the record definition in the dictionary, omitting the symbolic literal
- Do not use this record definition with VAX COBOL

The compiler ignores the symbolic literal. You must redefine and reinsert the record definition into the dictionary.

401 E ***Invalid multidimensional CDD OCCURS.**

This VAX CDD entry is incompatible with VAX COBOL. VAX CDD supports the definition of multidimensional tables more generally than does VAX COBOL. You must do one of the following:

- Redefine the record definition in the dictionary, omitting this multidimensional table definition
- Do not use this record definition with VAX COBOL

The compiler uses one dimension of information of a multidimensional table definition.

402 F ***Node <CDD-node-name> is a <CDD-node-type>, not a record definition.**

VAX COBOL requires a pathname to reference a VAX CDD record description. You must use a different pathname in your COPY FROM DICTIONARY statement or correct the VAX CDD entry to describe a record. The compiler ignores the COPY FROM DICTIONARY statement.

404 E ***Redefinition of FILLER invalid in COBOL.**

The compiler ignores the redefinition and treats the item as a separate data description entry.

411 E ***Length for database record-item "<item-name>" must be greater than zero.**

The minimum size for a COBOL data item is 1 byte. In a VAX DBMS Data Description entry, the minimum size for a subschema data item is 0 bytes. You must do one of the following:

- Redefine the subschema data item to be at least 1 byte, and recompile the subschema with the VAX DDL utility
- Do not use this subschema with VAX COBOL

The compiler treats the record-item as if it has a length of 1 byte. This may produce run-time errors.

412 E ***Length for database record-item "<item-name>" must be multiple of 8 bits.**

This entry is incompatible with VAX COBOL. The smallest unit of data that can be defined in a VAX COBOL program is 1 byte (8 bits). The compiler rounds the length up to the next multiple of 8 bits.

413 E ***Offset for database record-item "<item-name>" must be multiple of 8 bits.**

This entry is incompatible with VAX COBOL. The smallest unit of data that can be defined in a VAX COBOL program is 1 byte (8 bits). The compiler rounds the offset up to the next multiple of 8 bits.

414 E ***Length for database record "<record-name>" must be multiple of 8 bits.**

This entry is incompatible with VAX COBOL. The smallest unit of data that can be defined in a VAX COBOL program is 1 byte (8 bits). The compiler rounds the length up to the next multiple of 8 bits.

418 F ***Error in accessing subschema — DB statement ignored.**

The VAX COBOL compiler was unsuccessful in its attempt to access the subschema and/or schema specified in your DB statement. You

must make sure that the schema and subschema exist in the VAX CDD. Also verify that your logical names resolve to the schema and subschema that you intend to use. The compiler ignores the DB statement.

419 F *Invalid stride for database record-item "<item-name>".

This entry is incompatible with VAX COBOL. The stride attribute describes the separation (in bits) between one occurrence of a table item and the next occurrence. This should be the same as the allocated length of a single occurrence of the item. The compiler issues this diagnostic whenever the two lengths do not agree. You must: 1) redefine your subschema to ensure that these two database record-item lengths are identical, and 2) recompile the subschema containing this record-item with the VAX DBMS DDL utility. The compiler gives the record-item a stride equal to the length of one occurrence of the table item.

420 F *Unable to complete subschema processing.

The VAX COBOL compiler failed to exit the VAX CDD when it completed subschema processing. Recompile the COBOL program. The compiler terminates subschema processing.

439 F *Error in accessing record-item "<item-name>" from subschema.

The subschema containing the record item is most likely corrupt. Recompile the subschema with the VAX DBMS DDL utility.

441 F *Invalid multidimensional database record-item "<item-name>".

This entry is incompatible with VAX COBOL. The VAX DBMS Data Definition Language defines multidimensional tables more generally than VAX COBOL. You must do one of the following:

- Redefine the record definition in the dictionary, omitting such multidimensional table definitions
- Do not use this record definition with VAX COBOL

The compiler uses one dimension of information of the multidimensional table definition.

444 E *Unsupported subschema datatype for "<record-item-name>".

The compiler treats the item as if it were alphanumeric with a length equal to the original data type.

458 F *Invalid length for database record "<record-name>".

The subschema containing the record definition with the invalid length is most likely corrupt. Recompile the subschema with the VAX

DBMS DDL utility. The compiler assigns the record a length of one byte. This may produce run-time errors.

466 F *Offset required for database record-item "<item-name>".

The required offset-into-the-record attribute is missing in the entry for this subschema record-item. Most likely the subschema is corrupt. Recompile the subschema using the VAX DBMS DDL utility.

467 F *Subschema must have at least one database record.

This valid VAX DBMS DDL entry is invalid in COBOL. You must do one of the following:

- Redefine the subschema including a record-type definition and recompile the subschema with the VAX DBMS DDL utility
- Do not use such subschema definitions with VAX COBOL

The compiler terminates subschema processing.

468 F *Upper-bound required for database record-item "<item-name>".

The compiler encountered a table definition with no upper-bound. Most likely the subschema record description is corrupt. Recompile the subschema with the VAX DBMS DDL utility.

473 E *OCCURS DEPENDING ON data-name must be defined in the same DATA DIVISION as the OCCURS DEPENDING ON.

The compiler ignores the error.

479 F *Error in accessing record "<record-name>" from subschema.

The subschema containing the record is most likely corrupt. Recompile the subschema using the VAX DBMS DDL utility.

480 F *REFERENCE data name defined in an invalid section.

Dataname must be defined in the Subschema, File, or Working-Storage Sections. The compiler ignores the entire VALUE clause.

484 F *Error in accessing realm "<realm-name>" from subschema.

The subschema containing the realm is most likely corrupt. Recompile the subschema with the VAX DBMS DDL utility.

493 F *Invalid GLOBAL clause.

This data-item either: 1) does not have an explicit name, 2) is not an 01 or 77 item, or 3) is not defined in the File or Working-Storage Sections.

494 F ***Error in accessing set "<set-name>" from subschema.**

The subschema containing the set is most likely corrupt. Recompile the subschema with the VAX DBMS DDL utility.

495 F ***Numeric database record-item "<item-name>" must represent at least one digit.**

This subschema entry is incompatible with VAX COBOL. The VAX DBMS Data Definition Language allows the definition of numeric record-items to consist of zero digits; VAX COBOL does not. Correct the definition of the numeric record-item and recompile the subschema with the VAX DBMS DDL utility.

525 E ***Shared sequential file requires fixed, 512 character records.**

You have opened a sequential file with an OPEN ALLOWING statement to create fixed-length records in a file sharing environment. However, the program contains one or more of the following entries that cause the file to define variable-length records in a fixed-control formatted file. The use of any of these features for a sequential file in a file-sharing environment violates the rules for a file-sharing environment and may produce run-time errors:

- An 01-level Record Description entry for the file does not define a 512-character record
- The FD for the file does not specify a fixed-length record format
- The program declares the file to be EXTERNAL
- The program declares the file to be GLOBAL
- The program declares the file to be a LINAGE file
- The program declares the file with an APPLY PRINT-CONTROL clause
- The program references the file with a WRITE ADVANCING statement

Either remove the above offending entries from your program or remove the ALLOWING option of the OPEN statement.

532 F ***OFFSET invalid in a format 3 record selection expression.**

OFFSET can be used in the database key identifier form of the record selection expression, but not the record search access form.

533 F ***Operand subordinate to another database group operand.**

The list of record-items for this statement cannot contain any item that is subordinate to another item in the list.

562 F ***Invalid number of selection objects.**

In the WHEN clause of an EVALUATE statement, the number of selection objects must equal the number of selection subjects.

584 I ***Allocation of this table is incompatible with subset.**

For information on how to correct this error, see Part I, Appendix C.