CONTROL DATA
CORPORATION

# CONTROL DATA®
# 6000 COMPUTER SYSTEMS

# COBOL INSTANT
# 6000 VERSION 3

CONTROL DATA
CORPORATION

# CONTROL DATA®
# 6000 COMPUTER SYSTEMS

## COBOL INSTANT
## 6000 VERSION 3

New features, as well as changes, deletions, and additions to information in this manual are indicated by bars in the margins or by a dot near the page number if the entire page is affected. A bar by the page number indicates pagination rather than content has changed.

| REVISION RECORD | |
|---|---|
| **REVISION** | **DESCRIPTION** |
| A | Original printing. |
| (4-2-71) | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| Publication No. 60327600 | |

Additional copies of this manual may be obtained from the nearest Control Data Corporation sales office.

Address comments concerning this manual to:

CONTROL DATA CORPORATION
*Software Documentation*
215 MOFFETT PARK DRIVE
SUNNYVALE, CALIFORNIA 94086

# CONTROL DATA 6400/6500/6600 COBOL

The COBOL language is designed to simplify the programming of business data processing operations; it produces easily modifiable source programs that result in shorter program development time and low program conversion costs. COBOL source and object programs run under the control of SCOPE Version 3.3.

COBOL for the CONTROL DATA® 6000 series is upwards compatible with ANSI COBOL and also with 3000 COBOL.

**Special Features:**

Mass Storage input and output including Indexed Sequential file processing

SORT verb sorts files within COBOL program

Automatic table search using index names and the SEARCH and SET statements

Report Writer to produce printed reports automatically, or report page may be produced by user with LINAGE clause and WRITE statement

Full arithmetic facility including:
- 18–digit operands
- DIVIDE with REMAINDER
- COMPUTE with exponentiation
- CORRESPONDING option with ADD and SUBTRACT

Segmentation and overlay of object program

ENTER and CALL verbs, Common-Storage section provide communication with separately compiled COBOL programs and also with FORTRAN or COMPASS programs

COPY and INCLUDE provide access to COBOL source library

RERUN provides memory dumps with restart at specified checkpoints

Remote Interactive capability for remote terminal input/output

## PROGRAM EFFICIENCY HINTS

To reduce key punching:

Use abbreviations where permitted.

Use PIC clause rather than SIZE, CLASS, USAGE clauses.

To increase compilation efficiency:

Restrict data and paragraph names to 9 characters or less.

Eliminate unnecessary paragraph names.

Reduce forward references.

To increase execution efficiency:

Use same size sending and receiving fields.

Make table and item sizes a multiple of 10 characters.

Reduce subscripting.

Subscript with literals instead of variables.

Use COMPUTATIONAL-1 items or index-names as subscripts.

Use COMPUTATIONAL-1 items as arithmetic variables.

Restrict arithmetic items to 9 digits or less.

Use standard labels.

Use SYNCHRONIZED RIGHT clause for data frequently referenced.

Use SAME RECORD AREA to save moves; SAME AREA to save space.

## COBOL NOTATION

| | |
|---|---|
| [ ] | Enclosed elements are optional. |
| { } | Only one element may be selected. |
| ... | Repeat preceding bracketed material as needed. |

COBOL words have preassigned meanings and appear in capitals.

COBOL words not underlined may be omitted.

Terms in small letters are supplied by the programmer.

Punctuation and special characters are required where shown.

## IDENTIFICATION DIVISION

IDENTIFICATION DIVISION.

PROGRAM-ID. program-name.
[AUTHOR. [comment-sentences.] ]
[INSTALLATION. [comment-sentences.] ]
[DATE-WRITTEN. [comment-sentences.] ]
[DATE-COMPILED. [current-date supplied by compiler.] ]
[SECURITY. [comment-sentences.] ]
[REMARKS. [comment-sentences.] ]

## ENVIRONMENT DIVISION

ENVIRONMENT DIVISION.
CONFIGURATION SECTION.

SOURCE-COMPUTER.

format 1:

$$\underline{\text{COPY}}\ \text{library-name}\ \left[\underline{\text{REPLACING}}\ \left\{\begin{array}{l}\text{literal-1}\\\text{word-1}\\\text{identifier-1}\end{array}\right\}\ \underline{\text{BY}}\ \left\{\begin{array}{l}\text{literal-2}\\\text{word-2}\\\text{identifier-2}\end{array}\right\}\ \left[\left\{\begin{array}{l}\text{literal-3}\\\text{word-3}\\\text{identifier-3}\end{array}\right\}\ \underline{\text{BY}}\ \left\{\begin{array}{l}\text{literal-4}\\\text{word-4}\\\text{identifier-4}\end{array}\right\}\right]\ \ldots\right].$$

format 2:

$$\left\{\begin{array}{l}6400\\6500\\6600\end{array}\right\}$$

OBJECT-COMPUTER.

format 1:

$$\underline{\text{COPY}}\ \text{library-name}\ \left[\underline{\text{REPLACING}}\ \left\{\begin{array}{l}\text{literal-1}\\\text{word-1}\\\text{identifier-1}\end{array}\right\}\ \underline{\text{BY}}\ \left\{\begin{array}{l}\text{literal-2}\\\text{word-2}\\\text{identifier-2}\end{array}\right\}\ \left[\left\{\begin{array}{l}\text{literal-3}\\\text{word-3}\\\text{identifier-3}\end{array}\right\}\ \underline{\text{BY}}\ \left\{\begin{array}{l}\text{literal-4}\\\text{word-4}\\\text{identifier-4}\end{array}\right\}\right]\ \ldots\right]$$

format 2:

$$\left\{\begin{array}{l}6400\\6500\\6600\end{array}\right\}\ [\underline{\text{SEGMENT-LIMIT}}\ \underline{\text{IS}}\ \text{priority-number}].$$

SPECIAL-NAMES.

format 1:

```
                 ┌             ┌literal-1   ┐
COPY library-name│ REPLACING   │word-1      │  BY
                 └             └identifier-1┘

    ┌literal-2   ┐  ┌┌literal-3   ┐     ┌literal-4   ┐┐      ┐
    │word-2      │  ││word-3      │  BY │word-4      ││  ... │.
    └identifier-2┘  └└identifier-3┘     └identifier-4┘┘      ┘
```

format 2:

```
┌SWITCH integer-1                                             ┐
│     ┌ ON STATUS IS switch-status-name 1                    ┐│
│     │      [OFF STATUS IS switch-status-name-2]            ││
│     │ OFF STATUS IS switch-status-name-2                   ││
└     └      [ON STATUS IS switch-name-1]                    ┘┘
[non-numeric-literal IS mnemonic-name-1] ...
[implementor-name IS mnemonic-name-2] ...

[CURRENCY SIGN IS literal]

[DECIMAL-POINT IS COMMA]

[CONSOLE IS mnemonic-name-3]

[TERMINAL IS mnemonic-name-4].
```

INPUT-OUTPUT SECTION.

FILE-CONTROL.

format 1:

```
                 ┌             ┌literal-1   ┐
COPY library-name│ REPLACING   │word-1      │  BY
                 └             └identifier-1┘

    ┌literal-2   ┐  ┌┌literal-3   ┐     ┌literal-4   ┐┐      ┐
    │word-2      │  ││word-3      │  BY │word-4      ││  ... │.
    └identifier-2┘  └└identifier-3┘     └identifier-4┘┘      ┘
```

format 2:

```
SELECT [OPTIONAL] file-name-1 [RENAMING file-name-2]

     ASSIGN TO implementor-name-1  [FOR MULTIPLE {REEL}]
                                                 {UNIT}

     [ RESERVE {NO       }  ALTERNATE  [{AREA }]]
               {integer-1}              [{AREAS}]

     [FILE-LIMIT IS literal-1]

     [ORGANIZATION IS {INDEXED SEQUENTIAL}]
                      {STANDARD          }

     [ ACCESS MODE IS {SEQUENTIAL}]
                      {RANDOM    }

     [PROCESSING MODE IS SEQUENTIAL]

     [ {ACTUAL  }  KEY IS data-name-2]
       {SYMBOLIC}

     [SELECT ... ] .
```

I-O-CONTROL.

format 1:

```
COPY library-name [REPLACING {literal-1   }  BY
                             {word-1      }
                             {identifier-1}

     {literal-2   }   [{literal-3   }  BY {literal-4   }]  ... ] .
     {word-2      }   [{word-3      }     {word-4      }]
     {identifier-2}   [{identifier-3}     {identifier-4}]
```

format 2:

```
 [RERUN [ON file-name-1] EVERY {END OF REEL        }
                               {integer-1 RECORDS  }
                               {condition-name     }
     OF file-name-2]

 [SAME [{SORT  }] AREA FOR file-name-3,file-name-4
       [{RECORD}]

      [file-name-5] ...]

 [MULTIPLE FILE TAPE CONTAINS file-name-6
        [POSITION integer-2]  [file-name-7
        [POSITION integer-3] ]...]
```

## PICTURE DESCRIPTION CODES

### Data Characters

| | |
|---|---|
| A | Alphabetic character |
| X | Alphanumeric character |
| 9 | Numeric character |

### Operation Symbols

| | |
|---|---|
| S | Signed |
| V | Assumed decimal point location |
| P | Assumed decimal point scaling position |

### Replacement Characters

| | |
|---|---|
| Z | Leading zeros replaced by blanks |
| * | 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) |
| , | Comma |
| / | Slash (instead of comma) |
| . | Actual decimal point |
| B | Blank |
| 0 | Zero |
| - | Minus sign when item is negative, blank when positive; floating when more than one |
| + | Plus sign when item is positive, minus when negative; 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 |

## DATA SPECIFICATIONS

| | File Section | | | Common and Working Storage Sections | | | | Constant Section | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 01 | group | elem | 77 | 01 | group | elem | 77 | 01 | group | elem |
| REDEFINES | I | | | | | | | | | | |
| SIZE | | | R | R | | | R | R | | | R |
| USAGE | | | | | | | | | | | |
| CLASS | | | | R | | | | R | | | |
| OCCURS | I | | | I | I | | | I | I | | |
| POINT LOCATION | J | I | | | J | I | | | J | I | |
| SIGNED | J | I | | | J | I | | | J | I | |
| JUSTIFIED | J | I | | | J | I | | | J | I | |
| SYNCHRONIZED | J | I | | | J | I | | | J | I | |
| PICTURE | J | I | | | J | I | | | J | I | |
| Editing Clauses | J | I | | | J | I | | I | J | I | I |
| COPY | | | | | | | | | | | |
| VALUE | K | K | C | | | | | V | | | V |
| FILLER | I | | | I | I | | | I | I | | |

| | |
|---|---|
| C | Legal only in defining values for condition names |
| I | Illegal |
| R | Required if PICTURE is not used |
| blank | Optional |
| V | Required |
| J | Legal only on elementary 01 items |
| K | Documentary only |

## DATA DIVISION

$\underline{\text{DATA}}\ \underline{\text{DIVISION}}.$

$[\underline{\text{FILE}}\ \underline{\text{SECTION}}.]$

$[\underline{\text{COMMON-STORAGE}}\ \underline{\text{SECTION}}.]$

$[\underline{\text{WORKING-STORAGE}}\ \underline{\text{SECTION}}.]$

$[\underline{\text{CONSTANT SECTION}}.]$

$[\underline{\text{REPORT}}\ \underline{\text{SECTION}}.]$

**File Description Entry (File Section Only)**

format 1:

$$\underline{\text{FD}}\ \text{file-name}\ \underline{\text{COPY}}\ \text{library-name}\ \left[\underline{\text{REPLACING}}\ \left\{\begin{array}{l}\text{literal-1}\\ \text{word-1}\\ \text{identifier-1}\end{array}\right\}\ \underline{\text{BY}}\ \left\{\begin{array}{l}\text{literal-2}\\ \text{word-2}\\ \text{identifier-2}\end{array}\right\}\ \left[\left\{\begin{array}{l}\text{literal-3}\\ \text{word-3}\\ \text{identifier-3}\end{array}\right\}\ \underline{\text{BY}}\ \left\{\begin{array}{l}\text{literal-4}\\ \text{word-4}\\ \text{identifier-4}\end{array}\right\}\right]\ \ldots\right].$$

format 2:

$\underline{\text{FD}}\ \text{file-name}$

$$\left[\underline{\text{RECORDING}}\ \text{MODE IS}\ \left[\left\{\begin{array}{l}\underline{\text{BINARY}}\\ \underline{\text{DECIMAL}}\end{array}\right\}\right]\ \left[\left\{\begin{array}{l}\underline{\text{HIGH}}\\ \underline{\text{LOW}}\\ \underline{\text{HYPER}}\end{array}\right\}\ \text{DENSITY}\right]\right]$$

$[\underline{\text{FILE}}\ \text{CONTAINS ABOUT integer-1}\ \underline{\text{RECORDS}}]$

$$\left[\underline{\text{BLOCK}}\ \text{CONTAINS [integer-2}\ \underline{\text{TO}}]\ \text{integer-3}\ \left\{\begin{array}{l}\underline{\text{RECORDS}}\\ \text{CHARACTERS}\end{array}\right\}\right]$$

$$\left[\underline{\text{RECORD}}\ \text{CONTAINS [integer-4}\ \underline{\text{TO}}]\ \text{integer-5 CHARACTERS}\ \left[\underline{\text{DEPENDING}}\ \text{ON}\ \left\{\begin{array}{l}\underline{\text{RECORD-MARK}}\\ \text{data-name-1}\end{array}\right\}\right]\right]$$

$$\underline{\text{LABEL}}\ \left\{\begin{array}{l}\underline{\text{RECORDS}}\ \text{ARE}\\ \underline{\text{RECORD}}\ \text{IS}\end{array}\right\}\ \left\{\begin{array}{l}\underline{\text{STANDARD}}\\ \underline{\text{OMITTED}}\\ \text{data-name-2}\end{array}\right\}$$

If label records are STANDARD:

$$\underline{\text{VALUE}}\ \underline{\text{OF}} \left\{\begin{array}{l}\underline{\text{ID}}\\ \underline{\text{IDENTIFICATION}}\end{array}\right\} \text{IS} \left\{\begin{array}{l}\text{literal-1}\\ \text{data-name-3}\end{array}\right\}$$

$$\left[\underline{\text{DATE-WRITTEN}}\ \text{IS} \left\{\begin{array}{l}\text{literal-2}\\ \text{data-name-4}\end{array}\right\}\right]$$

$$\left[\underline{\text{EDITION-NUMBER}}\ \text{IS} \left\{\begin{array}{l}\text{literal-3}\\ \text{data-name-5}\end{array}\right\}\right]$$

$$\left[\underline{\text{REEL-NUMBER}}\ \text{IS} \left\{\begin{array}{l}\text{literal-4}\\ \text{data-name-6}\end{array}\right\}\right]$$

$$\left[\underline{\text{RETENTION-CYCLE}}\ \text{IS} \left\{\begin{array}{l}\text{literal-5}\\ \text{data-name-7}\end{array}\right\}\right]$$

If label records are data-name-2:

$$\left[\underline{\text{VALUE}}\ \underline{\text{OF}}\ \underline{\text{ENDING-TAPE-LABEL-IDENTIFIER}}\ \text{IS} \left\{\begin{array}{l}\text{literal-6}\\ \text{data-name-8}\end{array}\right\}\right]$$

$$\left[\underline{\text{LINAGE}}\ \text{IS} \left\{\begin{array}{l}\text{integer-6}\\ \text{identifier-1}\end{array}\right\} \underline{\text{LINES}}\right]$$

$$\left\{\begin{array}{l}\underline{\text{DATA}} \left\{\begin{array}{l}\underline{\text{RECORDS}}\ \text{ARE}\\ \underline{\text{RECORD}}\ \text{IS}\end{array}\right\} \text{data-name-9 [data-name-10] ...}\\ \left[\left\{\begin{array}{l}\underline{\text{REPORTS}}\ \text{ARE}\\ \underline{\text{REPORT}}\ \text{IS}\end{array}\right\} \text{report-name-1 [report-name-2] ...}\right]\end{array}\right\}$$

[<u>SEQUENCED</u> ON data-name-11 [data-name-12] ... ] .

**Sort File Description Entry (File Section Only)**

format 1:

$$\underline{\text{SD}}\ \text{file-name}\ \underline{\text{COPY}}\ \text{library-name} \left[\underline{\text{REPLACING}} \left\{\begin{array}{l}\text{literal-1}\\ \text{word-1}\\ \text{identifier-1}\end{array}\right\} \underline{\text{BY}} \left\{\begin{array}{l}\text{literal-2}\\ \text{word-2}\\ \text{identifier-2}\end{array}\right\} \left[\left\{\begin{array}{l}\text{literal-3}\\ \text{word-3}\\ \text{identifier-3}\end{array}\right\} \underline{\text{BY}} \left\{\begin{array}{l}\text{literal-4}\\ \text{word-4}\\ \text{identifier-4}\end{array}\right\}\right] \ldots\right].$$

format 2:

<u>SD</u> file-name

[<u>FILE</u> CONTAINS ABOUT integer-1 <u>RECORDS</u>]

[<u>RECORD</u> CONTAINS [integer-2 <u>TO</u>] integer-3 CHARACTERS]

$$\left[\underline{\text{DATA}} \left\{\begin{array}{l}\underline{\text{RECORDS}}\ \text{ARE}\\ \underline{\text{RECORD}}\ \text{IS}\end{array}\right\} \text{data-name-1 [data-name-2] ...}\right].$$

**Record Description Entry (File, Common-Storage, Working-Storage and Constant Sections)**

format 1:

```
level-number data-name-1  [REDEFINES data-name-2]
     COPY data-name-3 [FROM LIBRARY].
```

format 2:

```
                { data-name-1 }
level-number    { FILLER      }   [REDEFINES data-name-2]

[               { ALPHABETIC   } ]
[ [CLASS IS]    { NUMERIC      } ]
[               { ALPHANUMERIC } ]
[               { AN           } ]

[ SIZE IS integer-1 [ { CHARACTERS } ] ]
[                   [ { DIGITS     } ] ]

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

[ OCCURS integer-1  [TO integer-2]  TIMES

      [DEPENDING ON data-name-1]

  [ { ASCENDING  } KEY IS data-name-4 [data-name-5]... ]
  [ { DESCENDING }                                     ]

  [INDEXED BY index-name-1 [index-name-2] ...] ]

[SIGNED]

[SIGN IS data-name-6]

[ POINT LOCATION IS { LEFT  } integer-5 PLACES ]
[                   { RIGHT }                  ]

[ { JUST      }  RIGHT ]
[ { JUSTIFIED }        ]
```

$$\left[\ \left\{\begin{matrix}\underline{\text{SYNC}}\\\underline{\text{SYNCHRONIZED}}\end{matrix}\right\}\ \left\{\begin{matrix}\underline{\text{LEFT}}\\\underline{\text{RIGHT}}\end{matrix}\right\}\ \right]$$

[$\underline{\text{VALUE}}$ IS literal-1]

$$\left[\ \left\{\begin{matrix}\underline{\text{PIC}}\\\underline{\text{PICTURE}}\end{matrix}\right\}\ \text{IS character-string}\right]$$

$$\left[\ \left\{\begin{matrix}\underline{\text{ZERO}}\ \underline{\text{SUPPRESS}}\\\underline{\text{CHECK}}\ \text{PROTECT}\\\underline{\text{FLOAT}}\ \text{DOLLAR}\ \underline{\text{SIGN}}\\\underline{\text{FLOAT}}\ \text{CURRENCY}\ \underline{\text{SIGN}}\end{matrix}\right\}\ [\underline{\text{LEAVING}}\ \text{integer-6 PLACES}]\right]$$

$$\left[\ \left\{\begin{matrix}\underline{\text{BWZ}}\\\underline{\text{BLANK}}\ \text{WHEN}\ \underline{\text{ZERO}}\end{matrix}\right\}\ \right].$$

format 3:

66 data-name-1 $\underline{\text{RENAMES}}$ data-name-2 [$\underline{\text{THRU}}$ data-name-3].

format 4:

$$\text{88 condition-name}\ \left\{\begin{matrix}\underline{\text{VALUE}}\ \text{IS}\\\underline{\text{VALUES}}\ \text{ARE}\end{matrix}\right\}\ \text{literal-1}\ [\underline{\text{THRU}}\ \text{literal-2}]$$

[literal-3 [$\underline{\text{THRU}}$ literal-4] ...].

**Report Description Entry (Report Section only)**

format 1:

$\underline{\text{RD}}$ report-name [WITH $\underline{\text{CODE}}$ mnemonic-name-1]

$$\underline{\text{COPY}}\ \text{library-name}\ \left[\underline{\text{REPLACING}}\ \left\{\begin{matrix}\text{literal-1}\\\text{word-1}\\\text{identifier-1}\end{matrix}\right\}\ \underline{\text{BY}}\right.$$

$$\left.\left\{\begin{matrix}\text{literal-2}\\\text{word-2}\\\text{identifier-2}\end{matrix}\right\}\ \left[\left\{\begin{matrix}\text{literal-3}\\\text{word-3}\\\text{identifier-3}\end{matrix}\right\}\ \underline{\text{BY}}\ \left\{\begin{matrix}\text{literal-4}\\\text{word-4}\\\text{identifier-4}\end{matrix}\right\}\right]\ \ldots\ \right].$$

format 2:

$\underline{\text{RD}}$ report-name [WITH $\underline{\text{CODE}}$ mnemonic-name-1]

$$\left[\left\{\begin{matrix}\underline{\text{CONTROL}}\ \text{IS}\\\underline{\text{CONTROLS}}\ \text{ARE}\end{matrix}\right\}\ \left\{\begin{matrix}\text{data-name-1 [data-name-2] ...}\\\underline{\text{FINAL}}\\\underline{\text{FINAL}}\ \text{data-name-1 [data-name-2] ...}\end{matrix}\right\}\right]$$

$$\left[\text{PAGE} \left\{\begin{array}{l}\underline{\text{LIMIT}}\text{ IS}\\ \underline{\text{LIMITS}}\text{ ARE}\end{array}\right\} \text{integer-1} \left\{\begin{array}{l}\underline{\text{LINE}}\\ \underline{\text{LINES}}\end{array}\right\}\right.$$

$$[\underline{\text{HEADING}}\text{ integer-2}]\ [\underline{\text{FIRST}}\ \underline{\text{DETAIL}}\text{ integer-3}]$$

$$\left.[\underline{\text{LAST}}\ \underline{\text{DETAIL}}\text{ integer-4}]\ [\underline{\text{FOOTING}}\text{ integer-5}]\right]$$

**Report Group Description Entry (Report Section only)**

format 1:

$$\text{01 [data-name-1] }\underline{\text{COPY}}\text{ data-name-2 [FROM }\underline{\text{LIBRARY}}\text{]}$$

$$\underline{\text{REPLACING}} \left\{\begin{array}{l}\text{literal-1}\\ \text{word-1}\\ \text{identifier-1}\end{array}\right\} \underline{\text{BY}} \left\{\begin{array}{l}\text{literal-2}\\ \text{word-2}\\ \text{identifier-2}\end{array}\right\}$$

$$\left[\left[\left\{\begin{array}{l}\text{literal-3}\\ \text{word-3}\\ \text{identifier-3}\end{array}\right\} \underline{\text{BY}} \left\{\begin{array}{l}\text{literal-4}\\ \text{word-4}\\ \text{identifier-4}\end{array}\right\}\right] \ldots\right].$$

format 2:

01 [data-name-1]

$$\left[\text{[CLASS IS]} \left\{\begin{array}{l}\underline{\text{ALPHABETIC}}\\ \underline{\text{NUMERIC}}\\ \underline{\text{ALPHANUMERIC}}\\ \underline{\text{AN}}\end{array}\right\}\right]$$

$$\left[\underline{\text{LINE}}\text{ NUMBER IS} \left\{\begin{array}{l}\text{integer-1}\\ \underline{\text{PLUS}}\text{ integer-2}\\ \underline{\text{NEXT}}\ \underline{\text{PAGE}}\end{array}\right\}\right]$$

$$\left[\underline{\text{NEXT}}\ \underline{\text{GROUP}}\text{ IS} \left\{\begin{array}{l}\text{integer-3}\\ \underline{\text{PLUS}}\text{ integer-4}\\ \underline{\text{NEXT}}\ \underline{\text{PAGE}}\end{array}\right\}\right]$$

$$\left[\underline{\text{SIZE}}\text{ IS integer-5} \left\{\begin{array}{l}\text{CHARACTERS}\\ \text{DIGITS}\end{array}\right\}\right]$$

$$\left[[\underline{\text{USAGE}}\text{ IS] }\underline{\text{DISPLAY}}\right]$$

```
          / REPORT HEADING                                  \
          | RH                                              |
          | PAGE HEADING                                    |
          | PH                                              |
          | OVERFLOW HEADING                                |
          | OH                                              |
          | {CONTROL HEADING}   {data-name-3}               |
          | {CH             }   {FINAL      }               |
TYPE IS  <  DETAIL                                           >
          | DE                                              |
          | {CONTROL FOOTING}   {data-name-4}               |
          | {CF             }   {FINAL      }               |
          | OVERFLOW FOOTING                                |
          | OV                                              |
          | PAGE FOOTING                                    |
          | PF                                              |
          | REPORT FOOTING                                  |
          \ RF                                              /
```

**Report Element Description (Report Section only)**

```
level number [data-name-1]

[             { ALPHABETIC   } ]
[ [CLASS IS]  { NUMERIC      } ]
[             { ALPHANUMERIC } ]
[             { AN           } ]

[COLUMN NUMBER IS integer-1]

[  { ZERO SUPPRESS        }                               ]
[  { CHECK PROTECT        }  [LEAVING integer-2 PLACES]   ]
[  { FLOAT DOLLAR SIGN    }                               ]
[  { FLOAT CURRENCY SIGN  }                               ]

[{ BLANK  WHEN  ZERO }]
[{ BWZ               }]

[GROUP INDICATE]

[{ JUSTIFIED } RIGHT ]
[{ JUST      }       ]

[                    { integer-3       } ]
[ LINE NUMBER IS     { PLUS integer-4  } ]
[                    { NEXT PAGE       } ]
```

$$\left[\ \begin{Bmatrix}\underline{\text{PIC}}\\\underline{\text{PICTURE}}\end{Bmatrix}\ \text{IS character-string}\right]$$

$$\left[\ \underline{\text{POINT}}\ \text{LOCATION IS}\ \begin{Bmatrix}\underline{\text{LEFT}}\\\underline{\text{RIGHT}}\end{Bmatrix}\ \text{integer-5 PLACES}\right]$$

$$\left[\ \underline{\text{RESET}}\ \text{ON}\ \begin{Bmatrix}\text{data-name-2}\\\underline{\text{FINAL}}\end{Bmatrix}\right]$$

[<u>SIGNED</u>]

[<u>SIGN</u> IS data-name-3]

$$\left[\ \underline{\text{SIZE}}\ \text{IS integer-6}\ \begin{Bmatrix}\text{CHARACTERS}\\\text{DIGITS}\end{Bmatrix}\right]$$

$$\left\{\begin{array}{l}\underline{\text{SOURCE}}\ \text{IS}\ \begin{Bmatrix}\underline{\text{SELECTED}}\ \text{data-name-4}\\\underline{\text{LINE-COUNTER}}\\\underline{\text{PAGE-COUNTER}}\end{Bmatrix}\\[1em]\underline{\text{SUM}}\ \text{data-name-5 [data-name-6] ... [}\underline{\text{UPON}}\ \text{data-name-7]}\\\underline{\text{VALUE}}\ \text{IS literal-1}\end{array}\right\}$$

[[<u>USAGE</u> IS] <u>DISPLAY</u>].

<u>TYPE</u> clause allowed if level 01

<u>NEXT</u> <u>GROUP</u> clause allowed if level 01

## USAGE SPECIFICATIONS

| Element | Upper Limit |
|---|---|
| data-name | 30 characters, 5 levels of qualifications |
| elementary item/literal | 255 characters/digits |
| PERFORM nesting | 15 levels in separate overlays, no limit in main overlay |
| level numbers | 01-49, 66, 77, 88, FD, RD, SD |
| OCCURS...DEPENDING ON | 1 per record description |
| library copies | 5 levels of nesting |
| ACCEPT items | 80 characters; 40 characters from console |
| PICTURE clause | 30 symbols |
| arithmetic operand | 18 digits |
| GO TO statement | 100 procedure names |
| ALTER statement | 100 procedure names |
| DISPLAY items | no limit |
| ENTER parameters | no limit |
| Total files, I/O devices, and reports | 53 |
| Total procedure names | depends on field length |
| Total external references | depends on field length |

## VALID MOVE OPERATIONS

| Source Field \ Rec. Field | Elem. Binary | Elem. Alpha | Elem. BCD Num. | Elem. AN | Elem. Edit Num. | Elem. Edit AN | Group AN |
|---|---|---|---|---|---|---|---|
| Elem. Binary | Num. Bin. | X | Conv. Num. | Conv.† AN | Conv. Edit | Conv.† AN-Edit | TD AN |
| Elem. Alpha | X | AN | TD AN | AN | X | AN-Edit | AN |
| Elem. BCD Num. | Conv. Bin. | TD AN | Num. | AN† | Edit | AN-Edit | AN† |
| Elem. AN | X | TD AN | Num. | AN | Edit | AN-Edit | AN |
| Elem. Edit Num. | X | TD AN | X | AN | X | AN-Edit | AN |
| Elem. Edit AN | X | TD AN | X | AN | X | AN-Edit | AN |
| Group AN | TD AN | TD AN | TD AN | AN | X | AN-Edit | AN |
| Group Binary & Mixed | TD AN | TD AN | TD AN | TD AN | X | TD AN-Edit | TD AN |
| Zero | Num. Bin. | X | Num. | AN | Edit | AN-Edit | AN |
| Literal & Fig. Cons. AN | X | TD AN | X | AN | X | AN-Edit | AN |
| Literal Num. | Conv. Bin. | X | Num. | AN† | Edit | AN-Edit | AN |

† Valid only when source is integer; others PD.

Any move to a binary or mixed group is treated as an alphanumeric move; a precautionary diagnostic is issued.

A move to a figurative constant or literal is illegal.

| | |
|---|---|
| X | Illegal |
| AN | Alphanumeric |
| AN-Edit | Alphanumeric edited |
| Conv. | Conversion prior to move |
| Edit | Numeric edited |
| Num. | Numeric |
| Num. Bin. | Numeric binary |
| TD | Trivial diagnostic issued |

## PROCEDURE DIVISION

<u>PROCEDURE</u> <u>DIVISION</u>.

$$\left[\begin{array}{l}\underline{\text{DECLARATIVES}}.\\ \quad\text{Section-name }\underline{\text{SECTION}}.\text{ declarative-sentence.}\\ \quad\text{Paragraph-name. sentence-1 [sentence-2] ...}\\ \quad\underline{\text{END}}\ \underline{\text{DECLARATIVES}}.\end{array}\right]$$

<u>ACCEPT</u> identifier-1 [<u>FROM</u> mnemonic-name-1]

$$\underline{\text{ADD}}\left\{\begin{array}{l}\text{identifier-1}\\ \text{literal-1}\end{array}\right\}\left[\left\{\begin{array}{l}\text{identifier-2}\\ \text{literal-2}\end{array}\right\}\ldots\right]\text{ identifier-n }[\underline{\text{ROUNDED}}]$$

[ON <u>SIZE</u> <u>ERROR</u> imperative-statement]

$$\underline{\text{ADD}}\left\{\begin{array}{l}\text{identifier-1}\\ \text{literal-1}\end{array}\right\}\left[\left\{\begin{array}{l}\text{identifier-2}\\ \text{literal-2}\end{array}\right\}\ldots\right]\left\{\begin{array}{l}\underline{\text{GIVING}}\\ \underline{\text{TO}}\end{array}\right\}$$

identifier-m [<u>ROUNDED</u>] [identifier-n [<u>ROUNDED</u>]] ...

[ON <u>SIZE</u> <u>ERROR</u> imperative-statement]

$$\underline{\text{ADD}}\left\{\begin{array}{l}\text{identifier-1}\\ \text{literal-1}\end{array}\right\}\left[\left\{\begin{array}{l}\text{identifier-2}\\ \text{literal-2}\end{array}\right\}\ldots\right]\ \underline{\text{TO}}\ \left\{\begin{array}{l}\text{identifier-3}\\ \text{literal-3}\end{array}\right\}$$

<u>GIVING</u> identifier-m [<u>ROUNDED</u>] [identifier-n [<u>ROUNDED</u>]]...

[ON <u>SIZE</u> <u>ERROR</u> imperative-statement]

$$\underline{\text{ADD}}\left\{\begin{array}{l}\underline{\text{CORR}}\\ \underline{\text{CORRESPONDING}}\end{array}\right\}\text{ identifier-1 }\underline{\text{TO}}\text{ identifier-2 }[\underline{\text{ROUNDED}}]$$

[identifier-3 [<u>ROUNDED</u>]] ...

[ON <u>SIZE</u> <u>ERROR</u> imperative-statement]

<u>ALTER</u> procedure-name-1 <u>TO</u> [<u>PROCEED</u> <u>TO</u>] procedure-name-2

[procedure-name-3 <u>TO</u> [<u>PROCEED</u> <u>TO</u>] procedure-name-4] ...

$$\underline{\text{CLOSE}}\text{ file-name-1 }\left[\left\{\begin{array}{l}\underline{\text{UNIT}}\\ \underline{\text{REEL}}\end{array}\right\}\right]\left[\text{WITH}\left\{\begin{array}{l}\underline{\text{NO}}\ \underline{\text{REWIND}}\\ \underline{\text{LOCK}}\end{array}\right\}\right]$$

$$\left[\text{file-name-2 }\left[\left\{\begin{array}{l}\underline{\text{UNIT}}\\ \underline{\text{REEL}}\end{array}\right\}\right]\left[\text{WITH}\left\{\begin{array}{l}\underline{\text{NO}}\ \underline{\text{REWIND}}\\ \underline{\text{LOCK}}\end{array}\right\}\right]\right]\ \ldots$$

$\underline{\text{COMPUTE}}$ identifier-1 [$\underline{\text{ROUNDED}}$] [identifier-2 [$\underline{\text{ROUNDED}}$]] ...

$$\left\{\begin{array}{l}\underline{\text{FROM}}\\ =\\ \underline{\text{EQUALS}}\end{array}\right\} \left\{\begin{array}{l}\text{literal}\\ \text{arithmetic-expression}\\ \text{identifier-3}\end{array}\right\}$$

[ON $\underline{\text{SIZE}}$ $\underline{\text{ERROR}}$ imperative-statement]

$$\left\{\begin{array}{l}\underline{\text{COPY}}\\ \underline{\text{INCLUDE}}\end{array}\right\} \text{ library-name } \left[\underline{\text{REPLACING}} \left\{\begin{array}{l}\text{literal-1}\\ \text{word-1}\\ \text{identifier-1}\end{array}\right\} \underline{\text{BY}}\right.$$

$$\left.\left\{\begin{array}{l}\text{literal-2}\\ \text{word-2}\\ \text{identifier-2}\end{array}\right\} \left[\left\{\begin{array}{l}\text{literal-3}\\ \text{word-3}\\ \text{identifier-3}\end{array}\right\} \underline{\text{BY}} \left\{\begin{array}{l}\text{literal-4}\\ \text{word-4}\\ \text{identifier-4}\end{array}\right\}\right] \ldots\right]$$

$$\underline{\text{DISPLAY}} \left\{\begin{array}{l}\text{identifier-1}\\ \text{literal-1}\end{array}\right\} \left[\left\{\begin{array}{l}\text{identifier-2}\\ \text{literal-2}\end{array}\right\} \ldots\right]$$

[$\underline{\text{UPON}}$ mnemonic-name]

$$\underline{\text{DIVIDE}} \left\{\begin{array}{l}\text{identifier-1}\\ \text{literal-1}\end{array}\right\} \underline{\text{INTO}} \text{ identifier-2 [}\underline{\text{ROUNDED}}\text{]}$$

[identifier-3 [$\underline{\text{ROUNDED}}$]] ...

[ON $\underline{\text{SIZE}}$ $\underline{\text{ERROR}}$ imperative-statement]

$$\underline{\text{DIVIDE}} \left\{\begin{array}{l}\text{identifier-1}\\ \text{literal-1}\end{array}\right\} \left\{\begin{array}{l}\underline{\text{BY}}\\ \underline{\text{INTO}}\end{array}\right\} \left\{\begin{array}{l}\text{identifier-2}\\ \text{literal-2}\end{array}\right\} \underline{\text{GIVING}} \text{ identifier-3}$$

[$\underline{\text{ROUNDED}}$] [identifier-4 [$\underline{\text{ROUNDED}}$]] ...

[ON $\underline{\text{SIZE}}$ $\underline{\text{ERROR}}$ imperative-statement]

$$\underline{\text{DIVIDE}} \left\{\begin{array}{l}\text{identifier-1}\\ \text{literal-1}\end{array}\right\} \left\{\begin{array}{l}\underline{\text{BY}}\\ \underline{\text{INTO}}\end{array}\right\} \left\{\begin{array}{l}\text{identifier-2}\\ \text{literal-2}\end{array}\right\}$$

$\underline{\text{GIVING}}$ identifier-3 [$\underline{\text{ROUNDED}}$]

$\underline{\text{REMAINDER}}$ identifier-4

[ON $\underline{\text{SIZE}}$ $\underline{\text{ERROR}}$ imperative-statement]

$\underline{\text{ENTER}}$ $\underline{\text{COBOL}}$.

$\underline{\text{ENTER}}$ $\underline{\text{LINKAGE}}$.

$$\left\{\begin{array}{l}\underline{\text{ENTER}}\\ \underline{\text{CALL}}\end{array}\right\} \text{ [language-name] routine-name}$$

[$\underline{\text{USING}}$ parameter-list] .

```
EXAMINE identifier-1

  ⎧               ⎧ALL        ⎫                                ⎫
  ⎪  TALLYING     ⎨LEADING    ⎬  literal-1 [REPLACING BY       ⎪
  ⎪               ⎩UNTIL FIRST⎭                  literal-2]    ⎪
  ⎨                                                            ⎬
  ⎪               ⎧ALL          ⎫                              ⎪
  ⎪  REPLACING    ⎨LEADING      ⎬  literal-3  BY  literal-4    ⎪
  ⎩               ⎩[UNTIL] FIRST⎭                              ⎭

EXIT.

⎧EXIT PROGRAM.⎫
⎩RETURN.      ⎭

GENERATE identifier-1

GO TO [procedure-name-1]

GO TO procedure-name-2 [procedure-name-3 ...]
     DEPENDING ON identifier-1

IF conditional-expression [THEN]  ⎧statement-1  ⎫
                                  ⎩NEXT SENTENCE⎭

     [THEN]  ⎧OTHERWISE⎫   ⎧statement-2  ⎫
             ⎩ELSE     ⎭   ⎩NEXT SENTENCE⎭
```

Conditional expressions include:

```
                  ⎧           ⎧GREATER THAN      ⎫ ⎫
                  ⎪           ⎪GR                ⎪ ⎪
                  ⎪           ⎪>                 ⎪ ⎪
                  ⎪           ⎪LESS THAN         ⎪ ⎪
                  ⎪           ⎪LS                ⎪ ⎪
                  ⎪           ⎪<                 ⎪ ⎪
                  ⎪IS  [NOT]  ⎨GREATER-EQUAL TO  ⎬ ⎪
                  ⎪           ⎪GQ                ⎪ ⎪
⎧identifier-1⎫    ⎪           ⎪LESS-EQUAL TO     ⎪ ⎪  ⎧identifier-2⎫
⎨literal-1   ⎬    ⎨           ⎪LQ                ⎪ ⎬  ⎨literal-2   ⎬
⎩formula-1   ⎭    ⎪           ⎪EQUAL TO          ⎪ ⎪  ⎩formula-2   ⎭
                  ⎪           ⎪EQ                ⎪ ⎪
                  ⎪           ⎩=                 ⎭ ⎪
                  ⎪IS UNEQUAL TO                   ⎪
                  ⎪EQUALS                          ⎪
                  ⎪EXCEEDS                         ⎪
                  ⎪IS NQ                           ⎪
                  ⎪IS NGR                          ⎪
                  ⎩IS NLS                          ⎭
```

```
                                     ⎧POSITIVE⎫
⎧identifier-3⎫ IS [NOT] ⎨NEGATIVE⎬
⎩formula-3   ⎭                       ⎩ZERO    ⎭

identifier-4 IS [NOT] ⎧NUMERIC   ⎫
                      ⎩ALPHABETIC⎭

[NOT] ⎧condition-name    ⎫
      ⎩switch-status-name⎭

INITIATE ⎧report-name-1 [report-name-2] ...⎫
         ⎩ALL                              ⎭

       ⎧ ⎧CORR         ⎫ identifier-2 ⎫
MOVE  ⎨ ⎩CORRESPONDING⎭              ⎬ TO
       ⎪ literal-1                     ⎪
       ⎩ identifier-1                  ⎭

    identifier-3 [identifier-4] ...

MULTIPLY ⎧identifier-1⎫ BY identifier-2 [ROUNDED]
         ⎩literal-1   ⎭

    [identifier-3 [ROUNDED]] ...
    [ON SIZE ERROR imperative-statement]

MULTIPLY ⎧identifier-1⎫ BY ⎧identifier-2⎫
         ⎩literal-1   ⎭    ⎩literal-2   ⎭
    GIVING identifier-3 [ROUNDED]
    [identifier-4 [ROUNDED]] ...
    [ON SIZE ERROR imperative-statement]

NOTE character-string.
     ⎧ INPUT file-name-1  [⎧REVERSED       ⎫]
     ⎪                    [⎩WITH NO REWIND ⎭]
     ⎪
     ⎪     [file-name-2   [⎧REVERSED       ⎫]    ...]
     ⎪                    [⎩WITH NO REWIND ⎭]
OPEN ⎨ OUTPUT file-name-3[WITH NO REWIND]
     ⎪         [file-name-4[WITH NO REWIND]] ...
     ⎪
     ⎪ ⎧INPUT-OUTPUT⎫ file-name-5[file-name-6] ...
     ⎩ ⎩I-O         ⎭

PERFORM procedure-name-1[THRU procedure-name-2]
```

$$\underline{\text{PERFORM}}\ \text{procedure-name-1}\ [\underline{\text{THRU}}\ \text{procedure-name-2}]$$

$$\left\{\begin{matrix}\text{identifier-1}\\ \text{integer-1}\end{matrix}\right\}\ \underline{\text{TIMES}}$$

$$\underline{\text{PERFORM}}\ \text{procedure-name-1}\ [\underline{\text{THRU}}\ \text{procedure-name-2}]$$

$$\underline{\text{UNTIL}}\ \text{condition-1}$$

$$\underline{\text{PERFORM}}\ \text{procedure-name-1}\ [\underline{\text{THRU}}\ \text{procedure-name-2}]$$

$$\underline{\text{VARYING}}\ \left\{\begin{matrix}\text{index-name-1}\\ \text{identifier-1}\end{matrix}\right\}\ \underline{\text{FROM}}\ \left\{\begin{matrix}\text{literal-1}\\ \text{index-name-2}\\ \text{identifier-2}\end{matrix}\right\}\ \underline{\text{BY}}$$

$$\left\{\begin{matrix}\text{literal-2}\\ \text{identifier-3}\end{matrix}\right\}\ \underline{\text{UNTIL}}\ \text{condition-2}\ \left[\underline{\text{AFTER}}\ \left\{\begin{matrix}\text{index-name-3}\\ \text{identifier-4}\end{matrix}\right\}\right.$$

$$\underline{\text{FROM}}\ \left\{\begin{matrix}\text{literal-3}\\ \text{index-name-4}\\ \text{identifier-5}\end{matrix}\right\}\ \underline{\text{BY}}\ \left\{\begin{matrix}\text{literal-4}\\ \text{identifier-6}\end{matrix}\right\}\ \underline{\text{UNTIL}}\ \text{condition-3}$$

$$\left[\underline{\text{AFTER}}\ \left\{\begin{matrix}\text{index-name-5}\\ \text{identifier-7}\end{matrix}\right\}\ \underline{\text{FROM}}\ \left\{\begin{matrix}\text{literal-5}\\ \text{index-name-6}\\ \text{identifier-8}\end{matrix}\right\}\ \underline{\text{BY}}\right.$$

$$\left.\left\{\begin{matrix}\text{literal-6}\\ \text{identifier-9}\end{matrix}\right\}\ \underline{\text{UNTIL}}\ \text{condition-4}\right]\Bigg]$$

$$\underline{\text{READ}}\ \text{file-name-1 RECORD}\ [\underline{\text{INTO}}\ \text{identifier-1}]\ \text{AT}\ \underline{\text{END}}$$
$$\quad\text{imperative-statement}$$

$$\underline{\text{READ}}\ \text{file-name-1 RECORD}\ [\underline{\text{INTO}}\ \text{identifier-2}]\ \underline{\text{INVALID}}\ \text{KEY}$$
$$\quad\text{imperative-statement}$$

$$\underline{\text{RELEASE}}\ \text{record-name-1}\ [\underline{\text{FROM}}\ \text{identifier-1}]$$

$$\underline{\text{RETURN}}\ \text{file-name-1 RECORD}\ [\underline{\text{INTO}}\ \text{identifier-1}]\ \text{AT}\ \underline{\text{END}}$$
$$\quad\text{imperative-statement}$$

$$\underline{\text{SEARCH}}\ \text{identifier-1}\ \left[\underline{\text{VARYING}}\ \left\{\begin{matrix}\text{index-name-1}\\ \text{identifier-2}\end{matrix}\right\}\right]$$
$$[\text{AT}\ \underline{\text{END}}\ \text{imperative-statement-1}]$$
$$\underline{\text{WHEN}}\ \text{condition-1}\ \left\{\begin{matrix}\text{imperative-statement-2}\\ \underline{\text{NEXT}}\ \underline{\text{SENTENCE}}\end{matrix}\right\}$$
$$\left[\underline{\text{WHEN}}\ \text{condition-2}\ \left\{\begin{matrix}\text{imperative-statement-3}\\ \underline{\text{NEXT}}\ \underline{\text{SENTENCE}}\end{matrix}\right\}\right]\ \ldots$$

```
SEARCH ALL identifier-1 [AT END imperative-statement-1]

     WHEN condition-1 {imperative-statement-2}
                      {NEXT SENTENCE         }

SEEK file-name-1 RECORD [WITH KEY CONVERSION]

SET {index-name-1}   [{index-2     } ...]
    {identifier-1}   [{identifier-2}    ]

     TO {index-name-3}
        {identifier-3}
        {literal-1   }

SET index-name-1 [index-name-2] ...

   {UP BY  }  {identifier-1}
   {DOWN BY}  {literal-1   }

SORT file-name-1 ON {DESCENDING} KEY identifier-1 [identifier-2]...
                    {ASCENDING }

   [ON {DESCENDING} KEY identifier-3 [identifier-4] ...]
   [   {ASCENDING }                                    ]

   {INPUT PROCEDURE IS section-name-1 [THRU section-name-2]}
   {USING file-name-2                                      }

   {OUTPUT PROCEDURE IS section-name-3[THRU section-name-4]}
   {GIVING file-name-3                                     }

STOP {literal}.
     {RUN    }

SUBTRACT {identifier-1}  [{identifier-2}...] FROM identifier-m
         {literal-1   }  [{literal-2   }   ]

     [ROUNDED] [identifier-n [ROUNDED]] ...

     [ON SIZE ERROR imperative-statement]

SUBTRACT {identifier-1} [{identifier-2}...] FROM {identifier-m}
         {literal-1   } [{literal-2   }   ]      {literal-m   }

     GIVING identifier-n [ROUNDED]
     [identifier-o [ROUNDED]] ...
     [ON SIZE ERROR imperative-statement]
```

$$\underline{\text{SUBTRACT}} \left\{\begin{matrix}\underline{\text{CORR}}\\ \underline{\text{CORRESPONDING}}\end{matrix}\right\} \text{ identifier-1 } \underline{\text{FROM}}$$

$$\text{identifier-2 } [\underline{\text{ROUNDED}}] \; [\text{identifier-3 } [\underline{\text{ROUNDED}}] \ldots]$$

$$[\text{ON } \underline{\text{SIZE}} \; \underline{\text{ERROR}} \text{ imperative-statement}].$$

$$\underline{\text{TERMINATE}} \left\{\begin{matrix}\text{report-name-1 [report-name-2]} \ldots\\ \underline{\text{ALL}}\end{matrix}\right\}$$

$$\underline{\text{USE}} \; \underline{\text{AFTER}} \text{ STANDARD } \underline{\text{ERROR}} \; \underline{\text{PROCEDURE}} \text{ ON} \left\{\begin{matrix}\text{file-name}\\ \underline{\text{INPUT}}\\ \underline{\text{OUTPUT}}\\ \underline{\text{INPUT-OUTPUT}}\\ \underline{\text{I-O}}\end{matrix}\right\}$$

$$\underline{\text{USE}} \left\{\begin{matrix}\underline{\text{BEFORE}}\\ \underline{\text{AFTER}}\end{matrix}\right\} \text{ STANDARD } \left[\left\{\begin{matrix}\underline{\text{BEGINNING}}\\ \underline{\text{ENDING}}\end{matrix}\right\}\right] \quad \left[\left\{\begin{matrix}\underline{\text{REEL}}\\ \underline{\text{FILE}}\end{matrix}\right\}\right]$$

$$\underline{\text{LABEL}} \left\{\begin{matrix}\underline{\text{PROCEDURE}}\\ \underline{\text{PROCEDURES}}\end{matrix}\right\} \text{ ON} \left\{\begin{matrix}\text{file-name}\\ \underline{\text{INPUT}}\\ \underline{\text{OUTPUT}}\\ \underline{\text{INPUT-OUTPUT}}\\ \underline{\text{I-O}}\end{matrix}\right\}$$

$$\underline{\text{USE}} \; \underline{\text{BEFORE}} \; \underline{\text{REPORTING}} \text{ identifier-1 [identifier-2]} \ldots$$

$$\underline{\text{USE}} \text{ FOR KEY } \underline{\text{CONVERSION}} \text{ ON} \left\{\begin{matrix}\underline{\text{ALL}}\\ \text{file-name-1 [file-name-2]} \ldots\end{matrix}\right\}$$

$$\underline{\text{WRITE}} \text{ record-name-1 } [\underline{\text{FROM}} \text{ identifier-1}]$$

$$\left[\left\{\begin{matrix}\underline{\text{BEFORE}}\\ \underline{\text{AFTER}}\end{matrix}\right\} \text{ ADVANCING} \left\{\begin{matrix}\text{identifier-2 LINES}\\ \text{integer-1 LINES}\\ \text{mnemonic-name-1}\end{matrix}\right\}\right]$$

$$\left[\text{AT} \left\{\begin{matrix}\underline{\text{END-OF-PAGE}}\\ \underline{\text{EOP}}\end{matrix}\right\} \text{ imperative-statement}\right]$$

$$\underline{\text{WRITE}} \text{ record-name-2 } [\underline{\text{FROM}} \text{ identifier-2}] \; \underline{\text{INVALID}} \; \underline{\text{KEY}}$$

$$\text{imperative-statement}$$

## COBOL CONTROL CARD

Ten parameters are used to select compilation options. All are optional and may be specified in any order.

$$\left\{\begin{array}{l}\text{COBOL.}\\ \text{COBOL (p1,p2,p3,p4,p5,p6,p7,p8,p9,p10)}\end{array}\right\}\ \text{[comments]}$$

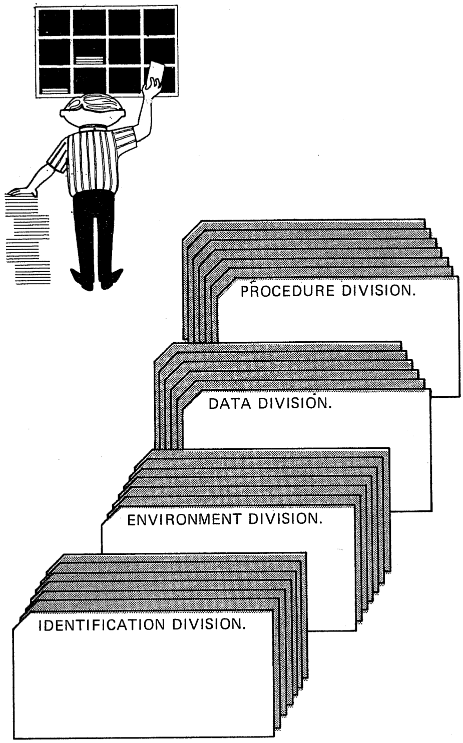
| | | |
|---|---|---|
| p1 (Source Input) | absent<br>I<br>I = INPUT | INPUT assumed |
| | I = fn | source input on file fn |
| p2 (Binary Output) | absent<br>B<br>B = LGO | relocatable binary file on file LGO |
| | B = fn | binary output on file fn |
| | B = 0 | suppress binary output |
| p3 (List) | absent<br>L | normal listing on OUTPUT |
| | LX | extended diagnostics |
| | LR | cross reference pointers |
| | LC | copy from library |
| | LO | object code in octal |
| | LM | data map |
| | L = fn | output on file fn |
| | L = 0 | suppress list output |
| p4 (Source Library) | absent<br>S<br>S = COLIB | source library from file COLIB |
| | S = fn | from file fn |
| p5 (Subcompile) | SUB | suppresses all data division binary output except from working and constant storage |
| p6 (Overlay Binary) | OB<br>OB = LGO2 | binary output on LGO2 |
| | OB = fn | binary output from overlay segments put on file fn |

| | | |
|---|---|---|
| p7 (EDITLIB) | E = fn | add object code to system library using EDITLIB |
| p8 (ASCII Collating) | U | use ASCII collating sequence |
| p9 (Tape Sort) | T | sort requests tape sort |
| p10 (BCOMMON) | H | BCOMMON replaces blank common as buffer area |

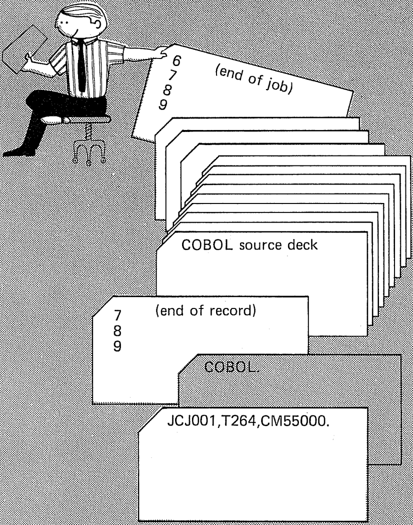
## COBOL CODING FORMAT

| Column | Element |
|---|---|
| 1 - 6 | Sequence number |
| 7 | Hyphen for continuation of words and/or literals |
| 8 | Division name |
| | Section name |
| | Paragraph name |
| | File description |
| | Record description level number |
| 12 | Record description data name |
| | First sentence of a paragraph |
| | File name |
| | Continuation of a data description or a sentence |
| 73 - 80 | Identification, optional |
| Sequence number | Optional, checked by the processor if used |
| Hyphen | Indicates continuation of a word from the preceding line |
| Division name | Terminated by period, remainder of line is blank |
| Section name | Followed by optional priority number, terminated by period, remainder is blank |
| Paragraph name | Terminated by period, and followed by at least one blank before text begins |
| File Description | FD or SD followed by file name and at least one blank |
| Record Description | Level number followed by at least one blank and data name |
| First Sentence | Begins in or after column 12. Spaces may be used freely to avoid splitting a word. If a word is split, a hyphen must appear in column 7 of the next line. |

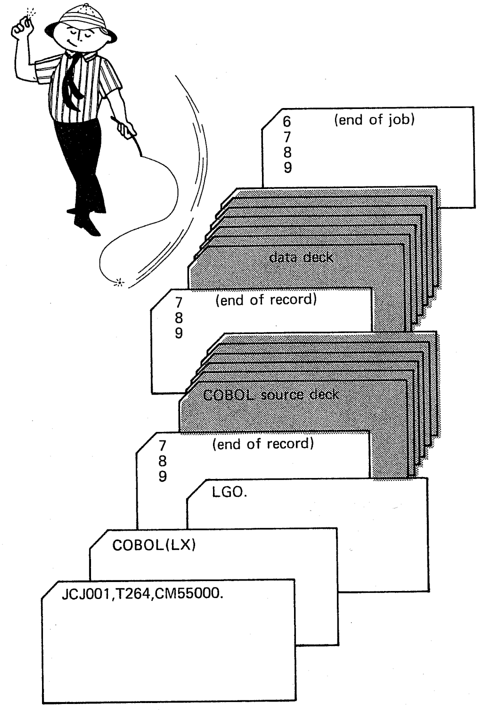
## COBOL SOURCE DECKS



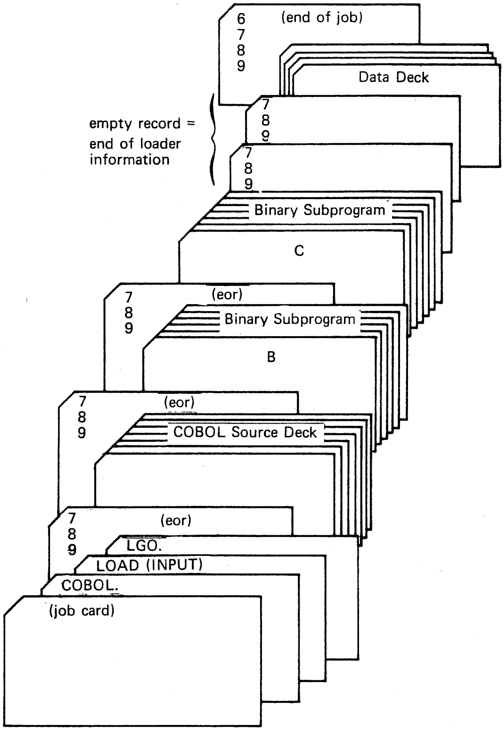
## COBOL COMPILATION



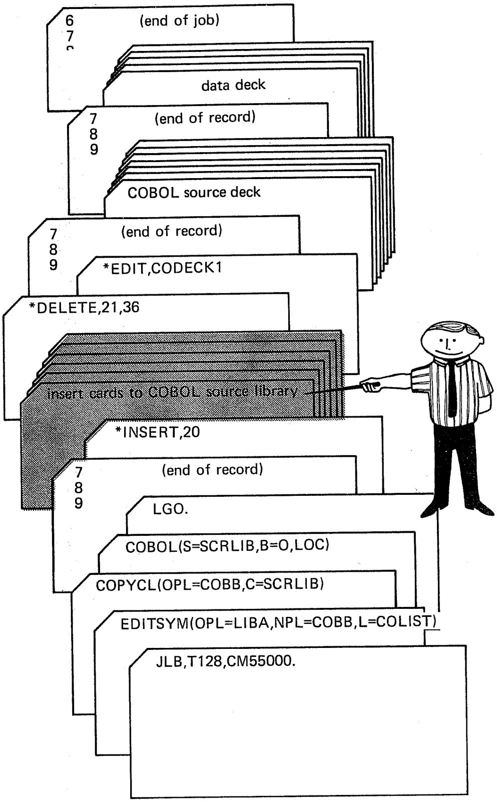
## EXECUTION


6 7 8 9 (end of job)
data deck
7 8 9 (end of record)
COBOL source deck
7 8 9 (end of record)
LGO.
COBOL(LX)
JCJ001,T264,CM55000.

## EXECUTION WITH SEGMENTATION



## LIBRARY UPDATE



## COBOL RESERVED WORD LIST

*indicates word not implemented in 6000 COBOL.

ABOUT
ACCEPT
ACCESS
ACTUAL
ADD
*ADDRESS
ADVANCING
AFTER
ALL
ALPHABETIC
ALPHANUMERIC
ALTER
ALTERNATE
AN
AND
*APPLY
ARE
AREA
AREAS
ASCENDING
ASSIGN
AT
AUTHOR

BEFORE
BEGINNING
BEGINNING-FILE-LABEL
BEGINNING-TAPE-LABEL
BINARY
*BITS
BLANK
BLOCK
BWZ
BY

CALL
CF
CH
CHARACTER
CHARACTERS
CHECK
CLASS
*CLOCK-UNITS
CLOSE
COBOL
CODE
COLUMN
COMMA
COMMON-STORAGE
COMP
COMP-1
COMP-2
COMPASS
COMPUTATIONAL
COMPUTATIONAL-1
COMPUTATIONAL-2
COMPUTE
CONFIGURATION
CONSOLE
CONSTANT
CONTAINS
CONTROL
CONTROLS
*CONVERSION
COPY
CORR
CORRESPONDING
CURRENCY

DATA
DATE-COMPILED
DATE-WRITTEN
DE
DECIMAL
DECIMAL-POINT
DECLARATIVES
*DEFINE
DENSITY
DEPENDING
DESCENDING
DETAIL
DIGIT
DIGITS
DISPLAY
DIVIDE
DIVIDED
DIVISION
DOLLAR
*DOWN

EDITION-NUMBER
ELSE
END
END-OF-PAGE
ENDING
ENDING-FILE-LABEL
ENDING-TAPE-LABEL
ENDING-TAPE-LABEL-IDENTIFIER
ENTER
ENTRY
ENVIRONMENT
EOP
EQ
EQUAL
EQUALS
ERROR
EVERY
EXAMINE
EXCEEDS
EXIT
EXPONENTIATED

FD
FILE
FILE-CONTROL
FILE-LABEL
FILE-LIMIT
FILE-LIMITS
FILLER
FINAL
FIRST
FLOAT
FOOTING
FOR
*FORMAT
FORTRAN-R
FORTRAN-X
FROM

GENERATE
GIVING
GO
GQ
GR
GREATER
GREATER-EQUAL
GROUP

*HASHED
HEADING
HIGH
HIGH-VALUE
HIGH-VALUES
*HOLD
HYPER

ID
IDENTIFICATION
IF
IN
INCLUDE
INDEX
INDEXED
INDICATE
INITIATE
INPUT
INPUT-OUTPUT
INSTALLATION
INTO
INVALID
I-O
I-O-CONTROL
IS

JUST
JUSTIFIED

KEY
*KEYS

LABEL
LAST
LEADING
LEAVING
LEFT
LESS
LESS-EQUAL
LIBRARY
LIMIT
LIMITS
LINAGE
LINAGE-COUNTER
LINE
LINE-COUNTER
LINES

LINKAGE
LOCATION
LOCK
LOW
LOW-VALUE
LOW-VALUES
*LOWER-BOUND
*LOWER-BOUNDS
LQ
LS

*MEMORY
MINUS
MODE
*MODULES
MOVE
MULTIPLE
MULTIPLIED
MULTIPLY

NEGATIVE
NEXT
NGR
NLS
NO
NOT
NOTE
NQ
NUMBER
NUMERIC

OBJECT-COMPUTER
OCCURS
OF
OFF
OH
OMITTED
ON
OPEN
OPTIONAL
OR
ORGANIZATION
OTHERWISE
OUTPUT
OV
OVERFLOW

PAGE
PAGE-COUNTER
PERFORM
PF
PH
PIC
PICTURE
PLACES
PLUS
POINT
POSITION
POSITIVE
*PREPARED
PRIORITY
PROCEDURE
PROCEDURES
PROCEED
*PROCESS
PROCESSING
PROGRAM
PROGRAM-ID
PROTECT
PUNCH
PUNCHB

QUOTE
QUOTES

RANDOM
RANGE
RD
READ
RECORD
RECORD-MARK
RECORDING
RECORDS
REDEFINES
REEL
REEL-NUMBER
RELEASE
REMAINDER
REMARKS
RENAMES
RENAMING
REPLACING
REPORT

REPORTING
REPORTS
RERUN
RESERVE
RESET
RETENTION
RETENTION-CYCLE
RETURN
REVERSED
REWIND
RF
RH
RIGHT
ROUNDED
RUN

*SA
SAME
SD
SEARCH
SECTION
SECURITY
SEEK
SEGMENT-LIMIT
SELECT
SELECTED
SENTENCE
SEQUENCED
SEQUENTIAL
SET
SIGN
SIGNED
SIZE
SORT
SOURCE
SOURCE-COMPUTER
SPACE
SPACES
SPECIAL-NAMES
STANDARD
STATUS
STOP
SUBTRACT
SUM
*SUPERVISOR
SUPPRESS
SWITCH
SYMBOLIC
SYNC
SYNCHRONIZED

TALLY
TALLYING
TAPE
TAPE-LABEL
TERMINAL
TERMINATE
THAN
THEN
THROUGH
THRU
TIMES
TO
TODAYS-DATE
TYPE

UNEQUAL
UNIT
UNTIL
*UP
UPON
*UPPER-BOUND
*UPPER-BOUNDS
USAGE
USE
USING

VALUE
VALUES
VARYING

WHEN
WITH
*WORDS
WORKING-STORAGE
WRITE

ZERO
ZEROES
ZEROS

## COLLATING SEQUENCE

| Collating Sequence | COBOL Character | Display Code | Hollerith Punch |
|---|---|---|---|
| 00 | Δ | 55 | space |
| 01 | ≤* | 74 | 8-5 |
| 02 | [* | 61 | 8-7 |
| 03 | →* | 65 | 0-8-5 |
| 04 | ≡* | 60 | 0-8-6 |
| 05 | ∧* | 67 | 0-8-7 |
| 06 | ↑* | 70 | 11-8-5 |
| 07 | ↓* | 71 | 11-8-6 |
| 08 | > | 73 | 11-8-7 |
| 09 | ≥* | 75 | 12-8-5 |
| 10 | ¬* | 76 | 12-8-6 |
| 11 | . | 57 | 12-8-3 |
| 12 | ) | 52 | 12-8-4 |
| 13 | ; | 77 | 12-8-7 |
| 14 | + | 45 | 12 |
| 15 | $ | 53 | 11-8-3 |
| 16 | * | 47 | 11-8-4 |
| 17 | – | 46 | 11 |
| 18 | / | 50 | 0-1 |
| 19 | , | 56 | 0-8-3 |
| 20 | ( | 51 | 0-8-4 |
| 21 | = | 54 | 8-3 |
| 22 | ≠† | 64 | 8-4 |
| 23 | < | 72 | 12-0 |
| 24 | A | 01 | 12-1 |
| 25 | B | 02 | 12-2 |
| 26 | C | 03 | 12-3 |
| 27 | D | 04 | 12-4 |
| 28 | E | 05 | 12-5 |
| 29 | F | 06 | 12-6 |
| 30 | G | 07 | 12-7 |
| 31 | H | 10 | 12-8 |

*Not in COBOL character set; may be present in data

†COBOL quote character (") is output on printer as ≠

**COLLATING SEQUENCE** (Continued)

| Collating Sequence | COBOL Character | Display Code | Hollerith Punch |
|---|---|---|---|
| 32 | I | 11 | 12-9 |
| 33 | V | 66 | 11-0 |
| 34 | J | 12 | 11-1 |
| 35 | K | 13 | 11-2 |
| 36 | L | 14 | 11-3 |
| 37 | M | 15 | 11-4 |
| 38 | N | 16 | 11-5 |
| 39 | O | 17 | 11-6 |
| 40 | P | 20 | 11-7 |
| 41 | Q | 21 | 11-8 |
| 42 | R | 22 | 11-9 |
| 43 | ] †† | 62 | 0-8-2 |
| 44 | S | 23 | 0-2 |
| 45 | T | 24 | 0-3 |
| 46 | U | 25 | 0-4 |
| 47 | V | 26 | 0-5 |
| 48 | W | 27 | 0-6 |
| 49 | X | 30 | 0-7 |
| 50 | Y | 31 | 0-8 |
| 51 | Z | 32 | 0-9 |
| 52 | :* | 63 | 8-2 |
| 53 | 0 | 33 | 0 |
| 54 | 1 | 34 | 1 |
| 55 | 2 | 35 | 2 |
| 56 | 3 | 36 | 3 |
| 57 | 4 | 37 | 4 |
| 58 | 5 | 40 | 5 |
| 59 | 6 | 41 | 6 |
| 60 | 7 | 42 | 7 |
| 61 | 8 | 43 | 8 |
| 62 | 9 | 44 | 9 |

††COBOL record mark

CONTROL DATA

CORPORATION

Pub. No. 60327600 Litho in U.S.A.