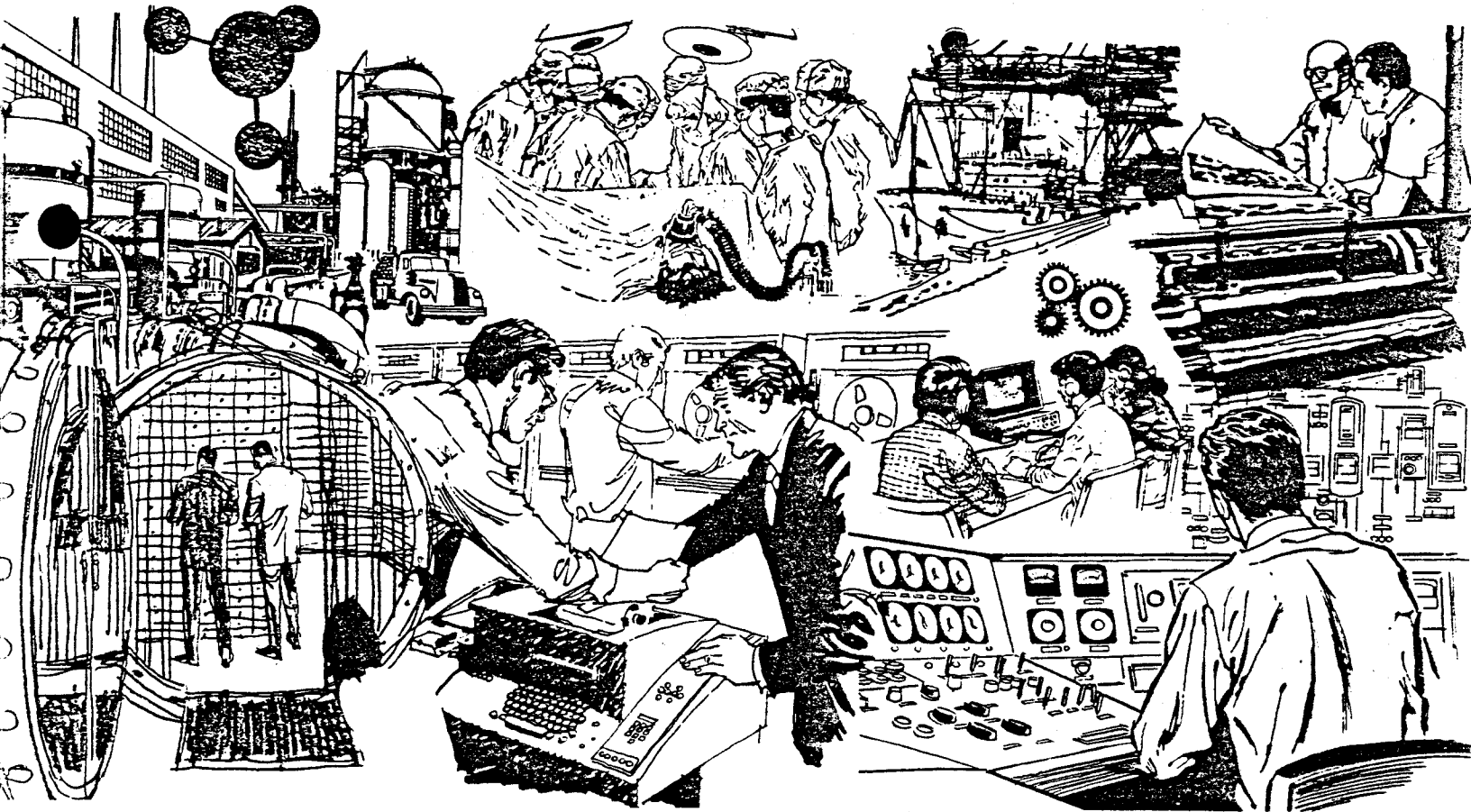


Don

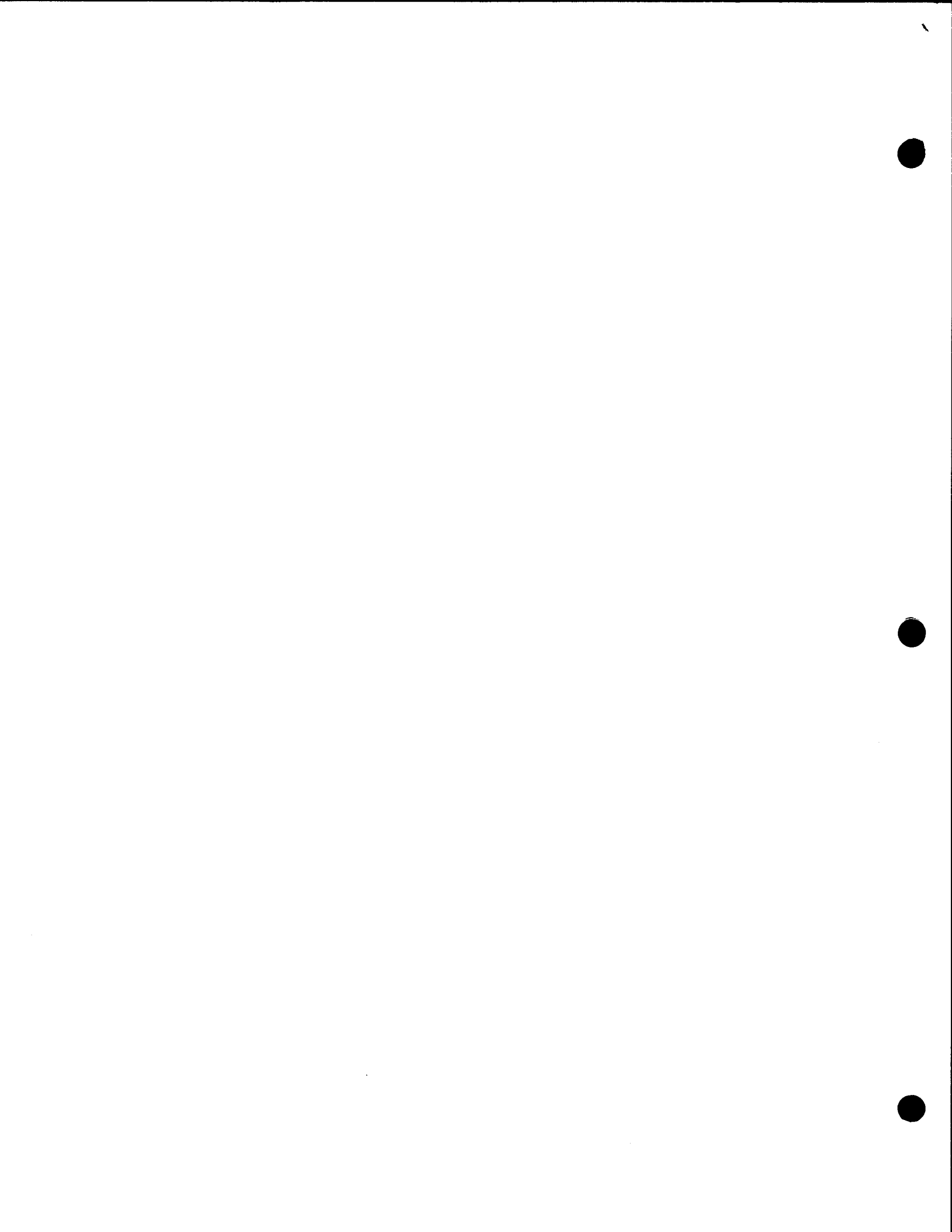
COBTRN303

OS/3 1968 ANS COBOL To OS/3
1974 ANS COBOL Converter

User Reference



SPERRY UNIVAC



COBTRN303

**OS/3 1968 ANS COBOL To OS/3
1974 ANS COBOL Converter**

User Reference

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1. Introduction

This document provides a functional description of the OS/3 Extended 1968 American National Standard COBOL to OS/3 1974 American National Standard COBOL Converter. It contains a general description of the converter and detailed specifications. The differences between OS/3 Extended 1968 COBOL and OS/3 1974 COBOL are presented along with the related converter actions and recommended user actions. A comprehensive index is provided for quick reference.

It is assumed that the user is familiar with the OS/3 Extended 1968 American National Standard COBOL and OS/3 1974 American National Standard COBOL languages and their respective operating environments.

The job control requirements for the installation and use of this converter is found in the Installation Memorandum for the current release.



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2. Overview

The function of the converter is to change the OS/3 Extended 1963 American National Standard COBOL source code to OS/3 1974 American National Standard source code. The conversion rules are presented in the following sections.

The converter flags (issues a diagnostic message for) each statement that cannot be converted and which may not be semantically compatible. The conversion listing produced by the converter clearly indicates the action taken by the converter.

The converted output is acceptable to the OS/3 1974 American National Standard compiler except for those items indicated by converter flags. These items should be corrected prior to the compilation of the converted source code to minimize the number of compiler diagnostic messages.

The converter has been designed to accept only syntactically correct UNIVAC OS/3 Extended 1968 American National Standard COBOL programs. The results may be incorrect when programs submitted for conversion contain incorrect syntax. The user should be reasonably familiar with the OS/3 operating environment. Most of the converted programs will require careful checking and possibly some manual adjustments or corrections.

Data file conversion must be addressed as a separate issue prior to execution of converted programs.

The converter is a six-phase program:

- Initialization - Processes PARAM statements.
- Scan - Parses the input and classifies the lexical entities, produces an input listing with diagnostics, and output in the form of lexical packets.
- Syntax - Consists of two passes. The first pass builds file attribute and SPECIAL-NAMES tables, makes all the alterations possible and collects information for the second pass. The second pass makes the remaining alterations, insertions, and deletions and produces the updated packet file.
- Sort - Sorts the updated packet file.
- Lister - Inserts comments, composes the output file and produces the converter output listings.
- Termination - Closes all files.



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3. Conversion Specifications

This section describes OS/3 Extended 1968 American National Standard features syntactically incompatible with OS/3 1974 American National Standard COBOL. The organization of this section proceeds from general to detailed specifications. The general format of the language feature is presented first followed by detailed descriptions of the conversion of individual statements or clauses. The COBOL divisions are presented as major subsections.

The language features are covered in approximately the same order of presentation as found in the COBOL Supplementary Reference (UP-8059).

In the following text, COB'68 refers to OS/3 Extended 1968 American National Standard COBOL and COB'74 refers to the OS/3 implementation of OS/3 1974 American National Standard COBOL.

The following information is provided:

- a) Language feature (syntax);
- b) Differences between the COB'68 and COB'74;
- c) Converter action;
- d) Recommended user action.

Language features not specifically addressed in this manual should not require attention.

COBOL conventions are used for syntax specification throughout this document. The following conventions are used for braces and brackets extending over one line:

- a) BRACKETS [] are represented as:

[]

- b) BRACES { } are represented as:

{ }

NOTE: The parentheses symbols used to form braces should not be confused with actual parentheses.

3.1 IDENTIFICATION DIVISION

3.1.1 Structure of IDENTIFICATION DIVISION

IDENTIFICATION DIVISION.

PROGRAM-ID. program-name.

[AUTHOR. [comment-entry]...]

[INSTALLATION. [comment-entry]...]

[DATE-WRITTEN. [comment-entry]...]

[DATE-COMPILED. [comment-entry]...]

[SECURITY. [comment-entry]...]

[REMARKS. [comment-entry]...]

3.1.2 REMARKS

Format

[REMARKS. [comment-entry]...]

Differences:

COB'74 does not support REMARKS.

Converter Action:

REMARKS paragraph is converted to comment.
("#" is inserted in column 7).

User Action:

None.

3.2 ENVIRONMENT DIVISION

This division, by its nature, contains some language differences that cannot be resolved by the converter. This section should be carefully reviewed for the differences in meaning as well as form.

3.2.1 Structure of ENVIRONMENT DIVISION

ENVIRONMENT DIVISION.

CONFIGURATION SECTION.

SOURCE-COMPUTER. (entry.)

OBJECT-COMPUTER. (entry.)

SPECIAL-NAMES. (entry.)

[INPUT-OUTPUT SECTION.

FILE-CONTROL. (entry.)

[I-O-CONTROL. entry.]]

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3.2.2 CONFIGURATION SECTION

· CONFIGURATION SECTION heading is generated if not present.

3.2.2.1 SOURCE-COMPUTER

This paragraph serves only as documentation.

Format

SOURCE-COMPUTER. UNIVAC-9030.

Differences:

Computer-name pertains to COB'68 system.

Converter Action:

Computer-name is changed to UNIVAC-OS3.

SOURCE-COMPUTER is generated if not present.

User Action:

None.

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| | | | |

3.2.2.2 OBJECT-COMPUTER

```

                                Format
-----
OBJECT-COMPUTER.  UNIVAC-9030.

    [,MEMORY SIZE integer ( WORDS           )
                           < CHARACTERS > ].
                           ( MODULES       )
    
```

Differences:

Computer-name pertains to COB'68 system.

Converter Action:

Computer-name is changed to UNIVAC-OS3.

OBJECT-COMPUTER is generated if not present.

User Action:

None.

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3.2.2.3 SPECIAL-NAMES

The SPECIAL-NAMES paragraph is generated if not present or if needed for some other conversion considerations. (See text regarding the handling of the APPLY clauses).

3.2.2.3.1 SYSDATE

| Format |
|---------------------------------|
| <u>SYSDATE IS</u> mnemonic-name |

Differences:

COB'74 does not support the SYSDATE clause.

Converter Action:

The SYSDATE clause is deleted.

The related ACCEPT verb in the PROCEDURE DIVISION is changed to ACCEPT data-name FROM DATE.

User Action:

None.

3.2.2.3.2 SYSTIME

Format

SYSTIME IS mnemonic-nameDifferences:

COB'74 does not support the SYSTIME clause.

Converter Action:

The SYSTIME clause is deleted.

The related ACCEPT verb in the PROCEDURE DIVISION is changed TO ACCEPT data-name FROM TIME.

User Action:

None.

3.2.2.3.3 CURRENCY SIGN

Format

CURRENCY SIGN IS literalDifferences:

COB'74 does not permit L / or = as literal in this context.

Converter Action:

L / or = is changed to \$ in this clause and in all related PICTURE strings. The CURRENCY SIGN is flagged.

User Action:

User should change currency symbol if \$ is not acceptable.

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3.2.2.3.4 SYSCHAN-t

Format

SYSCHAN-t IS mnemonic-name...

Differences:

Some COB'68 SYSCHAN designations are not compatible with COB'74.

Converter Action:

See text under heading "Printer Files".

User Action:

None.

3.2.2.3.5 SYSIN, SYSIN-96, SYSIN-128

Format

(SYSIN)
< SYSIN-96 > IS mnemonic-name...
(SYSIN-128)

Differences:

COB'74 does not distinguish between SYSIN, SYSIN-96, and SYSIN-128.

Converter Action:

SYSIN-96 and SYSIN-128 are converted to SYSIN.

User Action:

COB'68 ACCEPT (GETCS) pads trailing spaces to the specified size (80, 96 or 128), but COB'74 does not. Therefore, if multiple transmissions of data are involved and if trailing spaces are critical, the user must supply the trailing spaces of the first 'card' as leading spaces of second,... etc, 'card(s)'.

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3.2.2.3.6 SYSERR

Format

```
          ( ON STATUS IS condition-name )  
          ( [ OFF STATUS IS condition-name ] )  
SYSERR[-m] < >  
          ( OFF STATUS IS condition-name )  
          ( [ ON STATUS IS condition-name ] )
```

Differences:

COB'74 does not support SYSERR clause.

Converter Action:

The SYSERR clause is converted to a comment and a flag is issued.

User Action:

The user must review error processing and provide an appropriate procedure where necessary.

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3.2.3 INPUT-OUTPUT SECTION

INPUT-OUTPUT SECTION.[FILE-CONTROL.

file-control-entry

[file-control-entry]...].

[I-O-CONTROL.

i-o-control-entry

[i-o-control-entry]...].

3.2.3.1 FILE-CONTROL

3.2.3.1.1 ASSIGN

Format

ASSIGN TO [external-name][integer] implementor-name[OR implementor-name][FOR MULTIPLE (REEL)
(UNIT)]Differences:

Implementor-names differ in form and contents.

Converter Action:

Implementor-names are converted to the following format.

'Device-LFDname-mode'

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Device is resolved as follows:

| COB'53 Device | COB'74 Device |
|------------------|---------------|
| CARD-READER) | |
| CARD-READER-51 > | CARDREADER |
| CARD-READER-66) | |
| CARD-PUNCH | CARDPUNCH |
| PRINTER | PRINTER |
| TAPE) | |
| TAPE-6 > | TAPE |
| TAPE-6) | |
| DISC) | |
| DISC-8411) | |
| DISC-8414) | |
| DISC-8415 > | DISK |
| DISC-8416) | |
| DISC-8418) | |
| DISC-8430) | |

Mode F, V (or U) is picked up from RECORDING MODE clause in the FD.

Integer is deleted.

"OR" is deleted.

External-name is deleted and becomes "LFDname".

If external name is not specified, the first 8 characters of the file-name, defined in the SELECT statement, become "LFDname".

Hyphens, within the derived LFDname, are changed to "Q".

FOR MULTIPLE REEL/UNIT is deleted.

User Action:

The validity of the derived linknames should be checked.

Duplication is possible due to potential truncation.

3.2.3.1.2 RESERVE

Format

```
RESERVE ( integer ) ( AREA )  
( NO ) ( AREAS )  
ALTERNATE [ < > ]
```

Differences:

COB'74 does not support the NO or ALTERNATE terms.

Converter Action:

RESERVE NO is changed to RESERVE 1.

All other RESERVE clauses are changed to RESERVE 2.

ALTERNATE is deleted.

User Action:

None.

2.2.3.1.3 FILE-LIMITS

Format

```

      ( FILE-LIMIT IS ) (data-name )      (data-name )
[ < < > > < > THRU < > < >
      ( FILE-LIMITS ARE) (data-name )      (data-name )

      (data-name )      (data-name )
      [, < > THRU < > ]... ]
      (literal )      (literal )

```

Differences:

COB'74 does not support this clause.

Converter Action:

The clause is deleted.

User Action:

None.

3.2.3.1.4 PROCESSING MODE

Format

```
[ , PROCESSING MODE IS SEQUENTIAL ]
```

Differences:

COB'74 does not support this clause.

Converter Action:

The clause is deleted.

User Action:

None.

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3.2.3.1.5 ORGANIZATION

Format

```
[ ORGANIZATION IS ( SEQUENTIAL )  
  ( RELATIVE > ]  
  ( INDEXED )
```

Differences:

None.

Converter Action:

ORGANIZATION IS SEQUENTIAL is changed to ORGANIZATION IS SAM.

ORGANIZATION IS RELATIVE clause is flagged.

ORGANIZATION IS INDEXED is changed to ORGANIZATION IS ISAM.

User Action:

Converted code associated with relative and ISAM files should be checked for acceptability.

3.2.3.1.6 ACTUAL KEY

Format

```
( ACTUAL KEY IS data-name )  
[ < > ]  
( RELATIVE KEY IS data-name )
```

Differences:

COB'74 does not support ACTUAL KEY clause.

Converter Action:

If the access mode is SEQUENTIAL, the ACTUAL KEY clause is deleted.

If the access mode is RANDOM, ACTUAL KEY is changed to RELATIVE KEY.

User Action:

The user should make sure that the conversion for ACTUAL KEY clause is acceptable.

3.2.3.1.7 SYMBOLIC KEY

Format

```
[ SYMBOLIC KEY IS data-name ]
```

Differences:

COB'74 does not support the SYMBOLIC KEY clause.

Converter Action:

SYMBOLIC KEY clause is deleted.

Procedure is generated to "move SYMBOLIC KEY to RECORD KEY" where applicable.

User Action:

None.

3.2.3.2 I-O-CONTROL

I-O-CONTROL.

[RERUN clause]
[SAME clause]
[MULTIPLE FILE clause]
[APPLY clause]... .

3.2.3.2.1 RERUN

Format

RERUN ON external-name

EVERY integer RECORDS OF file-name [,file-name]

Differences:

RERUN-specifics to be supplied:

Converter Action:

The RERUN clause is flagged.

User Action:

Undefined.

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3.2.3.2.2 APPLY

Format

[APPLY VERIFY ON file-name [,file-name]...]

[APPLY BLOCK-COUNT ON < (file-name [,file-name)
(TAPES) >...]

[APPLY MASTER-INDEX ON file-name [,file-name]...]

[APPLY CYLINDER-INDEX AREA OF integer INDICES ON file-name
[,file-name]...]

[APPLY CYLINDER-OVERFLOWAREA OF integer PERCENT ON file-name
[file-name]...]

[APPLY EXTENDED-INSERTION AREA ON file-name [file-name]...]

[APPLY FILE-PREPARATION ON file-name [,file-name]...]

[APPLY ASCII [WITH BUFFER-OFFSET < (FOR BLOCK-LENGTH-CHECK)
(OF integer CHARACTERS .) >]
ON file-name [,file-name]...]

Differences:

COB'74 does not support the following APPLY clauses:

APPLY MASTER-INDEX
APPLY EXTENDED-INSERTION
APPLY FILE-PREPARATION
APPLY ASCII.

Converter Action:

The following APPLY clauses are deleted:

APPLY MASTER-INDEX
APPLY EXTENDED-INSERTION
APPLY FILE-PREPARATION
APPLY ASCII.

If APPLY ASCII is specified, a SPECIAL-NAMES paragraph is generated if not present, an ALPHABET-NAME clause is generated under SPECIAL-NAMES and a CODE-SET clause is generated in applicable FD entries.

User Action:

Deleted APPLY clauses should be reviewed and adjustments made where necessary.

3.3 DATA DIVISION

3.3.1 Structure of DATA DIVISION

DATA DIVISION.

FILE SECTION.

{file description entry

{record description entry}... }...

WORKING-STORAGE SECTION.

{data item description entry

{record description entry}... }...

LINKAGE SECTION.

{data item description entry

{record description entry}... }...

3.3.2 FILE SECTION

General Format

FILE SECTION.

{File description entry

{Record description entry}... }...

3.3.2.1 LABEL RECORDS

Format

```
      (RECORD IS      ) ( STANDARD      )  
LABEL <              > < OMITTED      >  
      (RECORDS ARE ) ( data-name  [,data-name ]...)
```

Differences:

COB'74 does not support user labels for disk.

Converter Action:

For disk files "LABEL RECORDS data-name" is converted to
"LABEL RECORDS STANDARD".

User Action:

None.

3.3.2.2 RECORDING MODE

| Format |
|-------------------------------|
| <u>RECORDING MODE</u> IS mode |

Differences:

Recording mode is specified in COB'74 implementor-name.

COB'74 does not support RECORDING MODE D.

Converter Action:

The mode is placed in the implementor-name and the corresponding RECORDING MODE clause is deleted.

RECORDING MODE D is converted to V and the corresponding ASSIGN clause is flagged.

If the file specified is assigned to CARD-READER and the recording mode is V or U, the corresponding FD clause is flagged and the recording mode is changed to F.

If no recording mode is specified, COB'63 default values are used.

User Action:

The user must verify the validity of generated recording modes.

3.3.2.3 VALUE OF

Format

```
[ VALUE OF unqualified-data-name IS ( data-name )  
                                     < >... ]  
                                     ( literal   )
```

Differences:

COB'68 treats this clause as a comment.

Converter Action:

The converter deletes this clause.

User Action:

None.

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3.3.3 Data Description

3.3.3.1 OCCURS DEPENDING

Format

OCCURS [integer TO] integer TIMES

DEPENDING ON data-name

Differences:

"Integer TO" is not optional for COB'74 .

Converter Action

Converter inserts "0 TO" if "integer TO" is not specified.

User Action:

None.

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3.3.3.2 PICTURE

Format

```
(PIC )  
< > IS character-string  
(PICTURE)
```

Differences:

COB'63 supports H in the PICTURE string.
COB'74 does not.

COB'74 does not support L / or = as currency sign character.

Converter Action:

H is deleted from the PICTURE string, and COMP-3 is included if not present.

The L / or = are changed to \$ and a flag is issued.

User Action:

The user should check the acceptability of \$ as the currency symbol.

3.3.3.3 USAGE

Format

USAGE IS INDEXDifferences:

None.

Converter Action:

None.

User Action:

The user should make sure that the value of items with the usage of INDEX is not zero.

3.3.3.4 MAP

Format

MAP IS integer CHARACTERSDifferences:

COB'68 treats this clause as a comment.

COB'74 does not support this clause.

Converter Action:

This clause is deleted.

User Action:

None.

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3.3.3.5 VALUE

| Format |
|-------------------------|
| <u>VALUE</u> IS literal |

Differences:

COB'74 does not permit a signed numeric literal as value when the PICTURE string does not contain S.

COB'74 QUOTE is assumed to be "'".

COB'74 does not permit numeric value in edited items.

Converter Action:

The sign in a numeric literal is deleted if the PICTURE string does not contain S.

QUOTE(S) is changed to ALL "'".

If the value in an edited item is a numeric literal, the literal is enclosed in quotes.

User Action:

None.

3.3.3.6 BLANK WHEN ZERO

Format

BLANK WHEN ZERODifferences:

COB'74 does not permit this clause in conjunction with check protect (*).

Converter Action:

Clause is deleted when check protection (*) is specified.

User Action:

None.

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3.4 PROCEDURE DIVISION

3.4.1 Structure of PROCEDURE DIVISION

PROCEDURE DIVISION [USING identifier [identifier]...].

[DECLARATIVES.

{section-name SECTION.

USE sentence.

{paragraph-name. {sentence}... }... }...

END DECLARATIVES.]

[[{section-name SECTION [priority].]

{paragraph-name. {sentence}... }... }...]

All references to QUOTE or QUOTES are changed to ALL "'".

3.4.2 DECLARATIVES

General Format

PROCEDURE DIVISION.

DECLARATIVES.

{section-name SECTION.

USE sentence.

{paragraph-name. {sentence}... }... }...

END DECLARATIVES.

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3.4.2.1 USE

Format 1

```

    ( BEFORE )      ( BEGINNING )   ( REEL )
  USE < BEFORE > STANDARD [ < BEGINNING > ] [ < FILE > ]
    ( AFTER )      ( ENDING )     ( UNIT )
  
```

```

    LABEL PROCEDURE ON ( file-name [,file-name ]... )
                       < OUTPUT >
                       ( INPUT )
                       ( I-O )
  
```

Format 2

USE AFTER STANDARD ERROR PROCEDURE

```

    ON ( file-name [,file-name ]... )
      < INPUT >
      ( OUTPUT )
      ( I-O )
  
```

Format 3

USE FOR FORM-OVERFLOW ON file-name-1.

Differences:

- COB'74 does not support label procedures for disk files.
- COB'74 does not recognize UNIT.
- COB'74 does not support USE FOR FORM-OVERFLOW.

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Converter Action:

Format 1.

If no tape files containing user labels exist in the specified category (INPUT or OUTPUT), the USE...LABEL... PROCEDURE... section is deleted.

Explicitly named files pertaining to user labeled tape files are retained. All other file names are deleted from the USE statement.

Format 2.

This format does not require conversion.

Format 3.

The USE FOR FORM-OVERFLOW statement is deleted and the specified procedure is moved outside DECLARATIVES.

Refer to text under heading "Printer Files" for further explanation.

User Action:

The user should review the conversion of label procedure and form overflow for acceptability.

3.4.3 Procedural Statements

3.4.3.1 ACCEPT

Format

ACCEPT identifier [FROM mnemonic-name]

Differences:

COB'74 does not support FROM SYSDATE.

COB'74 does not support FROM SYSTEMIME.

Converter Action:

Mnemonic name associated with SYSDATE is changed to DATE.

Mnemonic name associated with SYSTEMIME is changed to TIME.

User Action:

None.

3.4.3.2 CALL

Format

ENTER LINKAGE.

```

( file-name      )
( data-name      )
CALL entry-name [ USING <                >... ]
( procedure-name )
( sort-name      )

```

ENTER COBOL.Differences:

COB'74 requires that entry-name be in quotes.

COB'74 does not support ENTER LINKAGE and ENTER COBOL.

Converter Action:

The entry-name in the CALL statement is enclosed in quotes.

ENTER LINKAGE and ENTER COBOL statements are deleted.

User Action:

Since COB'74 does not support the ENTRY statement, the entry-name in the CALL statement must be the program name of the called module if the called module is a COBOL program.

3.4.3.3 CLOSE

Format

```

CLOSE file-name-1 | REEL | ( NO REWIND )
                  | UNIT | ( LOCK )

```

```

[,file-name-2 | REEL | ( NO REWIND )
              | UNIT | ( LOCK ) ] ]...

```

Differences:

COB'68 WITH LOCK is not equivalent to COB'74 WITH LOCK in all cases.

COB'74 supports FOR REMOVAL.

Converter Action:

For disc, WITH LOCK is deleted.

If REEL/UNIT, WITH LOCK is changed to FOR REMOVAL.

User Action:

None.

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3.4.3.4 ENTRY

Format

ENTER LINKAGE.ENTRY entry-name [USING (unqualified-data-name)...].ENTER COBOL.Differences.

COB'74 does not support the ENTRY statement.

COB'74 does not support ENTER LINKAGE and ENTER COBOL.

Converter Action:

The ENTRY statements are deleted and flagged.

ENTER LINKAGE and ENTER COBOL statements are deleted.

User Action:

User must check the conversion of ENTRY statements and make appropriate adjustments in calling and called programs.

| DOCUMENT NO. | TITLE | PAGE REV. | PAGE |
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3.4.3.5 EXAMINE

```

-----
                                Format
-----
EXAMINE identifier
(
  ( TALLYING < ALL ) )
  ( < LEADING > literal )
  ( ( UNTIL FIRST ) )
  ( )
  ( [ REPLACING BY literal ] )
  < >
  ( REPLACING < ALL ) )
  ( < LEADING > )
  ( ( UNTIL FIRST ) )
  ( )
  ( literal BY literal )
)
-----

```

Differences:

COB'74 does not support EXAMINE statement.

COB'74 does not support TALLY special register.

Converter Action:

EXAMINE statement is converted to INSPECT with format differences.

WORKING-STORAGE entry is generated for TALLY.

User Action:

None.

3.4.3.6 IF

Format

```

IF condition [THEN] < ( NEXT SENTENCE )
                    < ( statement ) >

[ ( ELSE ) ( NEXT SENTENCE )
  < > < > ]
  ( OTHERWISE ) ( statement )

```

Differences:

COB'74 does not support OTHERWISE.

COB'74 does not support relational operators EQUALS, UNEQUAL and EXCEEDS in conditions.

COB'74 interpretation of abbreviated compound conditions containing NOT differs from COB'68 in some combinations.

Converter Action:

OTHERWISE is converted to ELSE.

The relational operators are converted as follows:

```

"EQUALS" to "IS   ="
"UNEQUAL" to "NOT  ="
"EXCEEDS" to "IS   >".

```

User Action:

The user must inspect the compound conditions containing NOT and make appropriate changes where the COB'74 interpretation differs from COB'68.

3.4.3.7 INSERT

Format

```
INSERT record-name [FROM identifier ]  
    INVALID KEY imperative-statement
```

Differences:

COB'74 does not support the INSERT statement.

Converter Action:

INSERT is changed to WRITE.

User Action:

None.

3.4.3.8 NOTE

Format

```
NOTE character string.
```

Differences:

COB'74 does not support the NOTE statement.

Converter Action:

NOTE verb is deleted and all related character strings
are changed to comments by inserting an '*' in column 7.

User Action:

None.

| PAGE | PAGE REV. | TITLE | DOCUMENT NO. |
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3.4.3.9 OPEN

Format

```

(
( INPUT { file-name [ REVERSED ] } )
( [ WITH NO REWIND ] )
OPEN < >
( I-O { file-name }... )
(
( OUTPUT { file-name [WITH NO REWIND] }... )

```

Differences:

None.

Converter Action:

OPEN statements for relative files are flagged.

OPEN statements for ISAM files opened output are flagged.

User Action:

User should verify the suitability of all I/O statements associated with relative and ISAM files.

3.4.3.10 READ

Format

```
READ file-name RECORD [INTO identifier]
```

```
    (AT END      )
```

```
    <          > imperative-statement
```

```
    (INVALID KEY)
```

Differences:

COB'74 relative file access differs from COB'68.

READ NEXT is required for relative and ISAM files accessed sequentially.

COB'74 record-key instead of symbolic-key must be conditioned prior to random read of indexed files.

Converter Action:

READ statement is flagged if file organization is RELATIVE.

For sequential ISAM or sequential relative files NEXT is inserted following READ and AT END clause is appended, if not present.

For random ISAM files

```
    MOVE symbolic-key TO record-key.
```

is inserted before each READ statement.

User Action:

The user must check the correctness of the READ statements for relative and ISAM files.

PAGE

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3.4.3.11 RETURN

Format

ENTER LINKAGE.RETURN.ENTER COBOL.Differences:

COB'74 does not support the RETURN statement.

Converter Action:

RETURN is changed to EXIT PROGRAM.

ENTER LINKAGE and ENTER COBOL are deleted.

User Action:

None.

3.4.3.12 REWRITE

Format

```
REWRITE record-name [ FROM identifier ]  
[ INVALID KEY imperative-statement ].
```

Differences:

None.

Converter Action:

I/O statements for relative files are flagged.

User Action:

The user must review relative I-O statements.

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3.4.3.13 SEEK

| Format |
|------------------------------|
| <u>SEEK</u> file-name RECORD |

Differences:

COB'74 does not support the SEEK statement.

Converter Action:

For ISAM files the following statements are generated:

MOVE symbolic-key TO record-key.

START file-name KEY IS NOT LESS THAN record-key.

The SEEK statement is deleted and a flag is issued.

For relative files SEEK is replaced by START, RECORD is deleted, and the statement is flagged.

User Action:

The user should review the statements generated.

For relative files, the user must provide INVALID KEY clause for START statement or appropriate USE procedure.

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3.4.3.14 TRANSFORM

Format 1

```

TRANSFORM identifier [,identifier ]...CHARACTERS
      (identifier          ) (identifier          )
FROM <nonnumeric-literal > TO <nonnumeric-literal >
      (figurative-constant ) (figurative-constant )
    
```

Format 2

```

TRANSFORM identifier [,identifier ]...CHARACTERS
      (EBCDIC TO ASCII)
FROM < >
      (ASCII TO EBCDIC)
    
```

Format 3

```

TRANSFORM identifier [,identifier ]...CHARACTERS
      (ON)
      < >identifier
      (BY)
    
```

Differences:

COB'74 does not support Format 2.

Converter Action:

WORKING-STORAGE entries (translation tables) are generated for EBCDIC and ASCII.

Format 2 is converted to Format 3.

User Action:

None.

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3.4.3.15 WRITE

| Format 1 |
|---|
| <pre> WRITE record-name [FROM identifier] (BEFORE) (identifier LINES) [< BEFORE > ADVANCING < integer LINES >] (AFTER) (mnemonic-name) </pre> |
| Format 2 |
| <pre> WRITE record-name [FROM identifier] INVALID KEY imperative-statement </pre> |

Differences:

- a) COB'74 requires REWRITE when ISAM or relative files are updated.
- b) COB'74 does not support INVALID KEY on sequential files.

Converter Action:

- a) WRITE for relative file is flagged.
- b) For random ISAM files opened I-O, a WRITE/REWRITE sequence is generated and a flag is issued.

For sequential, sequential relative, and sequential ISAM files not opened OUTPUT, the WRITE is converted to REWRITE.
- c) For sequential files, INVALID KEY is changed to the comment:
IF SAM-FILE-STATUS = "34", and all succeeding words to the next period are changed to comments, SAM-FILE-STATUS is generated in WORKING-STORAGE, and STATUS IS SAM-FILE-STATUS is generated within the appropriate SELECT statement.

User Action:

The user must verify the acceptability of all WRITE statements for relative files.

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3.5 Special Features

3.5.1 Direct Access Devices

3.5.1.1 Relative Files

Relative file handling differs between COB'68 and COB'74.

- a) COB'68 requires that a relative file be "prepared" prior to first write. This can be accomplished by specifying APPLY FILE-PREPARATION or by the use of UTDMS utility.

COB'74 does not require this file preparation and does not provide the language for this function.

- b) COB'68 record deletion consists of marking the record with HIGH-VALUES in the first byte. Deleted and unwritten records are accessible and must be bypassed by the program logic.

COB'74: deleted or unwritten records are not accessible.

- c) COB'68 sequential READ will present the contents of the next record position including deleted and unwritten records.

COB'74 sequential READ will present only currently existing records, bypassing unwritten and deleted record positions.

- d) COB'68 random READ will present the contents of all record positions within established file boundaries.

COB'74 random READ will present only currently existing records; deleted and unwritten records will force INVALID KEY branch.

- e) COB'68 WRITE and REWRITE can be used interchangeably in random access files opened I-O.

COB'74 requires REWRITE when the record exists; attempt to use WRITE referencing a position that contains a record causes the INVALID KEY branch to be taken.

- f) COB'68 AT END indicates that the last record position within the file boundaries has been read.

COB'74 AT END indicates that the last existing record has been read.

The user must review the relative files with respect to the above considerations and alter the program logic to make the best use of COB'74 file handling features.

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3.5.2 Printer Files

The conversion of printer files and associated WRITE statements varies depending on the references to mnemonics associated with various SYSCHAN-b's, in the WRITE statement, and the specification of the USE FOR FORM-OVERFLOW.

Four specific cases can be recognized:

Case-1:

- No WRITE statement for this file refers to mnemonics associated with SYSCHAN-(other than 7, 14 or 15).
- No USE FOR FORM-OVERFLOW specified for this file.

Converter Action:

- a) Mnemonics associated with SYSCHAN-(7, 14 and 15) are replaced by PAGE.
- b) The lineage clause below is generated (in the FD).

LINAGE 57 LINES AT BOTTOM 9

User Action:

None.

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Case-2:

- No WRITE statement for this file refers to mnemonics associated with SYSCHAN-(other than 7, 14 or 15).
- USE FOR FORM-OVERFLOW is specified for this file.

Converter Action:

- a) Mnemonics associated with SYSCHAN-(7, 14 and 15) are replaced by PAGE.
- b) The lineage clause below is generated (in the FD).

LINAGE 66 WITH FOOTING AT 57
- c) All WRITE statements (excluding those appearing in form overflow procedure in the Declaratives section) are appended with

AT E-O-P PERFORM overflow-procedure.

where overflow-procedure is the procedure name in the declaratives section associated with FORM-OVERFLOW.

- d) The procedure associated with FORM-OVERFLOW is transferred outside of the DECLARATIVES.

User Action:

None.

Case-3:

- Some WRITE statements for this file refer to mnemonics associated with SYSCHAN-(other than 7, 14 or 15).
- No USE FOR FORM-OVERFLOW specified for this file.

Converter Action:

None.

User Action:

None.

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|------|-----------|-------|--------------|

Case-4:

- Some WRITE statements for this file refer to mnemonics associated with SYSCHAN-(other than 7, 14 or 15).
- USE FOR FORM-OVERFLOW is specified for this file.

Converter Action:

- a) Mnemonics associated with SYSCHAN-(7, 14 and 15) are replaced by PAGE.
- b) The lineage clause below is generated (in the FD).
LINAGE 66 WITH FOOTING AT 57
- c) Mnemonics associated with SYSCHAN-(4 - 13 (not 7)) are flagged.
- d) All WRITE statements (excluding those appearing in form overflow procedure in Declaratives section) are appended with
AT E-O-P PERFORM overflow-procedure.

where overflow-procedure is the procedure name in the declaratives section associated with FORM-OVERFLOW.

- e) The procedure associated with FORM-OVERFLOW is transferred outside of the DECLARATIVES.

User Action:

User should review flagged WRITE statements carefully and make corrections where necessary.

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4. Reserved Words

The converter will suffix all COB'74 reserved words appearing as COB'68 user words with '-Q' (within data declaration statements and procedure references).



5. Converter Diagnostic Messages

The following description of converter diagnostic messages is presented in the error code sequence.

5.1 Scan phase messages

001 - BLANK INSERTED BEFORE

Space required by syntax inserted before word indicated.

002 - BLANK INSERTED AFTER

Space required by syntax inserted after word indicated.

003 - END QUOTE ADDED TO LITERAL

Non-numeric literal terminated improperly. Trailing quote provided by the converter.

004 - PERIOD INSERTED BEFORE

Missing period provided in front of word indicated.

005 - COPY TERMINATION EXPECTED

Improper COPY clause termination detected.

006 - INVALID CONTINUATION

Invalid line continuation detected.

007 - INVALID CHARACTER

Invalid character detected.

008 - SIZE EXCEEDS MAXIMUM

Size exceeds permissible maximum for this item type.

Non-numeric literal 132 characters
User-defined word 30 characters
Picture string 30 characters.
Numeric literal 18 characters
(excluding sign and decimal point).

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009 - INVALID LITERAL SIZE

Null non-numeric literal detected.

010 - PERIOD EXPECTED BEFORE

Period missing in front of word indicated.

011 - CHECK COPYLIB -Q APPENDED

Reference to an identifier in REPLACING clause of COPY statement is a COB'74 reserved word and was suffixed with "-Q".

012 - RESERVED WORD -Q APPENDED

The indicated identifier is a COB'74 reserved word and was suffixed with "-Q".

013 - LEVEL 01/77 IN AREA-B

Syntax requires Area-A alignment for this data item. The alignment was adjusted to Area-A.

014 - NON 01/77 LEVEL IN AREA-A

Syntax requires Area-B alignment for this data item. The alignment was adjusted to Area-B.

015 - INVALID WORD (SCAN ERROR?)

Probable COBOL syntax error; possible converter (scan) failure.

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5.2 Syntax phase messages

020 - RELATIVE FILE ORGANIZATION

Code associated with indicated file should be checked for suitability.

022 - RELATIVE ORGANIZATION SEEK

SEEK was converted to START. Code should be checked and an INVALID KEY clause or declarative procedure provided.

023 - VARIABLE RECORDS INVALID

COB'74 requires that files assigned to CARDREADER must contain only records with fixed recording mode.

024 - RERUN CLAUSE

Rerun clause not converted. Code associated with this function must be provided.

027 - RECORDING MODE D

COB'74 does not support recording mode D. Code must be provided to service ASCII files.

028 - NON-TAPE RECORDING MODE U

Code must be checked. COB'74 permits Recording Mode U only for files assigned to tape.

029 - CURRENCY SIGN CHANGED TO \$

The character specified as currency symbol is not acceptable to COB'74. Symbol changed to \$.

030 - ISAM SEEK CHANGED TO START

SEEK verb converted to START. Code should be checked.

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033 - ISAM I/O WRITE --> REWRITE

WRITE, for sequential ISAM file opened I/O, was converted to REWRITE.

034 - ISAM WRITE/REWRITE PARAGRAPH

WRITE or REWRITE statement (for ISAM file) within a conditional statement. "PERFORM write-rewrite-procedure" was generated (see message 037 below).

035 - ISAM OPEN OUTPUT (EXTEND)

Intent should be checked. If file extension is intended the the OUTPUT should be changed to I-O.

036 - PRINT FILE WRITE PARAGRAPH

WRITE statement (for a printer file for which USE FOR FORM-OVERFLOW was specified) in the confines of a conditional statement. "PERFORM write-procedure" was generated.

037 - ISAM WRITE/REWRITE CODE

WRITE, for ISAM file opened I/O, changed to WRITE-REWRITE procedure. (See WRITE statement conversion). Code should be checked for suitability.

038 - INVALID KEY DELETED

INVALID KEY for a WRITE to a sequential file was deleted and replaced with the commented IF statement seen on the listing. Its use is left to the discretion of the user.

039 - CURRENCY SIGN CHANGED TO \$.

Corresponding characters in string changed to \$.

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040 - SELECT FOR FILE NOT FOUND

The program contains no select statement for the file indicated.

041 - SEQ. I/O WRITE --> REWRITE

WRITE for a sequential file not opened OUTPUT was converted to REWRITE.

042 - REL. I/O WRITE --> REWRITE

WRITE for a relative file not opened OUTPUT was converted to REWRITE.

047 - ACCEPT (MULTIPLE CARD?)

ACCEPT statement contains no FROM option or contains FROM mnemonic-name associated with SYSIN; see SYSIN section.

049 - SYSCAN-N INVALID #/LINEAGE

Linage was generated due to FORM-OVERFLOW routine. The user must provide suitable conversion for the mnemonics associated with SYSCAN-(4-13).

052 - SYSERR DELETED

Clause deleted. COB'74 does not support this function. The associated code must be modified.

054 - ENTRY STATEMENT DELETED

COB'74 does not support ENTRY statement. The statement is deleted. The code must be adjusted to compensate for the deletion.

055 - FILE NOT DEFINED

Program contains no SELECT statement or FD for file indicated.

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5.3 Run messages

CHV1 CHVaaa SOURCE IN bbbbb SOURCE OUT ccccc DIAGS dddd

where

aaa is the number of the source program being converted

bbbbb is the number of input lines read

ccccc is the number of output lines produced

dddd is the total number of diagnostics issued

CHV2 ppppaaa FATAL I-O ERROR FILE=ffffff CODE=cxxx

where pppp is one of the following phases:

INIT SCAN SYN1 SYN2 SORT LIST TERM

aaa is the number of the source program being converted

ffffff is one of the following files:

WORK1 WORK2 WORK3 WORK4 PRNTR PARAMS SRCIN SRCOT

further, if fffffff is WORKn, n=1,2,3,4, c is one of the following:

W (Write) R (Read) O (Open) C (Close)

and xxx is a Data Management code in decimal

when fffffff is PRNTR, c is one of the following functions:

W (Write) O (Open) C (Close) S (Space) E (Eject)

and xxx is a Data Management code in decimal

when fffffff is PARAMS, c is function G (Getc)

and xxx is error code '/# ' (Job Control) or '???'

when fffffff is SRCIN, c is one of the following functions:

O (Open) F (Find module) R (Read)

and xxx is a Data Management code in decimal where

002 = not a source module
003 = converter error
004 = I/O error reading module
064 = I/O error reading directory
128 = module not found

when fffffff is SRCOT, c is one of the following functions:

O (Open) A (Find library) W (Write) T (Terminate) (Post)

and for OPEN, xxx is a Data Management code in decimal, and an I/O error code for the remaining functions.

CHV3 pppaaa FATAL ??????? CONVERTER LOGIC ERROR nnn

where pppp and aaa contain the same values as in CHV2

??????? is any self-explanatory converter message

nnn is the number of the converter logic error message.

CHV4 CONVaaa PARAM CARD NUMBER nnn INVALID

where aaa contains the same value as in CHV2

nnn is the number of the card in error (relative to the beginning of the conversion PARAM cards).

CHV5 CONVaaa NO INPUT PROGRAM SPECIFIED

self-explanatory.

CHV6 CONVaaa BYPASSED DUE TO PARAM ERROR

self-explanatory.

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5. Reference Manuals

UP-3059
SPERRY UNIVAC
Operating System/3 (OS/3)
Extended COBOL
Supplementary Reference

UP-3613
Operating System/3 (OS/3)
1974 American National
Standard COBOL
Programmer Reference

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USER COMMENT SHEET

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conversion technical bulletin

Basic Systems

BULLETIN # 21

NOVEMBER, 1982

COBTRN303 OS/3 COBOL TRANSLATOR BUG USING COPY OPTION

A bug currently exists in release 4.1 of COBTRN303 while processing COPY modules with the REPLACING statement. COBTRN303 does not support REPLACING with respect to conversion, however, REPLACING allows syntax which causes the conversion step to come to a premature end. The Job Log will contain the message:

CNV3 FATAL CONVERTER LOGIC ERROR W22P (SYS12-*nnn*)

This occurs when processing COPY modules located in the DATA DIVISION that contain a REPLACING clause and a VALUE clause followed by a COBOL word, pseudo-text, or identifier rather than an alphanumeric literal, numeric literal, or a figurative constant.

A work-around is to temporarily change the object of the VALUE clause in the COPY modules to a literal or a figurative constant prior to the conversion step(s).

This bug will be fixed in release 4.2 due 4th quarter FY'83.

COMPANY CONFIDENTIAL "C"

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