PRODUCT SPECIFICATION

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
A	1/25/79	*[signature]*	**Original Issue -- Mark VIII.0 Release.**
B	9/11/79	*[signature]*	Changes for MARK 9.0 Release

Replaced SPO with ODT throughout.

1-1	Added COMPARE to "S/C is initiated" paragraph.
1-2	Added COMPARE STATEMENT syntax.
	Updated AND COMPARE paragraph.
1-3	Added COMPARE SPECIFICATION section.
1-4	Added fifth paragraph ("Note that. . . .").
1-5	Added VOLUME SPECIFICATION section.
1-6	Updated ATTRIBUTE LIST section.
1-7	Updated "files may be listed" paragraph.
2-1	Updated "library maintenance" paragraph.
	Added "messages can be directed" sentence.
2-2	Added NOT COPIED - IN DIRECTORY BUT NOT ON TAPE and NOT COPIED - FILE LOCKED.
2-3	Added SYSTEM/COPY paragraph and messages.
3-1 } 3-3 }	Reworte SYNTAX AND SEMANTICS ERROR MESSAGES section.
4-1 } 4-2 }	Added ⟨name⟩ and ⟨unit⟩ to all error messages.
8-1	Deleted ERRORFILE.
	Added DIRCOPY.
10-1	Updated "S/C is executed" paragraph.

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
C	7/17/80	*[signature]*	Changes for MARK 10.0 Release

Major revision--Rewritten to conform to CSG Work Flow Language
(Revision B).

TABLE OF CONTENTS

SYSTEM/COPY

SYSTEM/COPY is a library maintenance program that copies and compares disk and tape files. It produces corporate standard (COPY) library tapes which are not compatible with LOAD.DUMP tapes.

SYSTEM/COPY is initiated by the MCP commands COPY, COMPARE, ADD, and DIR.

COPY STATEMENT
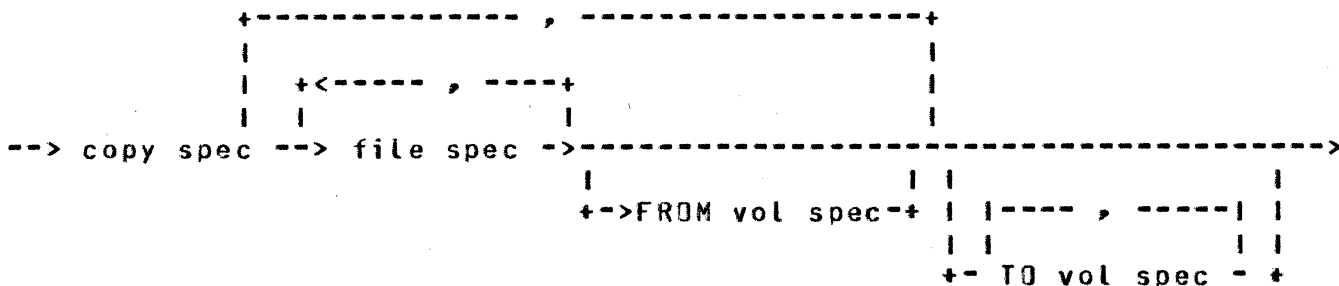
```
        +-------------- , ------------------+
        |                                   |
        |   +<----- , ----+                 |
        |   |             |                 |
--> copy spec --> file spec ->--------------------------------------------------->
                            |                      | |                            |
                            +->FROM vol spec-+ | |---- , -----| |
                                             | | |              | |
                                             +- TO vol spec - +
```

COPY Statement Diagram

COPY SPECIFICATION

```
-----> COPY ------------------------------------------------------->
   I              I          I                                   I
   +--> ADD -->+             +--> & --- SET - <option list> -+
                             I        I
                             +- AND -+
```
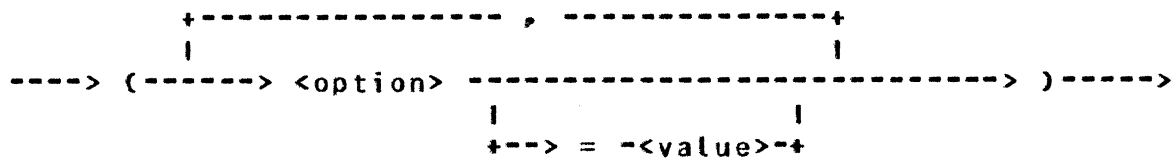
COPY Specification Diagram

The user may specify either COPY or ADD. COPY directs the
program to copy all of the files specified in the copy statement.
In the case of disk copies where a file by the same name already
exists,   the old file will be removed and the new file will be
entered in the disk directory. ADD is allowed only for disk
output files; files cannot be added to an existing library tape.
When ADD is specified, each file will be copied only if a file
with that name is not already on disk.

The copies are done in the same order as they are specified in
the COPY command, except that all copies from tape are done in
the order that the files appear on the tape.

OPTION LIST

```
        +---------------- , --------------+
        |                                 |
----> (------> <option> ----------------------------------> )----->
                         |                    |
                         +--> = -<value>-+
```

Option List Diagram

The option list is used to set run-time options. All options are
off by default, unless they are explicitly set through the option
list.   The   name   of   a boolean option may be used alone,   as a
shorthand way of saying <option> = TRUE.

```
        OPTION                  VALUE
        ------                  -----

        SUMMARY                 boolean
        COMPARE                 boolean
        MANDATORY               boolean
        DATE                    date range
```

SUMMARY

The SUMMARY option will produce a listing of the copy message,
and the results of the program.

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COMPARE

If COMPARE is specified, each file will be compared immediately
after it is copied. Tape files that cross reel boundaries will
not be compared. To compare files without copying them, or to
compare files that cross a reel boundary, the COMPARE statement
must be used by itself - the user should specify COMPARE instead
of COPY AND SET (COMPARE).

If an output tape is created, its directory file will also be
compared immediately after it is created. If the directory
crosses a reel boundary, then it cannot be compared. In that
case, the following message will be displayed.

> DIRECTORY FOR <volume name> (<unit name>) CROSSED
> REEL BOUNDARY AND CANNOT BE COMPARED

If SYSTEM/COPY detects an error when comparing the directory on
an output tape, then the tape will be purged and all copies to
that tape will be ignored. The following message will be
displayed.

> DIRECTORY COMPARISON ERROR ON <volume name> (<unit name>)
> ALL REQUESTS USING <volume name> HAVE BEEN ABORTED

MANDATORY

The MANDATORY option controls the action to be taken when a disk
input file cannot be found. By default, if SYSTEM/COPY
encounters a missing file it will generate an error message and
continue with the next copy request. However, if MANDATORY is
specified, SYSTEM/COPY will require operator intervention to
correct all missing file conditions, except those encountered
after SYSTEM/COPY has started to copy a file. If a file name is
listed which contains an equal sign, SYSTEM/COPY will insist on
there being at least one file matching that name.

The MANDATORY option has no effect on the handling of missing
tape files. Regardless of the setting of this option,
SYSTEM/COPY will always hang waiting for each input tape's
directory file. All files not included in the tape directory
will be reported as not found.

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DATE

If DATE is specified, only files whose update dates fall within
the specified range will be copied or compared.   If a file's
update date is zero (last update occurred prior to the 9.0
release),   then the file's creation date will be used instead of
update date.   SYSTEM/COPY will check each file specified in the
file list, and will ignore all files that do not match the date
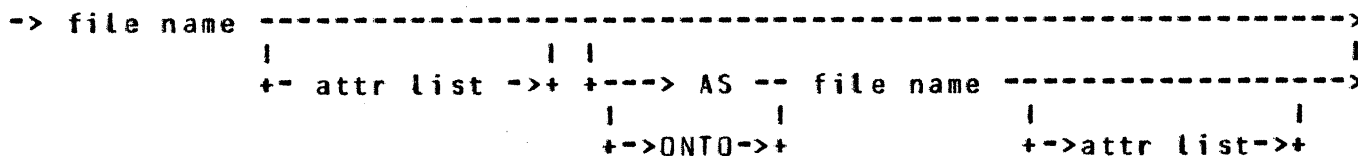selection criteria.   Values for the DATE option are:

<date>   Only files updated on the specified date will
                        be selected.

BEFORE <date>   Only files updated before the specified date
                        will be selected.

AFTER <date>   Only files updated after the specified date will
                        be selected.

<date1> TO <date2>   Files whose update dates fall within the specified
                        range will be selected. The range is inclusive
                        of the starting and stopping dates.
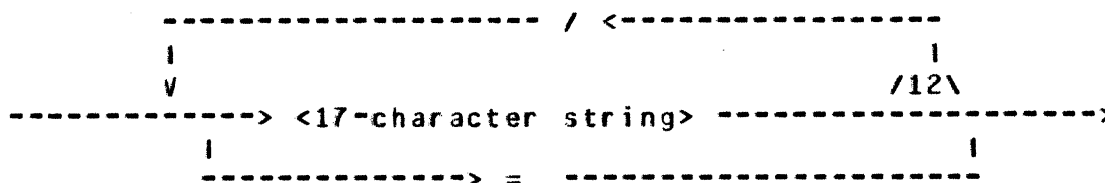
Dates must be of the form MM/DD/YY.

FILE SPECIFICATION

```
-> file name -------------------------------------------------------------->
            |                   | |                                        |
            +- attr list ->+ +---> AS -- file name -------------------->
                           |   |            |                          |
                           +->ONTO->+       +->attr list->+
```

<p align="center">File Specification Diagram</p>

```
        ------------------- / <-----------------
        |                                      |
        V                                    /12\
-------------> <17-character string> -------------------->
        |                                      |
        ---------------> =  -----------------------
```

<p align="center">Tape File Name Diagram</p>

```
        ------------------- / <-----------------
        |                                      |
        V                                    /1\
-------------> <10-character string> -------------------->
        |                                      |
        ---------------> =  -----------------------
```
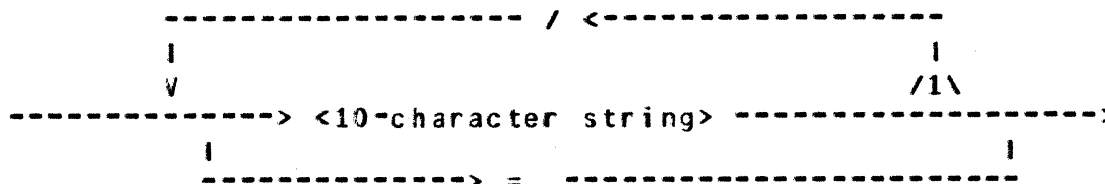
<p align="center">Disk File Name Diagram</p>

Each file specification phrase contains an input file name and an optional output file name. If an output file name is not specified, the input file name is used for both input and output.

Disk file names consist of a 10-character multifile-id and a 10-character file-id. Tape file names consist of 13 17-character ids. An equal sign used as the last id means any character string can be used in that position. File names with more than two ids of 10 characters each are not allowed as disk names and so in copying these files to disk, the AS phrase is needed. For example, to copy the file A/B/C/D from tape to disk, you would have to specify COPY A/B/C/D AS A/B FROM TAPE1(KIND=TAPE).

When ONTO is used, as in COPY <file1> ONTO <file2>, the first file is copied on top of the second file. The second file must be an installation allocated disk (IAD) file. The two files must have the same number of areas, blocks per area, records per block, and record size. After the copy is executed, the second file's file type, creation date, and EOF pointer correspond to that of the first file.

Also in the file specification, an attribute list may further define either of the file names, and is described later in this document.

Note that if SYSTEM/COPY is executed with a usercode, =/= is taken to mean (<usercode>)/=, and *=/= is not allowed.

FROM SPECIFICATION

The FROM phrase is used to tell the program which volume to use for input. It applies to all file specifications preceding it. For example, COPY A,B,C FROM TAPE1, D FROM TAPE2, tells SYSTEM/COPY that files A, B, and C are on TAPE1 and file D is on TAPE2.

One FROM phrase is allowed per file list. You cannot use the statement COPY A FROM TAPE1 FROM TAPE2, but rather COPY A FROM TAPE1, A FROM TAPE2.

If the FROM phrase is missing, the program assumes the file is on system disk. However, you cannot use COPY A, B FROM TAPE1 to indicate that file A is on the system disk. Instead you must specify COPY A FROM DISK, B FROM TAPE1. Both DISK and " " can be used to specify the system pack.

A maximum of 32 FROM phrases are allowed per copy statement.

TO SPECIFICATION

The TO phrase is used to tell the program which volumes to use
for output.   It follows the last FROM specification, if there is
one, and applies to all the file specifications.   For example,
COPY A FROM TAPE1 B, C, D TO TAPE3, TO TAPE4, tells the program
to copy file A from TAPE1 to TAPE3 and TAPE4 and copy files B, C,
and D from the system disk (if the FROM phrase is missing, the
system disk is assumed) to TAPE3, and TAPE4.   A maximum of eight
TO phrases are allowed per copy statement.

VOLUME SPECIFICATION

```
  ------> family name ----------------------------------->
     I                        I I                      I
     I                        I I-> attribute list --->+
     I                        I
     I                        I
     +---- DISK ------+
```

                    Volume Specification Diagram

The volume specification can be either DISK, or a volume name.
DISK indicates the system disk. A volume name may be followed by
an attribute list which is further described later in this
document.

ATTRIBUTE LIST

```
          +<--------------- , ----------------+
          I                                   I
  ----> ( ---> attribute --- = -------> value ------> ) ---->
```

                      Attribute List Diagram

Each file and volume name within the copy statement may be
optionally followed by a list of attributes enclosed in
parentheses.   Only those attributes marked with an asterisk (*)
have been implemented in the B1000 version of SYSTEM/COPY.   The
unmarked attributes have not been implemented, and a warning
message will be generated if they are used.

FILE ATTRIBUTES

ATTRIBUTE	VALUE	USE	DEVICE
*FAMILYINDEX	integer (0-15)	Output	Disk only
CYCLE	integer	Input/Output	
VERSION	integer	Input/Output	
*SAVEFACTOR	integer	Output	Disk only
SINGLEUNIT	boolean	Output	

FAMILYINDEX

The FAMILYINDEX attribute specifies which electronic unit of a disk family is to be used for an output file.

SAVEFACTOR

The SAVEFACTOR attribute specifies the value of the savefactor field in the output file's disk file header.

VOLUME ATTRIBUTES

ATTRIBUTE	VALUE	USE	DEVICE
*KIND	literal	Input/Output	
*HOSTNAME	17 character string	Input/Output	Disk only
*VOLUMEINDEX	integer(1-9999)	Input	Tape only
*DENSITY	literal	Input/Output	Tape only
SERIALNO	character string	Input/Output	
*SAVEFACTOR	integer	Output	Tape only

KIND

The KIND attribute specifies the hardware device to be used.

Values are:

DISK	any disk
TAPE	any magnetic tape
TAPE7	any 7-track magnetic tape
TAPE9	any 9-track NRZ magnetic tape
TAPEPE	any 9-track phase-encoded magnetic tape
TAPEGCR	any group-coded-recognition magnetic tape

DENSITY

If a volume has KIND=TAPE, then the DENSITY attribute can be used
to specify the recording density.

Values are:

    BPI800
    BPI1600
    BPI6250

VOLUMEINDEX

The VOLUMEINDEX attribute specifies which reel of an input tape
should be used for the copy. Searching will begin on that reel's
directory. Previous reels will be ignored.

SAVEFACTOR

The SAVEFACTOR attribute is used to calculate the expiration date
for an output tape volume. All files on the volume will have the
same expiration date.

HOSTNAME

The HOSTNAME attribute specifies the system on which a volume is
to be found.   If HOSTNAME is specified, then the copy is done
using the BNA logical I/O mechanism and certain restrictions are
enforced:

1)   "COMPARE", "ADD", and "COPY ONTO" are not valid;
2)   Tape files, whether input or output, are not valid; and
3)   An "=" in a file name may be specified only for source files
      which reside on the local host.

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COMPARE STATEMENT

```
          +<-------------------------------+
          I                                I
COMPARE-- file name ------------------------------------------------------->
                    I                    I I                I I            I
                    +- AS file name -> FROM vol spec -> TO vol spec ->
```

COMPARE Statement Diagram

With the COMPARE statement the user may compare files without
having them copied.   The syntax for the COMPARE statement is
similar to the COPY statement, except there can be only one input
unit and one output unit.   A listing is produced of the files
that were compared, and any files that are in error are flagged.

Examples:

  COMPARE = FROM MYTAPE (KIND=TAPE) TO MYDISK (KIND=DISK)

  COMPARE FILE1 AS FILE2, XYZ/= FROM TAPE1(KIND=TAPE) TO TAPE2(KIND=TAPE)

The compare listing contains the names of both the source (FROM)
and copy (TO) volumes, their reel number (if applicable), serial
number (if applicable), and hardware kind.   The name of each
source file will be listed along with the name of the associated
copy file, if different from the source file name.

The files will be compared pair by pair.   First the headers of
the two files will be compared.   If certain size related fields
in the header match, then the data portions of the files will be
compared.   If the files are the same, then the file type, record
size, records per block, end-of-file pointer and creation date
will be printed.   Otherwise, an explanation of the comparison
error will be printed.

The following comparison errors are possible, <which> is either SOURCE FILE or COPY FILE.

HEADER COMPARISON ERROR
DATA COMPARISON NOT DONE

HEADER COMPARISON ERROR IGNORED
[DATA SUCCESSFULLY COMPARED]

<which> NOT FOUND

<which> IN USE

<which> INVALID HEADER

<which> INVALID DIRECTORY ENTRY

DATA COMPARISON ERROR

<which> IO ERROR

<which> UNRELIABLE TAPE DATA

<which> REQUIRES TAPE REWIND

COMPARISON TERMINATED BY "QUIT"

<which> UNEXPECTED END-OF-FILE

CANNOT COMPARE {MULTI-PACK} FILES
                {VARIABLE }
                {RELATIVE }

<which> IN DIRECTORY BUT NOT ON TAPE

DIR STATEMENT


```
-----> DIR TAPE  "<tape name>" ---------->
```

The DIR command is used to list the contents of a library tape.
An example of the use of the syntax is DIR TAPE "MYTAPE".   Only
one tape may be specified per DIR request and that tape name must
be enclosed in quotes.

On occasion, files may be listed in the directory that do not
actually reside on tape.   This situation usually occurs when the
program creating the tape is abnormally terminated.   It may also
occur when a file is removed before the original copy is
complete.   There is no way to detect deficient files by looking
at the DIR listing.

The DIR listing contains the tape volume name, reel number (if
not reel 1), hardware kind, and serial number.   For each file on
the tape, the following information is printed:

        ordinal number (position of the file on the tape)
        name
        type
        record size (in characters)
        records per block
        end-of-file pointer
        creation date

LIBRARY MAINTENANCE MESSAGES

SYSTEM/COPY generates a library maintenance message for each file
it attempts to copy.   If the MCP COPY option is set, all these
messages appear on the operator display terminal (ODT).   If the
COPY option is reset, only the error messages are displayed on
the ODT.

Each message takes the form:

    <name1> <action> FROM <volume> [TO <volume>] [AS   <name2>]
                                                  [ONTO   ]
                    [-<explanation>]

In some error messages the TO phrase is omitted which means that
all copies to that unit were aborted because of the explanation
given with the message.

The following list enumerates possible combinations of actions
and explanations you might receive.   These messages can be
directed to the printer by using Program Switch 0, or the
SUMMMARY option.

COPIED
The file was successfully copied.

COPIED AND COMPARED
The file was successfully copied and compared.

COPIED BUT NOT COMPARED
The file was successfully copied but could not be compared.

NOT COPIED - NOT FOUND
The file could not be found.

NOT COPIED - SECURITY VIOLATION OR FILE REMOVED
The file was found, but could not be opened, either because
of a security violation, or because the file was removed by
another user.

NOT COPIED - ONTO FILE NOT FOUND
The output file used for an ONTO specification could not be
found.

NOT COPIED - INCOMPATIBLE ONTO FILE
The input and output files used in the ONTO specification
were not compatible.

NOT COPIED - MULTI-PACK FILE
Multipack files cannot be copied.

NOT COPIED - COPY OVER SELF NOT ALLOWED
The copy was not done, because it would have destroyed the
input file.

NOT COPIED - REQUIRES INPUT TAPE REWIND
An input tape can be read only once and if a copy requires a
tape to be rewound, the copy cannot be completed.

NOT COPIED - BAD FILE HEADER
The input file had a bad header and could not be copied.

NOT COPIED - FILE IN USE
The file was in use by another program and could not be
opened read-only by SYSTEM/COPY.

COPIED - COMPARISON ERROR
The file was copied but the comparison failed.

COPIED - IO ERRORS
The file was copied but IO errors occurred during the copy
which the user chose to ignore.

NOT COPIED - IO ERRORS
The copy was aborted because of IO errors (either the errors
were fatal or the user chose to abandon the copy).

NOT COPIED - UNRELIABLE INPUT
The user chose to terminate the copy because the input file
contained unreliable data.

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The following errors can only occur when a HOSTNAME is specified in the copy request.

NOT COPIED - NO USERCODE FILE IN NAME TABLE

NOT COPIED - INVALID USERCODE/PASSWORD PAIR

NOT COPIED - MISSING HOST - <host name>

NOT COPIED - USERCODE NAMING CONVENTION VIOLATED

NOT COPIED - REQUESTED FILE IS AN EXECUTE-ONLY CODE FILE

NOT COPIED - OUTPUT PACK NOT PRESENT

NOT COPIED - ERROR IN GET/CHANGE ATTRIBUTE REQUEST
The copy was aborted because a get or change attribute request failed.

When SYSTEM/COPY has completed all the copies requested, it displays the following messages.

<n> FILES COPIED [AND COMPARED]

<n> FILES COPIED BUT NOT COMPARED

<n> FILES COPIED BUT HAD ERRORS

<n> FILES NOT COPIED

Each message is displayed only if <n> is not zero.

SYNTAX AND SEMANTICS ERROR MESSAGES

The entire copy statement is parsed before the actual copy is
done. If any errors are discovered during parsing, the program
terminates with syntax errors and the copies are not done.
Warnings are nonfatal and allow the copy to be continued.
Program Switch 0 and the summary option can be used to direct
these messages to either the ODT or the printer.

The following error messages are results of errors that are
always fatal, and cause the program to terminate with syntax
errors. No copies will be done.

"COMPARE" OR "SET" EXPECTED FOLLOWING "&" OR "AND"

"TAPE" EXPECTED FOLLOWING "DIR"

MISSING KEYWORD - TRY "COPY", "COMPARE", "ADD", OR "DIR"

NUMERIC VALUE CONTAINS NON-NUMERIC CHARACTER - <value>

VOLUME NAME HAS MORE THAN 10 CHARS - <volume name>

VOLUME NAME CONTAINS SPECIAL CHARS - <volume name>

TAPE VOLUME NAME CANNOT BE BLANK

QUOTED STRING INCOMPLETE

TOKEN TOO LONG - <token>

MISSING FILE NAME

TOO MANY SLASHES IN NAME - <file name>

UNMATCHED EQUALS - <file name1> AND <file name2>
When COPY <file name1> AS <file name2> is specified, the two
names must have a compatible number of equals. COPY A/= AS
B/C/= can be used but COPY A/= AS B/C cannot be used.

UNKNOWN ATTRIBUTE - <attribute>

NAME HAS TRAILING SLASH - <file name>

VOLUME NAME EXPECTED FOLLOWING "TO" OR "FROM"

MISSING FINAL PARENTHESES

MISSING VALUE FOR <attribute or option>

UNEXPECTED TEXT FOLLOWING LIST - <text>

BLANK OR NULL ID IN NAME - <file name>

BAD VALUE FOR <attribute> - <value>

UNEXPECTED DELIMITER - <delimiter>

INVALID USE OF ASTERISK - <file name>

"ADD" AND "ONTO" BOTH SPECIFIED FOR <file name>

"COMPARE" AND "ONTO" BOTH SPECIFIED FOR <file name>

OUTPUT TAPE <volume name> NOT ALLOWED WITH "ADD"

"DIR TAPE" MUST BE FOLLOWED BY QUOTED TAPE NAME
DIR command was incorrectly entered.

UNEXPECTED TEXT FOLLOWING DIR REQUEST

"DIR" ONLY ALLOWED FOR TAPE

DENSITY AND KIND DO NOT MATCH FOR VOLUME <volume name>

"=" ONLY ALLOWED AS LAST ID OF NAME - <file name>

OPTION LIST EXPECTED FOLLOWING "AND SET"

STARTING DATE GREATER THAN STOPPING DATE

DATE EXPECTED

INVALID DATE - <date> - MM/DD/YY EXPECTED

NONEXISTENT DATE - <date>

"TO" EXPECTED IN DATE RANGE SPECIFICATION

UNKNOWN OPTION - <option>

INVALID USE OF PAREN IN FILE NAME - <file name>

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COMMA REQUIRED BETWEEN <what>
Commas are required between OPTIONS, ATTRIBUTES, FILE LISTS
and TO PHRASES.

EQUAL REQUIRED AFTER - <attribute or option>

TOO MANY "FROM"S - <volume name> IGNORED

TOO MANY "TO"S - <volume name> IGNORED

COPY STATEMENT MUST TERMINATE AFTER FIRST LIST OF "TO"S

ONLY ONE "FROM" AND ONE "TO" ALLOWED WITH "COMPARE"

TOO MANY VOLUMES FOR ONE STATEMENT - <volume name> IGNORED

<type> ATTRIBUTE <attribute> USED OUT OF CONTEXT
The attribute was used incorrectly. <type> may be FILE,
INPUT FILE, OUTPUT FILE, VOLUME, INPUT VOLUME, OUTPUT
VOLUME, OUTPUT, TAPE VOLUME, or DISK FILE.

"COMPARE" NOT ALLOWED WITH "HOSTNAME"

"ADD" NOT ALLOWED WITH "HOSTNAME"

"COPY ONTO" NOT ALLOWED WITH "HOSTNAME"

TAPE VOLUMES NOT ALLOWED WITH "HOSTNAME"

"=" NOT ALLOWED FOR SOURCE FILES NOT ON LOCAL HOST

The following error messages are a result of errors that are
fatal if they are discovered during parsing. If they are
discovered after the input text is parsed [for example, while
expanding names with equals (=)], they cause only the file in
error to be ignored, and the remaining files are copied.

ACTIVE SYSTEM FILE CANNOT BE COPIED - <file name>
The active system files SYSTEM/LOG, SYSTEM/ELOG,
SYSTEM/ODTLOG, and SYSTEM/ODT.QUEUE, cannot be copied.

DISK FILE NAME HAS MORE THAN 2 IDS - <file name>

DISK FILE NAME HAS MORE THAN 10 CHARS IN ID - <file name>

NON-STANDARD NAME FOR TAPE FILE - <file name>
Tape file names can have a maximum of 13 different
identifiers of up to 17 characters (alphanumeric characters
only) each.

CANNOT EXPAND <file name1> FROM <file name2> TO <file name3>

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The following error messages are a result of errors that indicate
a problem with a tape unit.   All copies using that unit are
ignored.

     <volume name> NOT A TAPE

     <volume name> NOT A LIBRARY TAPE

     <volume name> NOT CREATED BY B1000 COPY

     <volume name> INCORRECT TAPE LEVEL

The following warnings are intended for user information only.
They are nonfatal and allow the copy to be continued.

     EMPTY ATTRIBUTE LIST IGNORED

     <attribute> ATTRIBUTE NOT IMPLEMENTED
     The program recognized the attribute, but it is not yet
     implemented.

     "ONTO" COPY OF <file name> TO <volume name> CHANGED TO "AS"
     Onto copies are not allowed with output tapes.

     DUPLICATE COPY OF <file name> NOT DONE

     OUTPUT BUFFERING CHANGED TO 1 SINCE COMPARE NOT SPECIFIED

     FAMILYINDEX IGNORED WITH HOSTNAME

The following warning and error messages are intended to ease the
transition from the 9.0 to the 10.0 syntax.

     DEFAULT "TO DISK" NO LONGER ASSUMED FOLLOWING "FROM"

     "KIND" MUST BE SPECIFIED FOR <volume name>
     Unless Switch 9 is set to 1, no default kind is assumed.

DUPLICATION CHECKING

The 10.0 and later versions of SYSTEM/COPY do not do as much
checking for duplicate copies as older versions. The only
default checking provided is to prevent copying a file over
itself.

The user may not wish duplicate files on a tape. Setting program
Switch 3=1 will guarantee that each output tape contains files
with unique names.

If duplicate disk copies are requested each copy will remove the
files copied before it. If this is not desired, ADD may be
specified. In that case, only the first copy request for each
file will be done.

MISSING FILES

DISK INPUT

When SYSTEM/COPY discovers that an input disk is off-line, it
will display the following mesage:

          PACK <volume name> IS NOT ON-LINE
          PLEASE MOUNT THE PACK AND AX "READY"
          OR AX "SKIP" TO SKIP ALL REQUESTS USING THIS PACK

If the operator resonds with READY, then SYSTEM/COPY will verify
that the disk is on-line, and continue the copy. If the operator
responds with SKIP, then SYSTEM/COPY will abort all copies using
the missing disk, and display the following message:

          ALL REQUESTS USING <volume name> HAVE BEEN ABORTED

If the disk is on-line and the file cannot be found, then the
setting of the MANDATORY option determines the program's actions.
If MANDATORY is TRUE, then SYSTEM/COPY will display the following
message.

          FILE <file name> IS NOT PRESENT
          AX "OK" WHEN THE FILE IS AVAILABLE
          OR AX "OF" TO IGNORE THE FILE

The operator may respond with OK, indicating that the file is now
available, or OF, indicating that the file should be ignored.

TAPE INPUT

If a tape unit is off-line, the program will hang waiting for the
file <tape name>/TAPDIR1977.   In this case the   operator   should
either ready the tape or IL the file to another tape.

A missing file condition may also occur after the program has
begun copying from the tape.   This   situation   occurs   when   the
program   that   created   the   tape is DS-ed after the directory is
built and before all the files are copied.   SYSTEM/COPY   will
display   the   following message,   and all subsequent copies using
that tape will be aborted.

            LIBRARY TAPE <volume name> IS INCOMPLETE
            ALL REQUESTS USING <volume name> HAVE BEEN ABORTED

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ERROR RECOVERY

SYSTEM/COPY attempts to recover from errors on library files whenever possible. Three types of errors are possible: I/O errors, comparison errors, and unreliable input errors.

When an I/O error is detected, the program will display the following message.

```
EXCEPTION ON <volume name> (<unit name>)

WHILE { READING }   { DIRECTORY BANNER RECORD      }
      { WRITING }   { DIRECTORY FORMATTING RECORD  }
                    { DIRECTORY HEADERS            }
                    { DIRECTORY                    }
                    { HEADERS FOR <file name>      }
                    { <file name>                  }
```

When a comparison error is detected, the program will display the following message.

```
COMPARISON ERROR ON <volume name> (<unit name>)

FOR FILE <file name>
```

When an unreliable input record is detected, the program will display the following message.

```
[ BLOCK NUMBER <integer> ON ] TAPE <volume name> (<unit name>)
CONTAINS UNRELIABLE DATA FOR SEGMENTS <integer> - <integer>
OF FILE <file name>
```

Depending on the nature of the error, the user will be asked to choose from several courses of action:

```
AX "CONTINUE" TO IGNORE THE ERROR
AX "QUIT" TO ABANDON ONLY THIS FILE
AX "ABORT" TO ABORT ALL REQUESTS USING THIS UNIT
```

If the error is critical, such as one during the writing of a
tape's header records, the program does not offer CONTINUE as a
choice. If the error occurs on an output tape directory, the
tape will be purged and no copies using that tape will be done.

If you tell the program to continue, it attempts to gloss over
the error and continue the copy or compare. If you elect to tell
the program to quit, it gives up on the file in error. If the
file in error is an input file, all the output files are
abandoned. If the file in error is an output file, only the file
in error is abandoned. If you choose to tell the program to
abort, all copies using the bad unit are abandoned.

COPY library tapes mark each record as reliable or unreliable.
If you choose to continue after an input I/O error, the
corresponding output tape record is marked as unreliable. If you
elect to quit the copy, the final tape record is marked as
unreliable. All unreliable input records encountered during a
copy are reported to the user.

STATUS QUERIES

Unsolicited ODT input is allowed any time SYSTEM/COPY is copying
or comparing a file. Commands are entered using the MCP accept
message:

                    <job number> AX <command>

Valid commands are TEACH, HELP, STATUS and QUIT.

TEACH and HELP

The TEACH and HELP commands cause SYSTEM/COPY to display a list
of valid ODT commands:

          SYSTEM/COPY ACCEPTS THE FOLLOWING COMMANDS
          TEACH/HELP - DISPLAY THESE INSTRUCTIONS
          STATUS - DISPLAY CURRENT PROGRAM STATUS
          QUIT - DISCONTINUE PROCESSING THE CURRENT FILE

STATUS

If STATUS is requested, then SYSTEM/COPY will display a message
describing the status of the file currently being processed.

          {COPYING   }   <file name> FROM <volume name>
          {COMPARING   }
          {TRANSFERRING}

          (<# complete> / <total #> {RECORDS })
                                     {SEGMENTS}

QUIT

If QUIT is entered on the ODT, then SYSTEM/COPY will discontinue
processing the current file, and will go on to the next file
awaiting processing.

PROGRAM SWITCHES

SWITCH 0

Directs messages to the ODT or printer.

    0=0:   Messages go to the ODT

    0=1:   Messages go to the printer.

    0=2:   Messages go to both the ODT and the printer.

SWITCH 2

Controls which names are allowed for tape files.

    2=0:   Special characters allowed.

    2=1:   Only alphanumeric characters allowed as per corporate standard.

SWITCH 3

    3=0:   No checking for duplicate copies will be done.

    3=1:   No duplicate files will be copied to the output tapes.

SWITCH 9 (Temporary)

    9=0:   No KIND default.

    9=1:   DISK is the default value for KIND. Will suppress warning messages for discrepancies between the old (9.1 and earlier) and new (10.0 and later) syntax.

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INTERNAL FILES

SOURCE   Contains the actual copy request. This file is
built by the MCP, and is removed by SYSTEM/COPY
after the copy request is parsed. This file is called
COPY/<unique number> or (<usercode>)/<unique number>.

LINE   Printer file

CLAUSEFILE
NAMEFILE
HDRFILE   Work files
NAMEQUEUE
DIRCOPY
DUPFILE
SORTFILE

INFILE
OUTFILE1   Files used for actual copying.
OUTFILE2
     •
     •
     •
OUTFILE8

COPY LIBRARY TAPES

SYSTEM/COPY produces corporate standard libary tapes which are intended to be compatible with other Burroughs systems. Currently, SYSTEM/COPY only handles tapes created by B1000 systems.

The first file on each reel (or the second file if the first file is a continuation of a previous reel), is a directory of all files on that reel and all subsequent reels. Only the directory on the first reel is comprehensive; all other directories are subsets of the first directory. Each directory file is labelled "TAPDIR1977" and contains a list of the files on the tape and their file headers.

Each data file on the tape is labelled "F<8-digit number>" starting with "F00000001" for the first data file on the first reel. Each data file contains a file identifier record, followed by a symbolic file header, an object file header, and finally the data areas.

OPERATING SUGGESTIONS

SYSTEM/COPY usually runs with a dynamic memory size of 5000 bits,
which is sufficient for handling up to 16 volumes.   If more than
16 volumes are specified, then the user may need to increase the
dynamic memory size.

The input file INFILE uses two buffers,   while all the output
files use only one buffer each.   Performance may be improved by
increasing the number of buffers.   However, if the output files
use more than one buffer,   then the COMPARE option must be
specified.   This is because if more than one buffer is specified
for an output file, it is possible that an I/O error at the end
of the file might not be detected.   Specifying COMPARE ensures
that such an error will be reported.   If memory is limited, the
files may be modified to request only one buffer each.

All work files are declared with 25 areas and 100 blocks per
area.   This allows approximately 15000 files to be copied with a
single copy request.   If more files are to be copied, then the
work files should be modified to have larger areas.

If SYSTEM/COPY is executed from the ODT or a card reader without
a usercode, it is a privileged program, allowing it to copy all
public and private files.   If SYSTEM/COPY is fired up from
anywhere other than the ODT or card reader (e.g., through a ZIP
command),   it is considered nonprivileged and is only able to
access public files.   If SYSTEM/COPY is executed with a usercode,
it has the same privileges as the usercode with which it is run.
If the usercode is privileged, SYSTEM/COPY is able to access all
public and private files. If the usercode is nonprivileged, only
public files or files with the same usercode can be accessed by
SYSTEM/COPY,   and all the output files must have the usercode as
the multifile-id.

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