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B1800/B1700 TAPE/ARCHIVE

PRODUCT SPECIFICATION

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INTRODUCTION

GENERAL DESCRIPTION

TAPE/ARCHIVE is a utility program designed to aid in the process of archiving disk pack files on magnetic tape. The program is written for users with active datacomm operations who wish to make selective or cumulative backup tapes of files created during a given period of time. It operates on a number of levels: a simple dump of files created on that and the previous day, a merge dump of the day's (or a number of days') files, or a dump (optional) and a remove of files that are older than what the user wants to maintain on disk. Creation date, filename and filetype are all variables that can be used in selecting files to be dumped. Users may exercise optional control over some or all of these variables in any single execution of the program.

RELATED DOCUMENTATION

<u>NAME</u> ----	<u>NUMBER</u> -----
B1800/B1700 Software Operational Guide	1068731
B1800/B1700 MCP Utilities	P.S. 2212 5579

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OPERATING INSTRUCTIONS

When TAPE/ARCHIVE is executed from the console keyboard with a standard B1800/B1700 execute statement (EX TAPE/ARCHIVE), it creates an archive tape according to the default conditions listed below. By default, the following conditions are true:

- The system disk pack will be archived.
- An input tape is expected. In all cases, regardless of other options, if an input tape is present, its contents will be archived to the output tape. If a filename is present both on the input tape and on disk, the file on disk is considered to be the most recent and will be dumped to the output tape.

The NOINPUT option overrides this default condition.

- Any date greater than (i.e., later) or equal to yesterday's date is used as criterion for selecting files to be archived.

The SPAN option overrides this default.

- Only files whose types are 8 or greater (octal) will be archived. This avoids archiving printer backup and dump files which usually would not be pertinent.

The TYPE option overrides this default.

- A CHECK/LOAD.DUMP is performed with the output tape (labeled <pack-id>/<today's-date>ARCH) and disk. Note also that a CHECK/LOAD.DUMP will always be done with any remove output tape (caused by the REMOVE option and labeled <pack-id>/<today's-date>REM), regardless of the NOCHECK option.

The NOCHECK option overrides this default.

Non-default executions of the program, involving program switches one, two and five, are discussed later in this section and in the next, under their appropriate headings.

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OPERATOR INTERVENTION

Since TAPE/ARCHIVE calls SYSTEM/LOAD.DUMP and CHECK/LOAD.DUMP, features peculiar to them are also propagated in this program and are described here.

SYSTEM/LOAD.DUMP locks the device after creating a library tape. Since in most cases a CHECK/LOAD.DUMP is to be performed, the device must be readied by the program's operator for processing to continue.

In the two possible instances in which a device must be readied, (1. after creating the regular archive output tape, and 2. after creating the special remove output tape) a display statement will be sent to notify the operator. They are:

```
% TAPE/ARCHIVE = <job-number> PLEASE READY THE OUTPUT TAPE DEVICE  
% TAPE/ARCHIVE = <job-number> PLEASE READY THE REMOVE TAPE DEVICE
```

Operator response in both cases should be:

```
RYMT<unit-id>
```

where <unit-id> is the mnemonic of the tape drive on which the output tape resides.

TAPES REQUIRED

The program requires from one to three tapes (and drives), depending on the activity requested. A simple dump of the day's files requires one tape. A merge and dump requires two, and a merge, dump and remove requires three, assuming the user requests all of these activities to be done in one execution of the program.

The program can also be used to remove files without dumping them to tape (see Section entitled REMOVING OLD FILES WITHOUT BACKUP.)

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INPUT FROM CONSOLE KEYBOARD

If program switch one is set to a non-zero value (e.g., SW1=1), TAPE/ARCHIVE expects optional input parameters from the console keyboard (SPO) or from a remote terminal. A full discussion of these processes is contained in the next section, PROGRAM OPTIONS.

INPUT FROM OPTIONS FILE

If program switch two is set to a non-zero value (e.g., SW2=1) at execution, the program expects input from a data file on the system disk named ARCHIVE/OPTIONS. The internal file name of this file is OPTIONS and file-equates can be made to this name and device or the program can be Iled, depending on the particular situation.

The data file should be formatted to contain the same options that would have been entered through the accept process (see the next section, PROGRAM OPTIONS) minus the <job#>AX. The program simply reads one record at a time to process the options and continues to do so until EOF.

Errors encountered in this file are irrecoverable and the job will have to be discontinued after the error message is displayed.

The disk-resident options file is useful if non-default conditions are desired on a regular basis. Furthermore, possible input errors that can occur in the accept process are avoided.

Note: Setting program switch two (SW2) presumes that program switch one (SW1) is not set, since the conditions are mutually exclusive: i.e., options cannot be entered from both a datafile and a remote terminal or SPO.

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REMOVING OLD FILES WITHOUT BACKUP

Removal of disk files that have not been dumped during the current execution of the program is possible if the following conditions, controlled by program switch five, are met:

- a. Program switch five is set to one (SW5=1), not merely to a non-zero value.
- b. The REMOVE option is specified.
- c. The proper response is made to the display statement.

The display statement for the REMOVE option allows two options: YES or NO. YES verifies the fact that the files will not be dumped to tape. NO is allowed in the event the user has decided not to remove the files at that point. The display is:

XTAPE/ARCHIVE = <job-number> VERIFY THAT NO BACKUP TAPE IS
TO BE MADE OF REMOVED FILES. ENTER YES OR NO.

YES and NO in the accept statement are the only legitimate responses to this display. Any other input to the program at this point will prompt an error message that will ask for a valid response.

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PROGRAM OPTIONS

When TAPE/ARCHIVE is executed with program switch one set to a non-zero value (e.g., SW1=1), it asks for operator-supplied input that is sent to the program through the normal accept-message communication supported by the operating system. The options, described in this section, can be entered in any number of accept statements and in any order. The program will continue to ask for options until it processes a null (blank) accept statement.

After execution, the program displays:

```
% TAPE/ARCHIVE = <job-number>ENTER SPECS: SPAN INCL SELECT
  REMOVE NOINPUT NOCHECK TYPE
```

```
% TAPE/ARCHIVE = <job-number>ACCEPT
```

FORMAT

Railroad Syntax

Valid instructions for the TAPE/ARCHIVE program are presented in railroad-syntax diagrams, a method which allows visual representation of syntactic units. A TAPE/ARCHIVE instruction is constructed by following the main line of development from its beginning (>) to its point of termination (#). Where optional entries are concerned, the direction of flow proceeds down on the left-hand line and up on the right. Unless otherwise noted, optional entries are expected by the program in the order (top to bottom) in which they are presented.

Required entries occur on the main line of development; optional ones below the line. Required keywords appear in upper-case letters; variables in lower-case letters. Underlined portions of required keywords are acceptable abbreviations for the keywords.

Railroad syntax is further described in Appendix A.

The syntax of the accept message to TAPE/ARCHIVE is defined as:

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```
>--- <job-number> -- AX -- <option-list> ----->#
```

where <job-number> is defined as TAPE/ARCHIVE's current job-number and <option-list> is one or more of the following program options, entered in any order. Options may also be specified in an input file (see INPUT FROM OPTIONS FILE) or certain options can come from cards (see INCLUDE and SELECT).

```
>----->#
|<----->|
| |
| |--- INCL ----- CARDS ----->| |
| |           |<-----> , -----|
| |           |--- <filename> ----->|
| |
| |--- NOCHECK ----->|
| |
| |--- NOINPUT ----->|
| |
| |--- REMOVE -- <number> ----->|
| |
| |--- SELECT ----- CARDS ----->|
| |
| |--- SELECT ----- CARDS ----->| |
| |           |<-----> , -----|
| |           |--- <filename> ----->|
| |
| |--- SPAN -- <date>-<date> ----->|
| |
| |--- TYPE --- <integer> ----->|
| |
| |
| |           |<-----> , -----|
| |           |--- <integer> --->|
```

Figure 2.1 Program Options

The variables used in the previous syntax diagram and in the discussion that follows are defined as:

<date> Expected as mm/dd/yy date with no spaces between the month, day, and year. The month, day, and year are separated by a slash (/). A span of dates must be separated by a hyphen (-) only.

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<number> Positive integer up to 999.

<filename> Allowable B1800/B1700 filename which, for this program, is composed of a <multifile-id>/<file-id> or a <file-id>. Normally, <pack-id> would have to be supplied since disk files are being located. However, the name of the disk pack to be archived has been supplied at execution time (discussed below in SAMPLE EXECUTIONS), so the user need only specify the filename of the files to be located. Multiple <filenames> must be separated by commas only.

<integer> Positive decimal integer from 0 to 15, inclusive.

Parameter A variable supplied by the user which completes the syntax of an option chosen by name.

Option A function of TAPE/ARCHIVE specified by a unique name. These names are shown by capital letters and must be input as shown.

Multiple options entered in one accept message or file record must be separated by at least one blank character. Note that multiple parameters must be separated by commas only. If parameters of the options SELECT or INCL are entered through a card reader (in the CARDS file), they must be entered one per card.

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OPTION LIST

INCL

Syntax:

```
INCL ----- CARDS ----->#
      |                                     |
      |<----- , ----->|
      |                                     |
      |----- <filename> ----->|
```

Example:

```
INCL CARDS or INCL <filename1>,<filename2>,<filename3>
```

The parameters of the INCL option specify files that are to be dumped to the output tape regardless of other criteria. These files will be archived in addition to files meeting the date and type requirements. It differs from SELECT, for example, which specifies that only certain files should be dumped. INCLUDE is used for files the user wants backed up, regardless of date or type.

Example:

```
INCL FILE/=,PROG/1,PROG/2
```

archives all files with a multifile-id of FILE plus the two files named: PROG/1 and PROG/2.

If the list of names to be included is entered via a terminal or SPO accept statement, the files must be separated by commas.

If card input is used, a data deck is then expected with one filename per card.

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NOCHECK

Syntax:

NOCHECK ----->#

This causes the program to avoid calling CHECK/LOAD.DUMP after the output tape has been made. This option has no effect on the special output tape created as a result of the REMOVE option.

NOINPUT

Syntax:

NOINPUT ----->#

If no input tape is to be incrementally archived (merged with that day's dump), this option should be specified.

REMOVE

Syntax:

REMOVE ----- <number> ----->#

This option directs the program to dump, check, and then remove files from disk that have not been accessed for a period of time greater than the specified <number> of days. In a monthly clean-up of a disk pack (REMOVE 30), for example, files that have not been accessed for more than 30 days, with the restrictions noted below, are dumped to tape, checked and then removed from disk.

Note however that REMOVE is subject to two restrictions: the influence of the SELECT command and the restriction of the <save-factor>. If the SELECT option has been specified, only those files which first meet the SELECT requirements are candidates for the REMOVE process.

After verifying that a file's last access was more than <number> of days ago, and before a file is dumped and removed, TAPE/ARCHIVE checks the value of the <save factor> found in the disk file header and adds this value to the file's creation date.

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Only if the resultant sum is less than yesterday's date will the file be dumped, checked and removed. The save-factor, then, can exclude "permanent" files, selected by the user, from being removed.

A save factor guarantees that a file will not be removed from disk by TAPE/ARCHIVE for at least save-factor number of days. For example, a file that has a save factor of 365 (days) cannot be removed until the 366th day, even if it is not accessed at any point during the year. A low save factor, e.g., zero, means that the removal of a file is determined solely by the date of the last access.

Save factors are set by users via file statements or file equations. Default factors are determined by the various language compilers. For example, disk files generated by SDL programs have a default save factor of 30 while SDL object code files have a save factor of zero. Users should consult the language manuals of the various languages for information on default save-factors. The maximum REMOVE parameter that TAPE/ARCHIVE permits is 999 while the maximum possible save factor value is 4,096. Consequently, files with save-factors of greater than 999 are never candidates for removal via the REMOVE option of TAPE/ARCHIVE.

Criteria for removal are as follows:

- a. The file was last accessed more than the specified number of days ago.
- b. The file was created more than creation-date plus <save-factor> days ago.

When a file meets both standards (a and b), it is dumped to a separate output tape, checked with CHECK/LOAD.DUMP, and then removed from the disk. The tape created is named <pack-id>/<today's-date>REM. This special output tape is created after a normal output archive run that produces the dump of the daily files and requires that the operator mount and ready an additional scratch tape.

It is possible, though not recommended, to have the program remove files without first dumping them to a magnetic tape. The method, discussed previously in REMOVING OLD FILES WITHOUT BACKUP purposely requires redundant specification (verification) to reduce the possibility of inadvertant irrecoverable mistakes.

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SELECT

Syntax:

```
SELECT ----- CARDS ----->#
      |                               |
      |<----- , ----->|
      |----- <filename> ----->|
```

Example:

```
SELECT CARDS or SELECT <filename1>,<filename2>,<filename3>
```

SELECT causes all files included in its parameter list which meet the given standards to be archived. No other disk-resident files will be queried. In the example below, SELECT is combined with SPAN to archive only those files with a multifile-id of FILE, PROG/1 and PROG/2 which have creation dates between and including April 2-15, 1977. No other files will be dumped directly from disk. If an input tape is present, all of its files will be archived. The list of names to be selected is handled identically to those of INCL.

Example:

```
SPAN 4/2/77-4/15/77 SELECT FILE/=,PROG1/,PROG2/
```

SPAN

Syntax:

```
SPAN ----- <date>-<date> ----->#
```

Example:

```
SPAN M1/D1/Y1-M2/D2/Y2
```

The SPAN option overrides the default of archiving any file with creation dates greater than or equal to yesterday's date. When SPAN is invoked, all files with creation dates between and including the two dates specified are eligible to be dumped.

Note: No embedded blanks are allowed in the date parameters.

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TYPE

Syntax:

```
TYPE ----- <integer> ----->#
      |                               |
      |<----- , -----|
      |                               |
      |-- <integer> ->|
```

The TYPE option allows users to override the types of disk files that TAPE/ARCHIVE normally dumps. The <integer> range for TYPE is zero to 15, which corresponds to the MCP designation for disk files (0-F) and which can be obtained from a KA of the disk directory. By default, TAPE/ARCHIVE dumps types 8 or greater including code and data files and inhibits a dump of types 7 or less, including printer backup and dumpfiles, which the user normally would not want to have backed up. This means that code (type 8) and data files (type 9), for example, that meet the other criteria specified by the user (date, name, etc.) are dumped to the archive tape.

The TYPE designation has no effect on files contained on the input tape, if it is present. All files on the input tape are archived.

Each <integer> must be a number between, and including, 0 and 15; and the integers must be separated by commas only (blanks not allowed as separators).

If this option is used, the user must then specify each type of file to be dumped.

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SAMPLE EXECUIONS

This section provides examples of the various file equations and switch settings required by the program in order to properly specify the disk pack which is to be backed up, the name of the input file (if other than default), the name of an options file (if other than default), etc.

Each example is linked to an internal file type. Users should also note the switch settings displayed in the examples.

Internal File Name = Disk Pack

The internal file name for the disk pack to be archived is "D". If not file equated to another name in the execution statement, the system pack is archived.

Example:

```
EX TAPE/ARCHIVE;FILE D PID USER;SW1=1;
```

The disk pack archived is USER and setting switch one to one allows optional input from the console keyboard.

Internal File Name = Input Tape

The internal file name for the input tape is "INPUT.TAPE". Unless the NOINPUT option is specified, TAPE/ARCHIVE expects an input tape with an external label of "ILMTX" to be present. The internal file name "INPUT.TAPE" can be file equated at execution time or IL'ed when the name is requested.

If options are desired, either program switch one or two must be set to a non-zero value in the execution statement. Otherwise, default options are assigned.

Example:

```
?EX TAPE/ARCHIVE;FILE D PID USER;FILE INPUT.TAPE NAME  

  U.PACK/070177ARCH; SW1=1
```

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archives the pack labeled USER, expects an input tape labeled U.PACK/070177ARCH, and asks for operator-supplied options.

Internal File Name = Output Tape

The internal file name for the output tape is "OUTPUT.TAPE". If no file equation is done, it will be labeled <pack-id>/<today's-date>ARCH. This default name may be overridden by specifying any other name in a file equation at execution time.

Example:

```
EX TAPE/ARCHIVE; FI D PID USER.D; FI OUTPUT.TAPE NAM
MONTHLY/DUMPTAPE; SW1=1;
```

The execution allows an optional name to be specified for an output tape and to specify, for example, a SPAN 1/1/77-1/30/77 from the console keyboard.

Internal File Name = Options File

If program switch two is set to a non-zero value at execution time, an options file on the system pack will be expected with the name "ARCHIVE/OPTIONS". The internal file name "OPTIONS" may be file equated at execution time or IL'ed when the name is requested.

Example:

```
EX TAPE/ARCHIVE; SW2=1; FI OPTIONS NAM USER/DUMP/INSTR;
FI OUTPUT.TAPE NAM SPECIAL/BACKUP
```

The execute statement tells TAPE/ARCHIVE to read the disk file DUMP/INSTR on the USER pack in order to determine what options to use for making the archive tape which will be labelled SPECIAL/BACKUP.

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ERROR CORRECTION AND RECOVERY

Two types of errors, fatal and non-fatal, are flagged. Both display appropriate error messages.

A fatal error (such as a non-library input tape) forces the program to terminate while, for non-fatal errors, it attempts to continue processing.

For example, an invalid option will be flagged and a message to that effect displayed. The program ignores the invalid option, a non-fatal error, and displays the accept message again.

Some problems, particularly during the actual read of the disk, cannot be rectified by the program. Warning messages are displayed and processing continues under the assumption that the problem encountered will have no effect on the archive process.

TAPE/ARCHIVE is designed to accept and process options indefinitely. The last occurrence of any option will take precedence. For example, if both SPAN 1/5/60-1/10/60 and SPAN 1/5/61-1/15/61 were accepted in that order, the second occurrence would become the criterion for selecting files to be archived. This becomes useful if parameters are mistyped. DSing and restarting are unnecessary as long as the program is still asking for options.

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APPENDIX A

RAILROAD SYNTAX

In the example of railroad syntax given in figure A-1, the following conditions are implied:

- * The main line of development is from left to right, down on the left vertical line and up on the right. A loop or series of choices is shown by a return line with an arrow showing a flow to the left (<-----).
- * An arrow shows the direction of progress from the point of origination (>---) to termination (#). A statement is not complete until it reaches a terminator (#). Where the syntax continues on another line, a double arrow (>>) is used, both to break the first line and to continue the second. The continuation point is indented.
- * Required syntax is presented on the main line of development; optional on a secondary line. Required keywords are presented in capital letters; variables in lower case. Underlined portions of keywords are their allowable abbreviations.
- * The bridge /n\ shows the maximum number of times the line may be crossed. The bridge /n*\ shows that the line must be crossed at least once. Since required syntax is usually shown on the main line of development, the /n*\ option, presumably, will not need to be used often.
- * Abbreviations may be used for variables. A list of standard abbreviations may be presented in the introduction of the document or the list may immediately precede the figure. In either case, the abbreviation(s) should be as obvious as possible.

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- * Angle brackets (<>) and a space occur around variables; a space precedes and follows a required word.
- * The pound sign (#) denotes a termination point for the syntax of the item being described.
- * Continuation of a primary or secondary line of development can also be shown by a continuous line that returns (<-----) and then flows forward (----->) to a vertical line. The return line may contain an entry. This format is helpful when an optional parameter contains several elements itself.
- * A horizontal line between entries must be represented by at least a dash (--) in order to clearly distinguish the line from a hyphenated word.

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```

>-- PERFORM ----- <input-file-id> -->>
>-- PFM ----->| | |
>-- COPY ---->| |-- <routine-type> -->|

>>----->#
|<----->|
|-/1\-- <input-rec-lgth> ----->|
|          |-- <blocking-factor> -->|
|-----|
|-/1\-- TAG: <tag-file-id> ----->|
|-----|
|-/1\-- <input-file-access-mode> ----->|
|-----|
|-/1\-- <output-file-id> ----->|
|-----|
|-/1\----- <output-rec-lgth> ----->>
|-----|
| >>----->|
|   |----- <blocking-factor> ----->|
|   |-----|
|   |<----- <blocks-per-area> -----|
|   |-----|
|   |----->|
|   |   |-- <number-of-areas> ----->|
|-----|
|-/1\-- <output-file-access-mode> ----->|
|-----|
|-/1\-- VARIABLE ----->|
|   |-- VARY ---->|
|-----|
|-/1\-- SKIP <integer> ----->|
|-----|
|-/1\-- SEARCH -- <start-posn> ---- <search-arg> ----->|
|   |-----| | |
|   |-- SELECT ---- <start-posn> -- <search-arg> ----->|
|   |-----|
|   |   |-----|
|   |   |-----|
|   |-- EXCLUDE -->|   |-- <num-to-return> ---->|
|   |-----|
|   |-- KEY -- <start-posn> ----->|
|   |   |-----|
|   |   |----- <key-lgth> ---->|
|   |-----|
|   |<----- <search-op>----->|
|   |-----|
|   |<----- <search-arg> ----->|
|   |   |----->|
|   |   |-- <num-to-return> ---->|

```

Figure A-1: Sample of Railroad Syntax

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1800/B1700 TAPE/ARCHIVE
I.P.S. 2219 0508 REV A

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