

Burroughs Corporation



COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

2222 2681

B1800/B1700 SYSTEM/BACKUP

PRODUCT SPECIFICATION

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
B	7/21/78	<i>J. Hale</i>	<p>Changes for MARK VIII.0 Release B</p> <ul style="list-style-type: none"> 1-1 Updated the SYSTEM/BACKUP paragraph. 2-1 Updated File parameter Block sentence. Added "user-named backup" to program switch sentence. 2-3 Updated Format 2 syntax and explanation. 2-4 Updated KEY option paragraph. 2-5 Updated AUTO BACKUP section. 2-6 Added AX COMMANDS section. 2-7 Added SWITCH SETTINGS section. 3-1 Updated NUMBERS FILE paragraph. Added 0 "0" to Bit 0-1. Deleted "- Whether or not the NUMBERS file is used" and "- Whether or not AUTO BACKUP is set" from BACKFILE FILE variables. 3-3 Updated AUTOPRINT FILE paragraph. 3-4 Updated FPB.RECORDSIZE command. Deleted FPB.UNIT.NAME command. Added FPB.AUTOPRINT, FPB.UNIT.NAME, FPB.USER.BACKUP.NAME and FPB.TRANSLATE commands. 4-1 Added "or missing file condition" to any invalid AB syntax sentence.
C	5/15/79	<i>J. Hale</i>	<p>Changes for MARK 9.0 Release</p> <ul style="list-style-type: none"> 2-7 Added SW7=15 and SW8=1-15 to SWITCH SETTINGS. 3-2 Added "4 Bits format" to CONTROL INFO. 3-3 Rewrote CARRIAGE CONTROL section.
D	6/02/80	<i>J. Hale</i>	<p>Changes for MARK 10.0 Release</p> <ul style="list-style-type: none"> 2-3 Added "UPPER" to Format 2. 2-5 Added "UPPER" option. 2-6 Added "UPPER" command. Added "LOWER" command. 3-1 Changed "OPTION RECORD, Bit 7."
E	12/09/80	<i>J. Hale</i>	<p>Changes for MARK 10.0 Release</p> <ul style="list-style-type: none"> 2-1 Added "COPIES, HOSTNAME, UPPER" to the options possible. 2-2 Combined "Format 1" and "Format 2" to create the new "Format". Updated explanation paragraphs of the "Format". 2-3 Added "HOSTNAME" operation.

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PRODUCT SPECIFICATION

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
E	12/09/80		Changes for MARK 10.0 Release continued 2-4 Added "This option is not valid" paragraph. 2-5 Updated "RECORD" operation. 3-1 Updated "NUMBERS FILE" explanation. 4-1 Added "NUMBER 8" Error Message.

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GENERAL DESCRIPTION

SYSTEM/BACKUP is an MCP utility which enables the user to print or punch backup files. Implementation of the backup file mechanism in the operating system is not discussed here. Printer and punch files may be directed to backup tape or disk for later processing.

SYSTEM/BACKUP runs on B1700 and B1800 systems under control of the MCP II. The program may be executed via the PB control string or automatically, using the Auto Backup (AB) capability available with MCP II 6.1 or later. SYSTEM/BACKUP will vie for system resources as any other normal state program except in Auto Backup mode when SYSTEM/BACKUP has special privileges in obtaining output devices. The program runs at default priority 4 with a working set of approximately 4.5KB.

RELATED DOCUMENTATION

Name -----	Number -----
B1800/B1700 MCP II	P.S. 2212 5462
B1800/B1700 Software Operational Guide	1068731

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INITIATION AND OPERATION

PB (Print/Punch Backup)

The PB message is entered on the console, from cards, or through a ZIP command. The MCP rejects any invalid syntax and displays appropriate error messages. The MCP generates the necessary execute control string and SYSTEM/BACKUP is executed.

If PB=/= was specified, two copies of SYSTEM/BACKUP are executed providing both punch and printer files exist. With a multiple file specification (=/=, PRT/=, PCH/=), a file (NUMBERS) is passed to SYSTEM/BACKUP containing the names of the backup files. In the case of a single file specification (PB' 123 SAVE), the NUMBERS file contains option information. The options possible are SAVE, SINGLE, DOUBLE, COPIES, HOSTNAME, UPPER, RECORD, KEY, RANGE, EQUAL and output hardware. In the single file specification, the backup file name is file equated in the execute statement.

In operation, the input backup file, BACKFILE, is opened. The File Parameter Block (FPB) of the original print file is contained in the initial portion of the backup file. This FPB is read and written to the FPB of SYSTEM/BACKUP's output file, OUTFILE. The output file is then opened and the backup file printed/punched according to the PB specifications. This process loops (multiple file specification, COPIES, or FPB.REPETITIONS NEQ 0) until the files are exhausted or the specification satisfied.

If specified, the unit-mnemonic must be a tape (MT) or disk (DC, DK, or DP) device, and must indicate to the MCP the location of the requested backup file or files. If the unit-mnemonic is omitted, the default backup designation (BD) disk will be assumed.

Ordinarily, backup files are removed after they are printed or punched. Where user-named backup files (U.N NAM <name>) are concerned, however, a special condition exists: they are not removed after they are printed or punched out unless the default condition is overridden. The default (no removal) can be changed by setting program switch two (SW2) to a non-zero value. When program switch two is set to a non-zero value (SW2=1), user-named backup files are removed after printing/punching. These conditions also apply when AUTOBACKUP is set.

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Format:

```

----- PB ----- <file-specifier> ----->
      |
      |
      |
--- <us/pw> -->|

>>-----#
| |<----->| | |
| |-- SAVE ----->| |
| |-- COPIES ----- <integer> ----->| |
| |      |-- = -->| |
| |      | |
| |-- UPPER ----->| |
| |
| |-- HOSTNAME -----<hostname>----->| | | | | | |
| |      | |      | |      | |
| |      |- = >| |      | |<---- , ----| |
| |      | |      | |      | |
| |      |-(--- SAVE ----)->| |
| |      | |      | |
| |      |- NOLIST ->| |
| |
| |----- SINGLE ----->| |
| | |- DOUBLE -->| |
| |
| |-- RECORD --- <integer-1> ----->| | | |
| |      | |      | |
| |      |-- <integer-2> ->| |
| |
| |-- <output unit-mnemonic> ----->| |
| |
| |-- KEY --- <compiler-name>----->>| | | |
| |      | |      | |
| |      |- <column> <length> ---->| |
| |
| |>>--- RANGE <string-1> <string-2> ----->| | | |
| |      | |      | |
| |      |-- EQUAL <string-3> ----->| |
| |
| |----- LABEL ----->| | |
| |      | |
| |      |- LABELS -->| |

```

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<file-specifier>

```
----- /= -----#
| | |--- PRT/= ----->|
|-- <unit-mnemonic> ->| |--- PRN/= ----->|
|-- <unit-name>/ ---->| |--- PCH/= ----->|
| |----- <number> ---->|
| |-- # ->| |
| |-- Z ->| |
| | |
| |-- <name> ----->|
| |--- /= ----->|
| |--- /<name> ->|
```

The PB input message causes the printing and/or punching of existing backup files. When the /= option is used, all backup files existing on the designated disk or tape at the time the message is entered are printed or punched. If both printer and punch backup files exist on the disk, two copies of SYSTEM/BACKUP are executed: one copy handles printer files, and the second copy handles punch files. The PRT/= and PCH/= options cause the printing or punching of all printer and punch files, respectively, that exist on the designated unit. PRN/= is an acceptable equivalent of the PRT/= option.

Options may also be used to control the output and action taken by SYSTEM/BACKUP. No options may be used when the /= option is specified. If options are needed for both printer and punch files, then the use of PRT/= and PCH/= with options will be accepted. The options, in alphabetical order, are defined as:

COPIES

Causes SYSTEM/BACKUP to produce <integer> copies of the specified backup file. One copy is the default if this option is not specified.

DOUBLE

Causes SYSTEM/BACKUP to double-space the entire printer listing, overriding any carriage control specified in the backup file.

HOSTNAME

Causes SYSTEM/BACKUP to transfer the backup file to the specified <hostname>. If SAVE is specified with this option, the file will be saved on the receiving host after the transfer. If NOLIST is specified, the backup file will not be printed or punched on the receiving host. The receiving host always has final say as to the disposition of the file it receives.

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KEY

Use of the KEY option allows specification of a range of records to be printed or punched according to information within the records themselves (e.g., a sequence number). All records in the file will be printed or punched if this option is omitted. The portion of each record to be compared may be specified, as well as the information that will start and stop the output.

The <compiler-name> option causes automatic generation of the proper column number and length pair that corresponds to the sequence number field of the output listing produced by the specified compiler. The permissible compiler-names that can be used are: BASIC, COBOL, DASDL, FORTRAN, MIL, NDL, RPG, SDL and UPL.

The <column> specifies the beginning column number of the subfield to be used for the compare argument, and <length> specifies a length which must be greater than 0 and less than 10.

The RANGE and EQUAL parameters specify the argument to which the subfield in each record is to be compared, and the action to be taken when a "true" comparison is detected. The strings can consist of either integer(s) or alphanumeric literal(s) enclosed within quote marks. When the comparison arguments are of different lengths, an integer string is either left-truncated or left zero-filled to the same length as the subfield; an alphanumeric literal is either right truncated or right space-filled to the same length as the subfield.

If RANGE is specified, printing or punching begins when an exact comparison is made between the subfield and <string-1>. The printing and punching continues until an exact comparison is made between the subfield and <string-2>, or until the end-of-file is reached, whichever occurs first.

If EQUAL is specified, printing or punching begins when an exact comparison is made between the subfield and <string-3>, and will continue until end-of-file is reached.

If <string-1> is equal to <string-2>, the entire backup file will be searched. Every record in which the designated subfield matches <string-1> is printed or punched.

Since the specified comparisons require an exact match between the string and the subfield, no sequential ordering of the backup file is assumed.

This option is not valid when any of the "=" options are specified.

Note: If both the RECORD option and the KEY option are speci-

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fied in the same statement, the comparisons specified by the KEY option will be made only within the range of records specified by the RECORD options. This defines the intersection of the two specifications.

RECORD

Allows specification of a range of records to be printed or punched. Output will begin with the physical record specified by <integer-1> (the first record in the backup file is record number 1) and continue until the physical record specified by <integer-2>. If <integer-2> is omitted, end-of-file is assumed as the terminator. All records in the file are printed or punched if this option is omitted. This option is not valid when any of the "=" options are specified.

SAVE

Causes SYSTEM/BACKUP to leave the backup file on disk when the file is closed. The file will be removed from disk if this option is omitted. Tape backup files are always closed with release, so specification of SAVE is unnecessary.

SINGLE

Causes SYSTEM/BACKUP to single-space the entire printer listing, overriding any carriage control specified in the backup file.

UPPER

Causes SYSTEM/BACKUP to translate all lower case characters to upper case before printing.

<unit=~~non~~emonic>

If this option is included, it must specify a printer (LP) or card punch (CD or CP), and must be the first option specified following the backup file name or number. It will cause SYSTEM/BACKUP to direct its output to the designated unit, if that unit is available.

AUTO BACKUP

When Auto Backup is active, a copy of SYSTEM/BACKUP for each designated printer is executed. The names of the existing backup files are entered in a community queue file, AUTOPRINT. The names are read and written to OUTFILE's FPB. The individual file processing is the same as with a simple PB (PB 123). The backup files are removed after printing. Backup files that request special forms will not be printed by auto backup. They must be printed with a PB statement.

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The Auto Backup mechanism may be overridden for a particular backup file during execution or compilation by specifying NO AUTOPRINT or NO ATP. NO ATP sets a bit in the FPB called FPB.AUTOPRINT which prevents the file from being printed by Auto Backup. In order to get the file printed, you must PB it yourself. When the file is PBed, SYSTEM/BACKUP resets FPB.AUTOPRINT so that a NO ATP file that is PBed and then Oued to disk can be picked up by Auto Backup.

File equating is the means by which FPB.AUTOPRINT is set or reset. The syntax for file equating the AUTOPRINT field is:

```
>-- FILE -- <filename> ----- AUTOPRINT ----->#
--                               |-- NO -->|      |--- ATP ----->|
```

AX COMMANDS

AX commands affect only the file being printed at the time the AX command is entered.

TEACH or HELP	Displays explanation of AX commands and switch settings.
WHERE	Displays number of records written and EOF count for the file.
COPIES	Displays number of copies yet to be printed.
SINGLE	Single spacing overrides any carriage control.
DOUBLE	Double spacing overrides any carriage control.
+ or - <integer>	Spaces forward (+) or backward (-) <integer> records in the file. A warning is printed in the listing.
SAVE	File is saved after printing.
RE or REMOVE	File is purged after printing.
QT or QUIT	Terminates printing of current file. Remaining files will be printed.
QT END or QUIT END	Terminates program after current file is printed.
UPPER	Translates all lower case characters to upper case before printing.
LOWER	Resets UPPER to allow printing of lower case characters.

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SWITCH SETTINGS

Switch settings apply to all the files printed during a particular execution of SYSTEM/BACKUP.

- SW1=1 Single spacing overrides carriage control.
- SW2=0 All user.backup.name files are saved.
- SW3=0 All files are removed.
- SW6=0 FPB.EOP is set to 0 to override each file's original end-of-page action. When SW6=1, FPB.EOP remains unchanged. If FPB.EOP=0 and there is a channel 12 punch on the printer's carriage control tape, the printer file will automatically eject at the end of each page to avoid printing over the perforations between pages.
- SW7=1-14 When AUTOBACKUP is set, SYSTEM/BACKUP does not go to EOJ as soon as all files are printed. Instead, it waits up to 5 minutes for a new backup file to be released before it goes to EOJ.
- SW7=15 When AUTOBACKUP is set, SYSTEM/BACKUP does not go to EOJ as soon as all the files are printed. Instead, it waits for a new backup file to be released.
- SW8=1-15 Causes banner to be printed; banner is omitted if file is unlabeled or if "FORM" is set.

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FILES AND INTERNAL STRUCTURES

NUMBERS FILE

This is an "internal" disk file known only to SYSTEM/BACKUP and the MCP. It has a 10-byte recordsize and is blocked 18 records per block. The first record contains two (2) numbers—bits 8-31 and bits 32-55. The first number indicates how many option records follow, and the second number specifies in which option record the <hostname> begins. Each following record contains either a 10 character FILE.ID or 80 bits of encoded option specifications. If HOSTNAME is specified, then the given <hostname> spans two (2) option records, with the options SAVE and NOLIST specified as the last 2 bits of the second record. The format of the 80-bit option records is as follows:

OPTION RECORD

Bit 0 - 1	=	00
Bit 2	=	SAVE specified
Bit 3	=	DOUBLE specified
Bit 4	=	output hardware specified
Bit 5	=	COPIES specified
Bit 6	=	SINGLE specified
Bit 7	=	upper case only
Bit 8 - 31	=	UNIT.NAME of output hardware specified
Bit 32 - 55	=	number of COPIES
Bit 56 - 79	=	unused

KEY RECORD

Bit 0 - 1	=	01
Bit 2 - 4	=	000
		Bit 8 - 15 starting KEY column
		Bit 16 - 23 KEY length
Bit 2 - 4	=	010
		Bit 8 - 79 RANGE start
Bit 2 - 4	=	011
		Bit 8 - 79 RANGE stop
Bit 2 - 4	=	100
		Bit 8 - 79 EQUAL record

RECORD RECORD

Bit 0 - 1	=	10
Bit 8 - 31	=	RECORD start
Bit 32 - 55	=	RECORD stop

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BACKFILE FILE

BACKFILE contains control information on the backup disk or tape file to be processed plus the actual file itself. File equation is included in the MCP-generated execute statement to identify the following variables:

- The name(s) of the backup file(s) to be processed
- Whether the input is from tape or disk

Backup files contain header records and the program-generated backup file. Header records contain control information for SYSTEM/BACKUP, the original FPB, and the output label for the file. Non-header records are prefixed with eight bits of carriage control information.

Header records are described as follows:

CONTROL INFO

24 Bits	recordsize
6 Bits	increment, filler to align recordsize for PE and 7TK tape restrictions, subtracted from recordsize to get actual user data
18 Bits	control info length
24 Bits	FPB length
24 Bits	label length
4 Bits	label type
4 Bits	format

FPB

Beginning on a record boundary, the original printer/punch file's FPB is stored.

LABEL

Following the FPB is the original file's output label, also beginning on a record boundary.

FORMULA

The number of records described as a "few" above, and necessary to contain the header records is dependent on the original printer/punch file's recordsize. With the normal printer, 132 byte recordsize, 4 records are required to contain the control information, FPB and label.

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$$\begin{aligned} \text{Total header records} &= (\text{control info size} + \text{recordsize} - 1) \\ &\quad / \text{recordsize} \text{ (round up)} \\ &+ (\text{FPB length} + \text{recordsize} - 1) \\ &\quad / \text{recordsize} \\ &+ (\text{label length} + \text{recordsize} - 1) \\ &\quad / \text{recordsize} \end{aligned}$$

CARRIAGE CONTROL

Following the header records are the actual user records, each prefixed with an 16-bit carriage control specification. The user's original WRITE or POSITION communicates are encoded in these 16 bits. Four cases of the two communicates are handled; WRITE, WRITE WITH STACKER SELECT (punch file), SPACE N, and SKIP.TO.CHANNEL. The 16 bits are numbered 0 through 15, left to right.

Bits 0-2 Reserved

Bit 3
 0 Means write before spacing
 1 Means write after spacing

Bits 4-11 Contains spacing, channel or stacker information depending on the value of Bits 12-15

Bits 12-15 Used to identify one of five cases

Case 0000 - Write with skip to channel
 Bits 4-11 contain channel information

Case 0001 - Write with stacker
 Bits 4-11 contain stacker information

Case 0010 - Space
 Bits 4-11 contain spacing information
 Value 0-255

Case 0011 - Skip to channel
 Bits 4-11 contain channel information

Case 0100 - Write with spacing
 Bits 4-11 contain spacing information
 Value 0-255

AUTOPRINT FILE

The AUTOPRINT file is a queue file with 31-byte records, 2 buffers and 150 maximum messages. AUTOPRINT is used only in Auto Backup mode. Each record contains a 30 character backup file name, (PACK.ID, MULTI.FILE.ID, FILE.ID), and eight bits of control information. This queue file is shared by all SYSTEM/BACKUPS initiated by Auto Backup.

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DUPLICATE FILE

This file is the eventual output printer or punch file whose FPB has been written from the FPB contained in the header records of BACKFILE. Certain FPB fields may be changed when the original is written. They are:

FPB.COBOLE	::=	0 ; Z allow implied open
FPB.LABEL.TYPE	::=	label type in control info
FPB.RECORDSIZE	::=	if punch, then 224 characters; else 132 characters;
FPB.RECORDS.BLOCK	::=	1;
FPB.BUFFERS	::=	2
FPB.HDWR	::=	printer or card reader
FPB.AUTOPRINT	::=	0 ; Z backup print can be picked up by auto-backup
FPB.UNIT.NAME	::=	" " ; Z if unit name was not a printer or punch unit
FPB.USER.BACKUP.NAME	::=	0 ; Z will generate a regular backup name
FPB.TRANSLATE	::=	0 ;

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ERROR MESSAGES

Any invalid AB syntax, PB syntax, or missing file condition is detected by the MCP. Errors handled by SYSTEM/BACKUP are described below.

1. <filename> - EOF REACHED, NO RECORDS PROCESSED

Displayed if the file has zero records or the option specifications can not be satisfied. Example: RECORD 1000 2000 when the file contains only 500 records.

2. <filename> - FILE NOT PRESENT

Displayed if the backup file specified cannot be found, e.g., already removed.

3. <filename> - COLUMN OF ZERO NOT ALLOWED

KEY column is base 1 relative.

4. <filename> - KEY LENGTH OF ZERO NOT ALLOWED

5. <filename> - KEY LENGTH SPECIFIED TOO LARGE

Maximum of 9 characters

6. <filename> - RECORD START OF ZERO NOT ALLOWED

Record count is base 1 relative.

7. EXCEPTION ON READ - <filename>

Report exception until block is exhausted or until a good read. Skips bad blocks and continues processing rather than terminating.

8. MISSING HOST - <hostname>

Reported when attempting to print or punch a backup file on another system which was not available at open time.

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