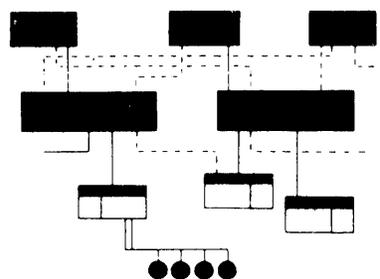


GE-625/635 Bulk Media Conversion



GENERAL  **ELECTRIC**

DOCUMENT REVIEW SHEET

TITLE: GE-626/635 Bulk Media Conversion

CPB #: 1096A

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CHECK ONE:

- Additional information would be helpful on following subjects.
- Errors indicated and pages where errors occur.
- Usefulness of manual could be improved as noted.

Please cut along this line

My comments are: Several ~~adjustments~~ adjustments ARE made ^{about} to the \$LIMITS card and its use in adjusting block sizes. (See page 6 of 20 of ~~the~~ manual). Nowhere is an example given. We have information as to how \$LIMITS is used to adjust block sizes. QUITE FRANKLY, \$LIMITS CANNOT do such things. Many times in this manual we find improper use of terminology. Page 1: SYSTEM/SYST is used when GEN/GENOUT is implied. "Master Memory" and "Slave Memory" is used to imply "Master Mode" or "Slave Mode" in which the PROCESSOR operates. There is no such distinction as to "MODE" in memory. Also the term "Analog media conversion program" when "Media Conversion Modules" of GENES is implied. Page 3: What is "media conversion"? Page 59: Restricting file code parameters are phrased as PAPER TAPE or DRUM card and examples when TU or XT could be used. The fact is that these are examples of ~~the~~ ~~same~~ ~~type~~ ~~of~~ ~~parameters~~. Page 15: The System Loader is NOT GENLOAD - it is GENLOAD. Page 22 (top part) PAPER card is incorrect

GENERAL  ELECTRIC INFORMATION SYSTEMS DIVISION COMPUTER EQUIPMENT DEPARTMENT	GE-600 SERIES TECHNICAL INFORMATION BULLETIN	DATE March 1968
		NO. 600-195
SUBJECT: Additions to Optional System Parameters and Error Recovery.		REF. CPB-1096 C

This TIB includes features implemented in System Development Letter 12.

Please remove the following pages from your GE-625/635 Bulk Media Conversion reference manual and replace them with the attached revised pages.

Remove	Insert
iii-iv	iii-iv
7-Blank	7-7.1
7.1-8	7.2-8
13-14	13-14
15-16	15-16
	16.1
19-20	19-20
21-22	21-22
35-36	35-36
37-Blank	37-Blank

Add Keyword Index pages 1-13 to the back of your book.

It is suggested that you add this page to the front of your manual to show that this TIB has been entered.

GENERAL  ELECTRIC INFORMATION SYSTEMS DIVISION COMPUTER EQUIPMENT DEPARTMENT	GE-600 SERIES TECHNICAL INFORMATION BULLETIN	DATE Aug. 1967
		NO. 600-176
SUBJECT: Corrections to BMC NLABEL and TAKE Option		REF. CPB-1096C

Please replace the following pages and insert this cover sheet in the front of your manual:

5 - 6
13 - 14

The TIB's now applicable to CPB-1096C are:

TIB 600-176

*What about TIB 600-164 on ImcV
type creator?*

GE-625/635
BULK MEDIA CONVERSION

REFERENCE MANUAL

March 1965

Rev. August 1967

GENERAL  **ELECTRIC**

INFORMATION SYSTEMS DIVISION

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There is no module or component in GEOS called SYSOUT. This seems to be a generic term that has developed and which implies the use of the modules SYOT and GOUT to process the system output files.

1. INTRODUCTION

(GEIN/GOUT) or (IMC/OMC) or (SYSIN/SYSOUT)

Two types of media conversion are available to users of GE-625/635 software systems:

1. System Media Conversion (~~GEIN/SYSOUT~~)--which processes many low-volume sets of data with different formats.
2. Bulk Media Conversion (BMC)--which processes large volumes of data in a single format.

System media conversion programs are system programs, executed in master memory, which are used to process low-volume input and output.

Bulk media conversion is performed, as a result of specific program requests, by the BMC program executed in slave memory.

This manual discusses bulk media conversion as implemented for the GE-625/635 System. Included are discussions of the various subprograms which make up the BMC program and detailed examples of programmer use of the different types of media conversion.

Bulk media conversion enables the user to perform ^{bulk} standard peripheral to peripheral ^{system} operations by calling the BMC program through the use of standard control cards. The information contained on these cards is used to set up General File and Record Control (GEFRC) file control blocks and buffer areas. Once the file control blocks and buffer locations are established, the BMC program is initiated and, using GEFRC, processes the data.

In past systems, the large volume media conversion operations have, for the most part, been done by small peripheral computers or other off-line devices. In the GE-625/635 System, large volume media conversion is performed on-line by the BMC program. In general, BMC operations are performed on an interrupt and demand basis concurrent with other work. Bulk media conversion may be executed either as an activity within a job or as a single activity job, depending on the user's needs.

huh?
So is everything; it's the heart of this 600!!

CPB-1096B ?

2. GENERAL USAGE

The BMC program performs media conversion ^{GOUT} for either input or output that exceeds the volume limits set for the GEIN and SYSOUT routines of the GE-625/635 Comprehensive Operating Supervisor (GECOS), because BMC has no volume limitations. Multiple files and multiple report codes may be processed and mixed printer/punch images may be present on the input device.

The BMC program performs media conversion for the following peripherals:

- Card reader
- Magnetic disc or drum (linked files)
- Magnetic tape subsystem
- Printer
- Card punch

Generally, BMC is used when large amounts of data are to be converted from one of the above listed peripheral devices to another. For example, where a data processing job has a large amount of output to be printed, the output could be saved on magnetic tape and a subsequent BMC activity used for printing the data. Memory and peripherals used by the data processing program could be released, and only the memory needed for the BMC program would be retained with a tape unit and one printer.

Another use of BMC could be for creating multiple copies of output files; for example, the multiple printing of compilation listings. During the running of compilation, the P* file (printer listing file) could be placed on a separate tape. This tape could then be printed by BMC as many times as needed.

CONTROL CARDS ASSOCIATED WITH BMC

The BMC program can be executed either as an activity within a job or as the only activity of the job. In either case, the BMC call card and the BMC control cards are the same.

The control cards associated with BMC are:

1	8	16
\$	CONVER	(DUMP Option) BMC call card

DUMP - Give ^{slave} ~~BMC~~ core dump if BMC activity terminates abnormally.

NDUMP - Give only dump of ^{processor} registers if BMC activity terminates abnormally.

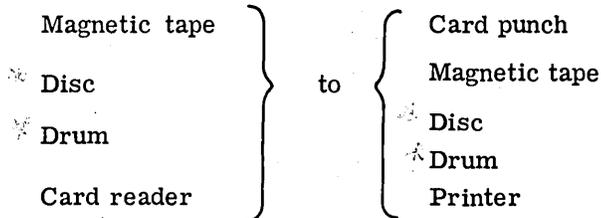
CPB-1096B ?

STANDARD SYSTEM PARAMETERS

If \$ INPUT and \$ OUTPUT cards are not included in the control card deck, BMC assumes standard parameters as a function of the input and output media. The standard system parameters are:

- Block size (device-dependent):
 - Unit record devices (card reader, punch, printer)--27 words
 - All other devices--320 words
- Number of buffers: double buffers
- Record form:
 - Unit record devices--fixed
 - All other devices--variable-length
- Record size: determined on basis of device type
- Labels (magnetic tape only): included without file name
- Block serial numbers: included where applicable
- Density (magnetic tape only): high
- Mode
 - Printer--BCD
 - Others--binary
- Retention period: 0 (magnetic tape only)

The standard system setup is capable of performing bulk media conversion between the following peripherals without need for input or output parameters:



** Card reader only*

OPTIONAL SYSTEM PARAMETERS

The standard file specifications can be altered by use of either \$ INPUT or \$ OUTPUT control cards. These cards can appear in any order following the \$ CONVER card and before the next activity or the \$ ENDJOB card.

	1	8	16
\$	(or)	INPUT	Variable <i>list</i>
\$		OUTPUT	Variable <i>list</i>

Retention Period--Rxxx

xxx=Retention period in days, left-justified. This variable is applicable only to labeled magnetic tape output files.

Fixed Record Length--Fxxx

xxx=Number of words/record, left-justified. In the standard system only the card reader, card punch, and printer use fixed record lengths. *per logical or physical?*

The Fxxx parameter is primarily used when input is from records of fixed form or when output is to be fixed form records with each record being the same length. The use of Fxxx on a \$ INPUT card will cause the input record form to be regarded as fixed and each record to be the length specified by Fxxx regardless of the presence or absence of record size control words in the input file. The use of Fxxx on a \$ OUTPUT card will cause the output record form to be fixed and all output records to be the length specified by Fxxx.

IMCV Tape--IMCV

This parameter is applicable only to output magnetic tape files. It is used when the creation of an IMCV tape from an input job stack (cards) is desired. A READ IN card and a \$ TAPE OT card, and the \$ OUTPUT card containing the IMCV parameter, are the only control cards needed with the \$ CONVERT card for the creation of an IMCV tape. (See GECOS-II SSI, CPB-1128, Section IX for further data on IMCV tapes.) *The TAKE card and CKSUM options are also available for making IMCV tapes. In SDC 12 - punching from non-sta. mixed record-length tapes will be available.*

Mixed Record Length--MIXL

The MIXL parameter is applicable to magnetic tape files only.

1. When MIXL is used on a \$ INPUT card, mixed-length ^(logical) records may be read; however there must be only one logical record per physical record. The primary use of MIXL for input is in the reading of IMCV tapes. Note that the record size control word is not used for mixed-length records; therefore media and report codes are not applicable.

For output to card punch, the recording mode is determined as follows:

- a. If input record size is 14 words, output mode is BCD.
- b. If input record size is 27 words, output mode is binary.
- c. If input record size is neither 14 nor 27 words, the recording mode is not changed from that found in the output file control block.

For output to printer, the print lines are edited and single spaced or spaced according to the SLEWx parameter.

2. When MIXL is used on a \$ OUTPUT card the output record size is made equal to the input record size. MIXL also inhibits the addition of a record size control word to the output record.

Printer Slew--SLEWx

The SLEWx parameter on a \$ OUTPUT card is used to specify the number of lines to slew when printing is done in the edit mode, i.e., input records are fixed length or the NMEDIA parameter is present on a \$ INPUT card. x = 1, 2, or 3, number of lines to slew; if x = other than 1, 2, or 3, a B1 abort will occur. If this parameter is not specified, a slew of 1 line is assumed.

Ignore Media Code--NMEDIA

For output to printer:

In order to print variable length records which have not been edited for printing (no media code 3 and/or no slew codes in the print image), the NMEDIA parameter must be used on a \$ INPUT card. NMEDIA will cause BMC to ignore media codes and to print in the edit mode (see CALL EPRINT in the GE-625/635 File and Record Control manual, CPB-1003) when variable length records are to be printed.*

A one line slew will be executed unless specified otherwise by a SLEWx parameter on a \$ OUTPUT card.

For output to card punch:

For variable length records BMC examines each record for a media code 1 or 2. If a 1 or 2 is found, the output mode is set accordingly (binary for 1, BCD for 2) and the card image is sent to output. In this case the NMEDIA option is not needed, and, if present, will be ignored by BMC.

If the variable length records have not been edited for punching (no media codes 1 or 2), it is necessary to specify NMEDIA on a \$ INPUT control card; otherwise no data is sent to output for punching. The NMEDIA option causes BMC to examine the input record size (bits 0-17 of the input record control word) of non-edited data and set the output mode as follows:

1. For 14 word record size - set output mode BCD.
2. For 27 word record size - set output mode binary.
3. If neither 14 or 27 word record size - leave the output mode unchanged.

*The NMEDIA parameter is not needed if the input records are fixed length or mixed length.

FILE CONTROL CARDS

The bulk media conversion program requires the use of standard GECOS file control cards. However, BMC specifies that the two-character file code designation be IN for input files and OT for output files. Examples of file control cards used by BMC are included in the following list. (For a more detailed discussion, refer to the GE-625/635 Comprehensive Operating Supervisor reference manual, CPB-1195.)

Card reader

1 8 16

\$	READ	IN, Logical unit designator
----	------	-----------------------------

Card punch

1 8 16

\$	PUNCH	OT, Logical unit designator
----	-------	-----------------------------

Printer

1 8 16

\$	PRINT	OT, Logical unit designator
----	-------	-----------------------------

Magnetic tape (input or output)

1 8 16 *or OT*

\$	TAPE	IN, Logical unit designator, Secondary logical unit designator, File serial no., Reel sequence no., File name
----	------	---

Drum (input or output)

1 8 16 *or IN*

\$	DRUM	OT, Logical unit designator, <i>access mode</i>
----	------	---

1 8 16 *or OT*

\$	PERM	IN, File name
----	------	---------------

\$ MULTI CONTROL CARD

The \$ MULTI control card(s) is used to build an output file, or files, from various input files according to the file sequence and report code(s) specified by the user. The format of the \$ MULTI control card is as follows:

1 8 16

\$	MULTI	(Variable, columns 16 through 71)
----	-------	-----------------------------------

Use of the \$MULTI Control Card

Although \$ MULTI cards may be placed randomly within the BMC deck, the order of the \$ MULTI cards is significant. The table of output file numbers, input file numbers, and report codes is constructed according to the order of the parameters found on the \$ MULTI control card, and according to the order of the \$ MULTI control cards in the BMC deck.

The following conventions are used to continue information from one \$ MULTI card to the next.

REPORT CODES. For each left parenthesis there must be an associated right parenthesis on the \$ MULTI control card; that is, pairs of parentheses cannot be split between \$ MULTI cards. If there is not enough room on the card for all the report codes needed for a given output file, begin the succeeding \$ MULTI card with the same input file number at column 16 (to avoid closing the output file) and follow the input file number with a set of parentheses containing the remaining report codes.

Example:

	1	8	16
First Card	\$	MULTI	1-1/2/3/4(01,02,22,23,24)
Second Card	\$	MULTI	4(25,26,30,15,16,17)

Output file 1 is created from input files 1, 2, 3, and those records of input file 4 with report codes 01, 02, 22, 23, 24, 25, 26, 30, 15, 16, and 17. All of report 01 is sent to output before report 02 is considered. All of report 02 is sent to output before report 22 is considered, etc.

INPUT FILE NUMBERS. If there is not enough room on a \$ MULTI card for all the input file numbers associated with a given output file number, continuation of input file numbers from one \$ MULTI card to the next (without closing the output file) is obtained by leaving a blank behind the nth file number and placing the N + 1 input file number on the next \$ MULTI card beginning in column 16. An output file number, an oblique, or a hyphen must not be followed by a blank or improper file sequencing will result.

Example:

	1	8	16
First Card	\$	MULTI	1-1/2/3/4
Second Card	\$	MULTI	5/6/7,2-1
Third Card	\$	MULTI	2/3/4/5

CPB-1096C

ERROR RECOVERY

Input Error

When an error occurs on an input device, BMC either accepts the record in error, deletes the record in error, or terminates the job depending on which one of the following options the user specifies on the \$ INPUT control card.

1. Use physical record in error--Uxxxxx

where

xxxxx=Maximum number of error records, left justified, to be accepted on the input device without occurrence of termination.

U=Parameter applicable only to \$ INPUT card.

The input record in error is used as read. A message is written on SYSOUT for each error record used. When the maximum number of errors is exceeded, a code B7 abort results, and a termination message is written on SYSOUT.

2. Skip physical record in error--Sxxxxx

where

xxxxx=Maximum number of error records, left justified to be skipped on the input device without occurrence of termination.

S=Parameter applicable only to \$ INPUT card.

The input record in error is skipped. A message is written on SYSOUT for each error record skipped. When the maximum number of errors is exceeded, code B7 abort results and a termination message is written on SYSOUT.

3. Specification of the U or S parameter on the \$ INPUT card causes the operator to be bypassed in the case of a physical record in error. If the user does not specify either the U or S parameter on the \$ INPUT card, an input error results in a code B6 (no user action) abort if the operator returns status to BMC by typing in a U.

Operations must always be directed to return status to BMC in response to input device error messages to ensure that the input error option selected by the user is carried out.

4. Block Serial Number Abort Option - SERALT (applicable only to the \$ INPUT card).

When a block serial number error occurs, the operator has the option of typing in a C or an A.

C=Ignore the error and continue the activity.

A=Abort the job.

If the SERALT parameter is not present on the \$ INPUT card, the run is aborted immediately if a block serial number error occurs.

Output Error

Standard recovery action for each type of output device is summarized in the following table.

Output Device	<i>ACTION</i>
Disc/Drum	GEFRC Abort
Magnetic Tape	GEFRC Abort
Printer	Uses the printer button interface and follows the operator action specified.
Card Punch	Types the message sssss-aa REMOVE LAST 2 CDS PN icc, and repunches the cards which were removed by the operator.

Restart Facilities

BMC has restart facilities for magnetic tape to printer and magnetic tape to card punch.

The following parameter must be specified on the \$ INPUT control card whenever a restart is desired:

Xnnnnn

where

nnnnn=Number of input print/punch records, [>]~~left-justified~~, which, instead of being sent to output, are to be skipped.

X=Parameter applicable only to \$ INPUT card.

All output is suppressed during the restart run until the logical input record count reaches nnnnn+1. If output is to the punch, normal punching is resumed. In the case of printer output, if the input contained its own slew codes and the nnnnn+1 record does not contain a top-of-page slew code, the input is backspaced to a record containing a top-of-page slew code before normal printing is resumed. Otherwise, normal printing is resumed immediately.

If restart is required at any file other than the first on a multi-file reel, the input tape must be positioned on the ~~right~~ ^{correct} file by a \$ MULTI or FILES control card in the restart activity.

If multiple report codes were being processed, a \$ MULTI control card must restart the activity at the proper report code, ~~also.~~

upper case X
Form identification information, "THREE PART 11~~X~~14 PAPE," is taken from the \$ FORM card. The BMC program supplies the remaining parts of the message.

When a \$ FORM option is used with printer or punched card output, the message to change form is typed and BMC waits until a special interrupt is received from the printer or punch indicating that the new form was placed in the output device.

Only one \$ FORM card should be used per activity.

LABEL CHECKING FOR CARD READER INPUT

Normally a label check is not made for card reader input, but if label checking is desired, the file name option *nnnnnnnnnnnn must appear on a \$ INPUT control card. A label card with an * in column 1 and the label, in columns 2-13, corresponding to the file name appearing on the \$ INPUT control card, is placed in front of the input card deck.

The label card is read and ^{its} contents compared with the file name. If there is no * in column 1, or the contents of columns 2-13 do not agree with the file name, the following message is typed:

```
*sssss-aa LABEL ERR *nnn...n      (Expected label as found on $ INPUT control card,
                                     where sssss=job number and aa=activity number)

                                     ccc...c NO      (Actual label from card where the C's are the
                                                         first 13 characters on the label card)

LOAD CORRECT DECK, TYPE RD      (Operator should reply with RD after loading into
                                  the card reader the deck with a label card con-
                                  taining the expected label)
```

After the operator has reloaded the card reader, and typed RD, the label check is repeated.

PRINTER AND CARD PUNCH OUTPUT IDENTIFICATION

If the output is to the card punch, a header card and a trailer card are punched with the following formats:

```
Col.      1---56789----80
Header    sssss-aa&&...&
Trailer   sssss-aa99 ...9
```

where sssss=SNUMB

aa=Activity number

88 = row 12 punch
99 = row 9 punch

If the output is to the printer, a header and trailer banner are printed.

The header banner appears as

```
SSSSS-aa
SSSSS-SSSSS-
SSSSS-SSSSS-SSSSS-
. . .
. . .
. . .
SSSSS-SSSSS-SSSSS-.....SSSSS-
SSSSS-SSSSS-SSSSS-.....SSSSS-SSSSS-
```

What the hell does this mean?

3. PROGRAM USAGE

An important step in using the BMC program is the definition of the input and output files. The user must decide if his input and output files are in the standard BMC format. If the files are not in standard format, optional control cards must be used for specifying their nonstandard features.

It is also important to note that if the combined input and output block sizes exceed 640 words, a \$ LIMIT control card must be used. See Appendix A for a complete list of control cards for BMC. Appendix B contains a complete list of both the standard and variable parameters for each peripheral used by BMC.

The input device is rewound at the beginning of a BMC activity. At the end of an activity the input file is locked and a MME GERELS is issued. Refer to GE-625/635 Comprehensive Operating Supervisor reference manual, CPB-1195A, for a description of the effect of GERELS on the input file according to the various disposition codes.

The output device is rewound at the beginning but not at the end of an activity.

When printing from an input file of fixed length records, BMC edits the line images before printing and provides a 1-line slew. Variable length input records must contain media code 3 to be printed and the media code 1 or 2 to be punched unless the NMEDIA option is used. (See "Interface with GECOS and GEFRC" in Chapter 3.)

The remainder of the chapter contains examples of deck setups for various types of bulk media conversion.

CARD TO PRINTER

This example of BMC input deck (Figure 1) assumes that the job is a card-to-printer conversion, and the input cards are in BCD format. Therefore, an input optional control card need not be used since the input mode is assumed to be BCD and the record length is fixed at 14 words during card-to-printer conversions. The complete control card deck for this job is shown below. The \$ READ and \$ PRINT control cards are standard GECOS file control cards designating the input device as a card reader and the output device as a printer.

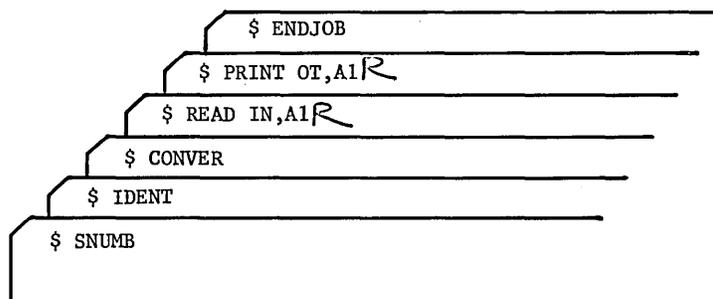


Figure 1. Card to Printer Deck

TAPE TO PUNCH

This example of a BMC input deck (Figure 4) assumes that the input file is a magnetic tape (containing BCD information) in binary mode with fixed length, 14-word records. The block size is 210 words and the blocks have serial numbers. The tape is labeled CARD-FILE. Since the output cards are in BCD mode instead of binary, an output variable control card must be used to specify BCD. The output record size (to be F14) does not have to be specified. In the absence of an output record size, BMC considers the output record size the same as the input record size.

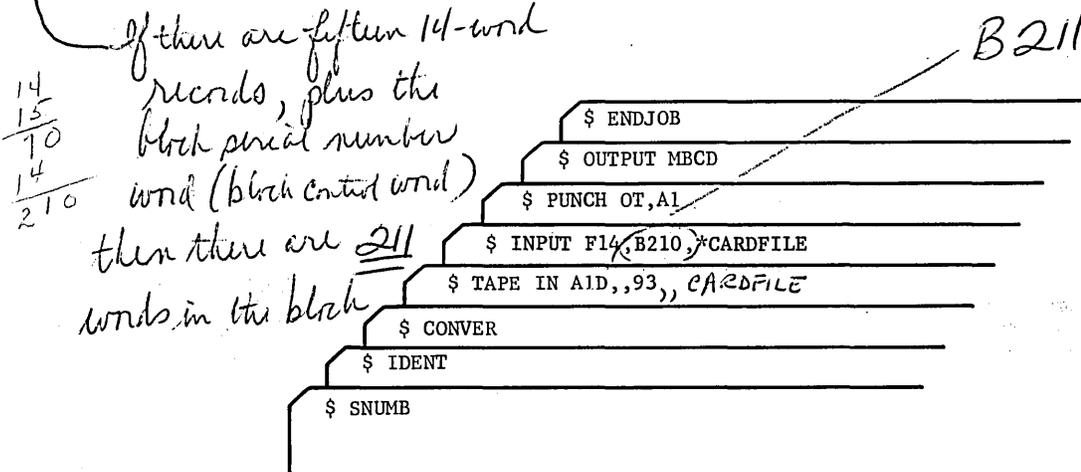


Figure 4. Tape to Punch Deck

DRUM TO PUNCH

In the previous examples, the media conversion is a one-activity job. In this example (Figure 5), the BMC program is run as the second activity of a job. This example assumes the first activity creates a drum file with BCD data from card and magnetic tape input. The BMC activity converts the drum file onto cards.

records
containing
into

Standard GECOS file control cards are used in both activities to designate the input and output devices.

CARD TO IMCV TAPE

This example shows a BMC input deck which will create an IMCV Tape.

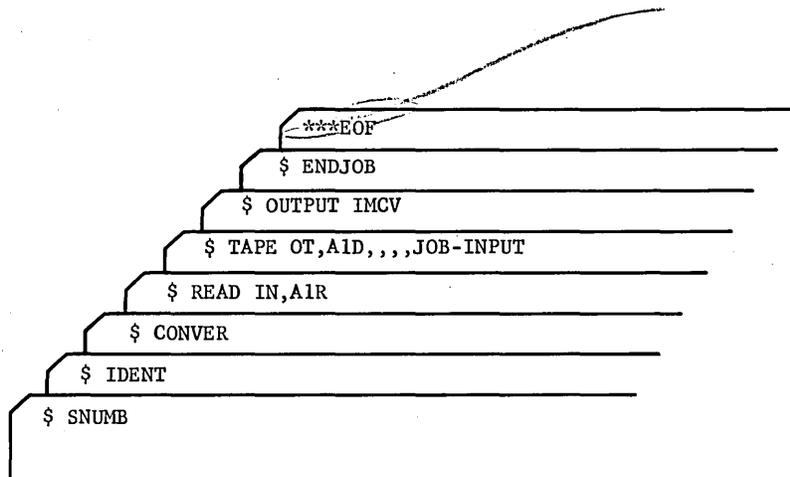


Figure 6. Card to IMCV Tape

Card input to the BMC run will look like any other job input deck. See GECOS-11 SSI, CPB II Section IX for further explanation of IMCV Tapes. ()

4. PROGRAM STRUCTURE

In order to conserve memory space, bulk media conversion is written as a series of subprograms. One subprogram, the main or executive routine of BMC, remains in memory throughout execution of the BMC activity. Other BMC subprograms are called as needed by the main routine and overlay one another using the System Loader (GECALL). The functions of the main routine of BMC and each overlay are described below, in the order of processing.

MAIN ROUTINE (OVERLAY A)

With the exception of the MC file and its associated buffer and OPEN routine, the main routine remains in memory throughout the execution of the BMC activity. This routine contains the three file control blocks used by BMC; (1) the IN (input) file, (2) the OT (output) file, and (3) the MC file (BMC control information file created by GECOS from BMC control cards). The main routine also contains the necessary control and switch words for communication between overlays.

OVERLAY B

Overlay B performs file control block initialization for the user input file IN, and the user output file OT, based on the \$ INPUT or \$ OUTPUT control card parameters, found in the MC file, and the device type. Overlay B also does the processing of the \$ FORM control card and builds a table of \$ MULTI control card parameters at the top of the allocated memory area.

During initialization, buffer locations are calculated, based either on standard system parameters for the specified device or on block size as supplied by the user through \$ INPUT and/or \$ OUTPUT parameters. Buffer areas occupy the top of the allocated memory area and extend downward as necessary; they follow the \$ MULTI table, if it is present.

are you saying that BMC is a DOWNLOAD?

Overlay B of the BMC program assigns standard block sizes on the basis of device type as follows:

Magnetic disc or drum	}	320 words
Magnetic tape		
Card reader	}	27 words
Card punch		
Printer		

This block is assumed to contain a block control word, but may have other fixed length variable length or a mixture of these type of logical records.

27/102

This will hold (brackets) 2 80 character card records or 1 print line record. And no block control word.

OVERLAYS K THROUGH Q

In any given activity, the \$ file control cards determine which of the following overlays will be used in the BMC run:

- Overlay K - High-speed device to high-speed device *MT } to { MT*
- Overlay L - High-speed device to card punch *DS } to { DS* *(9 possible combinations)*
- Overlay M - High-speed device to printer *PC } to { PC* *(3 possible combinations)*
- Overlay N - Card reader to high-speed device *(3 " ")*
- Overlay P - Card reader to card punch *(1 " ")*
- Overlay Q - Card reader to printer *(1 " ")*

20 possible types of combinations are provided

The Printer Button Interface subroutine is combined with Overlay J for use with Overlays M and Q.

OVERLAY R

Overlay R performs the control functions for the FILES option.

INTERFACE WITH GECOS AND GEFRC

Bulk media conversion, which is called by a \$ CONVER control card, operates as a system program in slave mode under GECOS. GECOS places all control cards and input/output optional parameter cards associated with the BMC activity in a file with the code MC. GECOS calls the BMC main subprogram into allocated memory from the system library file. The main BMC subprogram sets up a 13-word file control block for the MC file, and two 15-word file control blocks--one for the IN (input) file and one for the OT (output file). Overlay A performs the standard (GEFRC) OPEN function on the MC file. Overlay B performs the file control block initialization for files IN and OT, based on the control card information on the MC file and standard parameters for BMC. During initialization by Overlay B, the block sizes and buffer locations are also determined by the information contained on the MC file or BMC standard device type parameters.

Because the bulk media conversion program uses standard GEFRC routines to perform its input/output functions, it is necessary for the user to ensure that his input or output files conform generally to the GE-625/635 standard system format. (Exceptions are allowed as noted under "BMC Optional System Parameters.")

The details of the standard system format are as follows:

1. Block size--*PHYSICAL RECORD* Data blocks are variable in length up to a maximum block size of 320 words.
2. Block serial number--*control word* A block serial number exists as the first word of each data block and contains two binary values as follows:

Bits 0-17 Block serial number--The sequential number of this physical record within the current reel of this file. *In disc & drum, these bits contain a relative block address.*

Kindly explain item # 2 in terms of the standard format block for CR, CP, PPR on page 25

b. Trailer Label

<u>Word Number</u>	<u>Format</u>	<u>Description</u>
1	/bEOR/b or /bEOF/b	End-of-reel label or End-of-file label
2	XXXXXX	Block count
3-14	(arbitrary)	Not used

A pre-header option tests for a partial label* on opening an input tape file. For unlabeled tape files, each record read is tested for a partial label.

A partial label is detected by testing for the following conditions:

- Word 1 contains GE/b60
- Word 2 contains 0/bTL/b
- Word 7 contains 000000

The message PARTIAL HEADER (END-OF-INFORMATION) LABEL is written on SYSOUT and an abort with code B5 results when one is encountered.

Report codes

Detail code

Report

04	
06	WJ Tritium output file (w)
72	Activity accounting cards
73	ECPC error report (cards)
74	P# card file
75	C# physical deck
76	K# Comdex report
77	A* Aiter list

*A partial label is a label written by GEFRC as an end of data banner on all magnetic tapes.

5. OPERATOR INFORMATION

GENERAL INFORMATION

The operator receives special messages on the typewriter concerning the card reader, card punch, and printer when a BMC activity that uses these peripherals is allocated.

For the card reader, the system message contains the SNUMB, activity number, channel, and unit of the allocated card reader. After this message is typed, the BMC message sssss-aa LOAD CARD READER # nn instructs the operator that BMC is ready for card reader input. When the card reader label check option has been selected and the label on the deck is in error, the label error message is typed. If the operator is not able to locate the deck with the correct label, it is necessary for him to either terminate the activity or kill the job.

A system message is typed out when the card punch is allocated to a BMC job. This allows the operator to identify the output deck with the proper job in the multiple punch situation. The operator may receive additional information about the card punch from \$ FORM control cards.

The operator is also notified by a typewriter message when the printer is allocated to a BMC job. The operator may receive additional information about the printer from \$ FORM control cards.

When the printer has halted for a form change caused by the \$ FORM control card, the operator may align the form as follows:

1. Press the HALT button
2. Press the PRINT E's button

A line of E's will be printed on the paper. After the form is aligned, the operator signals that the printer is ready by pressing the OPERATE/RESET switch on the printer.

If the operator notices that the paper is not aligned after the BMC print routine has started, he may halt printing by pressing the HALT button on the printer. Overlay J of the BMC

APPENDIX A CONTROL CARDS

All the control cards used with BMC are shown below:

1	8	16	
\$	SNUMB	(Variable)	GECOS job identification card--required.
\$	IDENT	(Variable)	GECOS accounting information card--required.
\$	CONVER		BMC CALL card--required.
\$	LIMITS	(Variable)	GECOS job limits card--optional.
\$	(Variable) (device)	IN, LUD, ----	GECOS file card (input device)--required.
\$	INPUT	(Variables)	BMC parameter card--optional.
\$	(Variable) (device)	OT, LUD, ----	GECOS file card (output device)--required.
\$	OUTPUT	(Variables)	BMC parameter card--optional.
\$	MULTI	(Variables)	BMC parameter card--optional.
1	7	13	
FILES	(Variables) (to #)	(Form #)	BMC parameter card--optional.
1	8	16	
\$	FORM	(Variable) (MESSAGE)	BMC form control card--optional.
\$	ENDJOB		GECOS termination card--required for last activity of a job.

For a detailed discussion of the GECOS control cards, see the General Comprehensive Operating Supervisor reference manual, CPB-1195.

APPENDIX B. STANDARD AND OPTIONAL PARAMETERS

All the standard and optional parameters for every peripheral device used by BMC are shown in the following lists.

CARD READER

Standard Parameters:

Block size:	27 words
Number of buffers:	2
Record form:	Fixed
Record size:	27 words (binary cards), 14 words (BCD cards)
Mode:	Binary

NOTE: For card-to-printer conversion, the record size is 14 words and the mode is BCD.

Optional Parameters:

Mode:	BCD or MIXED
Block size:	≥27
Number of buffers:	1

CARD PUNCH

Standard Parameters:

Block size:	27 words
Number of buffers:	2
Record form:	Fixed length
Record size:	27 words maximum (set from input record size)
Mode:	Binary

Optional Parameters:

Mode:	BCD
Record size:	≥27
Number of buffers:	1

NOTE: When the input file contains variable length records, only those records with the media code 1 or 2 are punched. All others are ignored unless the NMEDIA option is specified on a \$ INPUT card.

When the input file contains fixed length records, the punch mode will be binary unless the user has specified BCD (MBCD parameter on the \$ OUTPUT card).

APPENDIX C

MEMORY REQUIREMENTS

The standard memory size limit assigned to BMC is 6,144 words. Less memory can be used depending on the combination of input and output devices and the control card options selected. The following table is a guide for selection of memory size.

The table is based on system standard buffer sizes, i.e., 320 words for magnetic tape, disc and drum and 27 words for card reader, card punch and printer.

INPUT DEVICE	OUTPUT DEVICE	I/O BUFFERS	BASIC no options	OPTION 1 Trans-literate	OPTION 2 Multi	OPTION 3 Translit. & Multi	OPTION 4 Files
Magnetic tape Disc Drum	Magnetic tape Disc, Drum Sysout	Single	4000	4000	4000	4000	4000
		Double	4000	4000	5000	5000	4000
	Card Punch	Single	3000	4000	4000	4000	4000
		Double	4000	4000	4000	4000	4000
	Printer	Single	5000	5000	5000	5000	5000
		Double	5000	5000	6000	6000	5000
Card Reader	Magnetic tape Disc, Drum Sysout	Single	3000	3000	4000	4000	N/A
		Double	4000	4000	4000	4000	N/A
	Card Punch	Single	3000	3000	3000	4000	N/A
		Double	3000	3000	3000	4000	N/A
	Printer	Single	4000	5000	5000	5000	N/A
		Double	4000	5000	5000	5000	N/A

Explanation of OPTIONS:

OPTION

- 1 **TRANSLITERATION:** this option is selected by the use of IBMF, IBMC, IBMEL or GE225 on a \$ INPUT or \$ OUTPUT control card.
- 2 **MULTI*:** this option is selected by the use of a \$ MULTI card.
- 3 **TRANSLITERATION and MULTI:** this option is selected by the use of IBMF, IBMC, IBMEL or GE225 on a \$ INPUT or \$ OUTPUT control card in addition to the use of a \$ MULTI card.
- 4 **FILES:** this option is selected by the use of a FILES card. Note that the FILES option precludes the use of both the TRANSLITERATION and MULTI options.

*The storage size shown in the above table for options 2 and 3 assumes a MULTI table of 100 words or less. If the MULTI table exceeds 100 words, the storage size must also be increased. Refer to "Use of the \$ MULTI Control Card" in this manual for the rules to follow for calculating the size of the MULTI table.

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The key-word index is formed by permuting titles, paragraph names, descriptive phrases, and figure names, putting each key word in the index position in the center of the page. The rest of the phrase appears on either side of the key word.

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DOCUMENT REVIEW SHEET

TITLE: GE-625/635 Bulk Media Conversion

CPB #: 1096C

FROM:

Name: _____

Position: _____

Address: _____

Comments concerning this publication are solicited for use in improving future editions. Please provide any recommended additions, deletions, corrections, or other information you deem necessary for improving this manual. The following space is provided for your comments.

COMMENTS: _____

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GENERAL ELECTRIC INFORMATION SYSTEMS DIVISION COMPUTER EQUIPMENT DEPARTMENT	GE-600 SERIES TECHNICAL INFORMATION BULLETIN	DATE Sept. 1968
		NO. 600-234
SUBJECT: Changes and Additions to GE-625/635 Bulk Media Conversion		REF. CPB-1096D

This TIB includes features implemented in GECOS-III System Development Letter-1.

Replace old pages in GE-625/635 Bulk Media Conversion reference manual, CPB-1096D, with the attached pages as follows:

<u>Old</u>	<u>New</u>
iii,iv	iii,iv
3,4	3,4,4.1
9,10	9,10
17,18	17,18,18.1
27,28	27,28

Vertical bars in the margins of these new pages indicate changes or additions to the existing text. This new information will be included in the next edition of the manual. The index changes required will also be made at that time.

Place this sheet in the front of your manual to show that the contents of this TIB have been incorporated.

This is the only TIB currently applying to CPB-1096D.

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2. GENERAL USAGE

The BMC program performs media conversion for either input or output that exceeds the volume limits set for the GEIN and SYSOUT routines of the GE-625/635 Comprehensive Operating Supervisor (GECOS), because BMC has no volume limitations. Multiple files and multiple report codes may be processed and mixed printer/punch images may be present on the input device.

The BMC program performs media conversion for the following peripherals:

- Card reader
- Magnetic disc or drum (linked files)
- Magnetic tape subsystem
- Printer
- Card punch

Generally, BMC is used when large amounts of data are to be converted from one of the above listed peripheral devices to another. For example, where a data processing job has a large amount of output to be printed, the output could be saved on magnetic tape and a subsequent BMC activity used for printing the data. Memory and peripherals used by the data processing program could be released, and only the memory needed for the BMC program would be retained with a tape unit and one printer.

Another use of BMC could be for creating multiple copies of output files; for example, the multiple printing of compilation listings. During the running of compilation, the P* file (printer listing file) could be placed on a separate tape. This tape could then be printed by BMC as many times as needed.

The BMC program can be executed either as an activity within a job or as the only activity of the job. In either case, the BMC call card and the BMC control cards are the same.

These cards are discussed below.

BMC CALL CARD

The \$ CONVER control card is used to call BMC. Its format is as follows:

1	8	16
\$	CONVER	Options

1	8	16
\$	(file)	IN

*Various standard GECOS file control cards (i.e., \$ READ, \$ DISC, etc.) for the input device

1	8	16
\$	INPUT	(Variable)

Optional control card; used only if the input file requires other than standard parameters for the device

1	8	16
\$	(file)	OT

*Standard GECOS file control card for the output device (i.e., \$ PUNCH, \$ TAPE, etc.)

1	8	16
\$	OUTPUT	(Variable)

Optional control card; used only if the output file requires other than standard parameters for the device

1	8	16
\$	MULTI	(Variable)

Optional control card; used for media conversion involving multiple input and/or output files; also for multiple report codes

1	7	
FILES	(Variables)	

BMC parameter card; causes sequential processing a specified number of files

1	8	16
\$	FORM	(Variable)

Optional control card; used to inform the operator of special printer or card form required for this BMC activity

The \$ INPUT and \$ OUTPUT control cards are necessary only if either of the media files varies from the BMC standard file parameters.

* Use only one \$ (file) IN and only one \$ (file) OT card per activity.

Printer Slew--SLEWx

The SLEWx parameter on a \$ OUTPUT card is used to specify the number of lines to slew when printing is done in the edit mode, i.e., input records are fixed length or the NMEDIA parameter is present on a \$ INPUT card. x = 1, 2, or 3, number of lines to slew; if x = other than 1, 2, or 3, a B1 abort will occur. If this parameter is not specified, a slew of 1 line is assumed.

Ignore Media Code--NMEDIA

For output to printer:

In order to print variable length records which have not been edited for printing (no media code 3 and/or no slew codes in the print image), the NMEDIA parameter must be used on a \$ INPUT card. NMEDIA will cause BMC to ignore media codes and to print in the edit mode (see CALL EPRINT in the GE-625/635 File and Record Control manual, CPB-1003) when variable length records are to be printed.*

A one line slew will be executed unless specified otherwise by a SLEWx parameter on a \$ OUTPUT card.

For output to card punch:

For variable length records BMC examines each record for a media code 1 or 2. If a 1 or 2 is found, the output mode is set accordingly (binary for 1, BCD for 2) and the card image is sent to output. In this case the NMEDIA option is not needed, and, if present, will be ignored by BMC.

If the variable length records have not been edited for punching (no media codes 1 or 2), it is necessary to specify NMEDIA on a \$ INPUT control card; otherwise no data is sent to output for punching. The NMEDIA option causes BMC to examine the input record size (bits 0-17 of the input record control word) of non-edited data and set the output mode as follows:

1. For 14 word record size - set output mode BCD.
2. For 27 word record size - set output mode binary.
3. If neither 14 or 27 word record size - leave the output mode unchanged.

*The NMEDIA parameter is not needed if the input records are fixed length or mixed length.

Output Error

Standard recovery action for each type of output device is summarized in the following table.

Output Device	
Disc/Drum	GEFRC Abort
Magnetic Tape	GEFRC Abort
Printer	Uses the printer button interface and follows the operator action specified.
Card Punch	Types the message sssss-aa REMOVE LAST 2 CDS PN icc, and repunches the cards which were removed by the operator.

Restart Facilities

BMC has restart facilities for magnetic tape to printer and magnetic tape to card punch.

The following parameter must be specified on the \$ INPUT control card whenever a restart is desired:

Xnnnnnn

where

nnnnnn=Number of input print/punch records, left justified, which, instead of being sent to output, are to be skipped.

X=Parameter applicable only to \$ INPUT card.

All output is suppressed during the restart run until the logical input record count reaches nnnnnn+1. If output is to the punch, normal punching is resumed. In the case of printer output, if the input contains its own slew codes and the nnnnnn+1 record does not contain a top-of-page slew code, the input is backspaced to a record containing a top-of-page slew code before normal printing is resumed. Otherwise, normal printing is resumed immediately.

If restart is required at any file other than the first on a multi-file reel, the input tape must be positioned on the right file by a \$ MULTI or FILES control card in the restart activity.

If multiple report codes were being processed, a \$ MULTI control card must restart the activity at the proper report code also.

IGNORE COUNT is the count of all logical records read but not sent to output, including multiple readings of the same record caused by using a \$ MULTI control card. The count is not reset by multiple files or reels. This count does not include (1) file marks and label records or (2) logical records contained in a skipped file or block.

Input records included in the ignore count are, for example:

1. Those preceding nnnnn+1 when restarting via the \$ INPUT Xnnnnn option.
2. Those whose report code does not match the report code in the \$ MULTI control card.
3. Those whose media code does not agree with the media code required for output.

\$ FORM CONTROL CARD

The format of the \$ FORM card is:

1	8	16	
\$	FORM	nnnnn...n	

where nnnnn...n is the form identification. (This field is restricted to 21 characters.)

If a specific form is required for printer or punch output, the \$ FORM control card must be used to define the form. The form identification from the \$ FORM card is typed on the console typewriter.

Example:

1	8	16	
\$	FORM	THREE PART 11x14 PAPER	

would result in the following typeout:

sssss-aa MOUNT FORM # THREE PART 11x14 PAPE ON $\left. \begin{array}{l} \text{PRINTER} \\ \text{PUNCH} \end{array} \right\} i \text{ cc AND}$
 PUSH OPERATE

where i=IOC number
 cc=Channel address
 sssss-aa=SNUMB and activity number

4. PROGRAM STRUCTURE

In order to conserve memory space, bulk media conversion is written as a series of subprograms. One subprogram, the main or executive routine of BMC, remains in memory throughout execution of the BMC activity. Other BMC subprograms are called as needed by the main routine and overlay one another using the System Loader (GECALL). The functions of the main routine of BMC and each overlay are described below, in the order of processing.

MAIN ROUTINE (OVERLAY A)

With the exception of the MC file and its associated buffer and OPEN routine, the main routine remains in memory throughout the execution of the BMC activity. This routine contains the three file control blocks used by BMC: (1) the IN (input) file, (2) the OT (output) file, and (3) the MC file (BMC control information file created by GECOS from BMC control cards). The main routine also contains the necessary control and switch words for communication between overlays.

OVERLAY B

Overlay B performs file control block initialization for the user input file IN, and the user output file OT, based on the \$ INPUT or \$ OUTPUT control card parameters, found in the MC file, and the device type. Overlay B also does the processing of the \$ FORM and FILES control cards and builds a table of \$ MULTI control card parameters at the top of the allocated memory area.

During initialization, buffer locations are calculated, based either on standard system parameters for the specified device or on block size as supplied by the user through \$ INPUT and/or \$ OUTPUT parameters. Buffer areas occupy the top of the allocated memory area and extend downward as necessary; they follow the \$ MULTI table, if it is present.

Overlay B of the BMC program assigns standard block sizes on the basis of device type as follows:

Magnetic disc or drum	}	320 words
Magnetic tape		
Card reader	}	27 words
Card punch		
Printer		