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OS/8

mark sense batch

users guide

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MARK SENSE BATCH
USER'S GUIDE

DEC-S8-OBUGA-A-D

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PREFACE

This manual describes the use and operation of the Mark Sense Batch (MSBATCH) OS/8 system program. In general, the manual is organized to provide information in a reference format and, except for Chapter 2, it assumes the reader is familiar with the use and operation of the OS/8 system software described in the OS/8 Handbook, DEC-S8-OSHPS-A-D. The inexperienced user should refer first to Chapter 2, which describes step-by-step procedures for preparing programs for submission to MSBATCH. Experience and familiarity with MSBATCH will lead to utilization of the more sophisticated MSBATCH features described in the other chapters.

Chapter 1 summarizes the functional characteristics of the program. Chapter 2 describes the step-by-step preparation of simple BASIC and FORTRAN batch jobs including: how to mark cards, how to prepare programs, how to use MSBATCH control commands, how to organize the job deck and how to interpret the results of job processing. Examples of marked cards illustrate important points. Chapter 3 describes all MSBATCH control commands including syntax and options, and gives examples of use. Chapter 4 describes input/output considerations for BASIC and FORTRAN programs. Chapter 5 describes the operating procedures for MSBATCH including: loading and starting MSBATCH, using its operating modes, responding to user requests, controlling job execution, and interpreting error messages.

The appendices include a glossary of terms peculiar to batch processing in general and MSBATCH in particular; detailed procedures for marking mark sense cards; a description of the operation of the CM8E and CM8F card readers; a description of the procedures used when installing MSBATCH into an OS/8 system, and instructions for using OS/8 keyboard commands under MSBATCH.

Except where it is necessary to illustrate how mark sense cards are marked, all programming examples simply show the contents of the card as interpreted by MSBATCH.

CHAPTER 1
INTRODUCTION

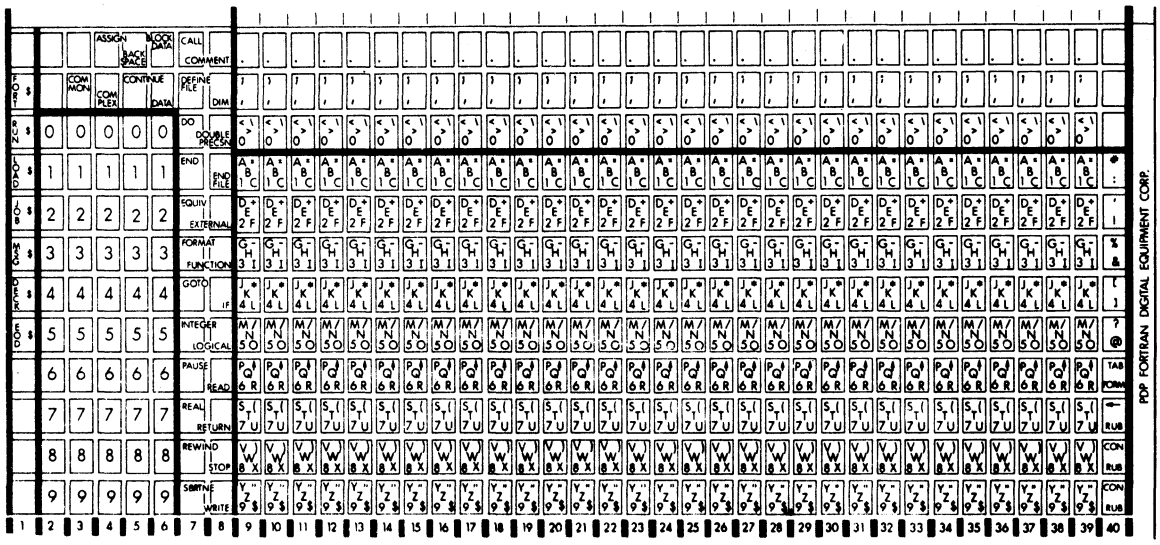
1.1 INTRODUCTION

Mark Sense Batch (MSBATCH) is an OS/8 program that translates the information contained on Digital's specially formatted optical mark sense cards into a standard OS/8 ASCII file. The principal service performed by MSBATCH is to act as a mark sense card pre-processor for OS/8 BATCH. This permits FORTRAN and BASIC programmers to prepare programs for execution under OS/8 BATCH using optical mark sense cards as the input medium.

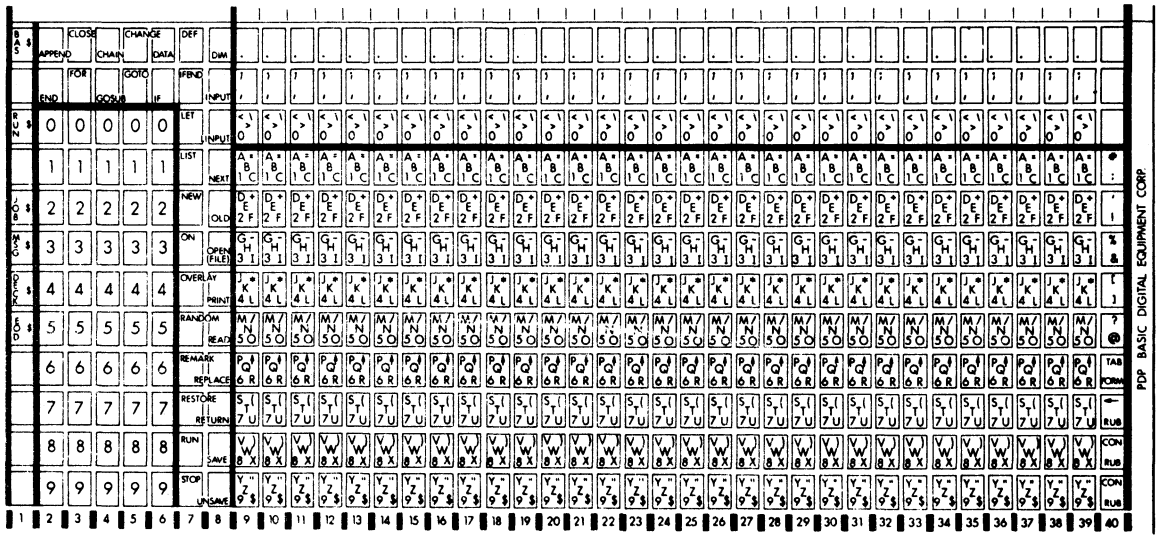
Mark Sense Cards can contain three categories of information:

- BASIC or FORTRAN language keywords.
- User specified text (arguments, data, OS/8 keyboard commands).
- Control commands that direct MSBATCH operation.

As shown in Figure 1-1, there are two types of cards that can be used with MSBATCH: BASIC cards, and FORTRAN cards. The cards are essentially identical, except that the FORTRAN card contains boxes printed with FORTRAN language keywords, while the BASIC card contains boxes printed with BASIC language keywords.



FORTRAN Card



BASIC Card

Figure 1-1
Mark Sense Card Formats

The mark sense cards are specifically designed to facilitate batch program preparation. Any language keyword or batch control command can be specified simply by marking a single box. Data or other user-specified text is entered as single characters. MSBATCH also may be used to create an OS/8 file from any data on mark sense cards.

MSBATCH has three operating modes:

- Batch Mode
- Interactive Batch Mode
- PIP Mode

In Batch Mode, MSBATCH prepares the deck of cards being input as a batch stream for execution by OS/8 BATCH. All program language keywords, data, and batch control commands are properly interpreted and placed in the output file. Wherever necessary, MSBATCH alters the batch stream to cause all user program input data, normally obtained from the terminal's keyboard, to be obtained from data cards following the user's program. Similarly, program output, normally directed to the terminal's printer, is switched to the OS/8 BATCH listing device, either a line printer or the terminal (whichever is available). Other OS/8 input/output devices can also be used to contain programs and data, in which case the batch stream being input from cards simply contains control commands. Once all cards are read and the batch stream file is complete, MSBATCH automatically passes control to OS/8 BATCH to execute the batch stream file. (Refer to the description of OS/8 BATCH in Chapter 2 of the OS/8 Handbook for further information.)

In Interactive Batch Mode, operation is identical to Batch Mode except that MSBATCH does not redirect input/output normally intended for the terminal. This allows the individual programmer or operator to run the program interactively, program data input being entered from the terminal's keyboard and program output being printed at the terminal's printer.

In PIP Mode, MSBATCH simply copies the contents of the cards being input into any specified OS/8 file. Control is not passed to OS/8 BATCH. If language keywords or MSBATCH control commands are included, they are interpreted and included in the file. This permits batch stream files to be created for submission to OS/8 BATCH at a later time. Interactive OS/8 and OS/8 BATCH users can also use this feature to create an OS/8 file from mark sense cards for any purpose (for example, data files).

Figure 1-2 illustrates the functions performed by MSBATCH and shows its relationship to OS/8 BATCH.

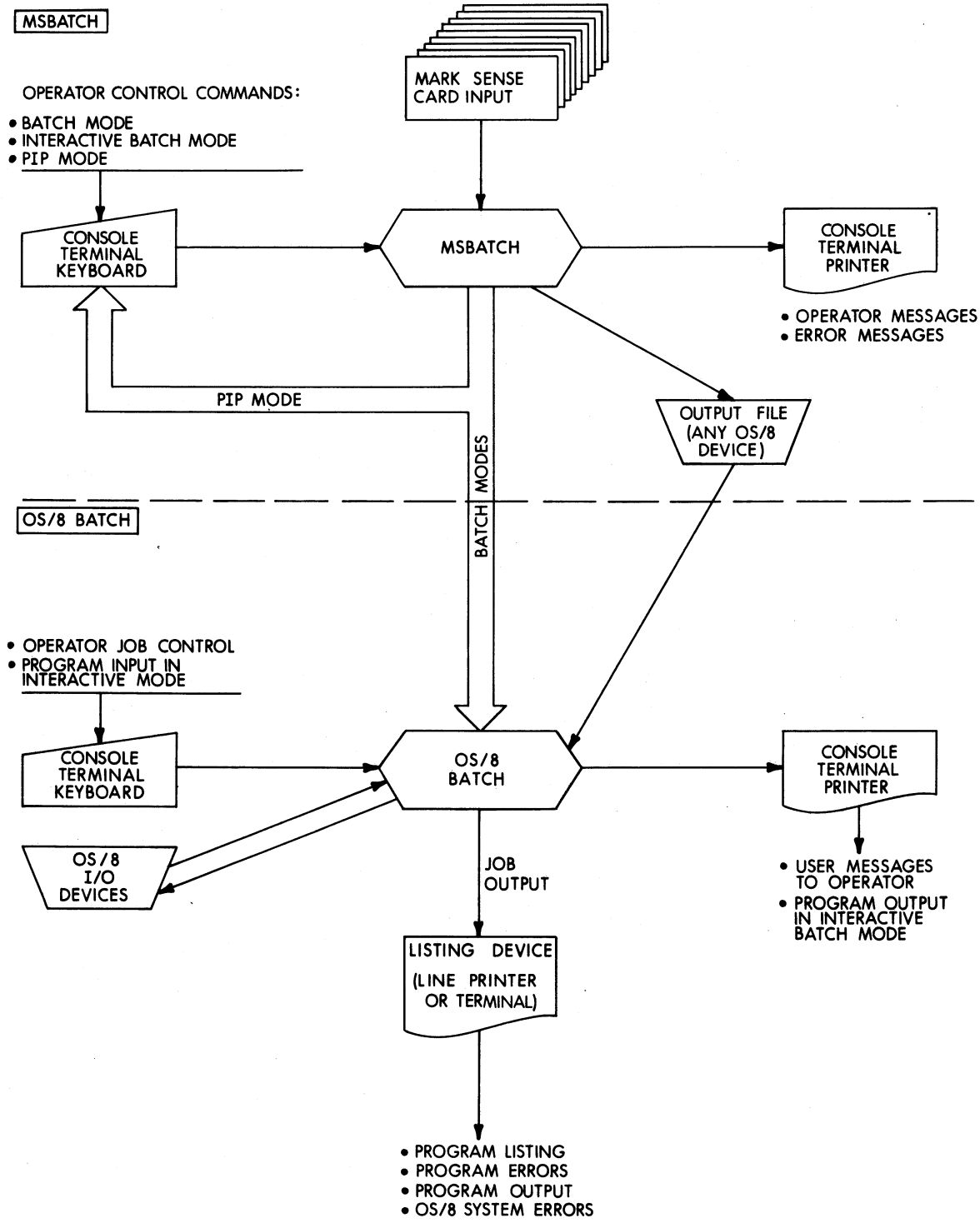


Figure 1-2
MSBATCH-OS/8 BATCH Interaction

1.2 HARDWARE/SOFTWARE ENVIRONMENT

MSBATCH operates as a system program of the OS/8 Monitor (version 3). It can be used on any PDP-8E/8F/8M hardware configuration that permits OS/8 BATCH operation and has either a model CM8F or a model CM8E optical mark card reader option.

1.3 HOW MSBATCH IS SUPPLIED

The MSBATCH software is supplied on the OS/8 Extension Kit tapes listed below.

DECtape	DEC-S8-UEXTB-A-UC
LINCtape	DEC-S8-UEXTB-A-AC
DECcassette	DEC-S8-UEXTB-A-TC
Paper Tape	DEC-S8-UEXTB-A-PB (MSBAT.SV) DEC-S8-UEXTB-A-PR (GENIOX.RL)

Installation procedures are provided in Appendix D.

CHAPTER 2
USING MSBATCH

This chapter describes the elementary procedures necessary for using MSBATCH in Batch Mode and is directed primarily to BASIC and FORTRAN users who are unfamiliar with batch processing under MSBATCH. Other operating modes are discussed in Chapter 5. Specific information presented includes:

- preparing BASIC and FORTRAN programs on cards
- preparing data cards
- submitting a program for execution
- interpreting the results of program run

A glossary of terms peculiar to MSBATCH and batch operation in general is presented in Appendix A. Appendix B contains step by step procedures for marking mark sense cards.

2.1 ELEMENTS OF BATCH MODE PROCESSING

In the batch mode environment of MSBATCH, users submit their FORTRAN and BASIC programs to a computer operator for batch compilation and execution. This is in contrast to conventional interactive operation where each user performs his own compilations and executions interactively at the computer. Figure 2-1 illustrates the steps required to prepare programs and data for submission to MSBATCH.

MSBATCH expects programs and data to be input from a mark sense card reader. This means that once a program is written, it must be transcribed onto specially formatted mark sense cards. Any data that the program is to read is also entered on these cards. The program cards are assembled into a deck called the program deck, while data cards are assembled into a separate deck called the data deck. Special cards called control cards are placed at the beginning and end of the program deck and at the end of the data deck. These cards contain control commands to MSBATCH that direct batch processing. Both decks are then combined to form a job. The job is submitted to the computer operator who, in turn, submits groups of jobs to MSBATCH for processing. During job processing a record of all operations relating to each job is printed on the system's listing device. This is called the job output. The job output is printed either on a line printer or the console terminal, whichever is available. The job output contains such information as:

- Control commands used
- Program compilation listing
- Program output
- Error messages

After job completion, the job deck and job output are returned to the user.

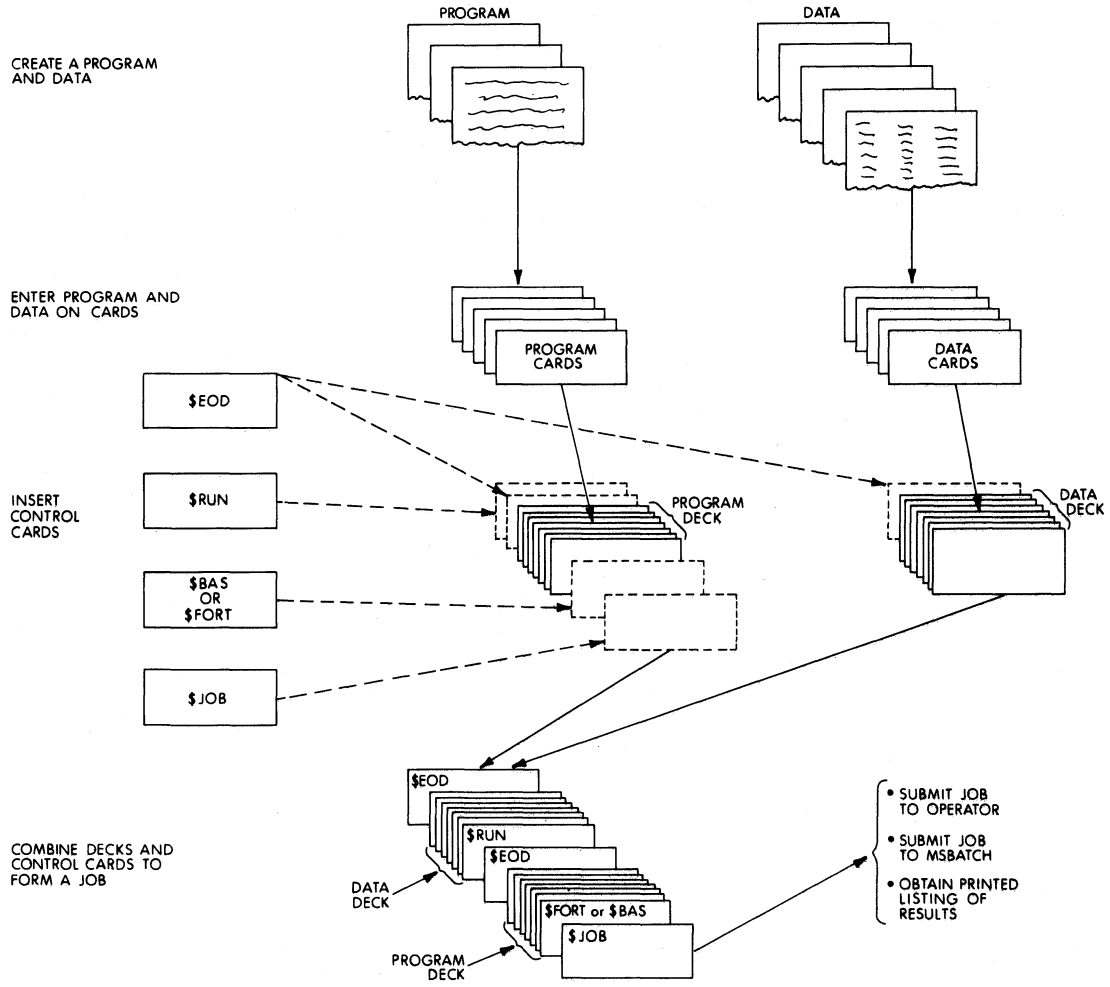


Figure 2-1
Elementary Batch Processing Steps

2.2 PREPARING PROGRAM CARDS

Programs to be submitted for processing by MSBATCH must be transcribed onto mark sense cards. There are two types of cards: BASIC and FORTRAN. These cards are printed with boxes that can be marked with a pencil to specify program line or step numbers, language keywords, and data, as well as control commands to MSBATCH. The BASIC card contains boxes that are printed with BASIC language keywords, the FORTRAN card contains boxes that are printed with FORTRAN language keywords. Detailed procedures for marking cards are provided in Appendix B.

Except for the input/output requirements described in 2.4, each user should prepare his programs in the normal way as described in the OS/8 Handbook. BASIC users should refer to Chapter 6, FORTRAN IV users should refer to Chapter 8, and FORTRAN II users should refer to Chapter 7.

2.3 PREPARING DATA CARDS

Data to be input by a program is also transcribed onto cards. Either FORTRAN or BASIC cards can be used since the data is entered only in a card's character field (beginning at card column 9 and continuing through column 40). A data card must not be marked in card columns 1 through 8. Appendix B specifically describes how to mark the character field.

2.4 INPUT/OUTPUT CONSIDERATIONS

FORTRAN or BASIC programs running in Batch Mode normally obtain input from a deck of cards containing the data. Output from these programs is sent to the system's listing device, either a line printer or the console terminal, whichever is available. In order to access the data deck and listing device, programs must perform I/O operations as described in the following paragraphs.

2.4.1 BASIC Programs

BASIC programs access the data deck and listing device by using the elementary forms of the INPUT and PRINT keywords. The INPUT keyword is used to read a card from the data deck. The user should be careful not to specify a device number since this task is performed automatically by MSBATCH.

For example:

The following program reads 19 cards from the data deck and stores them in array I.

```
10 DIM N$(30,19)
20 FOR I=1 TO 19
30 INPUT N$(I)
50 NEXT I
```

The PRINT keyword is used to output lines of numeric or string text to the listing device.

For example:

The following program prints the value of A, the sum of C and B, and the square root of A on a single line of the listing device.

```
5 A=16\B=5\C=4
10 PRINT A, C+B, SQR(A)
15 END
```

2.4.2 FORTRAN IV Programs

FORTRAN IV programs access the data deck and the listing device by using the READ and WRITE keywords. The READ keyword is used to read cards from the data deck through I/O unit 4.

For example:

The following statements read a single data card into the variable RAY.

```
    READ (4,100) RAY
100 FORMAT (F8.0)
```

The WRITE keyword is used to print program output on the listing device via I/O unit 5.

For example:

The following statements print the contents of the variable RAY on the listing device.

```
    WRITE (5,101) RAY
101 FORMAT (' RAY=',E13.6)
```

2.4.3 FORTRAN II Programs

FORTRAN II programs access the data deck and the listing device by using the READ and WRITE keywords. The READ keyword is used to read cards from the data deck, using unit number 1.

For example:

The following statements read one card into the variables X and Y.

```
      READ (1,100)X,Y
  100 FORMAT (2F8.0)
```

The WRITE keyword is used to print program output on the listing device via unit number 1.

For example:

This statement prints the content of variables X and Y on the listing device.

```
      WRITE (1,101)X,Y
  101 FORMAT (' X=',E13.7,5X,'Y=',E13.7)
```

2.5 SUBMITTING A PROGRAM TO MSBATCH

When all statements of a program are marked on cards, the cards are assembled into a single deck in the order of statement execution. Any data cards to be input by the program also are combined into a single deck and arranged in the order of use. Before the program deck and its data deck can be submitted for processing, however, MSBATCH must be given the job's name, the name of the language in which it is written and an explicit instruction to execute the program. This information is provided by adding special cards, called control cards, to the program and data decks. Control cards are not part of the actual program. They do not have keywords, statement numbers or line numbers marked on them. Control cards are cards that specify one of the MSBATCH control commands (see Appendix B).

2.5.1 The $JOB Control Command

The first card of any job being submitted for batch processing must contain a $JOB control command. This command specifies the name of the program and programmer and identifies the combined program and data decks as a new job. Further, it assists the computer operator in associating a user's deck with the output listing since the information on this card is printed at the top of each page of the listing. Any cards in a deck that come before a $JOB control command are ignored. A $JOB control card has a single mark in the $JOB box in card column 1. The name of the program, the programmer's name and any other identifying information can be entered in the card's character field (card columns 9 through 40). Figure 2-2 shows an example of a $JOB control card.

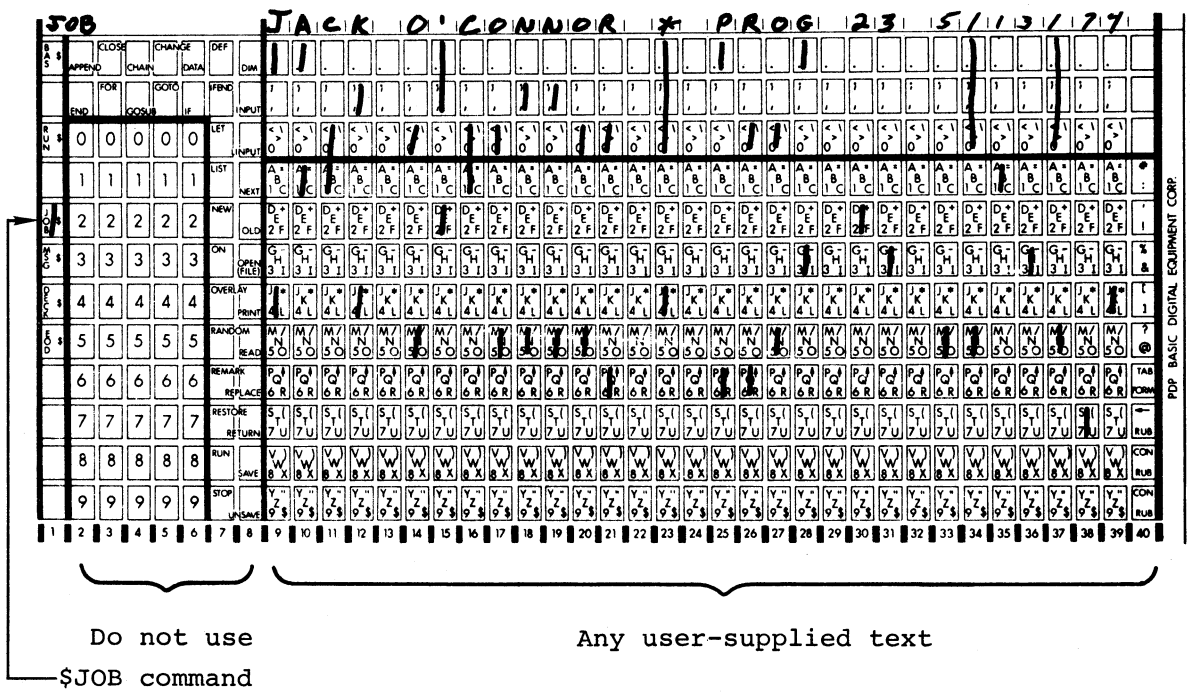


Figure 2-2
$JOB Control Card

2.5.2 The $BAS and $FORT Control Commands

The $BAS and $FORT Control Commands are used to tell MSBATCH whether to cause the program deck to be compiled as a BASIC program or as a FORTRAN program. A card containing a $BAS control command must be inserted immediately before a BASIC program deck. Similarly, a card containing a $FORT control command must be inserted immediately before a FORTRAN program deck. When the compilation is performed, a program listing is automatically printed on the listing device. Unlike other control commands, $BAS and $FORT appear only on the applicably marked language card (FORTRAN card for $FORT or BASIC card for $BAS). A $BAS control card has a single mark in the $BAS box in card column 1. A $FORT control card has a single mark in the $FORT box in card column 1. If the user does not wish to obtain a printed program listing from either compiler, he can enter the /NOL (for nolist) option on the appropriate card. This option is specified by marking the characters /NOL in the card's character field (columns 9 through 40). Figures 2-3 and 2-4 show examples of $BAS and $FORT control cards (notice that the /NOL option is specified on the $BAS card).

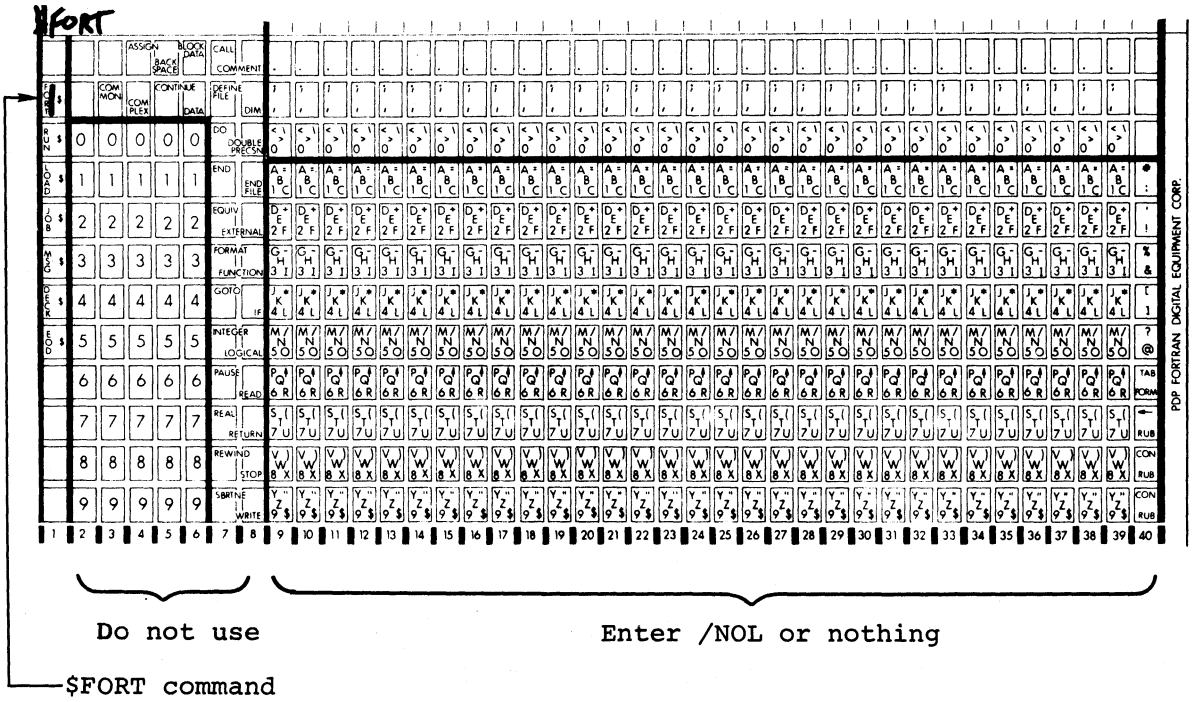


Figure 2-3
$FORT Control Card

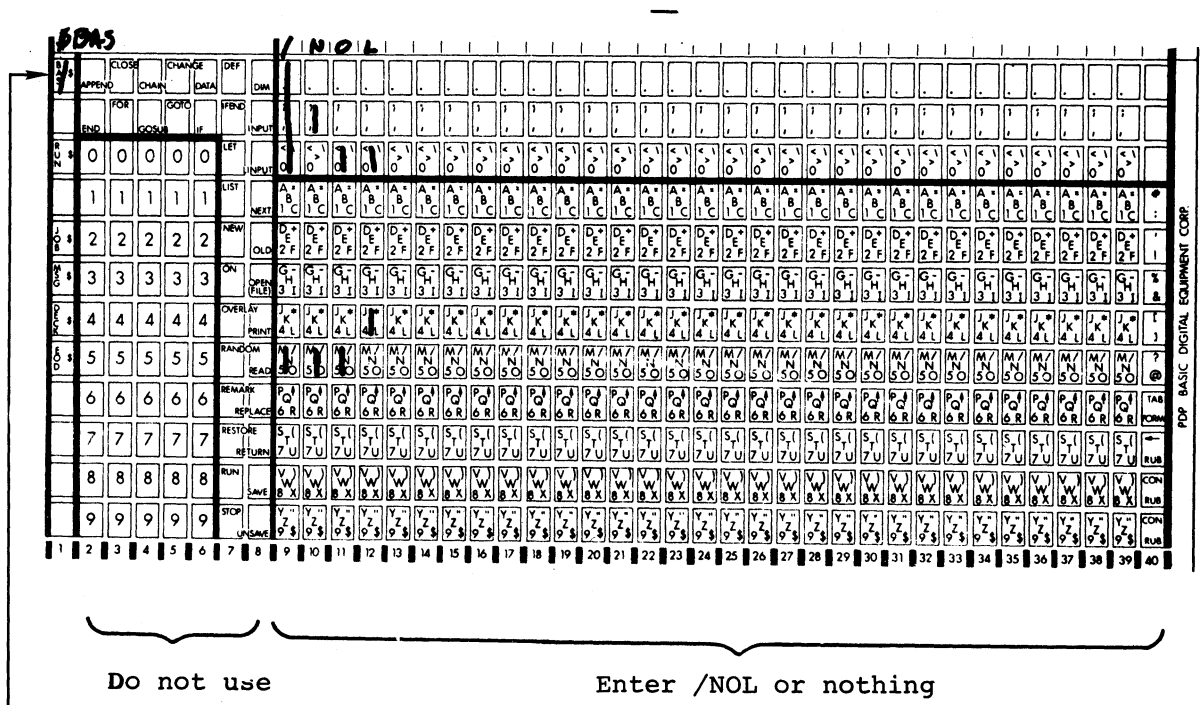


Figure 2-4
$BAS Control Card

2.5.3 The $EOD Control Command

A card containing a $EOD (end of deck) command must be the last card in both program and data decks. This control command tells MSBATCH where a program or data deck ends. A $EOD control card has a single mark in the $EOD box in card column 1. Figure 2-5 shows an example of a $EOD control card.

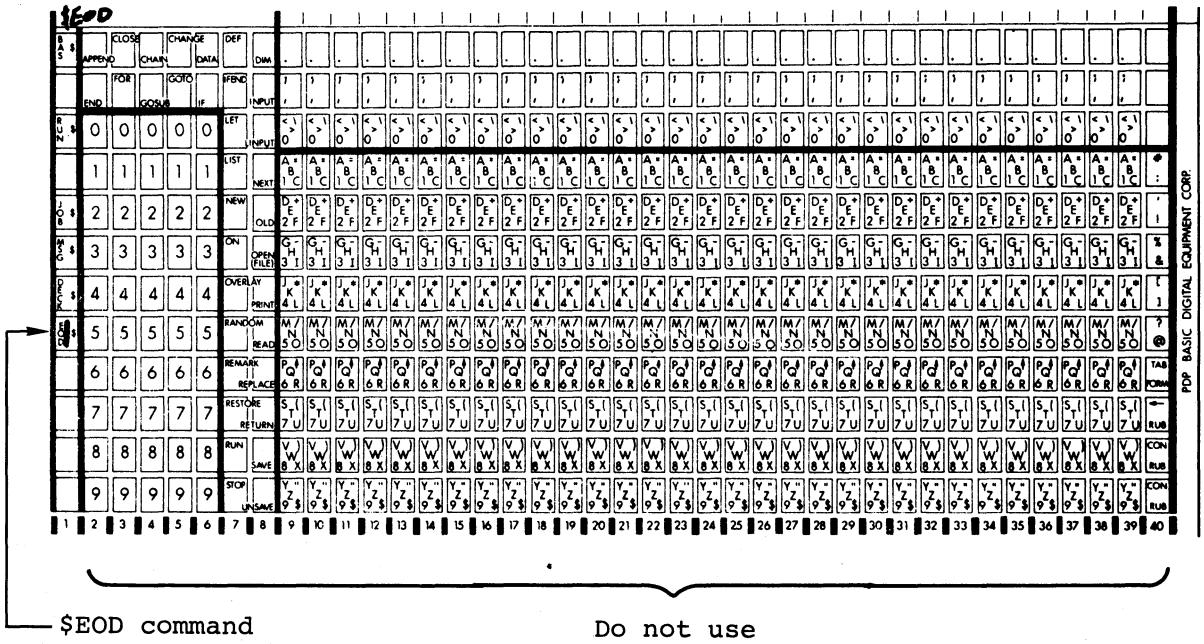


Figure 2-5
$EOD Control Card

2.5.4 The $RUN Control Command

The $RUN Control command causes the program compiled by a $BAS or $FORT control command to be executed. This command must be used if the program is to be executed. A $RUN control card is placed immediately after the $EOD control card that terminates the program deck. If the program requires a data deck, that deck must immediately follow the $RUN control card. The data deck must be terminated with a $EOD control card. The $RUN control card contains a single mark in the $RUN box in card column 1. Figure 2-6 shows an example of a $RUN Control Card.

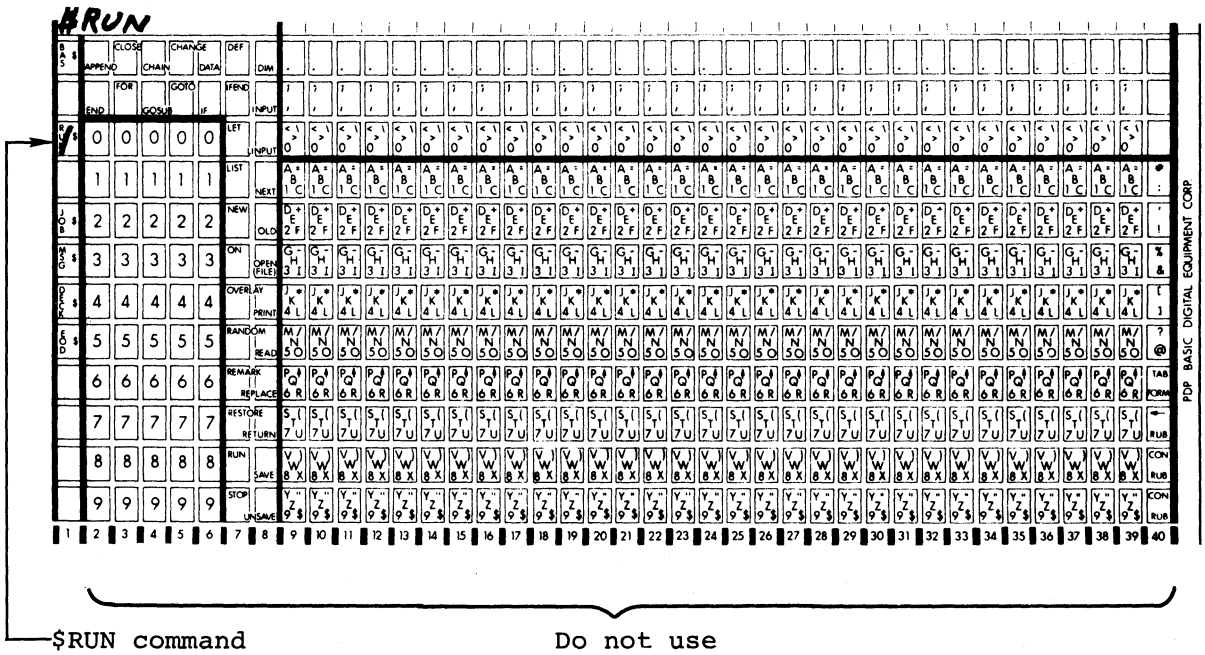


Figure 2-6
$RUN Control Card

2.5.5 Summary of Job Preparation Steps

A complete job deck ready to be run under MSBATCH control consists of:

1. A $JOB card as the first card
2. A $BAS or a $FORT card as the second card
3. The program deck
4. A $EOD card to terminate the program deck
5. A $RUN card if the job is to be executed
6. An optional deck of data cards
7. A $EOD card to terminate the data deck

Figure 2-7 shows the schematic layout of a complete job. This job deck is submitted to the system operator to be run.

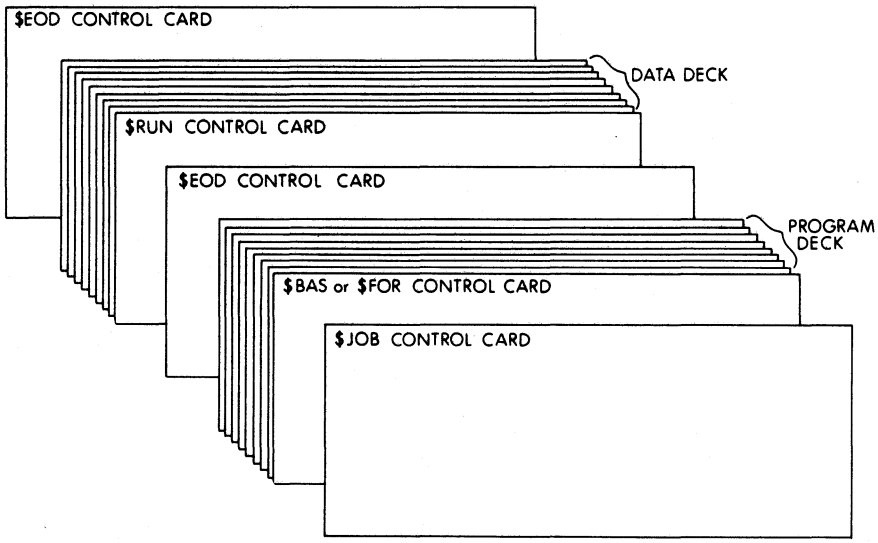


Figure 2-7
JOB Layout

2.6 INTERPRETING THE RESULTS OF A JOB RUN

The job output, printed on the listing device during the execution of each user's job, contains a running account of the results of job processing. Specific information that may appear in the job output include:

- Program listings, when requested
- Program output
- Control commands used in the job
- Error messages from either the FORTRAN or BASIC compiler
- Error messages from MSBATCH and OS/8 BATCH

In addition, the user will find other entries in the job output that do not appear to be related to his job. These entries are inserted into the job output by either MSBATCH or OS/8 BATCH. To understand the significance of these entries, the user should remember that the task of MSBATCH, when operating in Batch Mode or Interactive Batch Mode, is to prepare jobs into a batch stream file for execution by OS/8 BATCH. In order to do this, MSBATCH inserts a number of commands to OS/8 BATCH into the batch stream along with the contents of the user's job deck and any error messages concerning job preparation. MSBATCH also alters the input/output device specifications in BASIC programs being run in Batch Mode to allow them to properly access the user's data card deck and the listing device.

During job execution, OS/8 BATCH prints all batch stream commands, system program responses and OS/8 system program error messages on the listing device. The MSBATCH user need not be concerned with these entries and may ignore any entry in his job output that meets the following criteria:

1. Any line beginning with a period (.) or an asterisk (*) (these are OS/8 BATCH commands inserted by MSBATCH).

2. A $EOD control command following two lines after an entry beginning

   .R PIP ...

3. The message "NO FILES OF THE FORM...", inserted between entries described in 1 and 2 (above).

4. Modifications to BASIC program input/output statements that are directed to the data card deck and listing devices.

MSBATCH error messages directed to the user are defined in Table 2-1. These messages may be easily identified since they are preceded by a question mark (?). FORTRAN IV, FORTRAN II and BASIC compiler errors are described in Chapters 8, 7 and 6 (respectively) of the OS/8 Handbook.

The examples in Figures 2-8 through 2-13 show listings of BASIC, FORTRAN IV, and FORTRAN II job decks along with the associated job outputs produced during execution. The origin of each entry in the output listings is appropriately designated.

Each of the examples shows one or more instances of the use of the card continuation feature described in Appendix B. Since continuation is specified by a code rather than by a printing character, a vertical bar (|) is used, in these examples, to show the location of the continuation code relative to the preceding characters on the card.

FORTRAN users should notice that when a continuation card is specified, MSBATCH inserts an ampersand character (&) at the beginning of the continuation line. Further, the continuation line is offset three character positions to the left from the other lines so that the ampersand is positioned in the 6th character position of the line. (The reader should recall that the FORTRAN compilers require that program input lines must be in punched card image format. This means that statement numbers must be in character positions 1 through 5, while character position 6 specifies continuation if filled with a non-blank character. Positions 7 through 72 contain program statements.) Thus, the ampersand, since it is a non-blank character, causes FORTRAN to interpret the line as a continuation line. MSBATCH begins all other lines at character position 9 because it uses the CTRL TAB function (8 spaces) when separating statement numbers from statements.

Table 2-1

MSBATCH User Error Messages

Message	Meaning
?	Invalid character code or language statement keyword.
?BCL LINE TOO LONG	Batch Command Line too long. Too many characters in a control command to MSBATCH. The user continued a command card for more than 511 non-blank characters. The job is aborted.
?INVALID FILE SPECIFICATION	The user entered a file specification (dev:filenam.ex) incorrectly on a control card. The job is aborted.
?INVALID OPTION	The user specified an illegal option on a control card. The job is aborted.
?INVALID PROGRAM NAME	Invalid file specification (i.e.,dev:filenam.ex) on a $RUN control card. A $RUN control card was used without a previous compilation ($FOR or $BAS) or loading ($LOAD). When used this way, a $RUN control card must contain a file specification for the program being run.

NOTE

The last three error messages shown in Table 2-1 appear only when the advanced control card formats described in Chapter 3 are used.

```
$JOB BASIC EXAMPLE
$BASIC
        INPUT A0,A1,A2
        N=INT((A1-A0)/A2+.5)+1
        R0=A0*3.1416/180
        R2=A2*3.1416/180
        PRINT "X(DEGREES)","X(RADIANS)","SIN(
        X)"
        FOR I=1 TO N
        S=SIN(R0)
        PRINT A0,R0,S
        A0=A0+A2
        R0=R0+R2
        NEXT I
        STOP
        END
$EOD
$RUN

        0,90,5
$EOD
```

Control Cards

continuation card

continuation card specified here

Program Deck

Data Card

Figure 2-8
BASIC Example: Job Deck Listing

```
$JOB BASIC EXAMPLE

.R FOTP
*FIL???.*/D
NO FILES OF THE FORM: FIL???.*
$BASIC
.R PIP
*PROG.BA<BAT:
$EOD
*TTY:/T<PROG.BA
          FILE #3:"DATA.DA"\FILEV #4:"TTY:"
INPUT #3: A0,A1,A2
N=INT((A1-A0)/A2+.5)+1
R0=A0*3.1416/180
R2=A2*3.1416/180
PRINT #4: "X(DEGREES)","X(RADIANS)","SIN(X)"
FOR I=1 TO N
S=SIN(R0)
PRINT #4: A0,R0,S
A0=A0+A2
R0=R0+R2
NEXT I
CLOSE #4\STOP
CLOSE #4\END
$EOD
$RUN
.R PIP
*DATA.DA<BAT:
$EOD
.R BCOMP
*PROG.BA
X(DEGREES)     X(RADIANS)     SIN(X)
 0              0              0
 5              0.0872666      0.0871558
 10             0.174533       0.173648
 15             0.2618         0.258819
 20             0.349066       0.342021
 25             0.436333       0.422619
 30             0.5236         0.500001
 35             0.610866       0.573578
 40             0.698133       0.642789
 45             0.785399       0.707108
 50             0.872666       0.766045
 55             0.959932       0.819152
 60             1.0472         0.866025
 65             1.13446        0.906307
 70             1.22173        0.939692
 75             1.309          0.965926
 80             1.39626        0.984808
 85             1.48353        0.996196
 90             1.5708         0.999999
$EOD
```

$JOB Control Card

$BAS Control Card

BASIC Program Listing

Continuation Line

Inserted by MSBATCH

$EOD and $RUN Control Cards that follow the program deck.

Program output

$EOD Control Card that follows the data deck

Figure 2-9
BASIC Example: Job Output Listing

```
$JOB FORTRAN IV EXAMPLE
$FORTRAN
        READ (4,100) ANGLE0,ANGLE1,ANGINC
        N=INT((ANGLE1-ANGLE0)/ANGINC+.|
        5)+1
        RADIAN=ANGLE0*3.1416/180.
        RADINC=ANGINC*3.1416/180.
        WRITE (5,101)
        DO  1 I=1,N
        S=SIN(RADIAN)
        WRITE (5,102) ANGLE0,RADIAN,S
        ANGLE0=ANGLE0+ANGINC
 1      RADIAN=RADIAN+RADINC
        STOP
 100    FORMAT (3F8.0)
 101    FORMAT ('1X(DEGREES)',T20,'X(RADIANS)'|
        ,T40,'SIN(X)')
 102    FORMAT (' ',F3.0,T20,F5.3,T40,F5.3)
        END
$EOD
$RUN

        0.      90.     5.
$EOD
```

Control Cards

Continuation specified here

Continuation Card

Program Deck

Continuation specified here

Continuation Card

Data deck

Figure 2-10
FORTRAN IV Example: Job Deck Listing

```
$JOB FORTRAN IV EXAMPLE

.R FOTP
*FIL???.*/D
NO FILES OF THE FORM: FIL???.*
$FORTRAN
.R PIP
*FIL001<BAT:
$EOD
.R F4
*FIL001,TTY:<FIL001
```

$JOB Control Card

$FORT Control Card

Figure 2-11
FORTRAN IV Example: Job Output Listing

```
  OS/8  FORTRAN IV  3.02                                          PAGE  ONE

0002              READ (4,100) ANGLE0,ANGLE1,ANGINC
0003              N=INT((ANGLE1-ANGLE0)/ANGINC+.
                &5)+1
0004              RADIAN=ANGLE0*3.1416/180.
0005              RADINC=ANGINC*3.1416/180.
0006              WRITE (5,101)
0007  Cont.       DO  1 I=1,N
0010  Symbol      S=SIN(RADIAN)
0011              WRITE (5,102) ANGLE0,RADIAN,S
0012              ANGLE0=ANGLE0+ANGINC
0013     1        RADIAN=RADIAN+RADINC
0014              STOP
0015     100      FORMAT (3F8.0)
0016     101      FORMAT ('1X(DEGREES)',T20,'X(RADIANS)'
                &,T40,'SIN(X)')
0017     102      FORMAT (' ',F3.0,T20,F5.3,T40,F5.3)
0020              END
$EOD
$RUN
.R LOAD
*PROG.LD<
*FIL001/C
*$
.R PIP
*DATA.DA<BAT:
$EOD
.R FRTS
*PROG.LD
*DATA.DA/4
*TTY:/5
*$
```

Continuation Lines

$EOD and $RUN Control cards that follow the program deck.

```
X(DEGREES)          X(RADIANS)          SIN(X)
 0.                 0.000               0.000
 5.                 0.087               0.087
10.                 0.175               0.174
15.                 0.262               0.259
20.                 0.349               0.342
25.                 0.436               0.423
30.                 0.524               0.500
35.                 0.611               0.574
40.                 0.698               0.643
45.                 0.785               0.707
50.                 0.873               0.766
55.                 0.960               0.819
60.                 1.047               0.866
65.                 1.134               0.906
70.                 1.222               0.940
75.                 1.309               0.966
80.                 1.396               0.985
85.                 1.484               0.996
90.                 1.571               1.000
$EOD
```

Program Output

$EOD Control Card following data deck

Figure 2-11 (Cont.)
FORTRAN IV Example: Job Output Listing

```
$JOB FORTRAN 2 EXAMPLE
$FORTRAN
1         READ (1,100) X
          X2=SQRT(X)
          WRITE (1,101) X,X2
          GO TO 1
100       FORMAT (F8.0)
101       FORMAT ('SQRT(',E10.4,')=',E10.4,'
     &..')
          END
$EOD
$RUN
  1.
  4
  9.
  1.21
$EOD
```

Control Cards

Continuation Specified here

Program Deck

Continuation Card

2 spaces

Data Deck

Control Cards

Figure 2-12
FORTRAN II Example: Job Deck Listing

```
$JOB FORTRAN 2 EXAMPLE

.R FOTP
*FIL???,*/D
$FORTRAN
.R PIP
*FIL001<BAT:
$EOD
*TTY:/T<FIL001
1         READ (1,100) X
          X2=SQRT(X)
          WRITE (1,101) X,X2
          GO TO 1
100       FORMAT (F8.0)
101       FORMAT ('SQRT(',E10.4,')=',E10.4,'
     &..')
          END
.R FORT
*FIL001<FIL001
$EOD
$RUN
.R LOADER
*GENIOX
*FIL001
*$
.SAVE DSK:PROG
.RUN DSK:PROG
SQRT(0.1000E+01)=0.1000E+01   ..
SQRT(0.4000E+01)=0.2000E+01   ..
SQRT(0.9000E+01)=0.3000E+01   ..
SQRT(0.1210E+01)=0.1100E+01   ..
IOER ERROR AT LOC 03102
$EOD
$EOD
```

$JOB Control Card

$FORT Control Card

Continuation Line

$EOD and $RUN Control Cards that follow the program deck.

Program output

Note: This message is output by the FORTRAN II object time system whenever the end of the data deck is reached and can be ignored.

$EOD Control Card following data deck

Figure 2-13
FORTRAN II Example: Job Output Listing

CHAPTER 3
MSBATCH CONTROL COMMANDS

3.1 INTRODUCTION

3.1.1 General

The MSBATCH Control commands are used by the programmer to direct the operation of MSBATCH in preparing programs for execution. Most control commands consist of one or more elements. The first element is a mnemonic which characterizes the action or procedure that it performs. The mnemonic is located in card column 1 of the mark sense card. The dollar sign ($) is always the first character of a control command mnemonic.

Examples:

```
$BAS
$FORT
$RUN
$LOAD
$JOB
$MSG
$DECK
$EOD
```

Remaining elements of a control command are optional arguments and their delimiters. An argument is used both to modify the action of a control command and to specify the object to which the action of the control command is directed.

3.1.2 Symbology Used for Reference Format

The symbols and mnemonics described below are used throughout this chapter to assist in describing the various control command arguments.

{ }	Braces designate optional control command arguments.
||	Vertical bars designate a list of control command arguments among which a single choice must be made.

UPPER CASE CHARACTERS	Upper case characters indicate control command arguments that must be used exactly as shown.
lower case characters	Lower case characters indicate user-supplied control command arguments (e.g., filnam.ex, dev:, n, etc.).

3.1.3 Rules for Command Syntax

Since MSBATCH control commands can be input only from mark sense cards, the rules governing the syntax of these control commands are the same rules that govern the procedures for marking a control card. These procedures are described in detail in Appendix B and are summarized below:

1. A control command is designated by marking the box in card column 1 that is imprinted with the command.
2. Boxes in card column 1 that are not printed with a command mnemonic may not be marked.
3. Only one control command can be specified on a card.
4. None of the boxes in card columns 2 through 8 may be marked.
5. Control command arguments, when specified, must appear in card columns 9 through 40 (this also includes the marking to indicate continuation cards).
6. Leading, trailing, or intervening spaces in an argument are ignored.
7. File specifications (dev.filnam.ex) are separated from each other by a comma (,).

3.2 DETAILED DESCRIPTIONS

The control commands used by MSBATCH fall into three functional groups:

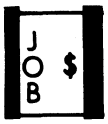
- General Purpose Job Control Commands
- BASIC Job Control Commands
- FORTRAN Job Control Commands

Table 3-1 summarizes the function of each control command by group. The paragraphs that follow describe the control commands and their options in detail, by group. Examples of use are provided as required for clarification.

Table 3-1

Control Command Summary

General Purpose Control Commands	Description
$JOB {text}	Initializes MSBATCH to begin a new job.
$DECK | dev: / dev:filnam / filnam | {options}	Copies a deck of cards to an OS/8 file.
$MSG text	Transmits a message to the computer operator.
$EOD	Terminates either a program deck or a data deck when no other control card follows.
BASIC Control Commands	
$BAS {options}	Prepares a BASIC program for execution.
$RUN	Executes program prepared by the last $BAS control card.
FORTRAN Control Commands	
$FORT {options}	Prepares FORTRAN IV or FORTRAN II programs for loading.
$LOAD {options}	Loads all FORTRAN IV or FORTRAN II programs for loading.
$RUN {options}	1. Executes the program(s) loaded by previous $LOAD. 2. Automatically performs a $LOAD and then executes the loaded programs.



3.2.1 General Purpose Control Commands

This section describes those control commands that are independent of both FORTRAN and BASIC programs.

3.2.1.1 $JOB Control Command

Form: $JOB{text}

Description: This control command initializes MSBATCH to accept a new job. This command must be on the first card in every job deck. $JOB deletes all temporary files and other internal data pertaining to the previous job.

Option: The optional argument (text) comprises the remainder of the card (columns 9 through 40) and consists of any text that the user wishes to include in the job header. This header information is used primarily for job identification to provide correlation between teleprinter and line printer output and the user's deck of cards.

Examples:

1. $JOB MATH 201, SECTION 6, J.J. QUACKENBUSCH III

2. $JOB STUDENT NO. 432. THIS JOB COMPILES AND RUNS A PROGRAM TO COMPUTE PI.

3.2.1.2 $DECK Control Command

Form: $DECK | dev / dev:filnam.ex / filnam | {options}

Description: This control command copies a deck of program cards or data cards to a specified device (dev:) and file (filnam.ex). All program statements that follow this command, up to the next control command, are normally interpreted as a BASIC program. A listing of the deck is printed on the listing device. If no device is specified, the file is output to the system device (SYS:). If no file name is specified, the device must be a non-file structured output device such as the paper tape punch (PTP:), line printer (LPT:), or console terminal (TTY:). In these cases, the /NOList option, described below, must be specified.

Options: Options can be specified in any order and are defined as follows:

/F{ORTRAN}	Interpret the cards that follow as a FORTRAN program.
/B{ASIC}	Interpret the cards that follow as a BASIC program (default option).
/NOL{IST}	Do not create a program listing. This option must be specified if the deck of cards is output to a non-file structured device such as paper tape punch (PTP:), line printer (LPT:), or console terminal (TTY:).

Examples:

1. This control command copies the cards that follow it as a BASIC program into TEST.BA on the system device (SYS:). No program listing is output.

```
$DECK TEST.BA/NOL
```

2. This control command copies the cards that follow it as a FORTRAN program into a file called TIM.FO and prints a listing of the deck on the listing device.

```
$DECK TIM.FO/F
```

3. This control command copies the cards that follow it as a BASIC program named TEMPO.12 on DECtape unit 1. No program listing is output.

```
$DECK DTA1:TEMPO.12/NOL
```

3.2.1.3 $MSG Control Command

Form: $MSG text

Description: This control command allows the user to send messages to the computer operator. The $MSG command causes the bell or other signalling device on the console terminal to sound and the text message in the character field of the card (columns 9 through 40) to be printed.

Options: None

Example:

This control command causes the message "PLEASE PLACE H. GLAZER'S TAPE IN READER." to be printed at the console terminal.

```
$MSG PLEASE PLACE H. GLAZER'S TAPE IN READER.
```

3.2.1.4 $EOD Control Command

Form: $EOD

Description: This control command delimits a deck of either data cards or program cards. This card is not required if a card deck is followed by a card containing another control command.

Options: None.

3.2.2 BASIC Job Control Commands

This section describes the job control commands that are particularly associated with programs written in the BASIC language.

3.2.2.1 $BAS Control Command

Form: $BAS {options}

Description: The $BAS control command prepares the cards that follow, up to the next control command, for execution as a BASIC program and prints the program on the listing device.

Options: Options can be specified in any order and are defined as follows:

{dev:} filnam.ex	Input the BASIC program from the specified file (filnam.ex) residing on the specified device (dev:), rather than from cards. If no device is specified, input is from the system device (SYS:).
/NOL{IST}	Do not create a program listing.

Examples:

1. This control command instructs MSBATCH to input the program from a file named INTEGR.BA, which resides on the system device, and to print its listing on the listing device.

```
$BAS INTEGR.BA
```

2. This control command causes the program to be input from cards and suppresses printing of the program listing.

```
$BAS /NOL
```

3.2.2.2 $RUN Control Command

Form: $RUN

Description: The $RUN control command executes the program prepared by the last $BAS control command. Any data input from cards must immediately follow this card. The data deck must be terminated by either a $EOD card or any other control command.

Options: None.

3.2.3 FORTRAN Control Commands

The following paragraphs describe the job control commands particularly associated with programs written in either the FORTRAN IV or FORTRAN II language. Unless otherwise stated, these job control commands can be used interchangeably with either FORTRAN IV or FORTRAN II programs.

3.2.3.1 $FORT Control Command

Form: $FORT {options}

Description: The $FORT control command compiles the cards that follow, up to the next control command, as a FORTRAN program, and produces a relocatable binary file on the system device. The program deck is terminated by either a $EOD card or any other control command. The program listing is printed on the listing device.

Options: Options can be specified in any order and are defined as follows:

{dev:} filnam.ex — Create a relocatable binary file with the specified file name (filnam.ex) on the specified device (dev:). If no device is specified, the file is placed on the system device (SYS:).

/S {RC} = {dev: } filnam.ex

Accept the program from the specified file (filnam.ex) residing on the specified device (dev:) rather than from cards. If no device is specified, the file is input from the system device (SYS:).

/NOL {IST} — Do not create a program listing.

/L {IST} = | dev:filnam,ex
filnam.ex
dev: |

Output the program listing to the specified file (filnam.ex) residing on the specified device (dev:). If no device is specified, the file is output to the system device (SYS:).

FORTRAN IV option only

/R{ALF}	Print an assembly listing of the RALF assembler code generated by the FORTRAN IV compiler on the listing device.

FORTRAN II option only

/S{ABR}	Print an assembly listing of the SABR assembly code generated by the FORTRAN II compiler on the listing device.

Examples:

1. This control command compiles a program from the cards that follow it and outputs the binary file to the system device with the file name STAT.RL. The program listing is printed on the listing device.

```
$FORT STAT.RL
```

2. This control command compiles a program from a file called CIRCLE residing on DECtape unit 1 and outputs a binary file called CIRCLE.RL to DECtape unit 1. No program listing is output.

```
$FORT/SRC=DTA1:CIRCLE,DTA1:CIRCLE/NOL
```

3.2.3.2 $LOAD Control Command

Form: $LOAD {options}

Description: The $LOAD control command automatically loads all relocatable binary files created by FORTRAN since the execution of the last $JOB and prepares them for execution via the $RUN control command. Only those files created since the last $LOAD or implicit $LOAD (via $RUN command) are loaded.

Options: Options can be specified in any order and are defined as follows:

{L= / O=} | dev:filnam.ex / filnam.ex / dev: |

Load an additional file (filnam.ex) from the specified device (dev:). Levels and overlays (FORTRAN IV only) are specified by using the optional syntax: "L=" for starting a new overlay level and "O=" for starting a new overlay within the current level. Refer to the description of the FORTRAN IV Compiler contained in Chapter 8 of the OS/8 Handbook.

Multiple programs are loaded by using an additional file specification (dev:filnam.ex) for each program. Separate each file specification from the next by a comma (,).

Note that the slash (/) delimiter is not used with this option.

/IM{AGE} = {dev:} filnam.ex

Save the memory image file produced by the loader, using the specified device (dev:) and file name (filnam.ex). If no device is specified, the file is saved on the system device (SYS:). If the /IMAGE option is not specified, the file is deleted when another $JOB, $LOAD, or $RUN with implied loading is executed.

/L{IST}=|dev:filnam.ex|
|filnam|
|dev:|

Save the loader's memory map listing using the specified device (dev:) and file name (filnam.ex). If no device is specified, the file is saved on the system device (SYS:). If no file name or device is specified, the listing is printed on the listing device.

/LIB{RARY}={dev:} filnam.ex

Load necessary object time system routines from a user-created library file (filnam.ex) residing on a specific device (dev:). If no device is specified, it is assumed that the library resides on the system device (SYS:).

/NOA{UTO}

Do not automatically load programs compiled since the last $JOB, $LOAD or implicit $LOAD (via $RUN). This option is used when a number of programs have been compiled but only specifically named programs are to be loaded.

FORTRAN IV option only

/SS{YMB}

Send a listing of system symbols to the device specified in the /LIST option.

FORTRAN II options only

/IN{PUT}

Reserve space for an input device handler.

/OUT{PUT}

Reserve space for an output device handler.

/TWO

The handler specified by either /IN or /OUT option is a 2-page handler.

Examples:

1. This control command loads all programs compiled since the last $JOB, $LOAD or $RUN with implied loading:

```
$LOAD
```

2. This control command loads three previously compiled programs called MAIN.RL, SUBRA.RL, and SUBRB.RL (only) residing on DECtape unit 1:

```
$LOAD  DTA1:MAIN,DTA1:SUBRA,DTA1:SUBRB/NOAUTO
```

3. This control command card:

   a. Loads all previously compiled programs since the last $JOB, $LOAD, or $RUN with implied loading.

   b. Loads a compiled program called TEST from the system device. (SYS:)

   c. Saves the resulting memory image on the system device as RUN4.

   d. Prints a Loader memory map on the listing device.

```
$LOAD /L/IM=RUN4,TEST
```

3.2.3.3 $RUN Control Command

Form: $RUN {options}

Description: This control command executes the program(s) loaded by the last $LOAD control command. Program data cards (if any) must immediately follow this card. If this card follows a $FORT card, rather than a $LOAD card, a $LOAD is automatically performed and any of the $LOAD options described in 3.2.3.2 can then be specified on this card.

Options: Options can be specified in any order and are described as follows:

{dev:}filnam.ex Run a memory image loader file residing on the specified device (dev:). If no device (dev:) is specified, the file is input from the system device (SYS:). The file must have been previously created using the $LOAD control command's /IMAGE option. Further, this option can be used only when $RUN is not preceded by either a $FORT or $LOAD card. When this option is selected, no $LOAD command options can be used.

FORTRAN IV option only

/un{N/C} = | dev:filnam.ex / filnam.ex / dev: / hn |

where:

un = FORTRAN IV logical unit numbers 1 through 9

N = create a new output file (file name must be specified)

C = reverse the listing device carriage control processing currently in effect (to on or off).

hn = FORTRAN IV device handler number, 1 through 4.

dev:filnam.ex = device (dev:) and file name (filnam.ex) where file resides. If no device is specified, the file resides on the system device (SYS:).

This option allows the user to establish and modify the input and output device assignments used by FORTRAN IV programs. OS/8 devices and files can be assigned to specific logical unit numbers. Existing assignments for FORTRAN IV's internal device handlers can be altered. Refer to Chapter 4 for further information about I/O devices available under MSBATCH.

> NOTE
>
> If a numeric file name in the range of 1 through 4 is used, it must be specified with a trailing period, whether or not a file name extension is used. For example:
>
> /6=3.
>
> assigns logical unit 6 to a file named 3 on the system device.

Examples:

1. This control command loads and runs all FORTRAN IV programs compiled since the last $JOB or $LOAD card. Input is via unit 4 from a file called JOE2 and output is via unit 5 to a new file (/N option) called RESULT. Both files are on the system device (SYS:).

```
$RUN    /4=JOE2/5N=RESULT
```

2. This control command runs the memory image file of either a FORTRAN IV or a FORTRAN II program called TASK31 residing on DECtape unit 2.

```
$RUN    DTA2:TASK31
```

3. This control command loads and runs either a FORTRAN II or a FORTRAN IV program compiled by the last $FORT card. The memory image file is saved on the system device as MTH02. Carriage control command processing for the line printer listing device (I/O unit 5) is reversed.

```
$RUN    /IMAGE=MTH02/5C=LPT:
```

CHAPTER 4
INPUT/OUTPUT CONSIDERATIONS

4.1 INTRODUCTION

In general, input/output programming facilities and techniques available to the MSBATCH user are those provided by OS/8. This information is described in Chapter 1 of the OS/8 Handbook. There are, however, several exceptions that are of concern to the user. The paragraphs that follow describe them.

4.2 FILE NAMING RESTRICTIONS

The user must be careful not to select filenames identical to the names of the temporary files used by MSBATCH and OS/8 BATCH. These files are automatically deleted when the next $JOB command is executed. Therefore, the user should not attempt to read from or write into files that have names that begin with the letters: FIL or PROG. Further, FORTRAN IV or BASIC users should not attempt to write into any file called DATA.DA, since this file contains the user's data deck card images.

4.3 I/O DEVICES

Both FORTRAN and BASIC programs normally obtain data from a file created from a deck of data cards that follows the $RUN control card. Output from a program is normally sent to the system's listing device, either line printer or console terminal, whichever is available. This I/O scheme can be altered in several ways:

- The operator can run MSBATCH in Interactive Batch Mode, in which case input/output as described above is automatically switched to the console terminal's keyboard and printer -- no program modification is required.

- The user can access other OS/8 devices and files in accordance with the rules of the language being used and the following paragraphs.

4.3.1 BASIC Programs

BASIC programs are permitted two simultaneously open files: two input files, two output files or one of each. Any OS/8 device can be used

except LPT: and CDR:. The file DATA.DA must not be accessed explicitly. Table 4-1 shows the input/output operations allowed under MSBATCH.

Table 4-1

BASIC I/O Operations

Statement	File Numbers	Device
INPUT	-	Program's card deck image file DATA.DA residing on the system device (SYS:)
PRINT	-	Listing device.
INPUT	1	I/O to user specified files and devices except LPT: and CDR:
PRINT		
INPUT	2	I/O to user specified files and devices except LPT: and CDR:
PRINT		

4.3.2 FORTRAN IV Programs

FORTRAN IV programs perform input/output operations using logical unit numbers in arguments to READ and WRITE statements. These logical units can be assigned at run time either to one of the internal device handlers within FORTRAN IV or to an OS/8 device and file. This is accomplished by a $RUN command option (see 3.2.3.3). Table 4-2 shows the default device assignments and their use.

Table 4-2

FORTRAN IV I/O Operations

Statement	Logical Unit Number	Device/Use
READ	1	Papertape reader (internal FORTRAN IV handler No. 1)
WRITE	2	Papertape Punch (internal FORTRAN IV handler No. 2)
READ/WRITE	3	Not assigned
READ	4	Program's data card deck image file DATA.DA residing on the system device (SYS:)
WRITE	5	Listing device (LPT: or TTY: whichever is available)
READ/WRITE	6 7 8 9	Not assigned

4.3.3 FORTRAN II Programs

FORTRAN II programs perform device dependent input/output. Table 4-3 shows the input/output operations and devices available.

Table 4-3

FORTRAN II I/O Operations

Statement	Unit No.	Device
READ	1	Program data deck card images from batch stream file
WRITE		Listing device
READ	2	High speed reader
WRITE	2	High speed punch
READ	4	Any OS/8 device and file
WRITE		

NOTE

Unit number 3 may not be used with programs being run under MSBATCH.

CHAPTER 5
OPERATING PROCEDURES

5.1 INTRODUCTION

This chapter describes the MSBATCH operating procedures. Installation procedures are described in Appendix D.

MSBATCH has three operating modes: Batch Mode, Interactive Batch Mode and PIP Mode.

In Batch Mode, users submit their jobs to the operator who, in turn, processes them via MSBATCH for automatic execution under OS/8 BATCH. User program input is obtained from either a data card deck, an OS/8 file, or paper tape. MSBATCH processes the batch stream to produce an output file, then chains to OS/8 BATCH for job execution. User program output is directed either to the listing device, to an OS/8 file, or to paper tape.

Interactive Batch Mode permits users to process their jobs individually. In this mode of operation all input/output normally associated with the data card deck and the listing device is automatically switched to the console terminal. Input, rather than being obtained from the data card deck, is derived from the console terminal's keyboard. Output is directed to the console terminal's printer rather than to the listing device.

In PIP Mode operation, MSBATCH permits the contents of a deck of cards to be transferred to any other OS/8 device. MSBATCH does not chain to OS/8 BATCH. Cards with control commands, language statements and data are interpreted accordingly.

5.2 PREPARING THE JOB DECK

The following steps describe MSBATCH job preparation.

1. Make sure that each job begins with a $JOB control card.

2. Collect all jobs to be processed during the same run into a single deck. There is no limit to the number of cards or jobs in this deck.

3. Place an end of file card at the end of the deck. This card automatically signals MSBATCH that there are no more cards to be input. An end of file card is a card that has the code for a back arrow (←) marked in column 1 as shown in Figure 5-1. The remainder of the card must be blank. If an end of file card is not used, the operator can manually signal MSBATCH when the end of the deck is reached by typing CTRL/Z in response to the "LOAD MORE CARDS OR TYPE ↑Z" message.

4. Arrange the cards so that they all face in the same direction.

5. Place the deck in the card reader's input hopper so that the cards face down with the row of black marks at the bottom of each card placed inward toward the back of the reader. If the deck is too large to fit in the reader, place as many cards as possible into the reader's input hopper starting at the beginning of the deck. (Refer to Appendix C for detailed card reader operating procedures.) MSBATCH will signal when it is ready to accept the remaining cards.

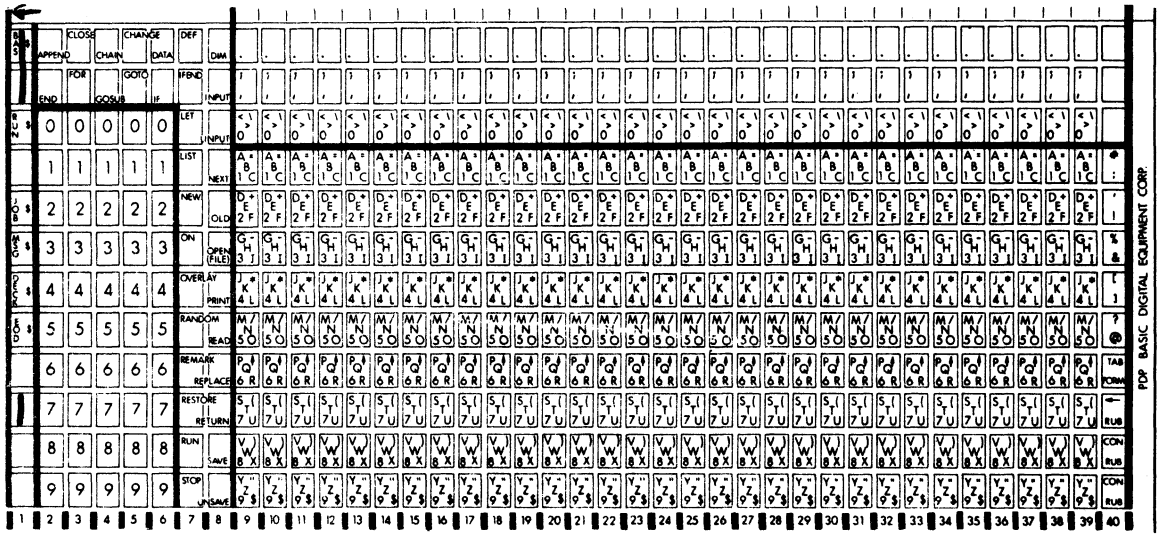


Figure 5-1
End of File Card

5.3 LOADING AND RUNNING MSBATCH

MSBATCH is loaded like any other OS/8 system program. The operator calls MSBATCH by typing:

```
.R MSBAT
```

immediately to the right of the dot prompting symbol (.) printed by the OS/8 Keyboard Monitor. The command decoder responds by printing an asterisk at the left margin. The operator then responds by typing an output file specification followed by any of the options listed below. No input file may be specified, since input is always obtained from the card reader. If no options are specified, MSBATCH assumes Batch Mode operation is desired. This means that MSBATCH prepares a batch stream file from all jobs input to it, then chains to OS/8 BATCH to execute them. It further assumes that the listing device is the line printer.

The format of the command decoder line is:

{dev:}{output.ex}{/options}

where:

dev: = Output device that contains the file obtained from the input card deck. If not specified, the system device (SYS:) is assumed.

output.ex = Name of the output file. If not specified, MSBATCH types:

<u>NO OUTPUT FILE SPECIFIED</u>

then recalls the OS/8 Command Decoder to allow the operator to input a name. The batch stream file created by MSBATCH must reside on the system device (SYS:) or on a device that is co-resident with SYS: if OS/8 BATCH is to read it.

/options

/B Enter PIP Mode and transfer the input card deck to the specified output device. All language keywords are assumed to be BASIC until a $FORT control card is encountered. This option should be used when copying data cards.

/F Same as /B option except all language keywords are interpreted as FORTRAN statements until a $BAS card is encountered.

/I Prepare programs for execution in Interactive Batch Mode. Programs that were set up to input from a data card deck and output to the listing device are altered so that the console terminal is accessed instead.

When either /B or /F is selected, and the deck to be translated contains only program statements (i.e., no control cards, /I should be specified.

/T Prepares the batch stream to use the console terminal, rather than the line printer, as the listing device.

/V Causes MSBATCH to print its version number at the console terminal; all other command string options are ignored. The command decoder is restarted to accept another command string.

/2 Instructs MSBATCH to use the FORTRAN II compiler. FORTRAN IV is normally assumed.

NOTE

If /T is not specified, BATCH will try to determine whether a line printer is present. If the line printer is not switched to "on line" when BATCH starts, some output will incorrectly be sent to the teleprinter. If this should happen, type CTRL/C to return to the OS/8 Monitor. Switch the line printer to "on line", type

```
.R BATCH
```

When BATCH prints an asterisk (*), type the name of the device and file originally specified to MSBATCH for its batch stream output:

```
*dev:output.ex
```

Since MSBATCH passes control to OS/8 BATCH when in Batch Mode or Interactive Batch Mode, the operator can also include any appropriate OS/8 BATCH options as described in the OS/8 Handbook.

The command decoder line can be terminated with either a Carriage RETURN or an ALT MODE. Once the terminator is typed, MSBATCH reads the cards the operator placed in the card reader. When all cards are read, MSBATCH prints

LOAD MORE CARDS OR TYPE ↑Z

at the console terminal and waits for the operator to respond. If there are more cards for MSBATCH to process, load and start the card reader. MSBATCH continues in this manner until all cards in the batch stream are read. If the last card in the deck is an end of file card, MSBATCH terminates input automatically. Otherwise, the message

LOAD MORE CARDS OR TYPE ↑Z

is again printed, and CTRL/Z must be typed to signify the end of the deck. (CTRL/Z is typed by depressing the CTRL key while striking the Z key.)

MSBATCH then prints a tally of the number of cards it detected that contained invalid characters. For example:

5 CARDS IN ERROR

or if no cards are in error:

NO CARDS IN ERROR

If neither the /B nor /F (PIP Mode) option is selected, control automatically passes to OS/8 BATCH so that each job can be executed. Otherwise, control returns to the command decoder to allow the operator to enter another command string.

5.4 RESPONDING TO USER REQUESTS

The user has the capability of communicating with the operator via the $MSG control card. This control command is passed to OS/8 BATCH for processing during job execution. When BATCH finds a $MSG command, it temporarily halts job processing, operates the console terminal's signalling device, prints the user's message at the console terminal, then waits for the operator to respond. Job processing is resumed by typing any character on the terminal's keyboard.

5.5 TERMINATING BATCH JOB EXECUTION

The operator can terminate MSBATCH or OS/8 BATCH processing by typing CTRL/C at the console terminal. This is accomplished by depressing the CTRL key while striking the C key. CTRL/C causes MSBATCH to return control to the OS/8 Keyboard Monitor.

5.6 ERROR MESSAGES

MSBATCH, OS/8 BATCH and the other OS/8 system programs perform error checking and reporting to facilitate rapid job processing. Operating errors detected by OS/8 programs other than MSBATCH are reported via OS/8 BATCH in the job output. Refer to the applicable sections of the OS/8 Handbook for descriptions of these messages and the appropriate recovery procedures.

Errors reported by MSBATCH are of two types: user errors and operator errors. User errors result from mistakes in preparing a job deck and are reported in each user's job output. Table 2-1 lists and describes error messages of this type. Operator error messages result from either faulty operating procedures or hardware problems with the MSBATCH output device. Table 5-1 lists and describes these error messages.

Table 5-1

MSBATCH Operator Error Messages

Message	Meaning
"BATCH.SV" NOT FOUND ON SYS:- CAN'T CHAIN	MSBATCH has created an output batch stream file, but in attempting to chain to OS/8 BATCH, it discovered that the file BATCH.SV (which contains OS/8 BATCH) was not resident on the system device (SYS:). If BATCH.SV is on another device, the operator can run OS/8 BATCH from that device and use the batch stream file created by MSBATCH for input. For example, if BATCH resides on DTA1 and the MSBATCH batch stream file was named RUN.01 and was on the system device, the operator could type: .RUN DTA1:BATCH *RUN.01(options)
CAN'T CLOSE FILE	While MSBATCH was attempting to close the output file (tape or disk), it discovered that the output device: 1. was switched to WRITE LOCK (or PROTECT), 2. generated a hardware error. The operator should: 1. correct the error condition, 2. reload the batch deck into the card reader, 3. run MSBATCH and repeat the operation.

Table 5-1 (Cont.)

MSBATCH Operator Error Messages

Message	Meaning
CAN'T ENTER FILE	While MSBATCH was attempting to open the output file (tape or disk), it discovered that the output device: 1. was switched to WRITE LOCK (or PROTECT), 2. had a full directory, 3. generated a hardware error. The operator should: 1. correct the error, 2. reload the deck into the card reader, 3. run MSBATCH and repeat the operation.
CAN'T FETCH DEVICE HANDLER	MSBATCH attempted to load a device handler that was not resident on the system device (SYS:). This means that the copy of the OS/8 system that resides on the system device is defective. The operator should: 1. install a new copy of the system onto the system device, 2. reload the deck into the card reader, 3. run MSBATCH and repeat the operation.
CARD IN READER BACKWARDS: TYPE SPACE TO CONTINUE.	The operator has placed one or more cards in the reader in the reverse direction or upside down. The operator should: 1. remove the offending card, 2. place it in the reader's input hopper correctly at the bottom of the deck (i.e., in the position of the next card to be read), 3. press the SPACE bar on the console terminal's keyboard to resume operation.

Table 5-1 (Cont.)

MSBATCH Operator Error Messages

Message	Meaning
nnnn. CARDS IN ERROR	MSBATCH detected a number of cards (nnnn) that were incorrectly marked. This message is printed at the end of every MSBATCH operation. This is due to user errors in marking the cards. The user's output listing indicates which cards were in error so that the user can correct them and resubmit them. The occurrence of error cards does not affect the execution of other jobs in the batch stream.
FILE TOO BIG	The MSBATCH output file exceeds the space available on the device (tape or disk). The operator should: 1. use another device or mount a new tape (tape device) or delete some of the files with PIP (D and S option switches), 2. reload the deck into the card reader, 3. run MSBATCH and repeat the operation.
LOAD MORE CARDS OR TYPE ↑Z	The card reader has run out of cards. Place more cards in the reader, then type any character on the console terminal's keyboard to continue the operation. If there are no more cards, type CTRL Z to signify this to MSBATCH. This message is not output if the last card in the deck is an end of file card (see 5.2).
NO OUTPUT FILE SPECIFIED	The operator neglected to enter an output file specification (dev:filnam.ex) to the Command Decoder while initializing MSBATCH.

Table 5-1 (Cont.)

MSBATCH Operator Error Messages

Message	Meaning
OUTPUT ERROR	While MSBATCH was attempting to write to the output file (tape or disk), it discovered that the output device: 1. was switched to WRITE LOCK (or PROTECT), 2. generated a hardware error. The operator should: 1. correct the error, 2. reload the deck into the card reader, 3. run MSBATCH and repeat the operation.

APPENDIX A
GLOSSARY OF TERMS

BASIC Card	A mark sense card that is preprinted with BASIC language statement keywords.
Batch Mode	A facility of MSBATCH that permits continuous sequential processing of a single job or an accumulated group of jobs under the supervision of a computer operator. Program input normally obtained from the terminal's keyboard is obtained from a data deck. Output normally directed to the terminal's printer is directed to the listing device.
Batch Stream	The sequence of control commands, keywords and data that comprise the job or jobs to be processed.
Control Card	A mark sense card that specifies one of the MSBATCH control commands contained in card column 1. Control cards are used to direct job processing.
Control Command	A control command is a mnemonic instruction used to direct the operations performed by MSBATCH. The first character of any control command mnemonic is a dollar sign ($). A control command is specified by marking the appropriate box in card column 1.
Data Card	A data card is a mark sense card on which information is entered in columns 9 through 40 only.
Data Deck	A group of data cards to be treated as an entity.
FORTRAN Card	A mark sense card that is preprinted with FORTRAN keywords.

Interactive Batch Mode	A facility of MSBATCH similar to Batch Mode that permits program data to be input from the console terminal keyboard rather than from the batch stream, and program data output to be directed to the console terminal printer rather than to the line printer.
Job	A job is a task or set of tasks that are considered as a group for MSBATCH processing purposes. A job consists of all cards that follow a $JOB control card up to either the next $JOB control card or the physical end of the batch stream.
Job Output	The sequential record of processing associated with a specific job. The job output is produced on the listing device and consists of an identifying header line followed by a body of text that can include: • Control commands (and internally generated monitor commands), • Compilation listings, • Program generated text, and • Error messages.
Keyword	A keyword is a language mnemonic as preprinted in the keyword field of a mark sense card.
Listing Device	The Batch Mode output device (either a line printer or the console terminal, depending on hardware configuration) that prints a job's output.
PIP Mode	A facility of MSBATCH that permits input from its card reader to be directed to any OS/8 output device. Control cards, program cards and data cards are interpreted accordingly.
Program Card	A program card is a mark sense card on which a language statement is specified.
Program Deck	A group of program cards that comprise a single program.

APPENDIX B
HOW TO MARK CARDS

B.1 INTRODUCTION

Mark Sense Batch accepts both control commands and program statements from specially formatted FORTRAN or BASIC Mark sense cards provided by Digital. Each card is preprinted with 40 columns of small rectangular boxes. The column number is printed at the bottom of the card below each column. Figures B-1 and B-2 illustrate FORTRAN and BASIC cards.

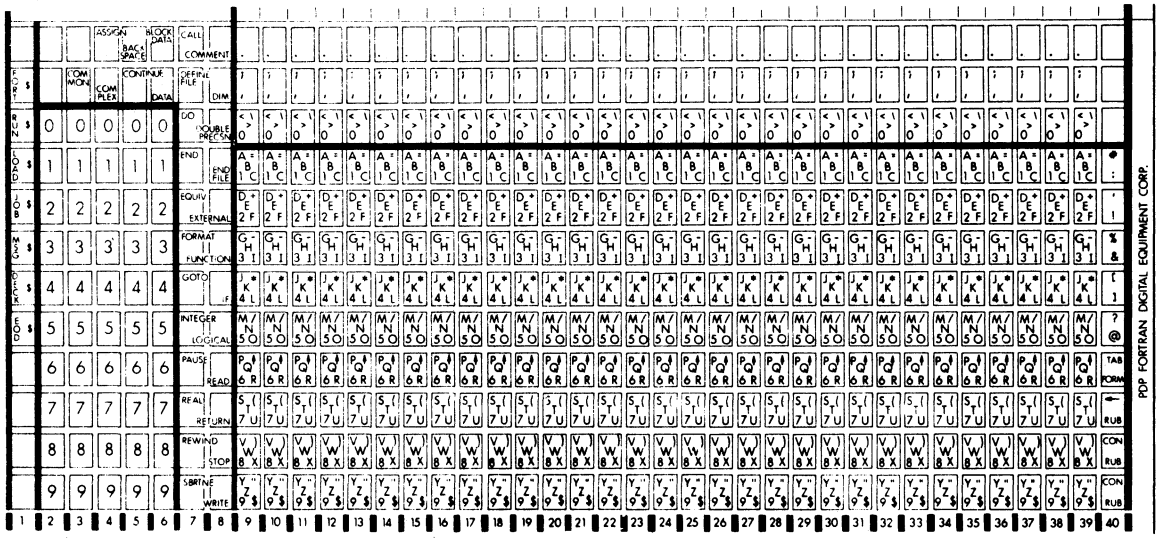


Figure B-1
FORTRAN Card

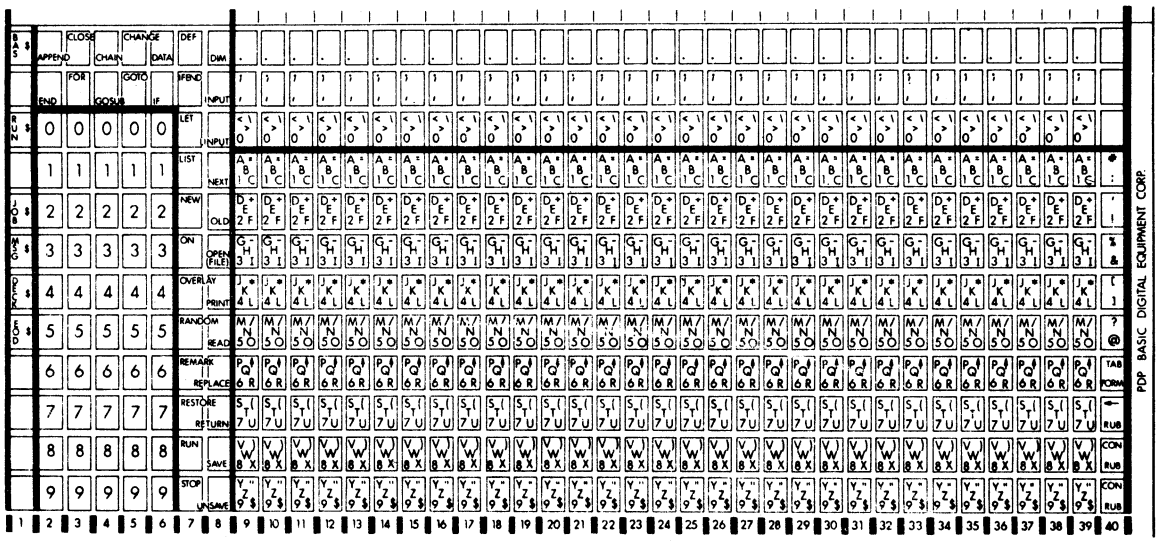


Figure B-2
BASIC Card

Program statements and control commands are entered onto the card by marking these boxes with an ordinary soft-lead pencil (number 2 is ideal). DO NOT USE A BALL POINT PEN OR A FELT TIP MARKER. Each box is marked with a single heavy line, drawn either vertically or diagonally. It is not necessary to fill the entire box. Avoid making stray marks as MSBATCH reads all marks on the card, whether or not they occur inside a box. Stray marks cause MSBATCH to misread the card. When two or more vertically adjacent boxes are to be marked, they can be marked with a single vertical stroke. Figure B-3 illustrates examples of properly marked cards.

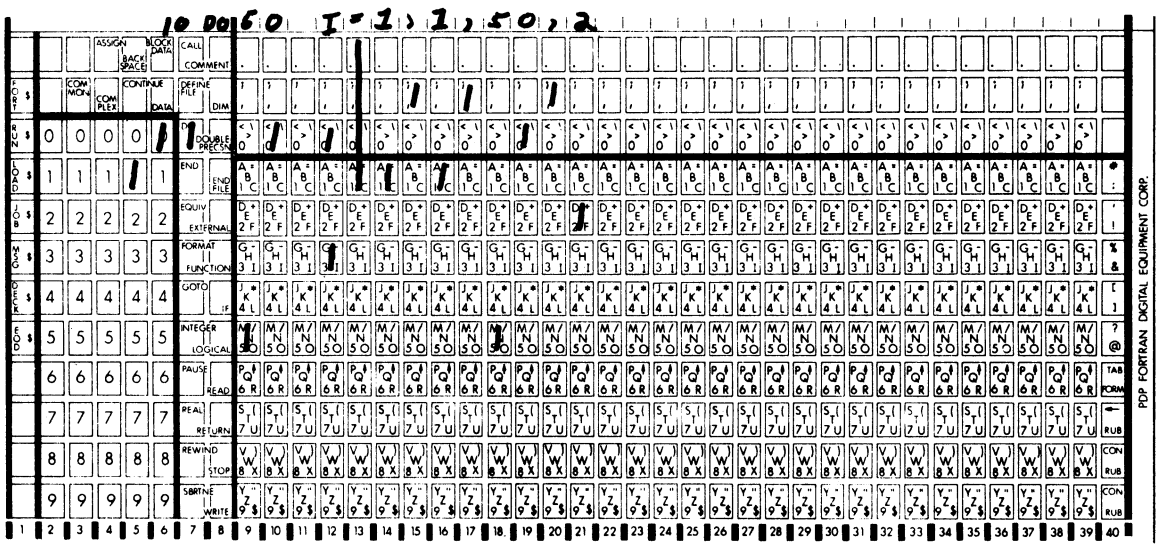
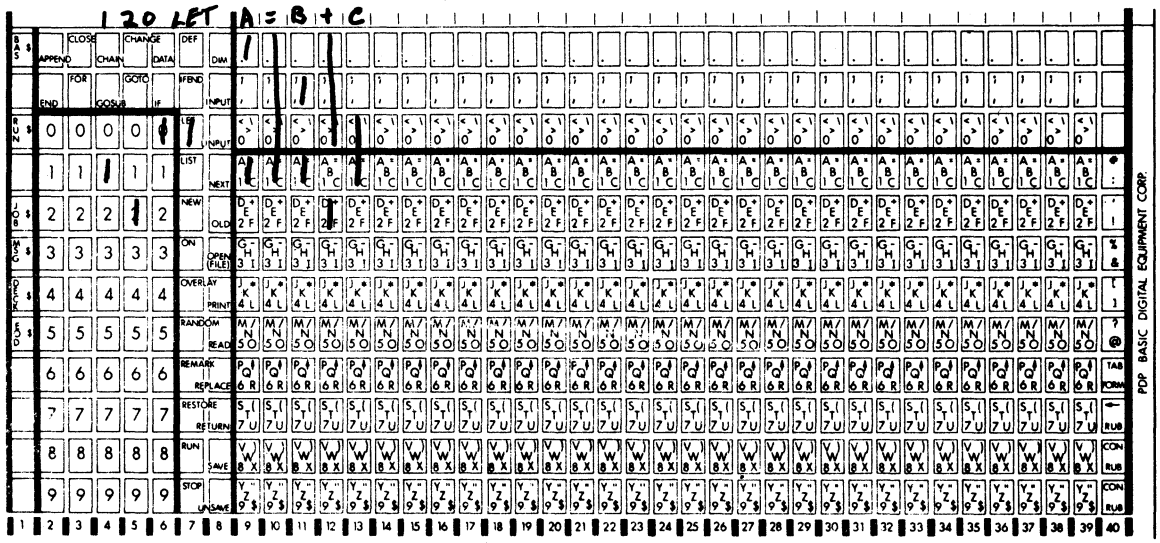


Figure B-3
Properly marked Cards



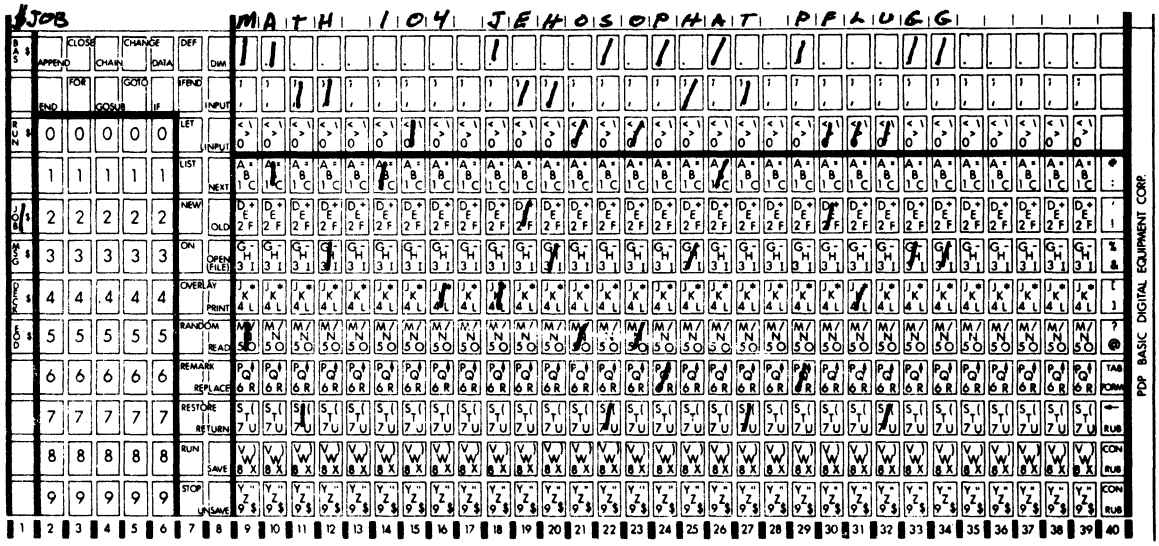


Figure B-3 (Cont).
Properly Marked Cards

NOTE

When marking cards, it is often helpful to write the line being entered in the space provided at the top of the card.

B.2 CARD FIELDS

Both FORTRAN and BASIC cards are divided into four areas or fields: the control command field, the statement number field, the keyword field, and the character field. Each field is separated from an adjacent field by a thick vertical line, as shown in Figure B-4.

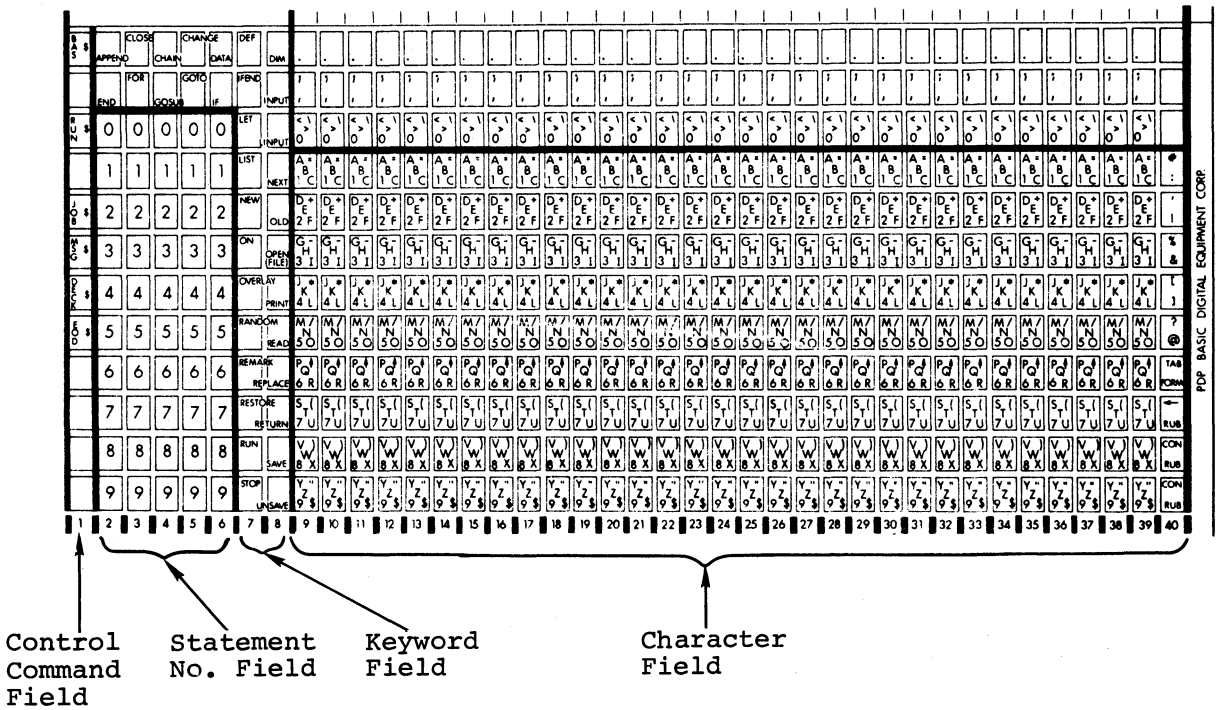


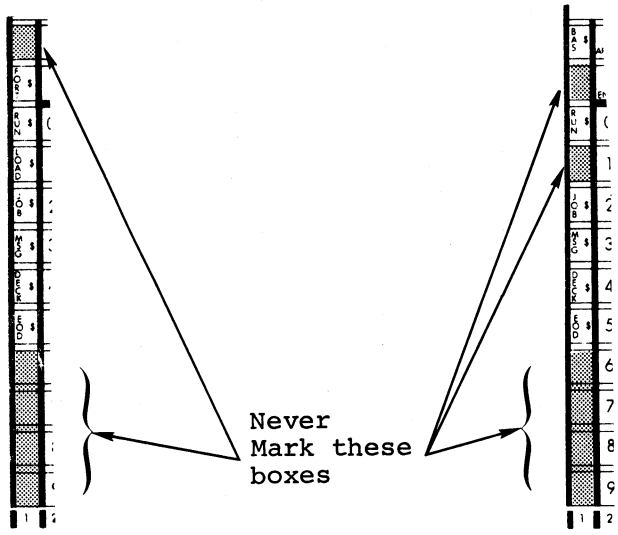
Figure B-4
Card Field Layout

Notice that the cards are identical except for the keyword field which contains either BASIC or FORTRAN statement keywords. In addition, the $BAS control command appears in the control command field of BASIC cards while the $FORT and $LOAD control commands appear in this field on FORTRAN cards.

B.2.1 Control Command Field

Each of the MSBATCH control commands is printed in one of the boxes in the control command field. When a box in this field is marked, the card is called a batch control or job control card. Batch control cards must be marked with the appropriate command in column 1. The character field contains command operands. The keyword and statement number fields must not be marked.

Either FORTRAN or BASIC cards can be used as batch control cards since this field is the same on both cards except for the $FORT and $BAS commands. Only one box in column 1 may be marked. Marking more than one box or marking a blank box causes an error. Figure B-5 shows the control command field as it appears on FORTRAN and BASIC cards.



FORTRAN Card BASIC Card

Figure B-5
Control Command Field

B.2.2 Statement/Line Number Field

The statement number field consists of five columns, each containing ten boxes numbered from 0 through 9. Either FORTRAN statement numbers or BASIC line numbers are marked in this field. To enter a statement/line number on a card, mark the box in each column that corresponds to the desired digit. Any column that is not marked is ignored. Only one of the boxes corresponding to the digits 0-9 should be marked in any column. Figure B-6 shows several ways of entering the number 15.

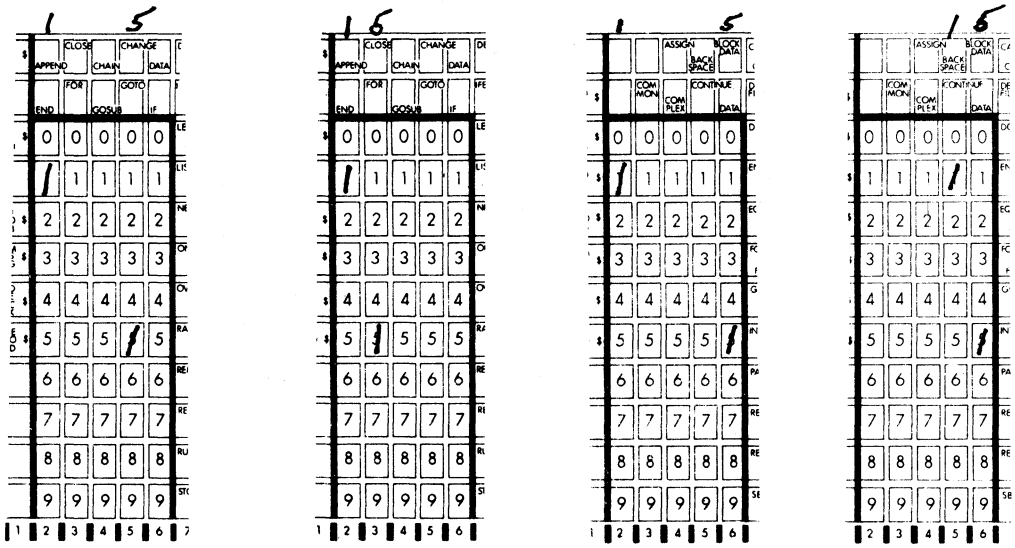


Figure B-6
Statement/Line Number Field

B.2.3 Keyword Field

Each box in this field contains either a BASIC or a FORTRAN keyword, depending on the card type. To select a keyword, mark the box that contains the desired keyword. Mark only one box in this field. Since the BASIC card is used with several dialects of BASIC, not all the keywords on the BASIC card apply to OS/8 BASIC. Figure B-7 shows the OS/8 BASIC statements in the unshaded areas of the field.

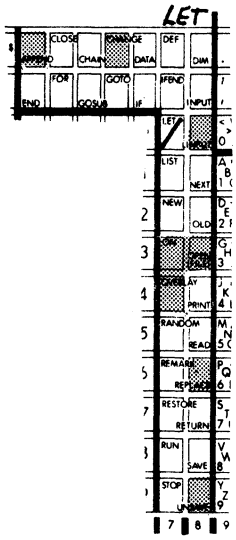


Figure B-7
BASIC Keyword Field

All keywords on the FORTRAN card can be used with OS/8 FORTRAN IV. If OS/8 FORTRAN II is to be used, only those statement keywords shown in the unshaded areas of Figure B-8 can be employed. Legal OS/8 BASIC or OS/8 FORTRAN language keywords not shown in this field can usually be entered in the character field (see B.2.4).

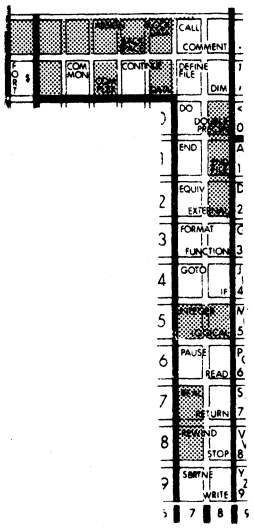


Figure B-8
FORTRAN Keyword Field

B.2.4 Character Field

The character field is used to specify:

- arguments to control commands to MSBATCH
- arguments to language keywords
- language keywords in addition to the keyword selected in the keyword field 1.
- language keywords not appearing in the keyword field(1).
- program data
- OS/8 keyboard commands (see Appendix E)

This field is subdivided into two subfields, separated by a heavy horizontal line: the zone subfield and the character subfield.

The boxes in columns 9 through 39 are identical and contain all the alphanumeric characters and most of the punctuation characters. Boxes in column 40 contain additional punctuation and special characters.

---

(1) Keywords entered in this field must be preceded by a backslash (\) character.

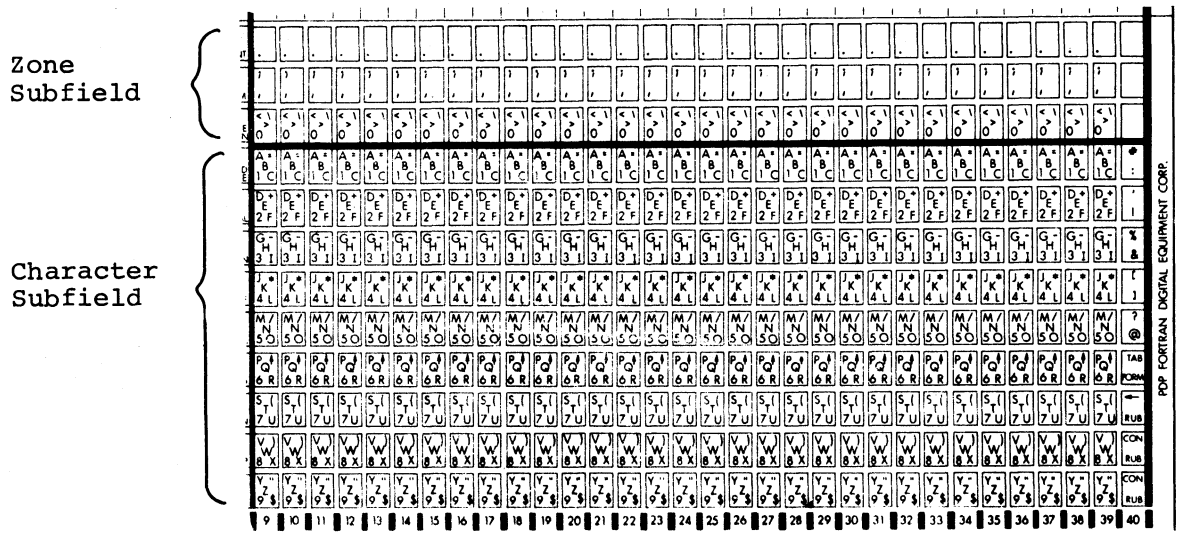


Figure B-9
Character Field

B.2.4.1 Marking the Alphabetic Characters and Dollar Sign ($)

To select any of the alphabetic characters or the dollar sign ($) character, two boxes must be marked: a character box and a zone box. First mark the box containing the desired character. Then determine the position of that character in its box (i.e., top-left, middle, bottom-right), and mark the zone box (top, middle, or bottom) that corresponds to the selected character's position. Figure B-10 shows all the characters that can be selected this way.

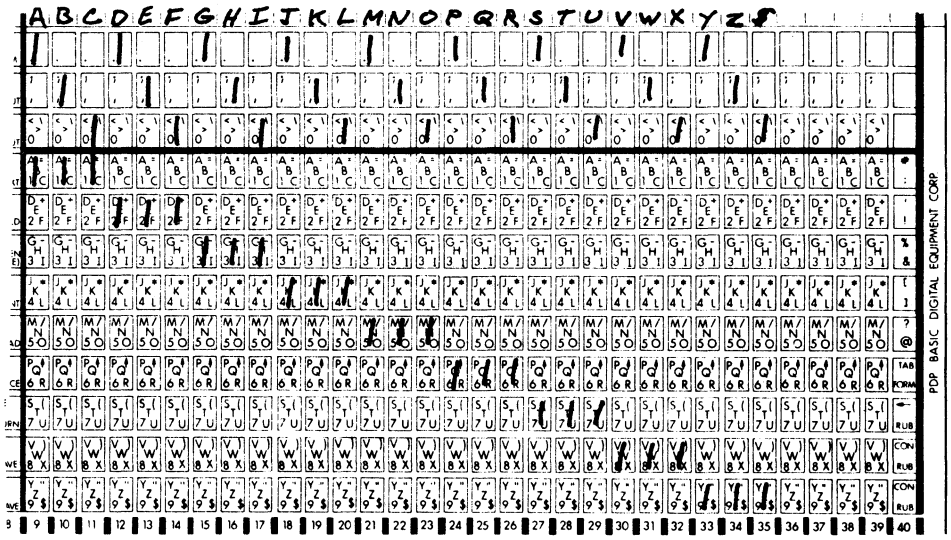


Figure B-10
Selecting Alphabetic Characters and the Dollar Sign Symbol

B.2.4.2 Marking the Symbols: < > and ;

The technique used for alphabetic characters is also used to select the special characters <, >, and ; in the zone field, as shown in Figure B-11.

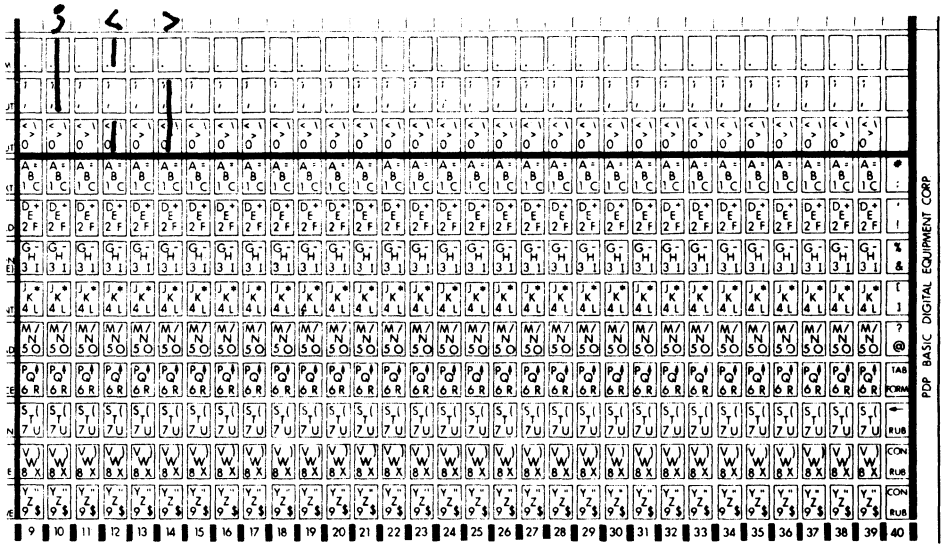


Figure B-11
Selecting the Characters: <, > and ;

B.2.4.3 Marking Numbers, Period, and Comma

To select the numeric characters, period (.), and comma (,), simply mark the box containing the character. Figure B-12 shows these characters.

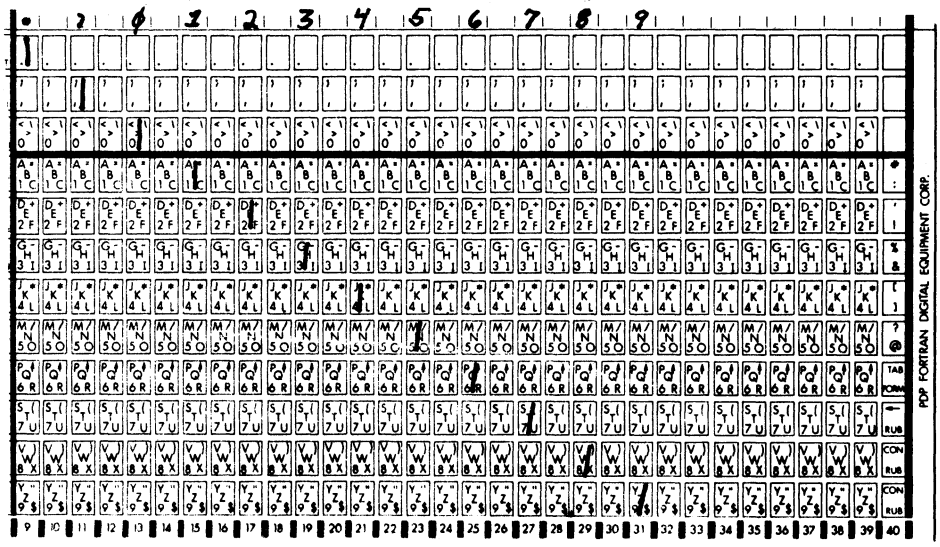


Figure B-12
Selecting Numbers, Period and Comma

B.2.4.4 Marking Special Characters

To select the characters located in the upper right corner of the boxes, mark the box containing the desired character and all zone boxes as shown in Figure B-13 (marking all the zone boxes can be accomplished with a single vertical stroke).

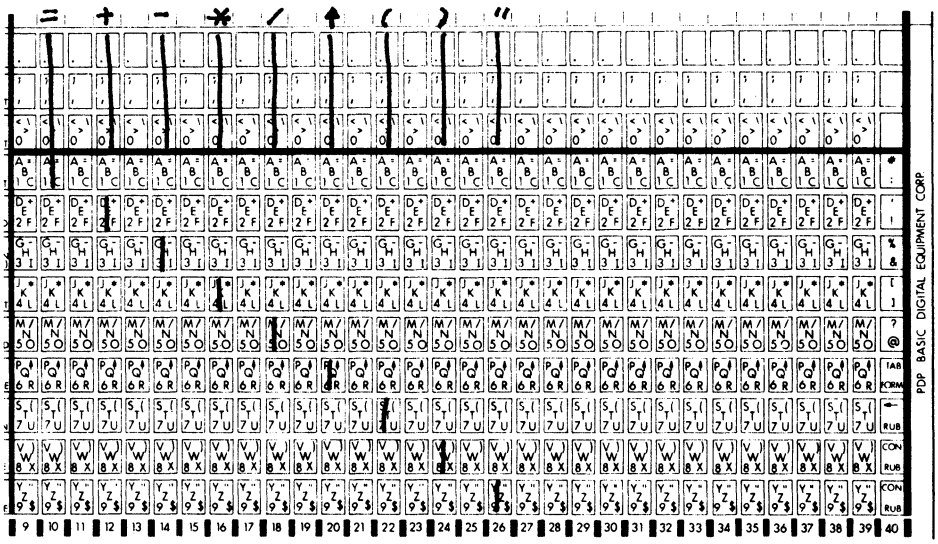


Figure B-13
Selecting Special Characters

To select one of the special characters in column 40, first mark the box containing the desired character. Then, if the character is in the top half of its box, mark the top and middle zone boxes. If the selected character is in the lower half of its box, mark the middle and lower zone boxes. Though these characters appear only in column 40, they can be marked in any column of the operand field, as shown in Figure B-14. Simply use column 40 as a template.

Character positions in the shaded area of Figure B-14 marked RUB (for rubout) and CON (for continue) perform special functions that are described in B.3 (below).

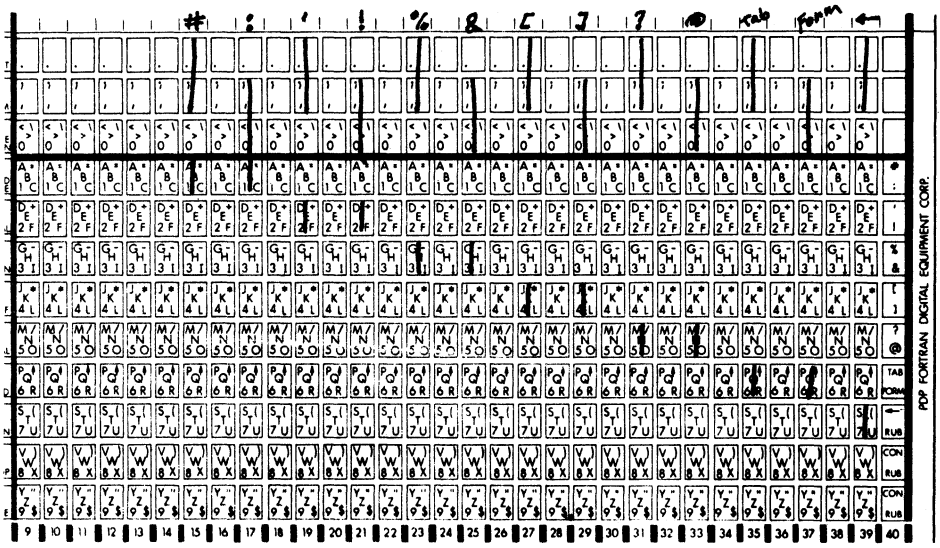
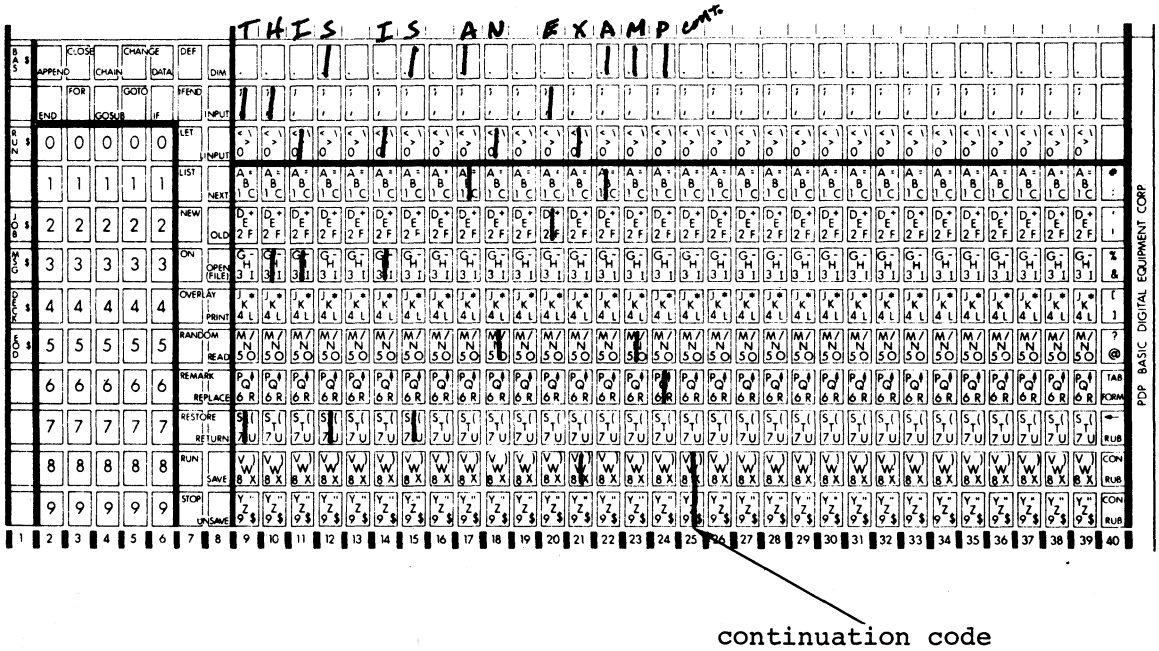


Figure B-14
Selecting Special Characters in Card Column 40

B.3 CONTINUATION CARDS

Marking the bottom two boxes in any column specifies a continuation of the current statement or command line onto the following card. Though the characters CON (for continuation) appear only in card column 40, the two bottom boxes in any column between 9 and 40 can be marked. Any marked columns that follow a continuation specification on that card are ignored. Figure B-15 shows an example of card continuation.

First Card



Continuation Card

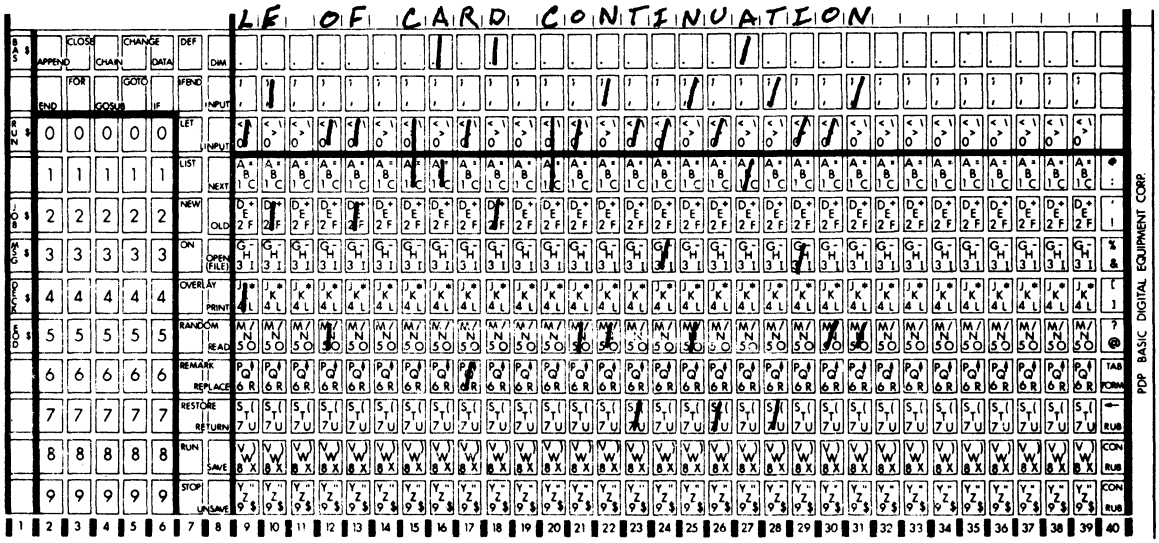


Figure B-15
Specifying Card Continuation

B.4 CORRECTING ERRORS

Incorrectly marked cards are corrected either by using MSBATCH's RUB (for rubout) feature or by completely erasing the incorrect marks. Marking the bottom three boxes in any column causes MSBATCH to ignore (rubout) any other character previously selected in that column. As with the other characters in column 40, RUBout can be used in any column of the card simply by using column 40 as a template (see Figure B-16).

Errors can also be corrected by completely erasing the marks that are in error; the column can then be correctly marked. Although more risky than using the RUBout feature, erasing is often more convenient, particularly when the error is in the middle of a fully marked card. Wherever possible however, RUBout should be used to correct errors, rather than erasing.

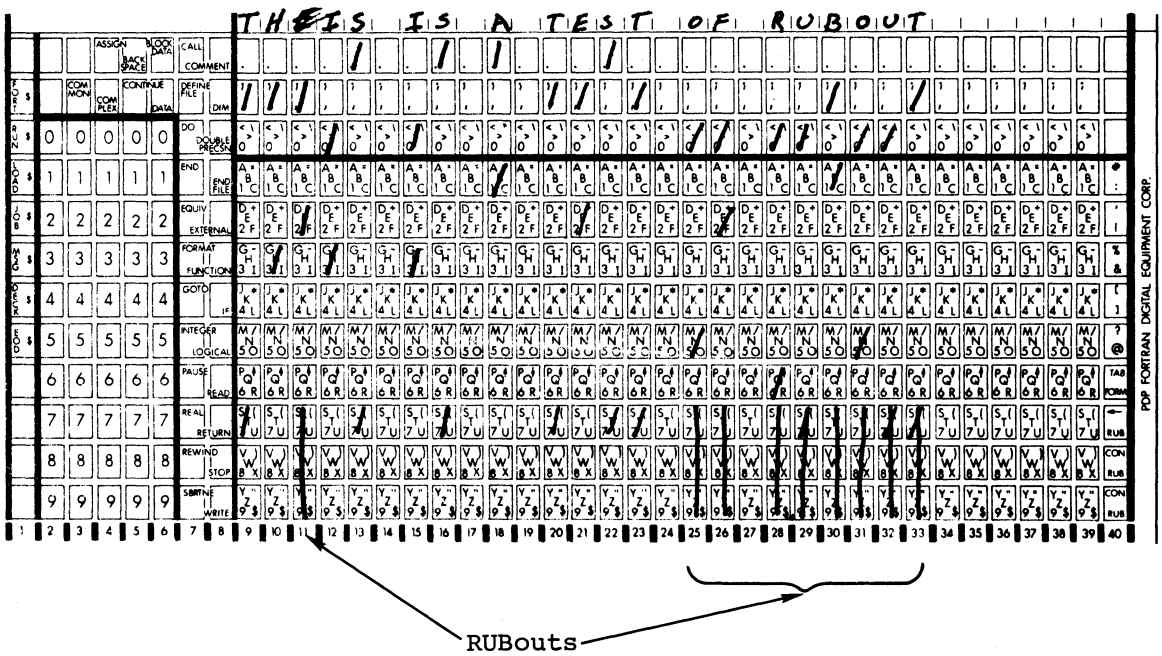


Figure B-16
Correcting Errors with RUBout

APPENDIX C
CARD READER OPERATING PROCEDURES

C.1 INTRODUCTION

This appendix describes the operating procedures for the CM8F and CM8E optical mark card readers. Figures C-1 and C-2 show front views of the CM8F and CM8E card readers.

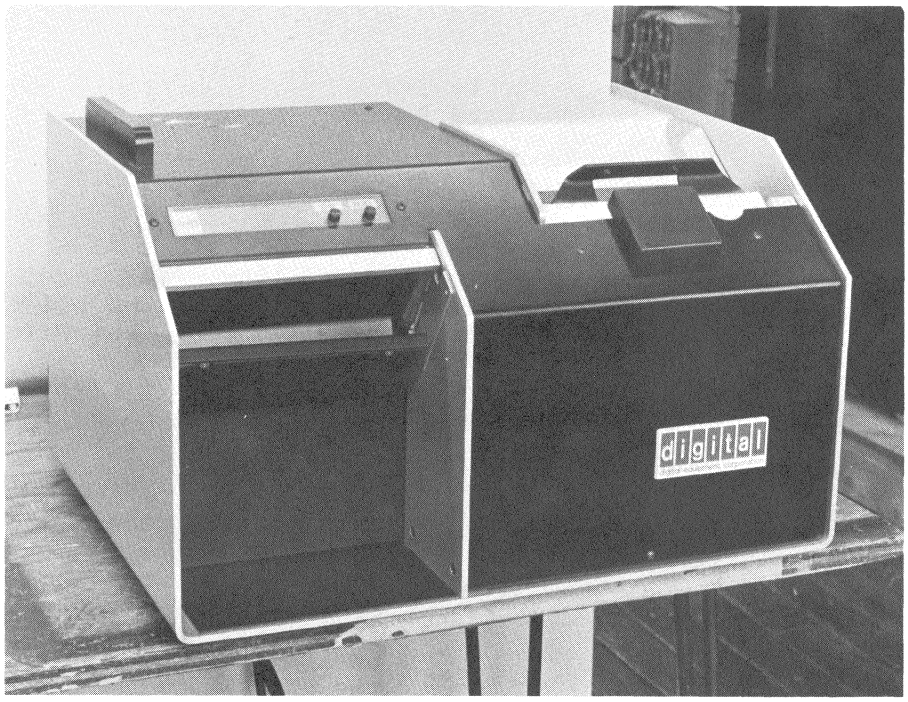


Figure C-1
CM8F Card Reader

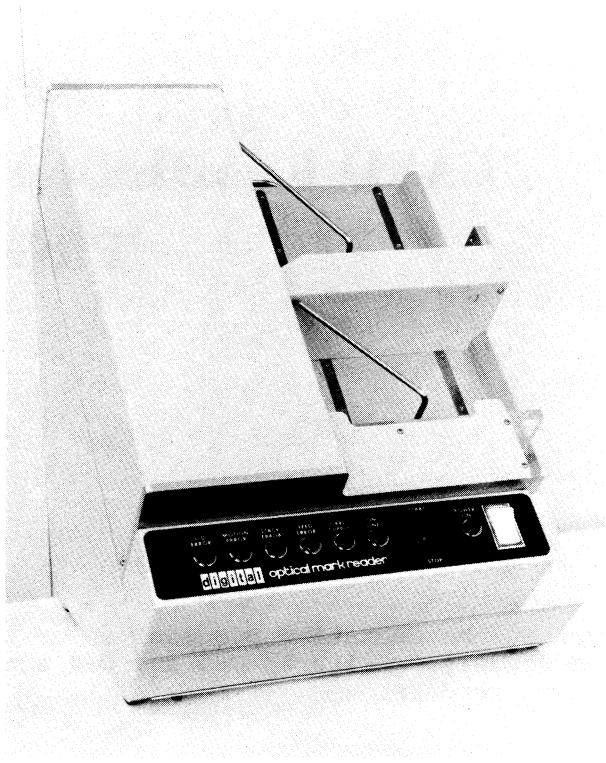


Figure C-2
CM8E Card Reader

C.2 CONTROL AND INDICATORS

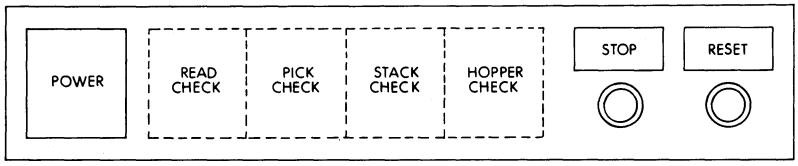
The controls and indicators used to operate the CM8F card reader system are shown in Figure C-3 and listed in Tables C-1 and C-2. The controls and indicators used to operate the CM8E card reader are shown in Figure C-4 and listed in Table C-3.

The items covered in each table are listed below:

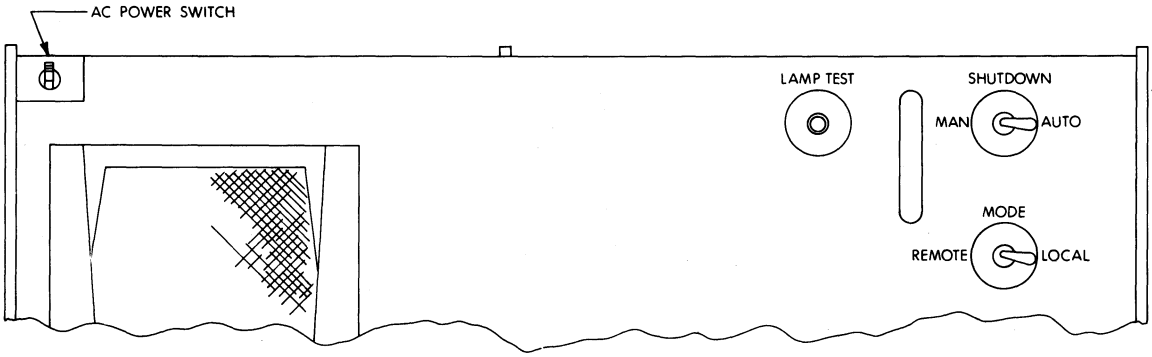
Table C-1 CM8F Front Control Panel (see Figure C-3)	This control panel, located at the upper left-hand corner of the front of the reader, contains the controls and indicators used for normal on-line/off-line operation of the card reader.
Table C-2 CM8F Rear Control Panel (see Figure C-3)	This panel, located at the upper right-hand corner of the back of the reader, is used for initial setup of the system and for maintenance purposes.

Table C-3 CM8E Control Panel
(see Figure C-4)

This control panel, located at the lower edge of the front of the header, contains the controls and indicators used for card reader operation.



FRONT CONTROL PANEL



REAR PANEL

Figure C-3
CM8F Controls and Indicators

Table C-1

CM8F Front Panel Controls and Indicators

Control or Indicator	Type	Function
POWER switch	alternate-action pushbutton/indicator switch	Controls application of all power to the card reader. When indicator is off, depressing switch applies power to reader and causes associated indicator to light. When indicator is lit, depressing switch removes all power from reader and causes indicator to go out.
READ CHECK indicator	white light	When lit, this light indicates that the card just read may be torn on the leading or trailing edges. Because READ CHECK indicates an error condition, whenever this indicator is lit, it causes the card reader to stop operation and extinguishes the RESET indicator.
PICK CHECK indicator	white light	When lit, this light indicates that the card reader failed to move a card into the read station after it received a READ COMMAND from the controller. Stops card reader operation and extinguishes RESET indicator.

Table C-1 (Cont.)

CM8F Front Panel Controls and Indicators

Control or Indicator	Type	Function
STACK CHECK indicator	white light	When lit, this light indicates that the previous card was not properly seated in the output stacker and therefore may be badly mutilated. Stops card reader operation and extinguishes RESET indicator.
HOPPER CHECK indicator	white light	When lit, this light indicates that either the input hopper is empty or that the output stacker is full. In either case, the operator must manually correct the condition before card reader operation can continue.
STOP switch	momentary pushbutton/indicator switch (red light)	When depressed, immediately lights and drops the READY line, thereby extinguishing the RESET indicator. Card reader operation then stops as soon as the card currently in the read station has been read. This switch has no effect on the system power, it only stops the current operation.

Table C-1 (Cont.)

CM8F Front Panel Controls and Indicators

Control or Indicator	Type	Function
RESET switch	momentary pushbutton/indicator switch (green light)	When depressed and released, clears all error flip-flops and initializes card reader logic. Associated RESET indicator lights to indicate that the READY signal is applied to the controller. The RESET indicator goes out whenever the STOP switch is depressed or whenever an error indicator lights (READ CHECK, PICK CHECK, STACK CHECK, or HOPPER CHECK).

Table C-2

CM8F Rear Panel Controls

Control	Type	Function
LAMP TEST switch	pushbutton	When depressed, illuminates all indicators on the front control panel to determine if any of the indicator lamps are faulty.
SHUTDOWN switch	2-position toggle	Controls automatic operation of the input hopper blower. MAN position - blower operates continuously whether or not cards are in the input hopper. AUTO position - causes the blower to shut down automatically whenever the input hopper is emptied. Blower automatically restarts when cards are loaded into the hopper and the RESET switch is depressed. Blower activates approximately three seconds after RESET is depressed.
MODE switch	2-position toggle	Permits selection of either on-line or off-line operation. LOCAL position - removes the READ COMMAND input from the controller to allow the operator to run the reader off-line by using the RESET and STOP switches on the front control panel. REMOTE position - enables the READ COMMAND input from the controller to allow normal on-line operation under program control once RESET is depressed.

Figure C-4
CM8E Controls and Indicators

Table C-3

CM8E Controls and Indicators

Control or Indicator	Type	Function
POWER ON switch	2-position rocker	When upper portion of switch is depressed, applies primary power to all card reader circuits except drive motor. Depressing lower portion of switch removes all power from reader.
POWER ON indicator	green light	When lit, indicates that primary ac power has been applied to the reader.
START switch	pushbutton	When depressed, starts main drive motor and resets all error indicators provided the error condition has been corrected. Upon releasing switch and allowing motor to come up to speed, the reader can accept a READ COMMAND from the controller and start processing cards. Lights ON LINE indicator.
STOP switch	pushbutton	When depressed, stops reader operation by stopping main drive motor. If this switch is depressed while card reading is in process, the current card cycle is completed before the motor stops. Extinguishes ON LINE indicator.

Table C-3 (Cont.)

CM8E Controls and Indicators

Control or Indicator	Type	Function
ON LINE indicator	green light	When lit, indicates that the reader is on-line and able to accept commands from the controller. This light comes on when the START switch is depressed. This light goes out whenever the STOP switch is depressed or whenever an error condition occurs.
CARD SUPPLY indicator	red light	When lit, indicates that either the input hopper is empty or that the output stacker is full. Condition must be corrected by the operator before card reading can continue. Stops reader operation and extinguishes ON LINE indicator.
FEED ERROR indicator	red light	When lit, indicates that the card reader failed to move a card into the read station after it received a READ COMMAND from the controller. Stops card reader operation and extinguishes ON LINE indicator.
STACK ERROR indicator	red light	When lit, indicates that a card was not properly delivered to the output stacker after the read operation. Stops card reader operation and extinguishes ON LINE indicator.

Table C-3 (Cont.)

CM8E Controls and Indicators

Control or Indicator	Type	Function
MOTION ERROR indicator	red light	When lit, indicates a card jam in the read station. Stops card reader operation and extinguishes ON LINE indicator.
L.D. ERROR indicator	red light	When lit, indicates that the card failed to pass the light/dark check at the read station. Stops card reader operation and extinguishes ON LINE indicator.

C.3 CARD HANDLING PROCEDURES

The following paragraphs present the recommended procedures for loading the input hopper, unloading the output stacker, and correcting error conditions.

C.3.1 Loading Cards

The following procedure is used when loading the input hopper with punched cards to be read:

Step	Procedure
1	Pull the hopper follower back with one hand and begin loading card decks into the hopper. Make certain that the first card to be read is placed at the front, face down, column 1 to the left.
2	Continue placing cards into the input hopper until it is loosely filled (this is the approximate amount of cards listed as the capacity for a particular card reader model).

> CAUTION
>
> Do not pack the input hopper so full that the air from the blower cannot riffle the cards properly. If the cards are packed too tightly, it impairs proper operation of the vacuum picker.

3	Cards may continue to be loaded while the reader is operating provided tension is maintained on the front portion of the deck as cards are added to the rear. Additional cards should not be loaded, however, until the hopper is approximately 1/2 to 2/3 empty.

> CAUTION
>
> When maintaining tension on the card deck, use just enough pressure to maintain the riffle action to prevent card damage and jamming of the reader.

4	Normally, all cards are moved through the reader into the stacker. However, if it is necessary to remove cards from the input hopper, simply pull back the follower and remove the card deck.

C.3.2 Unloading Cards

To unload cards from the output stacker, pull the stacker follower back with one hand and remove the card deck from the stacker, being careful to maintain the order of the deck. The stacker may be unloaded while the cards are being read.

C.4 OPERATING PROCEDURES

C.4.1 Model CM8F

C.4.1.1 Off-line Operation - Off-line operation of the CM8F card reader is used primarily for setting up and checking reader operation prior to switching to on-line use; for correcting error conditions; and for maintenance tests. When placed off-line, the reader can be operated locally from the control panels. The following procedure is used to energize the reader and check off-line operation prior to switching to on-line operation.

Step	Procedure
1	Make certain that the ac power cord is plugged in and that the circuit breaker on the rear base panel of the reader is in the ON position.
2	Set MODE switch to LOCAL position.
3	Set SHUTDOWN switch to AUTO position.
4	Depress POWER switch to energize reader. Note that POWER indicator lights but blower does not come on.
5	Depress LAMP TEST switch and observe that all front panel indicators are lit.
6	Load a card deck into the input hopper.
7	Depress RESET switch and observe that associated green indicator comes on. After approximately 3 seconds, cards should start being picked and moved through the read station into the output stacker.
8	When the input hopper is empty, observe that the HOPPER CHECK indicator lights, the green RESET indicator goes out, and the red STOP indicator lights.
9	The card reader may now be operated locally or switched to on-line operation.

C.4.1.2 On-line Operation

Step	Procedure
1	Make certain that the card reader is operational by performing the procedure given in Paragraph C.4.1.1.
2	Make certain the output stacker is empty. Load the input hopper with the cards to be read.
3	Set the MODE switch to REMOTE.
4	Depress the RESET switch and observe that the associated green indicator lights. The card reader is now on-line.
5	If the card reader goes off-line because of an error alarm, it can be placed back on-line by correcting the error and then depressing the RESET switch.
6	Any time it is desired to go off-line, depress the STOP switch.

C.4.2 Model CM8E

C.4.2.1 Off-line Operation - The model CM8E reader has no capability for off-line operation. Verification of satisfactory operation is determined simply by successful on-line operation.

C.4.2.2 On-line Operation

Step	Procedure
1	Make certain that the card reader is operational by performing the procedure given in paragraph C.4.1.2.
2	Make certain the output stacker is empty. Load the input hopper with the cards to be read.
3	Press the START switch. Observe that the green ON LINE indicator lights. The card reader is now on-line.
4	If the card reader goes off-line because of an error alarm, it can be placed back on-line by correcting the error and then depressing the START switch.
5	Any time it is desired to go off-line, depress the STOP switch.

APPENDIX D
INSTALLING MSBATCH

This appendix describes how to install MSBATCH on an OS/8 Version 3 system (MSBATCH will not operate under earlier versions of OS/8).

MSBATCH is installed by copying the files listed in the first column of Table D-1 onto the system device. The copy operation can be performed as described in the OS/8 Handbook, using either the PIP or FOTP programs, or the COPY keyboard command. The other columns in Table D-1 list the system programs and files required for BASIC, FORTRAN IV and FORTRAN II operation.

Table D-1

List of Files Associated with MSBATCH

MSBATCH Files	BASIC Files	FORTRAN IV Files	FORTRAN II Files
MSBAT.SV	BCOMP.SV	F4.SV	FORT.SV
BATCH.SV (not required for PIP Mode operation)	BLOAD.SV	PASS2.SV	SABR.SV
	BRTS.SV	PASS20.SV	LOADER.SV
	BASIC.AF	PASS3.SV	LIB8.RL
	BASIC.FF	RALF.SV	GENIOX.RL
	BASIC.SF	LOAD.SV	
	BASIC.UF	FRTS.SV	
		FORLIB.RL	
		LIBRA.SV	

APPENDIX E
ADVANCED FEATURES

This appendix describes two additional features that are available to MSBATCH and OS/8 users.

E.1 USING MSBATCH TO PROCESS OS/8 JOBS

MSBATCH allows users to run OS/8 jobs from mark sense cards or simply to insert BATCH commands into an MSBATCH job. Any legitimate BATCH command can be used by entering the command in the card's character field (columns 9 through 40). Those MSBATCH keywords on the card that have counterparts in BATCH can also be used. For further information refer to the section in the OS/8 Handbook that describes BATCH. Cards containing BATCH commands can be placed anywhere in the job deck except in a program or data deck.

E.2 USING THE BATCH STREAM DEVICE

The batch stream device is a pseudo device called BAT: that allows the user to read lines from the batch stream. BAT: can be used anywhere a non-file structured ASCII device is legal. The device inputs any line in the batch stream except those lines beginning with a $. Input begins with the current batch stream line, that is, the line following the last line executed by BATCH. Input terminates when a line beginning with a $ is detected. BAT: resides within BATCH and therefore it can be used only when BATCH is resident in memory. Since BATCH resides in the top of the upper field of memory and requires a minimum of 12K of memory to run, any user or any OS/8 program written to run within 8K of memory can safely use BAT:.

Example:

```
$JOB EXAMPLE OF BAT: USE
.R PIP
*FOO<BAT:
THIS INPUT IS IN THE BATCH STREAM.
IT WILL BE TERMINATED BY THE NEXT
LINE THAT BEGINS WITH A DOLLAR
SIGN ($) CHARACTER.
$EOD
```

Submitting this to BATCH will produce a file named FOO which contains:

```
THIS INPUT IS IN THE BATCH STREAM.
IT WILL BE TERMINATED BY THE NEXT
LINE THAT BEGINS WITH A DOLLAR
SIGN ($) CHARACTER.
```

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Software Problem Report (SPR) forms are available from the specialists or from the Software Distribution Centers cited below.

PROGRAMS AND MANUALS

Software and manuals should be ordered by title and order number. In the United States, send orders to the nearest distribution center.

Digital Equipment Corporation	Digital Equipment Corporation
Software Distribution Center	Software Distribution Center
146 Main Street	1400 Terra Bella
Maynard, Massachusetts 01754	Mountain View, California 94043

Outside of the United States, orders should be directed to the nearest Digital Field Sales Office or representative.

USERS SOCIETY

DECUS, Digital Equipment Computer Users Society, maintains a user exchange center for user-written programs and technical application information. A catalog of existing programs is available. The society publishes a periodical, DECUSCOPE, and holds technical seminars in the United States, Canada, Europe, and Australia. For information on the society and membership application forms, write to:

DECUS	DECUS
Digital Equipment Corporation	Digital Equipment, S.A.
146 Main Street	81 Route de l'Aire
Maynard, Massachusetts 01754	1211 Geneva 26
	Switzerland

Mark Sense Batch
User's Guide
DEC-S8-OBUGA-A-D

READER'S COMMENTS

NOTE: This form is for document comments only. Problems with software should be reported on a Software Problem Report (SPR) form (see the HOW TO OBTAIN SOFTWARE INFORMATION page).

Did you find errors in this manual? If so, specify by page.

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Did you find this manual understandable, usable, and well-organized? Please make suggestions for improvement.

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Is there sufficient documentation on associated system programs required for use of the software described in this manual? If not, what material is missing and where should it be placed?

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Please indicate the type of user/reader that you most nearly represent.

- ☐ Assembly language programmer
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