

IBM® 1401/1460 Program Library



Data Processing Division
112 East Post Road
White Plains, New York 10601

WH 9-1900 (Code 914)

International Business Machines Corporation

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Memorandum to: Users of 1401 Tape-to-Printer Utility Program

Subject: 1401 Tape-to-Printer Utility Program,
Program #1401-UT-026, Version 3,
Modification Level 0

This letter transmits the 1401 Tape-to-Printer Utility Program and associated material.

Abstract for 1401 Tape-to-Printer

Purpose:

The 1401 Tape-to-Printer Utility Program provides the means whereby tapes of many configurations may be printed in many configurations under the control of a series of parameters punched into control cards. Specifically, simulation of 717 and 720 printers is provided. However, the program additionally allows sequence checking, exception procedures, heading lines, page numbering, field selection, file selection and other features.

Use of Program:

The parameters which specify a particular configuration of tape and printed output are punched into a series of control cards. These cards are inserted into the program deck which is then loaded and the tape is printed.

Machine Configuration

The minimum 1401 machine configuration which is needed by this program is as follows:

1. 4000 positions of core storage
2. High-Low-Equal Compare
3. IBM 1403 Printer, Model 2
4. One IBM 729 II, IV, V, VI or 7330 Tape Unit
5. IBM 1402 Card Read-Punch (a system tape may be produced, which allows runs without this item)

In accordance with the program request you submitted, the Basic Program Material being forwarded is:

1. The program deck which is sequentially numbered in columns 78-80 and which contains a "3" in column 77.
2. The documentation of 1401 Tape-to-Printer including flow charts, a symbolic listing of the program and a listing of the program deck.

The Optional Program Material, being forwarded only if requested, is the symbolic source deck of the 1401 Tape-to-Printer Program.

The following information will be helpful in implementing this system:

1. IBM 1401 DATA PROCESSING SYSTEM
BULLETIN - UTILITY PROGRAMS FOR
IBM 1401 TAPE SYSTEMS - Form Number
J29-1411 (available from IBM Stationery
Stores, Endicott, N.Y.).

The 1401 Tape-to-Printer Utility Program will be maintained through the use of modification letters. Whenever modifications are made to the program, a serially numbered letter, starting with number 1, accompanied by the appropriate change cards will be mailed to all users. When the program is requested and the modification level is other than 0, all letters will be supplied with the material, but no change cards will be forwarded since the program deck will always reflect the latest changes. Should the nature or quantity of changes make a reassembly necessary, this will be distributed as a new version and modification letters to this new version will begin at 1.

An Applied Programming Analysis Report (APAR) should be submitted through the IBM Systems Engineer to report any difficulties encountered in the use of this system. The APAR should be addressed to:

APAR Processing
IBM Applied Programming
Department 302, Building 647
Endicott, New York

Any discrepancy between the material you receive and the items listed above should be directed to the Manager of the DP Program Information Department, IBM, 112 East Post Road, White Plains, New York.

Program Information Department

cc: Branch Office
No attachments sent with carbon

Table of Contents

<u>Section No.</u>	<u>Name</u>	<u>Page No.</u>
I	Introduction	1
II	Specifications	1
III	Format of Control Cards	3
IV	Operating Instructions	9
V	Examples	10
VI	Comments	13
VII	Patching Additional Sub-Routines	14
VIII	Deck Complement	17
IX	Flow Charts	18
X	Storage Layout at Object Time	24
	Appendix A - First Character Space/Skip Control	
	B - Record Form Control Characters	
	C - Block Form Control Characters	
	D - Program Listing	
	E - Listing of Program Deck	

1401 Tape-to-Printer Utility Program

I. Introduction

The 1401 Tape-to-Printer Utility program will permit the printing of many varied tape configurations in many varied print configurations without the need of specific programs. The format of the input records and the desired output are specified by the user in a series of control cards which are inserted in the program deck prior to running on the 1401. The minimum 1401 configuration needed to operate this program includes:

1. 1401 Model C3*
2. High-Low-Equal Compare
3. 1403 Model 2 Printer
4. 1 (one) Tape Unit (Model 729 II, 729 IV, 729 V, 729 VI or 7330)
5. 1402 Model 1* Card Read Punch.

II. Specifications

The following list contains specifications of the Tape-to-Printer Utility Program.

1. Tapes may contain either fixed length records with fixed blocking or variable length records with variable blocking. Variable length records in a block must each be followed by a record mark. The last record may or may not have a record mark. In addition, fixed or variable length records may be unblocked.
2. The maximum block length allowed is 1496 characters without Editing: 1279 with Editing.
3. Spacing or skipping between records can be controlled either by the control card or by the first character of the record.
4. Spacing or skipping between blocks can be specified in the control card.
5. Pages may be numbered or not, as desired.
6. Up to three lines of heading information may be printed at the beginning of the listing.
7. One or two lines of additional heading information may be printed at the top of each page of the listing.

*If system tape has been produced on 1401 Model C3, program may be run on 1401 Model D3 without 1402 Model 1.

8. Up to 99 separate, adjacent files may be printed on one pass of the program or any three files may be selected from a tape. In addition, a file may be bypassed during the running of the program under sense switch control (SSC).

9. A continuous field up to 30 characters in length may be specified for sequence checking of the records within a file.

10. Up to two characters of a record may be used to detect exceptions which may be punched into cards, punched and printed, or bypassed entirely.

11. Fixed length records may be printed in either of two modes:

a) Tape Image - the records would be printed exactly as they appear on tape except that they may be printed on more than one line (i. e. , a record 200 characters in length, where the characters per line is specified on the control card as 100, would print on two lines).

b) Field Selection - up to 16 portions of the record may be printed on up to nine lines in any order. Each field may be 132 characters or less in length and may be printed exactly as it appears in the record, or may be zero suppressed (i. e. , high order zeroes replaced by blanks), or may be edited before printing (the edit control words are supplied by the user as part of the Parameter Set of cards).

12. Variable length records are printed in tape image as explained for fixed length records. However, one additional option is allowed the user. The user may specify that if any record exceeds the number of characters to be printed per line, only the first line will be printed and the remainder of that record bypassed.

13. At the end of a file, the number of records which have been processed will be printed.

14. If a tape contains a header label, the user may choose to print, punch or check the header label.

15. The following options are allowed the user in specifying a method to halt the program when the job is completed:

- a) Specifying the number of files to be printed.
- b) Selecting files for printing.
- c) Assuming (a) is not known and (b) is not used, specifying the presence of a trailer label and letting the program check for it.
- d) Same as (c) except no trailer label but two consecutive End-of-File marks on the tape.
- e) Under sense switch control or control card control, halt at the end of each file.

16. A system tape containing the program modified by the user set of control cards may be prepared on the Model C3 machine for use on the Model D3 machine or for repetitive use of the same parameters.

III. Format of Control Cards

<u>Card No.</u>	<u>Columns</u>	<u>Meaning</u>
1	1-4 (4)	<u>Record length</u> - including any forms control character and special character (record mark) if present. For variable length records punch "VVVV". Variable length records must be terminated by a record mark except for the last record of the block which need not have a record mark, but may have one.
1	5-7 (3)	<u>Blocking</u> - number of records per block; leave blank for variable length records since variable blocking is permissible for variable length records.
1	8-10 (3)	<u>Characters per line</u> - maximum 132 characters. Used to specify the maximum number of characters to be printed on each line. Must be punched for all record types.
1	11-12 (2)	<u>Number of files</u> - actual number if printing all files on reel or selecting files. If printing starting with first file and continuing printing each file for a number less than the actual total, use the number to be printed. If unknown, leave blank. A file is defined as data on tape between tape marks. Therefore, a trailer label at the end of a file (or header label at the beginning of a file), if preceded and followed by a tape mark, is considered to constitute a file.
1	13 (1)	<u>Program Operation</u> - it is possible to prepare a system tape containing the program modified by the set of control cards, heading cards, etc. when the same tape and print configurations will be repetively used on the Model C machine, or when it is desired to use the Model D for the actual printing operation. To prepare this system tape, the program together with the control cards, heading cards, and the Header Label cards should be loaded in the card reader as usual. A blank tape should be set on Tape Unit #1. The control card should contain a "D" in column 13. After producing the system tape, the program will halt. If the user has a tape he wishes to print at the same time, the Object Tape should be readied on #3, the printer readied and the "Start" Button depressed.
1	14 (1)	<u>Halt Option code</u> - an option is allowed to halt after printing each file. Punch 1 to halt, leave blank if halt is not desired. Sense switch B will accomplish the same result.
1	15-16 (2)	<u>First file to be printed</u> - file number (starting from first file as file 1) when file selecting.
1	17-18 (2)	<u>Second file to be printed</u> - when file selecting.
1	19-20 (2)	<u>Third file to be printed</u> - when file selecting.
1	21 (1)	<u>Page Number option</u> - pages are automatically numbered unless the option is used. Punch a 1 to prevent page numbering. Otherwise, leave blank.

<u>Card No.</u>	<u>Columns</u>	<u>Meaning</u>
1	22 (1)	<u>First Character Space/Skip Control</u> - if the first character of each record is to be used to control spacing and skipping between records, punch a 1. If no, leave blank. (See Appendix A for list of legal characters).
1	23 (1)	<u>Suppress Option Code</u> - if column 22 contains a 1, an option is allowed when the first character contains an "&" which means space suppress to other printers. Punch a 1 to prevent printing of the record; punch 2 to cause a set of asterisks to be printed before the record is printed.
1	24 (1)	<u>Record Form Control Character</u> - if column 22 is blank, column 24 must be punched with the proper character to indicate what spacing is desired between records. If left blank, single spacing will be used. (See Appendix B for list of legal characters).
1	25 (1)	<u>Block Form Control Characters</u> - column 25 must be punched with the proper character to indicate additional spacing between blocks. If left blank, no additional space will be taken. (See Appendix C for list of legal characters).
1	26 (1)	<u>Exception Option code</u> - if there are to be records that will not follow the normal printing procedure, this column must be punched. Punch 1 to cause exception records to be bypassed, punch 2 to cause exception records to be punched into cards & punch 3 to cause both punching and normal printing. Leave blank if no exceptions.
1	27 (1)	<u>Exception Type code</u> - up to 2 columns of a record may be designated to mark exceptions. If an "and" condition between the columns is desired, punch a 1. If an "or" condition is desired, punch a 2. If column 26 is punched, column 27 <u>must</u> be punched unless only one column is to be checked.
1	28 (1)	<u>First character configuration</u> - the actual configuration to be checked for must be punched here (character, zone or digit).
1	29 (1)	<u>First character disposition</u> - column 28 can be a character, zone or digit. For presence of a character, punch 1; absence of character, punch 2. For presence of a zone, punch A; for absence, punch B. For presence of a digit, punch J; for absence, punch K.
1	30-33 (4)	<u>First character location</u> - the location within the tape record (assuming the start as location 0001) of the first exception character.

<u>Card No.</u>	<u>Columns</u>	<u>Meaning</u>
1	34 (1)	<u>Second-character configuration</u> - explanation same as column 28.
1	35 (1)	<u>Second character disposition</u> - explanation same as column 29.
1	36-39 (4)	<u>Second character location</u> - explanation same as columns 30-33.
1	40-43 (4)	<u>Sequence check field location</u> - up to 30 contiguous columns of a record may be sequence checked. These columns are used to specify the high order position of the field to be checked (assuming the start of the record as 0001).
1	44-45 (2)	<u>Sequence check number of characters</u> - the number of characters in the field to be sequence checked.
1	46 (1)	<u>Number of lines of fixed heading</u> - up to 3 lines of heading may be printed on the first page of the listing. If this column is left blank, there is no fixed heading. There must be 2 cards per heading line with the first 80 columns in the first card; the next 52 columns in columns 1-52 of the second card. If spacing is desired between heading lines, one of the characters shown in Appendix B should be punched in column 80 of the second card.
1	47 (1)	<u>Fixed Heading print option</u> - normally, the fixed heading is printed on the first page of the report. If it is desired to print the fixed heading on a separate page, punch a 1 in this column. Otherwise, leave blank.
1	48 (1)	<u>Number of lines of variable heading</u> - up to 2 lines of heading may be printed on the top of each page of the listing. If this column is left blank, there is no variable heading (see column 46 for description of cards).
1	49-51 (3)	<u>Number of characters in header label</u> -if there is a header label as the first record on the tape, these columns must be punched. The maximum number of characters that may be processed is 160. If the label is greater than 160, punch 160.
1	52 (1)	<u>Disposition of header label</u> - punch a 1 to print the label; a 2 to punch the label; a 3 to bypass the label; and a 4 to compare the label to cards which are contained in the deck. Up to 80 columns, use one card; over 80 (maximum 160) use two cards.
1	53 (1)	<u>Variable length record single line option</u> - an option is allowed to print only one line per record even if the record lengths of a variable length tape sometimes or always exceed a line length. To exercise this option, punch a "1" in this column. Otherwise, leave blank.

<u>Card No.</u>	<u>Columns</u>	<u>Meaning</u>
1	54-55 (2)	<u>Number of fields to be selected</u> - for a tape containing fixed length records, it is possible to select portions of the record for printing. Up to 16 fields may be selected. Printing can be on up to 9 lines for a record; both tape and print positions are noted; zeroes may be inserted; fields may be zero suppressed when printed. Fields may be edited before printing. The order of the fields in the control cards must be line number order.
1	56-69 (4)	<u>Field 1 - high order record location</u> - the high order position of the field to be selected (assuming the start of the record as 0001) is punched here. If this field is to be inserted zeroes instead of a tape record field, punch "ZZZZ".
1	60-62 (3)	<u>Field 1 - number of characters</u> - the number of characters in the field to be selected or the number of zeroes to be printed.
1	63-65 (3)	<u>Field 1 - high order print location</u> - the high order position on the printed line of the field which has been selected, or zeroes, (assuming the start of the line as 001).
1	66 (1)	<u>Field 1 - line number to be printed on</u> - starting with line 1 for field 1, each field must specify what line it is to be printed on. In addition, if the field is to be zero suppressed when printed, overpunch column 66 with a "12" punch. If the field is to be edited, overpunch column 66 with an "x" punch. It should be noted that care must be exercised in selecting fields to make sure that the maximum line length allowed is not exceeded for any one line.
1	67-70 (4)	<u>Field 2 - high order record location</u> - see columns 56-59 for explanation.
1	71-73 (3)	<u>Field 2 - number of characters</u> - see columns 60-62 for explanation.
1	74-76 (3)	<u>Field 2 - high order print location</u> - see columns 63-65 for explanation.
1	77 (1)	<u>Field 2 - line number to be printed on</u> - see column 66 for explanation.
1	78 (1)	<u>Field Selection editing</u> - if any of the selected fields is to be edited, punch a 1 in column 78. In addition, a card must be included in the Parameter Set containing the Edit word for each field using this feature. These Edit word cards must be in the same order as the fields are in the control cards.
1	79 (1)	<u>Trailer label comparison</u> - if the tape contains a trailer label which can be used to indicate the end of the printing operation, punch a 1 in this column and include a card in the Parameter Set containing an image of the trailer label. If the trailer is greater than 80 columns in length, only the first 80 may be compared.
1	80 (1)	<u>Additional Form Spacing</u> - normally, after printing the page number and variable heading at the top of a page, an additional triple space is taken before the first body line is printed. If this additional triple space is not desired, punch a 1 in col. 80.

<u>Card No.</u>	<u>Columns</u>	<u>Meaning</u>
2, 3	1-4 5-7 8-10 11	Field 3, 10
2, 3	12-15 16-18 19-21 22	Field 4, 11
2, 3	23-26 27-29 30-32 33	Field 5, 12
2, 3	34-37 38-40 41-43 44	Field 6, 13
2, 3	45-48 49-51 52-54 55	Field 7, 14
2, 3	56-59 60-62 63-65 66	Field 8, 15
2, 3	67-70 71-73 74-76 77	Field 9, 16
2, 3	78-80	Blank (not used)

Notes:

1. All parameter cards except for one control card are optional (depending on procedure)
2. For fixed length records without field selection where the record length is less than the specified number of characters/line, the following are not applicable:
 - a) First Character Space/Skip Control
 - b) Record Form Control (single spaced between lines within blocks)
 - c) Exceptions
 - d) Sequence checking.
3. Page number will be printed at the top of every page and will be reset for each file unless column 21 is punched.
4. After each file, the count of number of records processed will be printed.
5. For fixed length records where the record length exceeds the specified number of characters/line, the record form control will be exercised only between records; single spacing will be used between lines within the record.

6. Tape to be printed must be on Tape #3.
7. To use a system tape (prepared as described in column 13), ready the system tape on Tape #1, ready the tape to be printed and the printer and depress "Tape Load" Button.
8. A carriage control tape must be prepared as part of the job set-up.
9. If simulating the 720 printer, columns 21 and 80 should both be punched with a "1". This will prevent page numbering and the additional triple space at the top of a page. In addition, if using the first position of the record for carriage control in the Fixed Length Tape Image mode, compute the line length (cols. 8-10) by including the first position as a print position. (The first position is blanked and printed in print position one). For example, if the record length is 121 including the carriage control character, specify 121 for line length, not 120. The last 120 positions will print in positions 2-121. If it is desired to print in positions 1-120 instead, Field Selection should be used.
10. In all cases, except Field Selection, when the last character of a record is a record mark, it is blanked out before printing.

IV. Operating Instructions

A. The most critical part of the operation is the punching of the parameter set of cards and the order and insertion point of the cards in the main program deck. Refer to page 17 of this write-up for the order and insertion point of the parameter set.

B. To run the program, use the following procedure:

- 1) Set proper forms in printer
- 2) Set proper forms control tape in printer
- 3) Ready printer
- 4) Place parameter set of cards in deck between card 026-03-069 and 026-03-070
- 5) Add patch routine to deck, if any
- 6) Place cards in punch if punching
- 7) Ready Reader-punch
- 8) Place tape to be printed on a tape drive and set that drive to 3
- 9) Ready tape at load point
- 10) If producing a system tape mount a blank tape (with file protection ring in place) on another drive and set to 1.
- 11) Set Mode Switch to Run
- 12) Press Start Reset Switch
- 13) Set desired Sense Switches
- 14) Press Load Button
- 15) If producing a system tape, the program will halt after creating the tape at 2995. If a tape is mounted for printing, press start.
- 16) If using a system tape, disregard steps 4 and 5. Mount the system tape on 1, the object tape on 3, perform steps 11-13 and then press the Tape Load Button. The program will halt at 0010; to continue, press start. If only one tape drive is available, proceed as before except when the halt at 0010 is reached, remove the system tape, mount the object tape, set the drive to 3 and press start.

C. Redundancy - ten tries are made to read a redundant record. If after ten tries, if the record is still redundant, there are two courses of action possible, depending on the setting of Sense Switch F. If the user desires, redundancies may be disregarded and just printed by having SSF ON. If SSF is OFF, the program will halt at location 1214 after ten tries. At this point, again there are two courses of action possible. Setting SSG ON and depressing the start button will cause another nine tries to be made at reading. If the record is still redundant, and SSF is still OFF, the program will halt again at 1214. If, however, the operator wants to try to correct the bad record, he should set SSG OFF, set the Tape Select Switch to "D", and press start. This will cause the record to be read again, but redundant characters will enter storage redundantly and the program will halt at 1247. The operator should immediately set the Tape Select Switch back to "N". Then, with the Mode Switch set to Storage Scan, the operator can locate the bad characters and manually correct them. If the record has been corrected, the operator should set the instruction address to 0593, the Mode Switch to Run and press start. If the operator cannot correct the record, he should set the instruction address to 1247, the Mode Switch to Run and press start. If he desires to bypass the bad record, he should set the instruction address to 0569, the Mode Switch to Run and press start. After setting the instruction address, be sure to press the Start Reset button before pressing the Start Button. (See Flow Chart, page 19)

V. Examples

In this section, one example will be given for each main type of configuration:

- A. Fixed Length Tape Image
- B. Fixed Length Field Selection
- C. Variable Length

A. Fixed Length Tape Image

1. Input parameters:

- a) Record Length 100 characters
- b) Blocked 3 records
- c) Header Label present on Tape (120 characters)
- d) Number of files on tape unknown

2. Output parameters:

- a) Print one record/line
- b) Double space between records
- c) Extra space between blocks
- d) One line of heading on each page
- e) Number pages
- f) No Exceptions
- g) Sequence check columns 6-19
- h) Print first and third file only
- i) Print header label

3. Control card layout:

<u>Columns</u>	<u>How Punched</u>	<u>Meaning</u>
1-4	0100	Record Length - 100
5-7	003	Blocking - 3
8-10	100	Line Length = Record Length
15-16	01	First file
17-18	03	Third file
24	S	Double space - record
25	J	Extra space - block
40-43	0006	High Order Sequence Location
44-45	14	Number of columns
48	1	One heading line/page
49-51	120	Header Label length
52	1	Print header label
all other columns left blank.		

4. Other cards needed:

Two additional cards would be needed containing the heading line specified in col. 48.

B. Fixed Length Field Selection

1. Input parameters: same as example A.
2. Output parameters:
 - a) Select three fields from each record. First field contained in columns 5-16, print in positions 1-12 exactly as stored. Second field contained in columns 50-59, print in positions 1-10 of line below suppressing high order zeroes. Third field contained in columns 16-25, edit and print in positions 21-37 of second line. Edit control word is (\$bb, bbb, bb0, bb&CR).
 - b) Double space between records
 - c) No heading
 - d) No page numbering
 - e) The presence of an "x" punch in column 10 and the presence of an "M" in column 65 will constitute an exception which will be punched out, but not printed.
 - f) No sequence check
 - g) Print first 3 files
 - h) Bypass header label
 - i) No page numbering
3. Control card layout:

<u>Columns</u>	<u>How Punched</u>	<u>Meaning</u>	
1-4	0100	Record length - 100	
5-7	003	Blocking -3	
8-10	132	Maximum Line Length	
11-12	03	Print 3 files	
21	1	No page number	
24	S	Double Space - record	
26	2	Punch Exceptions	
27	1	"and" Type Exception	
28	"x" (11 punch)	First Character configuration	
29	A	Presence of zone	
30-33	0010	Location	
34	M	Second character configuration	
35	1	Presence of character	
36-39	0065	Location	
49-51	120	Header Label length	
52	3	Bypass Header Label	
54-55	03	3 fields selected	
56-59	0005	High Order Field location	} Field 1
60-62	012	No. of characters	
63-65	001	High Order Print location	
66	1	Line number	
67-70	0050	High Order Field location	} Field 2
71-73	010	No. of characters	
74-76	001	High Order Print Location	

3. Control card layout:

<u>Columns</u>	<u>How Punched</u>	<u>Meaning</u>	
77	(12-zero supp.)	Line No. & Disposition Field 2	
78	B (2-line no)	Editing being used on this run.	
	1		
Second control card			
1-4	0016	High Order Field Location	} Field 3
5-7	010	No. of characters	
8-10	028 (11-edit)	High order Print Location	
11	K(2-line no.)	Line No. & Disposition	

All other columns left blank.

4. Other cards needed:

One card containing the edit control word must be included as follows:

Column 1	<input checked="" type="checkbox"/> (Identification)
2-3	17 (Length of Edit Word)
4-20	\$bb, bbb, bb0, bb&CR (Edit Word)

C. Variable Length

1. Input parameters:

- a) 3 files on tape
- b) No header Label

2. Output parameters:

- a) Print 80 characters/line
- b) Only one line/record
- c) No spacing
- d) No heading
- e) Number pages
- f) No exceptions
- g) No sequence check
- h) Print all files.

3. Control card layout:

<u>Columns</u>	<u>How Punched</u>	<u>Meaning</u>
1-4	VVVV	Variable length record
8-10	080	Character/line
11-12	03	No. of files
53	1	One line/record

All other columns left blank

4. Other cards needed.

None

VI. Comments

A. It will be noted from the examples shown in Section V that the control card punching will follow directly from the input and output parameters. In addition, punching is not required for features which are not used. However, there are three fields which must always be punched for proper operation:

- 1) Record Length (cols. 1-4)
- 2) Blocking (cols. 5-7) except Variable Length
- 3) Characters/line (cols. 8-10)

B. The following errors are checked for to insure correct operation of the program.

1 - During Assignment Phase of Program

	<u>Address Displayed</u>	<u>Course of Action</u>
a) Record Length and/or Character/line not punched	3063	Repunch cont. cards and start over
b) More than three Fixed Heading Lines	3064	"
c) More than two Variable Heading Lines	3068	"
d) More than 160 columns of Edit words	3004	"
e) Block Length exceeds maximum allowed	2972	Press start or start over
f) More than 16 fields in Field Selection	2976	Repunch cont. cards and start over
g) Zero overpunch of line number in Field Selection	2976	"
h) Fields not punched in line number order	2976	"
i) One line exceeds characters/line allowed	2976	"
j) Incorrect punching - col. 26, 27, 29, 35	3038	Press Start (no exceptions) or start over
k) Incorrect punch-col. 52	2836	Press start or start over
l) Header Label does not compare equal	2836	"

2. During Object Phase of Program

a) Files selected for printing not in sequence	0787	Press start (get next file)
b) Record out of sequence when sequence checking	0935	Press start
c) Redundancy		
(1) After 10 tries at reading and still redundant (unless SSF on)	1214	Set SSG, Tape Select Switch and press start
(2) After eleventh read with SSG off and Tape Select Switch set to "D".	1247	Correct record and set proper

C. Rule for Editing under Fixed Length Field Selection Mode - When the edit word is longer than the field to be edited, subtract the length of the field from the length of the edit word and add the difference to the high-order position of the print field. Punch this number in the control card devoted to print position.

VII. Patching Additional Sub-Routines

A. Patching may be accomplished with the following two modes of operation:

- a) Fixed Length Record Tape Image mode
- b) Variable Length Record mode

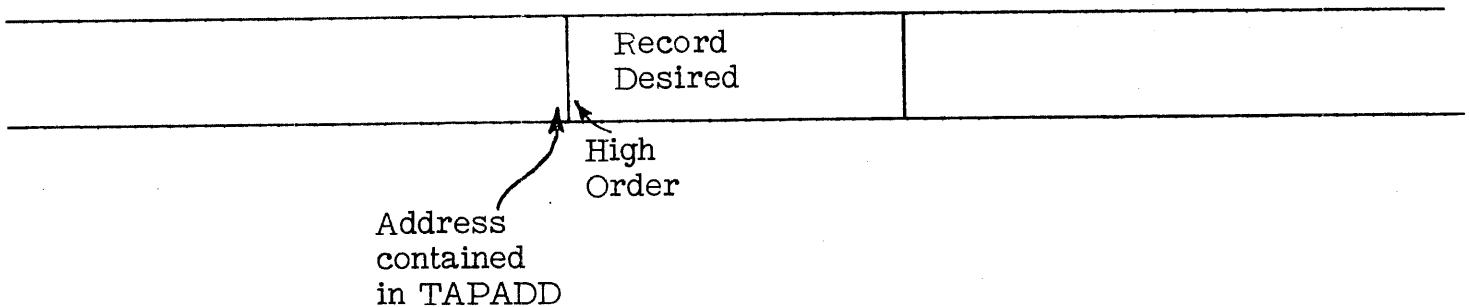
It is not possible to patch when using the Fixed Length Record Field Selection mode of operation, since there is no storage available for the patch.

B. Patches may be linked to the main routine to perform some operation pertaining to individual records. Three different linkages are illustrated which will accomplish the most needed operations:

- a) Operate on all records
- b) Operate on Exception records only
- c) Operate on Non-exception records only

C. Upon reaching the patch routine, the following parameters will be available to enable the user to operate on a record:

- a) TAPADD - 3 digits - located in 1602-1604; contains the address of the storage location preceding the high-order position of the record in question.



- b) RCLCNV - 3 digits - located in 1590-1592 contains the record length when operating in fixed length mode.

D. The patch routine itself may be written in symbolic form, except where referring to the main routine, when actual addresses should be used. Use the origin shown for the mode being used and be careful not to exceed the maximum space available for the patch. The last two cards must read as shown. The general format is as follows:

```

      ORG  xxxx      (2164 for Fixed Length, 2345 for Variable Length)
                        (First Patch instruction)
PATCH
      ---
      :
      :
      EX  0063 }
      END  }      Last Two Cards
  
```

After assembly of the patch, eliminate the "END" card and the first three cards. Place the additional cards shown in section E or F in front of the assembled deck. In front of this entire deck place the following two cards:

Card 1 - columns 39-66
 ,024X039X043X0471X071075B039

Card 2 - columns 56-66
 X0510551056

These two cards eliminate the need to condense the assembled patch. Then set the entire patch deck between card 026-03-142 and card 026-03-143 of the main routine.

E. Fixed Length Record Tape Image Mode

1. Patch Origin - 2164 (J64)

2. Space Available for Patch - 336 location (2164-2499)

3. (a) To operate on all records with the patch routine, include the following card in front of the assembled patch:

 columns 56-70
 L070X351056BJ64

(b) The Exit instruction from the patch should read B0787

4. (a). To operate on Exception records only, include the following card in front of the assembled patch:

 columns 56-70
 L0708781056BJ64

(b) The Exit instruction from the patch should read B1761 (X61)

5 (a). To operate on Printed records only (i. e. , records which are not exceptions) include the following card in front of the assembled patch:

 columns 56-70
 L070930D 56BJ64

(b) The Exit instruction from the patch should read B1736 (X36)

(c) If the exception option chosen is 3 (punch and print), the instruction shown in 5(a) has the same effect as 3(a) (i. e. , process all records). If it is desired not to process these printed exceptions with the patch routine, one more card is needed with the card in 5(a). It should be noted, however, that this card will cause these exceptions not to be sequence checked.

 columns 56-74
 L074Y981056BX36W423

Instruction 5(a) and 5(b) are not affected.

F. Variable Length Record Mode

1. Patch Origin - 2345 (L45)

2. Space Available for Patch - 155 locations (2345-2499)

3(a) To operate on all records with the patch routine, include the following card in front of the assembled patch:

columns 56-70

L070X581056BL45

(b) The Exit instruction from the patch should read B0787

4 (a) To operate on Exception records only, include the following card in front of the assembled patch:

columns 56-70

L0708781056BL45

(b) The Exit instruction from the patch should read B1770 (X70)

5 (a) To operate on Printed records only (i. e. , records which are not exceptions) include the following card in front of the assembled patch:

columns 56-70

L0709301056BL45

(b) The Exit instruction from the patch should read B1759 (X59)

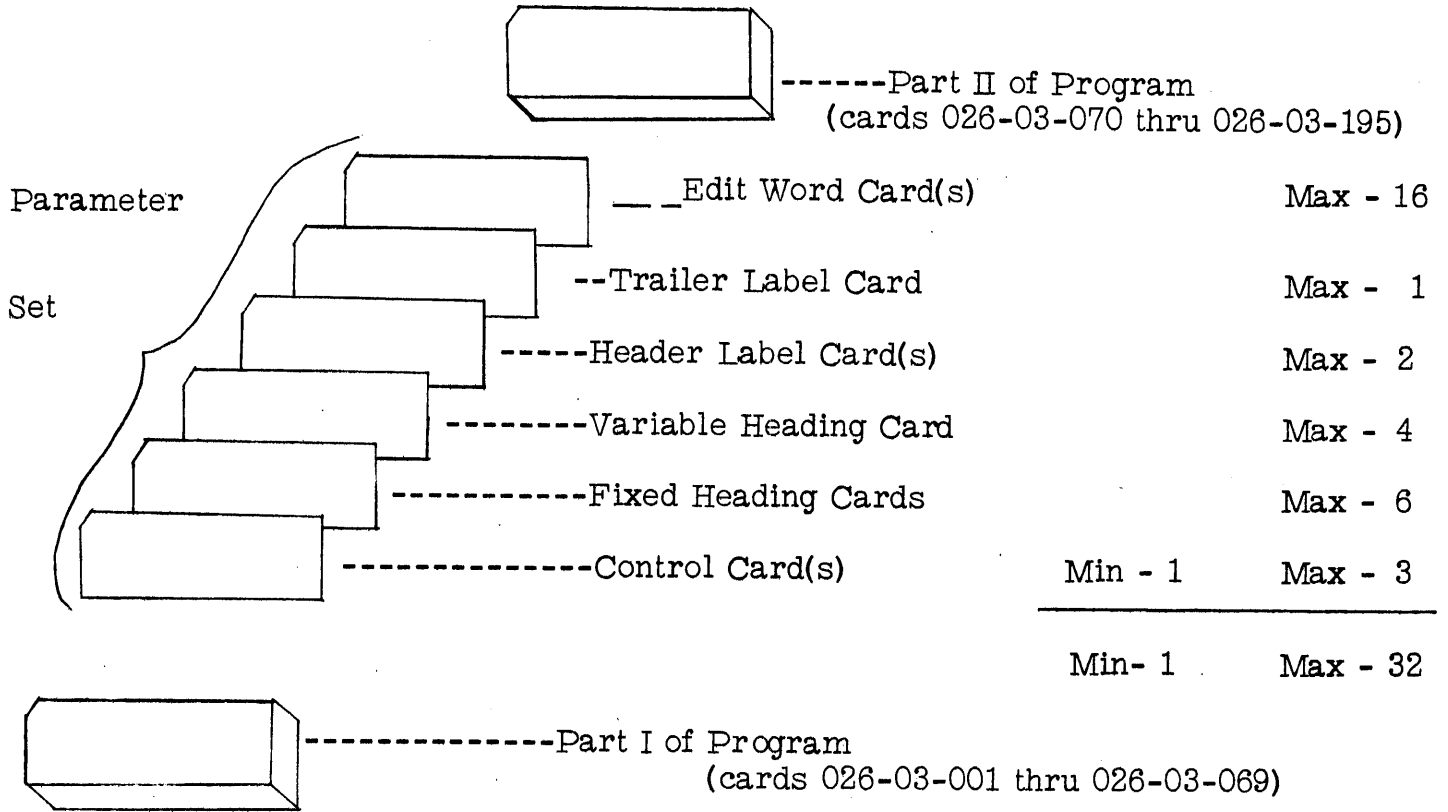
(c) If the exception option chosen is 3 (punch and print), the instruction shown in 5(a), has the same effect as 3(a), (i. e. , process all records). If it is desired not to process these printed exceptions with the patch routine, one more card is needed with the card in 5(a). It should be noted, however, that this card will cause these exceptions not to be sequence checked.

columns 56-74

L074Z661056BX59W423

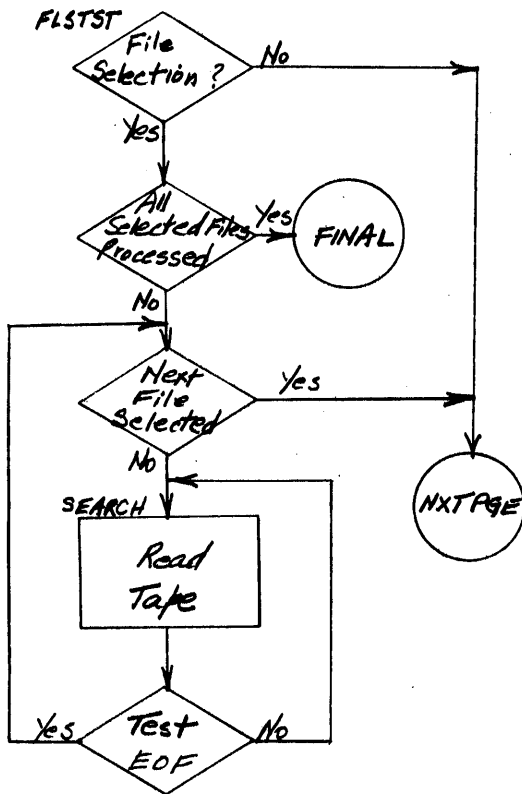
Instructions 5 (a) and 5 (b) are not affected.

VIII Deck Complement

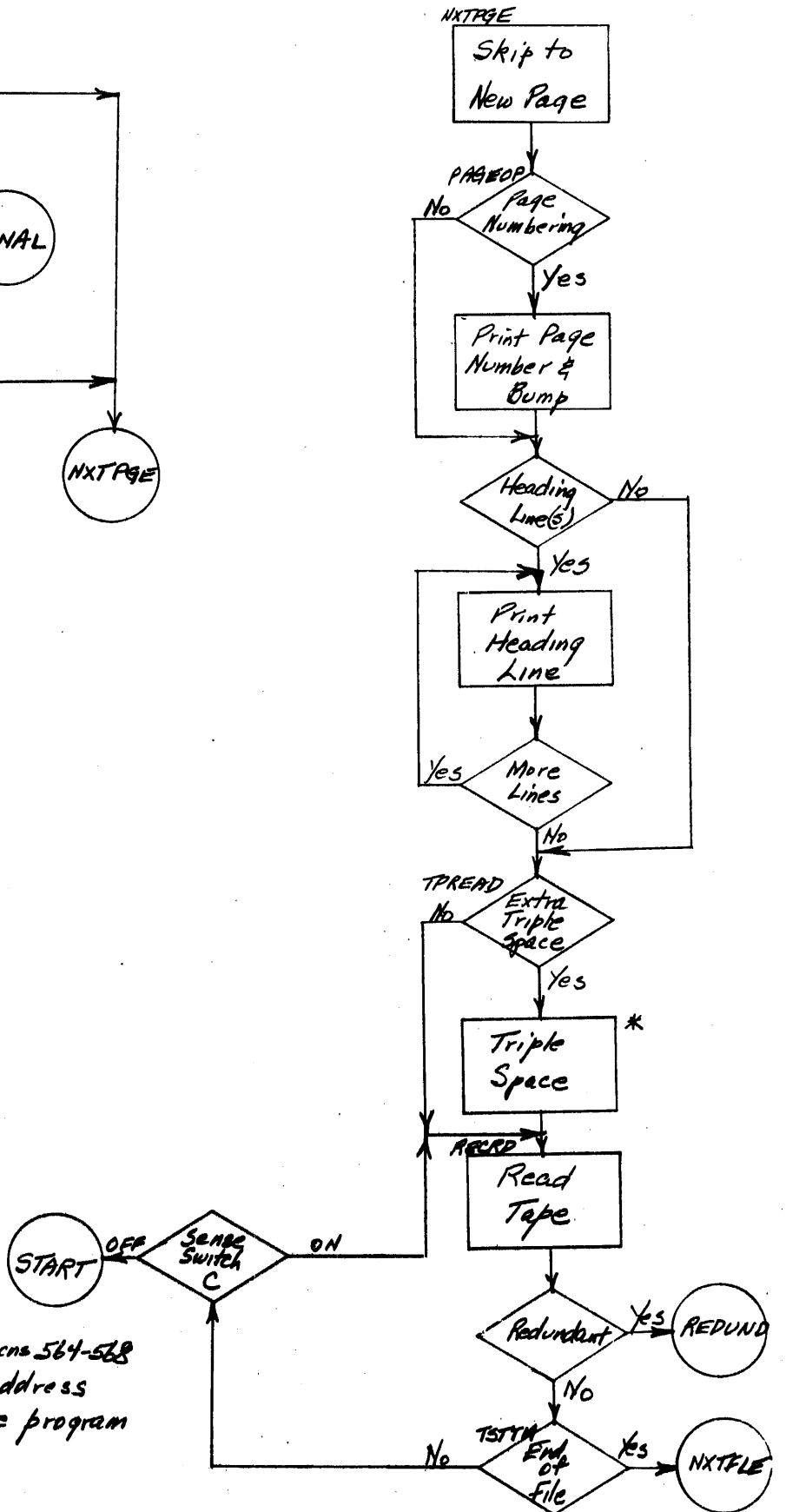


MAIN LINE

FILE SELECTION

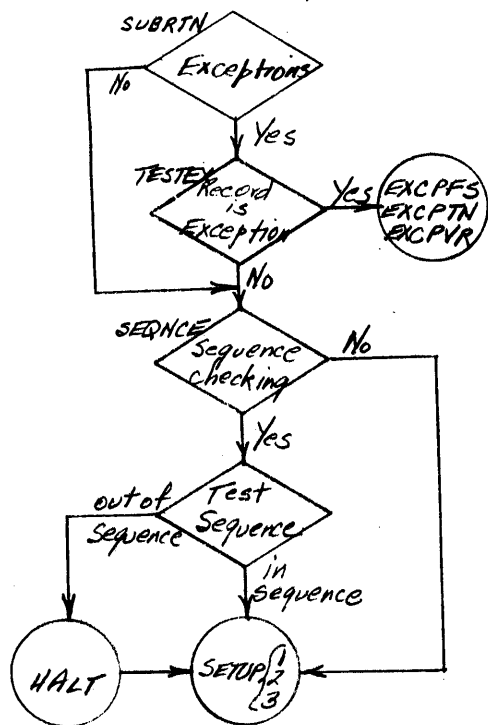


FORM SETUP & TAPE READ

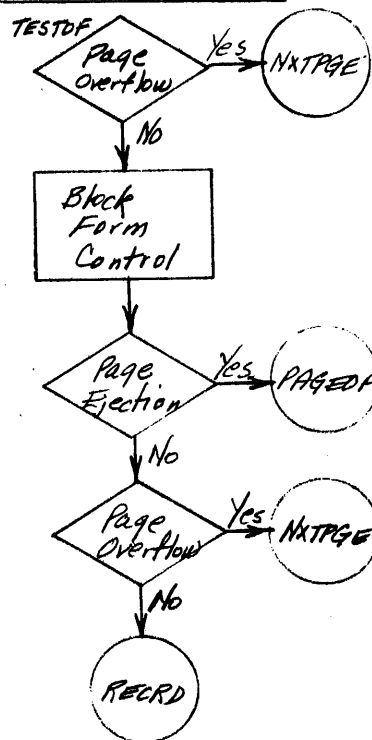


* Instruction "F xxx L" in locns 564-568 has a variable return address at different points in the program

EXCEPTIONS & SEQUENCE CHECK

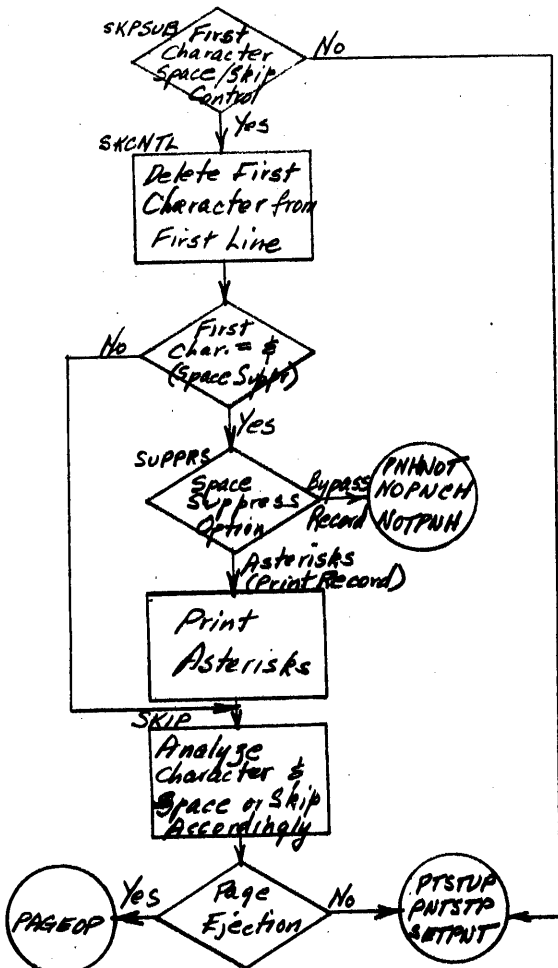


END OF BLOCK



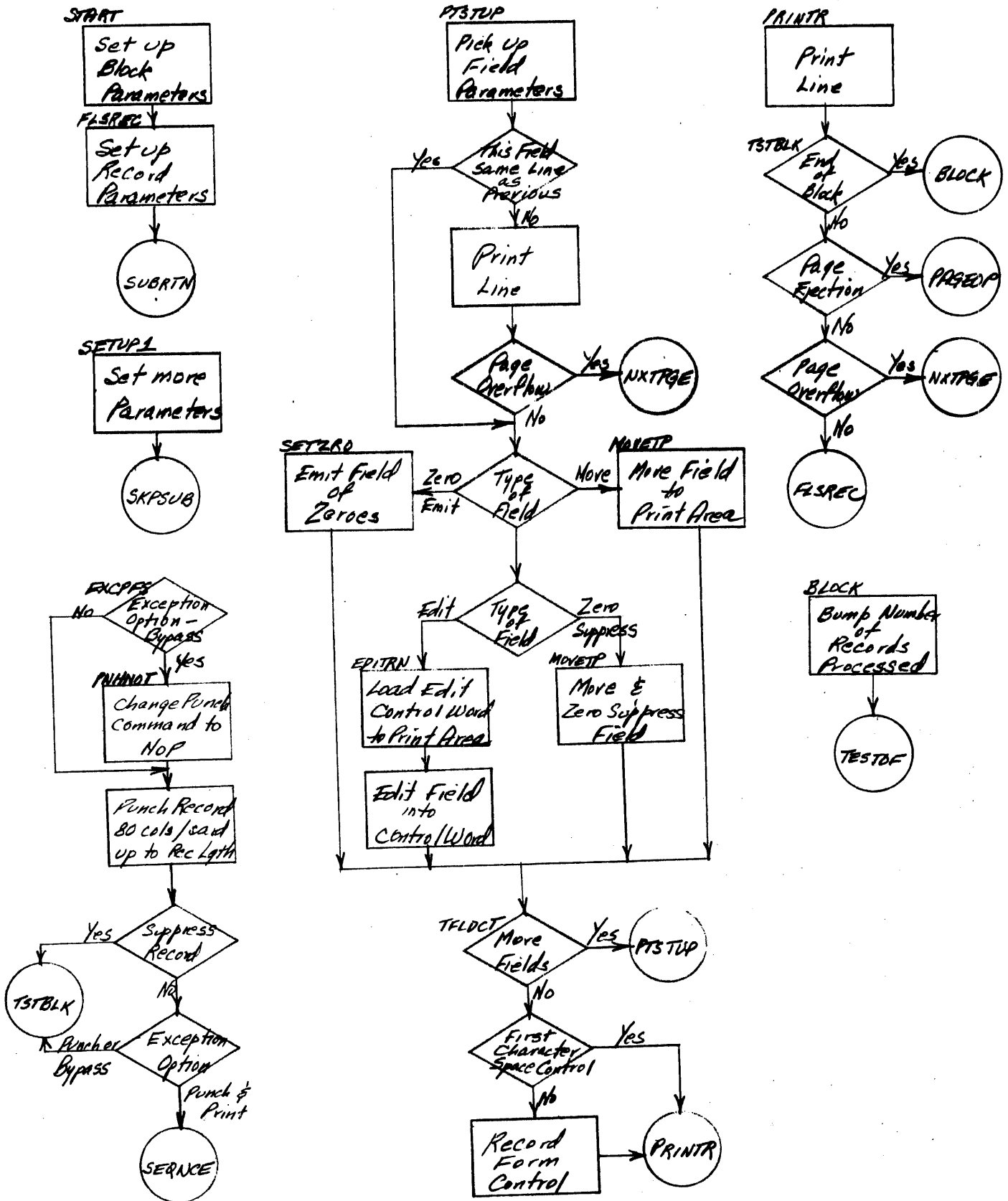
FIRST CHARACTER SPACE/SKIP

CONTROL

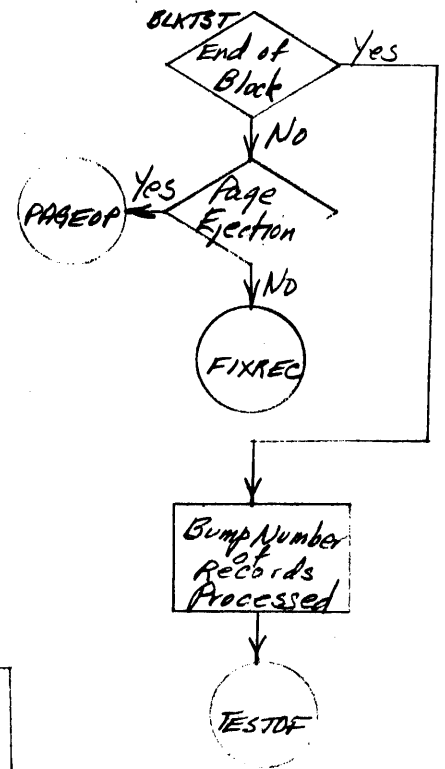
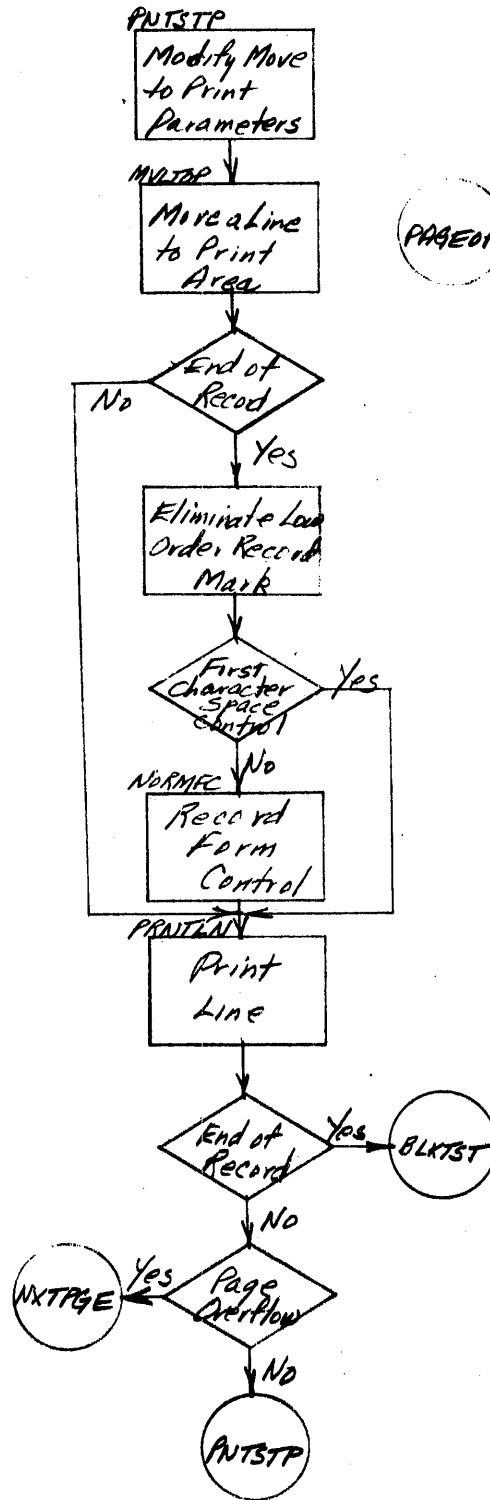
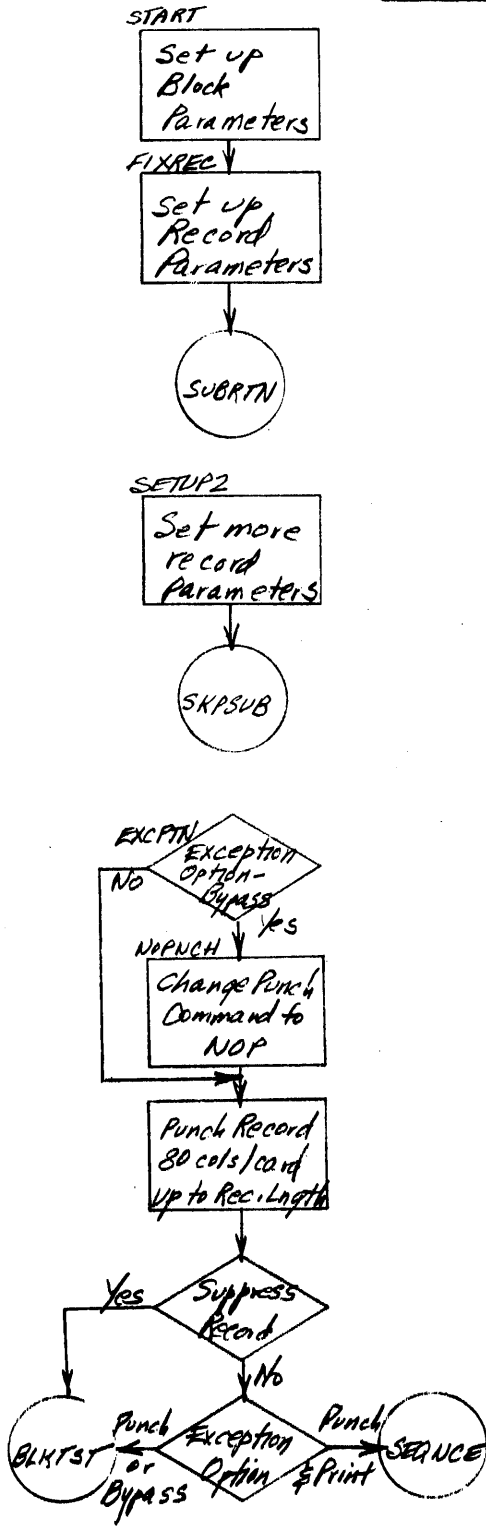


-21-
FIELD SELECTION

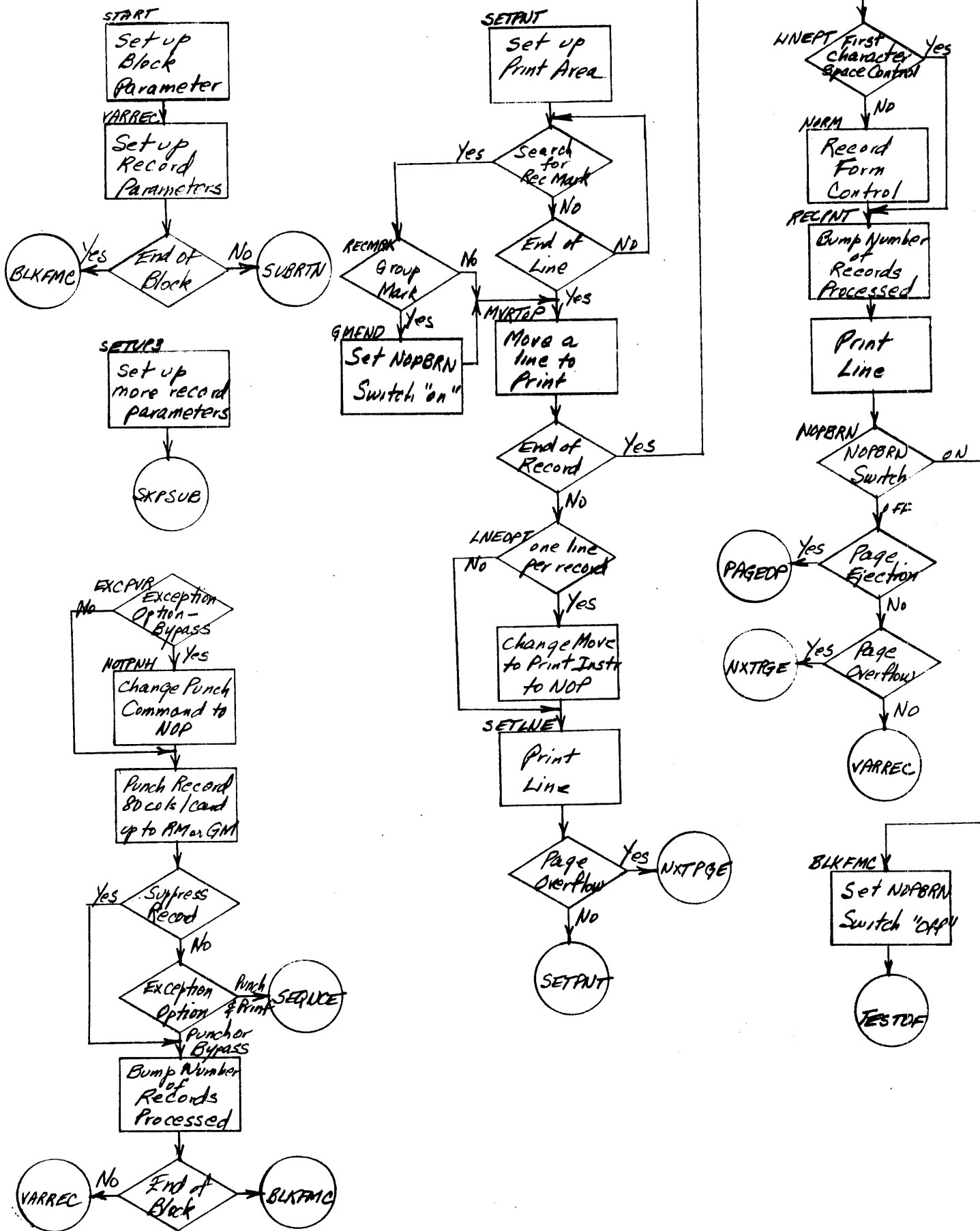
Version 3



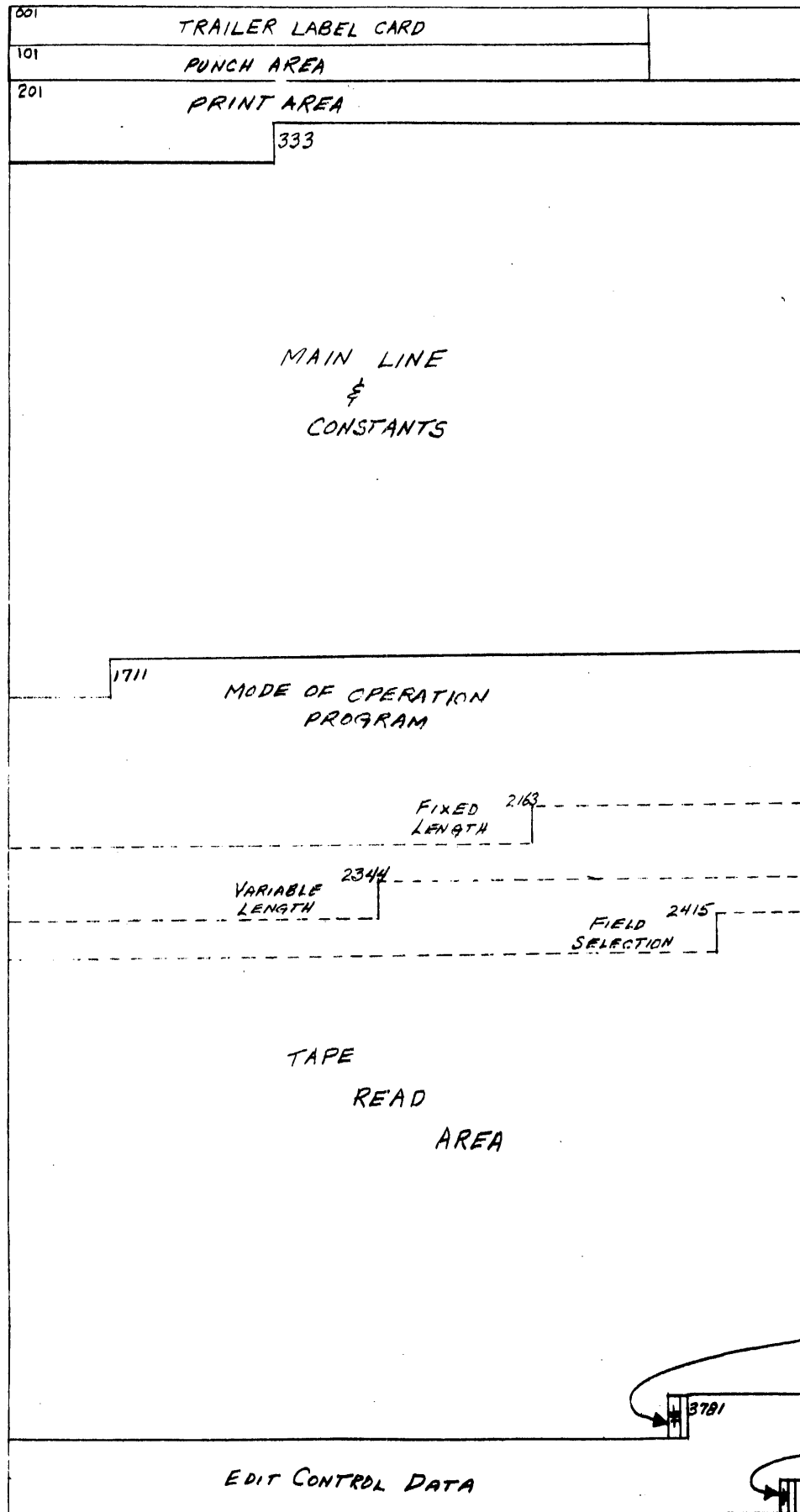
FIXED LENGTH



VARIABLE LENGTH



X STORAGE LAYOUT AT OBJECT TIME



Appendix A

List of Characters Applicable to First Character Space/Skip Control

<u>Character</u>	<u>Meaning</u>
&	Suppress spacing (not applicable to 1403 printer; see col. 23)
blank	single space
0 (zero)	double space
-(11)	triple space
1-9 or J-R	skip to channel 1-9

Appendix B

Legal Characters for Record Form Control

<u>Character</u>	<u>Meaning</u>
b (blank)	single space
S	Double space
T	Triple space
A	Skip to channel 1
B	Skip to channel 2
C	Skip to channel 3
D	Skip to channel 4
E	Skip to channel 5
F	Skip to channel 6
G	Skip to channel 7
H	Skip to channel 8
I	Skip to channel 9
+	
o	Skip to channel 10
.	Skip to channel 11
~	Skip to channel 12

Appendix C

Legal Characters for Block Form Control

<u>Character</u>	<u>Meaning</u>
J	Single space
K	Double space
L	Triple space
1	Skip to channel 1
2	Skip to channel 2
3	Skip to channel 3
4	Skip to channel 4
5	Skip to channel 5
6	Skip to channel 6
7	Skip to channel 7
8	Skip to channel 8
9	Skip to channel 9
0	Skip to channel 10
#	Skip to channel 11
@	Skip to channel 12

Version 3
-1-
APPENDIX D
PROGRAM LISTING

CLEAR STORAGE 1 008015,022026,030034,041,045,053,0570731026
 CLEAR STORAGE 2 L072116,110106,1051178101/199,027A0750291027B001C2708026/0991,001/001117100
 BOOTSTRAP CARD 008015,022029,056063/056029 ,0240671056

PG LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS
1 010			CTL	33				
1 020			ORG	0333				
1 030				*TAPE TO PRINTER	1401 UTILITY - MAIN LINE			VERS 3 - 12/1/61
1 040	4	FLSTST	B	NXTPGE			0353	BR IF NO FILESEL
1 050	7		A	KTWO			0337	A W77 S91
1 060	7		MCW	FLSELA	FLSELA		0344	M S91 371
1 070	7		MCW	FLSELA+006			0351	M S91 379
1 080	7		MCW	FLSELA+014			0358	M S91 383
1 090	8	FILESL	B	FILESLA	FILESL+018		0365	B 772 000
1 100	7		S	FINAL	0000		0373	S W76 000
1 110	7		C	ONE	NOFLSP		0380	C 000 S80
1 120	5		B	0000			0387	B 425 S
1 130	5		B	NXTPGE		S	0392	B 783 U
1 140	8	SEARCH	LCA	FSQERR			0397	L U03 I95 R
1 150	5		B	U03	3995		0400	B 414 K
1 160	4		B	* +005			0410	B 397
1 170	7		A	SEARCH			0414	A W76 S80
1 180	4		B	ONE	NOFLSP		0421	B 380
1 190	4	NXTPGE	B	FILESL+015			0425	B 431
1 200	2		CC	* +003			0429	F 1
1 210	7		CC				0431	M W93 425
1 220	4		MCW	KENN			0438	/ 332
1 230	1		CS	0332			0442	/
1 240	4	PAGECP	MGP	HDPRT			0443	N 469
1 250	7		MCS	PAGENO			0447	Z T00 299
1 260	7		MCW	PAGE			0454	M S96 295
1 270	1		N				0461	2
1 280	7		A	ONE			0462	A W76 T00
1 290	7	HDPRT	LCA	ADDLN	CARRCT+005		0469	L V73 539
1 300	7		LCA	KNOLNS	LNSCTR		0476	L T02 T04
1 310	7	PRINTH	LCA	CARRCT+005	HEADLN+003		0483	L 539 522
1 320	7		A	ONE	HEADLN+003		0490	A W76 522
1 330	7		S	ONE	LNSCTR		0497	S W76 T04
1 340	8		BWZ	TPREAD	LNSCTR		0504	V 559 T04 K
1 350	7		CW	HEADLN+001	CARRCT+003	K	0512	J 520 537
1 360	7	HEADLN	MCW	0000	CARRCT+001		0519	M 000 535
1 370	8		B	CARRCT+002	CARRCT+001		0526	B 536 535
1 380	2	CARRCT	CC				0534	F 0
1 390	7		MCW	0000	0332		0536	M 000 332
1 400	1		W				0543	2
1 410	4		SW	CARRCT+003			0544	J 537
1 420	7		A	K133			0548	A W91 539
1 430	4		B	PRINTH	CARRCT+005		0555	B 483
1 440	4	TPREAD	CS	0332			0559	/ 332
1 450	1		CS				0563	/
1 460	5		CC	* +001			0564	F 569 L
1 470	7	RECRD	LCA	3997		L	0569	L 199 197
1 480	8		LCA	U03	RIAREA	R	0576	L U03 N01 R READ TAPE BLOCK

PG	LN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
1	490	4		LCA	RMBLNK			0584	L X06	
1	500	5		B	REDUND		L	0588	B 746 L	CHECK REDUNDANCY
1	510	5	TSTTM	B	NXTFLE		K	0593	B 614 K	TEST EOF
1	520	7		MCW	BLANK	BYPASS		0598	M W92 M61	
1	530	5		B	RECRD		C	0605	B 569 C	SENSE SW C-BYP
1	540	4		B	START			0610	B X11	TO OBJECT PRGM
1	550	7	NXTFLE	A	CNE	NCFLSP	I	0614	A W76 S80	ADD 1 TO FILES
1	560	2		CC				0621	F 1	
1	570	4		CS	0332			0623	/ 352	
1	580	1		CS				0627	/	
1	590	7		MCW	RECLEG	0299		0628	M S76 299	PRINT NUMBER OF
1	600	7		MCS	KNORCS	0291		0635	Z S69 291	RECORDS IN FILE
1	610	1		W				0642	Z	
1	620	7		MCW	0332	SEQHLD		0643	M 332 W38	BLANK SEQ FLD
1	630	7		MCW	0332	KNORCS		0650	M 332 S69	BLANK NO RECS
1	640	7		ZA	K001	PAGENC		0657	+ X04 TCO	RESET PAGE NO
1	650	7		C	NCFLSP	KNOFLS		0664	C S80 S78	COMP FILES PROC
1	660	5		B	FINAL		S	0671	B 772 S	OUT IF EQUAL
1	670	4	FILOPT	B	HALTOP			0676	B 760 B	END OF FILE HALT
1	680	5		B	HALTOP		B	0680	B 760 B	CONT CD OR SS B
1	690	7	TAPELD	LCA	3999	RIAREA+080		0685	L 199 N81	READ TO CHECK
1	700	8		LCA	U03	RIAREA	R	0692	L U3 N81 R	SECOND EOF MARK
1	710	4		LCA	FILE4			0700	L S88	
1	720	5		B	FINAL		K	0704	B 772 K	
1	730	7		LCA	0080			0709	L 080 180	
1	740	8		B	CLTRWM	RIAREA+080		0716	B 764 N81	
1	750	7	COMTLR	C	CNE			0724	C W76 W76	
1	760	7		LCA	RIAREA+080	0181		0731	L N81 181	
1	770	1		C				0738	C	COMP FOR TRAILER
1	780	5		B	FINAL		S	0739	B 772 S	
1	790	5		CU	U03		B	0744	U U03 B	
1	800	7	TOFILT	LCA	3999	3997		0749	L 199 197	
1	810	4		B	FLSTST			0756	B 333	START NEXT FILE
1	820	4	HALTOP	H	TAPELD			0760	- 685	EOF TEMP HALT
1	830	4	CLTRWM	CW	RIAREA+080			0764	J N81	
1	840	4		B	COMTLR			0768	B 724	
1	850	5	FINAL	CU	U03		R	0772	U U03 R	REMIND TAPE
1	860	2		CC			I	0777	F 1	RESTORE FORM
1	870	4	FSQERR	H	* -003			0779	- 779	HALT-END OF JOB
1	880	4	SUBRTN	MCW	FLSTST			0783	- 333	FILE NOS OUT SEQ
1	890	7		B	SEQUENCE	EXITCT		0787	M W92 W62	FROM OBJECT PRGM
1	900	4		B	SEQUENCE			0794	B 879	BYP IF NO EXCPNS
1	910	7	TESTEX	LCA	TAPADD	TESTC1+003		0798	L W04 836	SET UP ADDRESSES
1	920	7		LCA	TAPADD	TESTC2+003		0805	L W04 859	OF EXCEPTION
1	930	7		A	C1ADDR	TESTC1+003		0812	A W45 836	CHARACTER
1	940	7		A	C2ADDR	TESTC2+003		0819	A W48 859	LOCATIONS
1	950	7		CW	TESTC1+001	TESTC2+001		0826	J 834 857	
1	960	7	TESTC1	MCW	0000	TSTCH1		0833	M 000 W51	
1	970	7		C	TSTCH1	CHAR1		0840	C W51 W49	COMP FIRST CHAR
1	980	5		B	TESTC2		/	0847	B 856 /	BRANCH ON PROPER
1	990	4		B	EXCFND			0852	B 875	CONDITION
2	000	7	TESTC2	MCW	0000	TSTCH2		0856	M 000 W52	COMP SECOND CHAR
2	010	7		C	TSTCH2	CHAR2		0863	C W52	

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOG	INSTRUCTION COMMENTS
2	020	5		B	SEQNCE		/	0870	B 879 /
2	030	4	EXCFND	B	EXCPIN			0875	B X61 BR ON PROPER CND
2	040	4	SEQNCE	B	OUTSEQ-004			0879	B 927 BR-PROCESS EXCPN
2	050	7		LCA	SEQADD	CHKSEQ+003		0883	L W41 911 BYP IF NO SEQCHK
2	060	7		A	TAPADD	CHKSEQ+003		0890	A W04 911 SET UP SEQUENCE
2	070	7		MCM	CHKSEQ+003	CHKSEQ+010		0897	M 911 918 CHECK ADDRESS
2	080	4		CM	CHKSEQ+001			0904	J 909
2	090	7	CHKSEQ	C	OGGO			0908	C 000 000 CHECK SEQUENCE
2	100	7		MCM	0000			0915	M 000 000
2	110	5		B	OUTSEQ		U	0922	B 931 U BR-OUT OF SEQNCE
2	120	4		B	SETUP2			0927	B X36 TO PROCESS RECRD
2	130	4	OUTSEQ	H	* -007			0931	* 927 BYP-NOT FIRST CR
2	140	4	SKPSUB	B	LINKGE			0935	B #58 SET UP ADDRESS
2	150	7		LCA	TAPADD			0939	L W04 967 OF FIRST CHAR
2	160	7		A	ONE	SKCNTL+003		0946	A W76 967
2	170	7		MCM	ONE	SKCNTL+003		0953	M 967 977
2	180	4		CM	SKCNTL+001			0960	J 965
2	190	7	SKCNTL	MCM	0000	FCCHAR		0964	M 000 W06 PICK UP CHAR
2	200	7		MCM	BLANK	0000		0971	M W92 000 BLANK CHAR
2	210	7		MCM	FCCHAR	AMPRSD		0978	C W06 X01 CHECK FOR SPACE
2	220	5		C	SKIP		/	0985	B #18 / SUPPRESS
2	230	7	SUPPRS	MCM	ONE	EXITCT		0990	M W76 W62 SPACE SUPPRESS
2	240	4		B	NOPNCH			0997	B Z10 OPTION TO BYPASS
2	250	4		CS	0332			1001	/ 332
2	260	1		CS				1005	/
2	270	7		MCM	ASTRSK	0203		1006	M W96 203 OPTION TO PRINT
2	280	1		W				1013	2
2	290	4		CS	0203			1014	/ 203
2	300	8	SKIP	B	LINKGE	FCCHAR		1018	B #58 W06 SINGLE SPACE
2	310	8		B	FORM	FCCHAR	0	1026	B #62 W06 0 DOUBLE SPACE
2	320	8		B	FORM +005	FCCHAR	-	1034	B #67 W06 - TRIPLE SPACE
2	330	8		BWZ	FORM +010	FCCHAR	2	1042	V #72 W06 2 SKIP TO CHANNEL
2	340	8		BWZ	FORM +010	FCCHAR	K	1050	V #72 W06 K 1-9
2	350	4	LINKGE	B	PNTSTP			1058	B Z21 LINK TO PRINT
2	360	5	FORM	CC	LINKGE		J	1062	F #58 J
2	370	5		CC	LINKGE		K	1067	F #58 K
2	380	7		MCM	ADLINK	TPREAD+008		1072	M W68 567
2	390	7		MN	FCCHAR	* +002		1079	D W06 #87
2	400	2		CC			0	1086	F 0
2	410	8		B	PAGEOP-005		1	1088	B #38 #87 1 PAGE EJECT-HDNCS
2	420	4		B	LINKGE			1096	B #58
2	430	7	TESTOF	MCM	OVFAD3	TPREAD+008		1100	M W65 567
2	440	8		B	RECRD	BYPASS		1107	B 569 W61
2	450	5		B	NXTPGE		*	1115	B #25 * OVERFLOW-EJECT
2	460	7		MCM	FCBLKC	* +002		1120	M W08 /28 BLOCK FORM CNTL
2	470	2		CC			0	1127	F 0
2	480	8		B	PAGEOP-005		1	1129	B #38 /28 1 OVERFLOW-EJECT
2	490	5		B	NXTPGE		*	1137	B #25 * GET NEXT BLOCK
2	500	4		B	RECRD			1142	B 569 REDUNDANCY
2	510	7	REDUND	MCM	TSTSSF+005	OPTN8 -004		1146	M S13 S43 SET CTR FOR TRYS
2	520	7		MCM	TRYCTR-002	TRYCTR		1153	M S59 S61
2	530	7	RETRY	S	ONE	TRYCTR		1160	S W76 S61
2	540	8		BWZ	TSTSSF	TRYCTR	K	1167	V S08 S61 K OUT IF TEN TRYS

PG	LN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS
2	550	5		CU	(U3		B	1175	U (U3 B
2	560	7		LCA	3999	3997		1180	L I99 I97
2	570	8		LCA	(U3	RIAREA	R	1187	L (U3 M01 R BACKSPACE-READ
2	580	4		LCA	RMBLNK			1195	L X06
2	590	5		B	RETRY		L	1199	B /60 L
2	600	4		B	TSTTM		F	1204	B 593
2	610	5	TSTSSF	B	TSTTM			1208	B 593 F
2	620	1		H				1213	-
2	630	5		B	RETRY -007		G	1214	B /53 G
2	640	5	BKSPRD	CU	(U3		B	1219	U (U3 B
2	650	7		LCA	3999	3997		1224	L I99 I97
2	660	8		LCA	(U3	RIAREA	R	1251	L (U3 M01 R BACKSPACE-READ
2	670	4		LCA	RMBLNK			1259	L X06
2	680	4		H	TSTTM			1243	- 593
2	690	7	OPTNB	MCH	KBEE	OPTNB -004		1247	M W97 S43
2	700	4		B	BKSPRD			1254	B S19
2	710	2		DCM	*			1259	
2	720	2	TRYCTR	DCM	*		09	1261	
2	730	8	KNORCS	DCM	*		09	1269	
2	740	7	RECLEG	DCM	*		RECORDS	1276	
2	750	2	KNOFLS	DCM	*		99	1278	
2	760	2	NOFLSP	DCM	*		0+	1280	
2	770	2	FILE1	DCM	*			1282	
2	780	2	FILE2	DCM	*			1284	
2	790	2	FILE3	DCM	*			1284	
2	800	2	FILE4	DCM	*			1286	
2	810	3	FLSELA	DSA	*			1288	
2	820	5	PAGE	DCM	*	FILE1 -002	S80	1291	HALT-USER FIX
2	830	4	PAGENO	DCM	*		PAGE	1296	CANNOT FIX-READ
2	840	2	KNOLNS	DCM	*		1	1300	AND PROCESS
2	850	2	LNSCTR	DCM	*		00	1302	
2	860	1	LINE1	DCM	*			1304	
2	870	79	LINE1A	DS	*			1305	
2	880	52	LINE1B	DS	*			1384	
2	890	1	LINE1FC	DCM	*			1436	
2	900	1	LINE2	DCM	*			1437	
2	910	79	LINE2A	DS	*			1438	
2	920	52	LINE2B	DS	*			1517	
2	930	1	LINE2FC	DCM	*			1569	
2	940	3	ADLNI	DSA	*			1570	
2	950	4	KRECLG	DCM	*	LINE1B	U36	1573	
2	960	4	PARAM1	DCM	*		0000	1577	
2	970	4	KLINLG	DCM	*		0000	1581	
2	980	4	PARAM2	DCM	*			1585	
2	990	3	RCLCNV	DCM	*			1589	
3	000	3	KBLKNG	DCM	*		000	1592	
3	010	3	BLKCTR	DCM	*			1595	
3	020	3	TRUEBL	DCM	*		000	1598	
3	030	3	TAPADD	DCM	*			1601	
3	040	1	SKPTST	DCM	*			1604	
3	050	1	FCCHAR	DCM	*			1605	
3	060	1	FCINST	DCM	*		/	1606	
3	070	1	FCBLKC	DCM	*		N	1607	
							0	1608	

PG LIN	CT	LABEL	OP	A. OPERAND	B. OPERAND	D	LOC	INSTRUCTION COMMENTS
3 080	30	SEQHLD	DCW	*			1638	
3 090	3	SEQADD	DCW	*			1641	
3 100	1	EXCOPT	DCW	*			1642	
3 110	3	C1ADDR	DCW	*		000	1645	
3 120	3	C2ADDR	DCW	*		000	1648	
3 130	1	CHAR1	DCW	*			1649	
3 140	1	CHAR2	DCW	*			1650	
3 150	1	TSTCH1	DCW	*			1651	
3 160	1	TSTCH2	DCW	*			1652	
3 170	4	PNHLGT	DCW	*			1656	
3 180	4	TPELGT	DCW	*			1660	
3 190	1	BYPASS	DCW	*			1661	
3 200	1	EXITCT	DCW	*			1662	
3 210	3	OVFAD3	DSA	*		569	1665	
3 220	3	ADLINK	DSA	*		#58	1668	
3 230	3	KRRR	DSA	*		N00	1671	
3 240	4	KZEROP	DCW	*		000+	1675	
3 250	1	ONE	DCW	*		1	1676	
3 260	1	KTHO	DCW	*		2	1677	
3 270	1	KFOUR	DCW	*		4	1678	
3 280	4	K80	DCW	*		0080	1682	
3 290	3	K100	DCW	*		100	1685	
3 300	3	K200	DCW	*		200	1688	
3 310	3	K133	DCW	*		133	1691	
3 320	1	BLANK	DCW	*			1692	
3 330	1	KENN	DCW	*		N	1693	
3 340	3	ASTRSK	DCW	*		***	1696	
3 350	1	KBEE	DCW	*		8	1697	
3 360	3	K11	DCW	*		011	1700	
3 370	1	AMPRSD	DCW	*		+	1701	
3 380	3	K001	DCW	*		001	1704	
3 390	2	RMBLNK	DCW	*		+	1706	
3 400	1	KTHREE	DCW	*		3	1707	
3 410	3	KG83	DCW	*		G83	1710	
3 420	3	RIAREA	DS	2501			2501	
3 430	3	EXCDSA	ORG	0081				
3 440	3	KDEE	DCW	*		879	0083	
3 450	1	KYYY	DCW	*		D	0084	
3 460	1	KMAXLG	DCW	*		Y	0085	
3 470	4	KMINLG	DCW	*		1496	0089	
3 480	4	KG79	DCW	*		1279	0093	
3 490	3	TEMP	DCW	*		679	0096	
3 500	3	K16	DCW	*			0099	
3 510	2	K16	DCW	*		16	0101	
3 520	1	KEMH	DCW	*		M	0102	
3 530	1	KZEE	DCW	*		Z	0103	
3 540	4	TABLE	DCW	3993		2SKB	3993	
3 550	1	GRPMRK	DCW	3997				
3 560	2	K03	DCW	*		03	0105	
3 570	2	K10	DCW	*		10	0107	
3 580	3	HLDADD	DSA	*		W08	0110	
3 590	1	SLASH	DCW	*		/	0111	
3 600	1	ESS	DCW	*		S	0112	

RECRD
LINKGE
RIAREA-001

SEQNCE

SEQHLD-030

PG LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS
140	1		R				2662	I
150	2		SS				2663	K 1
160	7	FIXCD2	MCM	0052	3471		2665	M 052 DZJ
170	7		MCM	0080	3472		2672	M 080 D72
180	7		SW	FIXCD1+004	FIXCD2+004		2679	M 059 069
190	4		SW	FIXCD2+011			2686	M 076
200	7		A	K133	FIXCD1+006		2690	A W91 061
210	7		A	K133	FIXCD2+006		2697	A W91 071
220	7		A	K133	FIXCD2+013		2704	A W91 078
230	7		CW	FIXCD1+004	FIXCD2+004		2711	M 059 069
240	4		CW	FIXCD2+011			2718	M 076
250	4		B	NXTFHD			2722	B 037
260	7	STORVH	MN	3147	KNOLNS		2726	D A47 T02
270	7		ZA	KNOLNS	LNSCTR		2733	+ T02 T04
280	7		C	3147	KTWO		2740	C A47 W77
290	5		B	ERROR3			2747	B +64 T
300	7	NXTVHD	S	ONE	LNSCTR		2752	S W76 T04
310	8		BWZ	STORHL	LNSCTR		2759	V Q27 T04
320	1		R				2767	I
330	2		SS				2768	K 1
340	7	VARCD1	LCA	0080	LINEIA		2770	L 080 T84
350	1		R				2777	I
360	2		SS				2778	K 1
370	7	VARCD2	MCM	0052	LINEIB		2780	M 052 U56
380	8		B	* +008	0080		2787	B Q02 080 /
390	7		MCM	0080	LINEIFC		2795	M 080 U37
400	7		MCM	ADDL2A	VARCD1+006		2802	M +70 P76
410	7		MCM	ADDL2B	VARCD2+006		2809	M +73 P86
420	7		MCM	ADDL2F	VARCD2+021		2816	M +76 Q01
430	4		B	NXTVHD			2823	B P52
440	8	STORHL	B	* +005	3151		2827	B Q59 A51 4
450	4		B	STORTL			2835	B Q79
460	1		R				2839	I
470	2		SS				2840	K 1
480	7		LCA	0080	3818		2842	L 080 H18
490	4		SW	3148			2849	M A48
500	7		C	K80	3150		2853	C W82 A50
510	5		B	* +005			2860	B Q09 U
520	4		B	STORTL			2865	B Q79
530	1		R				2869	I
540	2		SS				2870	K 1
550	7		MCM	0080	3898		2872	M 080 H98
560	8	STORTL	B	EDITST	TEMP -001		2879	B Q97 098
570	1		R				2887	I
580	2		SS				2888	K 1
590	7		LCA	0080	3978		2890	L 080 I78
600	8	EDITST	B	SELPGM	TEMP -002		2897	B +04 097
610	7		SW	0002	0004		2905	M +002 004
620	1	NXTEDI	R				2912	I
630	8		B	* +012	0001		2913	B R32 001
640	7		CW	0002	0004		2921	M 002 004
650	4		B	SELPGM+001			2928	B +05
660	2		SS				2932	K 1

PG	LN	CI	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
4	670	7		MCW	K03	STEDIT+003		2934	M 105 R66	SET UP ADDRESS
4	680	7		A	0003	STEDIT+003		2941	A 003 R66	OF EDIT WORD
4	690	4		SW	STEDIT+004			2948	R 67	
4	700	7		A	0003	STEDIT+006		2952	A 003 R69	MOD STORE ADDR
4	710	4		CM	STEDIT+004			2959	J R67	
4	720	7	STEDIT	LCA	0000	ADDED0		2963	L 000 161	STORE EDIT WORD
4	730	7		A	0003	ADDED1		2970	A 003 116	STORE ED WD ADDR
4	740	7		A	KTHREE	STEDIT+013		2977	A X07 R76	
4	750	7		C	ERREDI+006	EDTIST		2984	C R69 327	TESI OVER 160
4	760	5		B	ERREDI		T	2991	B +80 T	COLUMNS
4	770	4		B	MXEDI			2996	B R12	GET NEXT EDIT CD
4	780	4	ERREDI	H	*			3000	+ +00	OVER 160 COLUMNS
4	790	1	SELPGM	R	-003			3004	I	
4	800	7		SW	0024	0056		3005	R 024 056	RESTORE BOOTSTRP
4	810	7		SW	0063	0067		3012	R 063 067	WORD MARKS
4	820	8		B	VARRCD	3103	V	3019	B +39 A03 V	
4	830	8	DECKSL	B	0056	0076	2	3027	B 056 076 2	BR IF PROPER PGM
4	840	4		R	DECKSL			3035	I +27	SEARCH IF NOT
4	850	7	VARRCD	MCW	KTHREE	DECKSL+007		3039	M X07 +34	SET VAR LING PRGM
4	860	4		B	DECKSL			3046	B +27	
4	870	8	RUNOUT	B	0056	0076		3050	B 056 076	IO LOAD PROGRAM
4	880	4		R	RUNOUT			3068	I +50	
4	890	1	ERROR1	H	*			3062	-	NO REC OR LN LGT
4	900	1	ERROR2	H	*			3063	-	OVER 3 FIX HEAD
4	910	1	ERROR3	H	*			3064	- 144	OVER 2 VAR HEAD
4	920	3	ADDL2A	DSA	-003	LINE2A	V17	3070		
4	930	3	ADDL2B	DSA	*	LINE2B	V69	3073		
4	940	3	ADDL2F	DSA	*	LINE2FC	V70	3076		
4	950			EX	AMALL			3076	B M00	
4	960			ORG	1711					
4	970			MCW	KBLKNG					
4	980	7	START	MCW	KRRR	BLKCTR		1711	M V95 V98	SET BLOCK CTR
4	990	7	FLSREC	MCW	ONE	TAPEMD		1718	M W1 K88	SET TARE ADDR
5	010	7		MCW	KGB3	COMPLR+007		1725	M W76 Z71	SET TIME NO EQ 1
5	020	7		MCW	TAPEND	EDITAD		1732	M X10 M85	SET EDIT WORD AD
5	030	4		B	SUBRTN	TAPADD		1739	M K08 W04	
5	040	7	SETUP1	MCW	KFLDCT	FLDCTR		1746	B 787	BR TO EXC + SEQ
5	050	7		LCA	ADDFLD	PTSTUP+014		1750	M K90 K92	SET NO OF FIELDS
5	060	4		B	SKPSUB			1757	L M82 Z85	
5	070	8	EXCPFS	B	PNHNDT	EXCPT	1	1764	B 935	BR TO FORM CTL
5	080	7		MCW	K80	PNHLGT		1768	B Z10 M42	I EXCEPT 1-BYPASS
5	090	7		MCW	KRECLG	TPELGT		1776	M W82 W56	
5	100	7		LCA	TAPEND	TPELGT		1783	M V77 M40	
5	110	7	NAICD	LCA	KIDU	TAPEPN+003		1790	L K88 Y55	SET UP ADDRESSES
5	120	7		C	TPELGT	TAPEPN+006		1797	L W85 Y58	FOR MOVE INSTR
5	130	5		B	ADDLGT	PNHLGT		1804	C W60 W56	
5	140	7		MCW	TPELGT	PNHLGT	T	1811	B Y23 T	SET CARD LENGTH
5	150	7	ADDLGT	A	PNHLGT	TAPEPN+003		1816	M W60 W56	EQ REC IF LESS
5	160	7		A	PNHLGT	TAPEPN+006		1823	A W56 Y55	MODIFY MOVE
5	170	4		CS	0180			1830	A W56 Y58	ADDRESSES
5	180	4		SW	0101			1837	/ 180	
5	190	4		SW	0101	TAPEPN+004		1841	/ 101	
5	190	7		SW	0101	TAPEPN+001		1845	/ Y53 Y56	

PG	LN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
5	200	7	TAPEPN	MCM	0000	0000		1852	M 000 000	MOVE REC TO CARD
5	210	4	SW	MCM	TAPEPN+001			1859	Y 53	
5	220	1	P	MCM				1863	4	PUNCH OR NOP
5	230	7	S	MCM	PNHLGT	TPELGT		1864	S W56 W60	
5	240	7	C	MCM	PNHLGT	KZEROP		1871	C M60 M75	TEST FOR ZERO
5	250	5	B	MCM	NXTCD			1878	B K97 /	ANOTHER IF NOT
5	260	7	MCM	MCM	KFOUR	TAPEPN+011		1883	M W78 Y63	
5	270	8	B	MCM	TSTBLK	EXITCT	1	1890	B J18 W62	1 SPACE SUPPR RECD
5	280	8	B	MCM	SEQNCE	EXCOPT	3	1898	B 879 W42	3 OPT-PUNCH + PRNT
5	290	4	B	MCM	TSTBLK			1906	B J18	BYPASS PRINTING
5	300	7	PNHNOT	MCM	KENN	TAPEPN+011		1910	M W93 Y63	BYPASS OR SUPPRS
5	310	4	B	MCM	EXCPFS+008			1917	B X76	
5	320	7	PTSTUP	A	K11	PTSTUP+014		1921	A X00 Z35	MODIFY FIELD
5	330	4	CM	MCM	PTSTUP+012			1928	J Z33	PARAM PICKUP
5	340	7	LCA	MCM	0000	FLDANL		1932	L 000 M79	PICKUP FLD PARAM
5	350	7	MCM	MCM	ONE	BYPASS		1939	M W76 W61	
5	360	7	SM	MCM	PTSTUP+012	FLDANL-003		1946	W 233 M76	
5	370	7	SM	MCM	FLDANL-004	FLDANL-007		1953	W 275 M72	
5	380	4	SM	MCM	FLDANL			1960	W 279	
5	390	8	COMPRL	B	OVFRT1+005	FLDANL-004	0	1964	B Z90 M75	0 FIELD SAME LINE
5	400	1	W	MCM				1972	2	PRINT IF NOT
5	410	7	MCM	MCM	OVFAD1	TPREAD+008		1973	M K82 567	
5	420	5	B	MCM	NXTPGE			1980	B 425	EJECT IF OVERFLO
5	430	4	OVFRT1	CS	0332			1985	/ 332	
5	440	1	CS	MCM				1989	/	
5	450	8	B	MCM	SETZRO	FLDANL-005	Z	1990	B J80 M74	Z TEST ZERO EMIT
5	460	7	A	MCM	TAPEMD	FLDANL-005		1998	A K88 M74	MODIFY ADDRESSES
5	470	7	A	MCM	TAPEMD	FLDANL-008		2005	A K88 M71	TO MOVE FIELD TO
5	480	7	MCM	MCM	FLDANL	MOVETP+004		2012	M W79 -44	PRINT AREA
5	490	7	MCM	MCM	FLDANL-001	MOVETP+010		2019	M W78 -50	
5	500	7	MCM	MCM	FLDANL-005	MOVETP+007		2026	M W74 -47	
5	510	7	MCM	MCM	FLDANL-008	MCVETP+003		2033	M W71 -43	
5	520	4	MOVETP	SM	0000			2040	W 000	
5	530	7	MCM	MCM	0000	0000		2044	M 000 000	MCM,MCS OR NOP
5	540	8	B	MCM	EDITRN	FLDANL	N	2051	B K20 M79	N OR TO EDIT-NOP
5	550	7	TELDCT	MCM	FLDANL-008	* +004		2059	M W71 -69	
5	560	4	CM	MCM	0000			2066	J 080	
5	570	7	S	MCM	ONE	FLDCTR		2070	S W76 K92	SUBT 1-MO FIELDS
5	580	7	MCM	MCM	FLDANL-004	COMPLR+007		2077	M W75 Z71	RESET LINE NO
5	590	8	BWZ	MCM	PTSTUP	FLDCTR	B	2084	V Z21 K92	B NEXT FIELD-PLUS
5	600	8	B	MCM	PRINTR	SKPTST	1	2092	B J17 W05	1
5	610	7	NORMAL	MCM	FCCHAR	PRINTR-001		2100	M W06 J16	SET FORM CONTROL
5	620	8	B	MCM	PRINTR	PRINTR-001	/	2107	B J17 J16	/
5	630	2	W	CC			0	2115	F 0	
5	640	1	PRINTR	MCM				2117	2	PRINT LINE
5	650	4	TSTBLK	CS	0332			2118	/ 332	
5	660	1	CS	MCM				2122	/	
5	670	7	MCM	MCM	OVFAD6	TPREAD+008		2123	M K85 567	
5	680	7	S	MCM	ONE	BLKCTR		2150	S W76 V98	
5	690	7	A	MCM	RCLCNV	TAPEMD		2137	A V92 K88	BUMP TAPE ADDR
5	700	8	BWZ	MCM	BLOCK	BLKCTR	K	2144	V J69 V98	K OR IF END OF BLK
5	710	8	B	MCM	PAGEOP	PRINTR-001	A	2152	B 443 J16	A
5	720	5	B	MCM	NXTPGE			2160	B 425	EJECT IF OVERFLO

PG	LN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
5	730	4		B	FLSREC			2165	B X25	GET NEXT RECORD
5	740	7	BLOCK	A	TRUEBL	KNORCS		2169	A W01 569	BUMP NO OF RCRDS
5	750	4		B	TESTOF			2176	B /00	TO 8LK FORM CTL
5	760	7	SETZRO	MCW	FLDANL-008	* +004		2180	M W71 J90	
5	770	4		SW	0000			2187	, 000	
5	780	7		MCW	FLDANL-001	ZEROST+006		2191	M W78 K11	SET ADDRESS FOR
5	790	7		MCW	FLDANL-001	ZEROST+010		2198	M W78 K15	FIELD OF ZEROS
5	800	7	ZEROST	MCW	KZEROP-003	0000		2205	M W72 000	GENERATE FIELD
5	810	4		MCW	0000			2212	M 000	OF ZEROS
5	820	4		B	TFLDCT			2216	B -59	TO BUMP NO FLDS
5	830	7	EDITRN	MCW	FLDANL-001	LDEDIT+006		2220	M W78 K61	SET UP ADDRESSES
5	840	7		MCW	FLDANL-001	LDEDIT+013		2227	M W78 K68	OF FIELD FROM
5	850	7		MCW	FLDANL-005	LDEDIT+010		2234	M W74 K65	TAPE RECORD
5	860	7		MCW	EDITAD	* +004		2241	M M85 K51	SET UP ADDRESS
5	870	7		MCW	0000	LDEDIT+003		2248	M 000 K58	OF EDIT WORD
5	880	7	LDEDIT	LCA	0000	0000		2255	L 000 000	LOAD EDIT WORD
5	890	7		MCE	0000	0000		2262	E 000 000	EDIT FIELD
5	900	7		A	KTHREE	EDITAD		2269	A X07 M85	BUMP EDIT ADDR
5	910	4		B	TFLDCT			2276	B -59	TO BUMP NO FLDS
5	920	3	OVFAD1	DSA	*	OVFR11		2282		
5	930	3	OVFAD6	DSA	*	FLSREC		2285		
5	940	3	TAPEND	DCW	*			2288		
5	950	2	KFLDCT	DCW	*			2290		
5	960	2	FLDCTR	DCW	*			2292		
5	970	11	FIELD1	DCW	*			2303		
5	980	11		BCW	*			2314		
5	990	11		DCW	*			2325		
6	000	11		DCW	*			2356		
6	010	11		DCW	*			2347		
6	020	11		DCW	*			2368		
6	030	11		DCW	*			2369		
6	040	11		DCW	*			2380		
6	050	11		DCW	*			2391		
6	060	11		DCW	*			2402		
6	070	11		DCW	*			2413		
6	080	11		DCW	*			2424		
6	090	11		DCW	*			2435		
6	100	11		DCW	*			2446		
6	110	11		DCW	*			2457		
6	120	11	FIELD0	DCW	*			2468		
6	130	11	FLDANL	DCW	*			2479		
6	140	3	ADDFLD	USA	*			2482		
6	150	3	EDITAD	DCW	*	FIELD1-011		2485		
6	160			EX						
6	170			ORG	RUNOUT					
6	180				1711					
6	190	7	START	MCW	*TAPE TO PRINTER	1401 UTILITY - FIXED LENGTH				
6	200	7		LCA	KBLKNG	BLKCTR		1731	M V95 V98	SET BLOCK CTR
6	210	7	FIXREC	MCW	KRRR	MVLTOP+003		1718	L W71 Z61	SET TAPE ADDR
6	220	4		B	MVLTOP+003	TAPADD		1725	M Z61 W04	
6	230	7	SETUP2	MCW	SUBRTN	PARAM1		1736	B 767	BR TO EXC + SEQ
6	240	7		MCW	KRECLG	PARAM2		1743	M V77 V81	SET UP RECORD
6	250	7		LCA	K200	MVLTOP+006		1743	M V85 V89	LENGTH+LINE LGTH
6	250	7		LCA	K200			1750	L W88 Z64	

PG LIN	CT	LABEL	OP	A. OPERAND	B. OPERAND	D	LOC	INSTRUCTION	COMMENTS
6 260	4		B	SKPSUB			1757	B 935	BR TO FORM CTL
6 270	8	EXCPTN	B	NOPNCH	EXCPT	1	1761	B Z10 W42	1 EXCOPT 1-BYPASS
6 280	7		MCW	K80	PNHLGT		1769	M W82 W56	
6 290	7		MCW	KRECLG	TPELGT		1776	M V77 W60	
6 300	7		LCA	MVLTOP+003	TPTOPN+003		1783	L Z61 Y48	SET UP ADDRESSES
6 310	7	NXTCRD	LCA	K100	TPTOPN+006		1790	L W85 Y51	FOR MOVE INSTR
6 320	7		C	TPELGT	PNHLGT	T	1797	C W60 W56	
6 330	5		B	ADDPNL			1804	B Y16 T	SET CARD LENGTH
6 340	7	ADDPNL	MCW	TPELGT	PNHLGT		1809	M W60 W56	EQ REC IF LESS
6 350	7		A	PNHLGT	TPTOPN+003		1816	A W56 Y48	MODIFY MOVE
6 360	7		A	PNHLGT	TPTOPN+006		1823	A W56 Y51	ADDRESSES
6 370	4		CS	0180			1830	/ 180	
6 380	4		SM	0101			1834	/ 101	
6 390	7		CM	TPTOPN+001			1838	J Y46 Y49	
6 400	7	TPTOPN	MCW	0000	TPTOPN+004		1845	M 000 000	MOVE REC TO CARD
6 410	4		SM	TPTOPN+001	0000		1852	/ Y46	PUNCH OR NOP
6 420	1		P				1856	/	
6 430	7		S	PNHLGT	TPELGT		1857	S W56 W60	
6 440	7		B	TPELGT	KZEROP		1864	C W60 W75	TEST FOR ZERO
6 450	5		C	NXTCRD		/	1871	B X90 /	ANOTHER IF NOT
6 460	7		MCW	KFOUR	TPTOPN+011		1876	M W78 Y56	
6 470	8		B	* +009	EXITCT	1	1883	B Y99 W62	1 SPACE SUPPR RECD
6 480	8		B	SEQNCE	EXCPT	3	1891	B 879 W42	3 OPT-PUNCH + PRNT
6 490	7		MCW	TPTOPN+003	MVLTOP+003		1899	M Y48 Z61	BYPASS PRINTING
6 500	4		B	BLKST	TPTOPN+011		1906	B J09	BYPASS OR SUPPRS
6 510	7	NOPNCH	MCW	KENN			1910	M W93 Y56	
6 520	4		B	EXCPTN+008			1917	B X69	
6 530	7	PNTSTP	A	PARAM2	MVLTOP+003		1921	A V89 Z61	MODIFY MOVE TO
6 540	7		A	PARAM2	MVLTOP+006		1928	A V89 Z64	PRINT INSTR
6 550	7		MCW	ONE	BYPASS		1935	M W76 W61	
6 560	4		CS	0332			1942	/ 332	
6 570	1		CS				1946	/	
6 580	4		SM	0201			1947	/ 201	
6 590	7		CM	MVLTOP+001	MVLTOP+004		1951	J Z59 Z62	MOVE TO PRINT
6 600	7	MVLTOP	MCW	0000	0000		1958	M 000 000	
6 610	7		SM	MVLTOP+001	MVLTOP+004		1965	J Z59 Z62	
6 620	7		C	PARAM1	PARAM2		1972	C V81 V89	
6 630	5		B	PRNTLN		T	1979	B -47 T	BR IF NOT END
6 640	5		B	ERROR		U	1984	B J54 U	BR IF LL GRTR RL
6 650	7		MCW	MVLTOP+006	* +007		1989	M Z64 -02	
6 660	8		B	* +005	0000	#	1996	B -08 000	+ TEST LO FOR RM
6 670	4		B	FORMAT			2004	B -22	
6 680	7		MCW	MVLTOP+006	* +007		2008	M Z64 -21	ELIMINATE LOW
6 690	7		MCW	BLANK	0000		2015	M W92 000	ORDER RECORD MRK
6 700	8	FORMAT	B	PRNTLN	SKPTST	1	2022	B -47 W05	
6 710	7	NORMFC	MCW	FCCHAR	PRNTLN-001		2030	M W06 -46	SET FORM CONTROL
6 720	8		B	PRNTLN	PRNTLN-001	/	2037	B -47 -46 /	
6 730	2		CC			0	2045	F 0	
6 740	1	PRNTLN	W		TREAD+008		2047	2	PRINT LINE
6 750	7		MCW	OVFAD4			2048	M J60 567	
6 760	5		B	NXTPGE			2050	S 425 /	EJECT IF OVERFLO
6 770	7	OVFT4	S	PARAM2	PARAM1		2055	S V89 V81	
6 780	7		C	PARAM1	KZEROP		2067	C V81 W75	TEST END OF REC

PG LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS
6 790	5		B	BLKTST		S	2074	B J09 S
6 800	7		C	PARAM1	PARAM2		2079	C V81 V89
6 810	5		B	* PARAM1 +008		T	2086	TEST REC LGTH LESS THAN LINE
6 820	7		MCW	PARAM1	PARAM2		2091	M V81 V89
6 830	7		LCA	K200	MVLTOP+006		2098	L W88 Z64
6 840	4		B	PNTSTP			2105	B Z21
6 850	7	BLKTST	S	ONE	BLKCTR		2109	S W76 V98
6 860	8		BWZ	NEWPGE	BLKCTR	B	2116	V J35 V98 B
6 870	7		A	TRUEBL	KNORCS		2124	A W01 S69
6 880	4		B	TESTOF			2191	B 700
6 890	7	NEWPGE	MCW	ADELXR	TPREAD+008		2135	M J63 S67
6 900	8		B	PAGEOP-005	PRNTLN-001	A	2142	B 438 -46 A
6 910	4	ERROR	B	FIXREC			2150	B X25
6 920	4		H	* -003	OVFRT4		2154	. J54
6 930	3	OVFAD4	DSA	*	FIXREC		-60	
6 940	3	ADFIXR	DSA	*			2160	
6 950			EX	* RUNOUT			2163	B +50
6 960			ORG	1711				
6 970				*TAPE TO PRINTER				
6 980	7	START	LCA	KRRR	MVRTOP+003		1711	L W71 J21
6 990	7	VARREC	MCW	MVRTOP+003	TAPADD		1718	M J21 W04
6 991	7		LCA	TAPADD	COMPND+006		1725	L W04 X49
6 992	7		A	ONE	COMPND+006		1732	A W76 X49
6 993	4	COMPND	CW	COMPND+004			1739	J X47
6 994	4		C	RMBLNK-001	0000		1743	C X05 000
6 995	5		B	RLKPMC		S	1750	B L23 S
7 000	4		B	SUBRTN	MVRTOP+006		1765	B 787
7 010	7	SETUP3	LCA	K200			1759	L W88 J24
7 020	4		B	SKPSUB			1766	B 935
7 030	8	EXCPVR	B	NOTPNH	EXCPT	I	1770	B Z96 W42 I
7 040	7		LCA	MVRTOP+003	TAPPNH+003		1778	L J21 Y65
7 050	7		MCW	BLANK	TSTGPM		1785	M W92 L44
7 060	4	NEWCRD	CS	0180			1796	. 101
7 070	4		SW	0101			1800	L W85 Y68
7 080	7		LCA	K100	TAPPNH+006		1807	A W76 Y65
7 090	7	GETCHR	A	ONE	TAPPNH+003		1814	A W76 Y68
7 100	7		A	ONE	* +007		1821	M Y65 Y34
7 110	7		MCW	TAPPNH+003			1828	B Y85 080 #
7 120	8		B	RMFND	TAPPNH+006		1836	C X95 Y68
7 130	7		C	NEWCRD+003			1843	B Y07 T
7 140	5		B	GETCHR	SWITCH	T	1848	M W92 L43
7 150	7		MCW	BLANK	TAPPNH+004		1855	J Y63 Y66
7 160	7	LOADPH	CW	TAPPNH+001			1862	M 000 000
7 170	7	TAPPNH	MCW	0000	0000		1869	. Y63
7 180	4		SW	TAPPNH+001	SWITCH	I	1873	B Z36 L43 I
7 190	8		B	PNCHCD			1881	. X92
7 200	4		P	NEWCRD	TSIEOF+006		1885	M Y65 Z05
7 210	7	RMFND	MCW	TAPPNH+003	SWITCH		1892	M W76 L43
7 220	7		MCW	ONE	0000	I	1899	V Z11 000 I
7 230	8	TSTEOF	BWZ	GRMFND			1907	B Y55
7 240	4		B	LOADPH	TSTGPM		1911	M W76 L44
7 250	7	GRMFND	MCW	ONE	TAPPNH+003		1918	A L42 Y65
7 260	7		A	K199				SUBT I FROM

PG LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
7 270	7		A	KI99	TAPPNH+006		1925	A L42 Y68	MCVE ADDRESSES
7 280	4		B	LOADPH			1982	B Y55	RETURN TO PUNCH
7 290	1	PNCHCD	P				1936	4	PUNCH LAST CARD
7 300	7		MCW	KFOUR	PNCHCD		1937	M W78 Z36	RESET NOP INSTRS
7 310	7		MCW	KFOUR	RMFND -004		1944	M W78 Y81	TO PUNCH INSTRS
7 320	8		B	* +009	EXITCT	1	1951	B Z67 W62 1	SPACE SUPPR RECD
7 330	8		B	SEQUCE	EXCOPT	3	1959	B 879 W42 3	OPT-PUNCH + PRNT
7 340	7		A	ONE	KNORCS		1967	A W76 S69	BUMP NO OF RECS
7 350	7		MCW	TSTEOF+006	MVRTOP+003	1	1974	M Z05 J21	BYPASS PRINTING
7 360	8		B	BLKPMC	TSTGPM		1981	B L23 L44 1	TO BLK FORM CTL
7 370	7		CS	VARREC	0203		1989	/ X18 Z03	OR NEXT RECORD
7 380	7	NOTPMH	MCW	KENN	PNCHCD		1986	M W93 Z36	BYPASS OR SPACE
7 390	7		MCW	KBEE	RMFND -004		2003	M W97 Y81	SUPPRESS
7 400	4		B	EXCPVR+008			2010	B X78	
7 410	7	SETPNT	MCW	ONE	BYPASS		2014	M W76 W61	
7 420	4		CS	0332			2021	/ 332	
7 430	1		CS				2025	/	
7 440	4		SW	0201			2026	/ 201	
7 450	7	NXTCTR	A	ONE	MVRTOP+003		2030	A W76 J21	BUMP REC ADDRESS
7 460	7		MCW	MVRTOP+003	* +007		2037	M J21 -50	
7 470	8		B	RECRMK	0000	*	2044	B J90 000	* TEST FOR REC MRK
7 480	7		A	ONE	MVRTOP+006		2052	A W76 J24	BUMP PRNT ADDR
7 490	7		C	KLIMLG	MVRTOP+006		2059	C V85 J24	TEST FUEL LINE
7 500	5		B	NXTCTR		T	2066	B -30 T	NEXT CHAR IF NCT
7 510	7		MCW	BLANK	SWITCH		2071	M W92 L43	
7 520	7		LCA	MVRTOP+003	LKAHED+006		2078	L J21 J09	SET UP TEST
7 530	7		A	ONE	LKAHED+006		2085	A W76 J09	FOR RECORD MARK
7 540	7		MCW	LKAHED+004	E0FTST+006		2092	M J09 K17	IN NEXT POSITION
7 550	4		CV	LKAHED+006			2099	J J07	
7 560	8	LKAHED	B	PICKSW	0000	*	2103	B K04 000	* BRANCH IF RM NXT
7 570	7	MOVERC	CV	MVRTOP+001	MVRTOP+004		2111	J J19 J22	
7 580	7	MVRTOP	MCW	0000	0000		2118	M 000 000	MOVE ONE LINE
7 590	4		SW	MVRTOP+001			2125	/ J19	
7 600	8		B	LINEPT	SWITCH	1	2129	B K34 L43 1	OUT IF END RECD
7 610	4	LINEOPT	B	SETLINE			2137	B J62	NOP-ONE LN / RCD
7 620	7		MCW	KENN	MVRTOP		2141	M W93 J18	NOP MOVE AND
7 630	7		MCW	KENN	SETLINE+007		2148	M W93 J69	PRINT INSTRS
7 640	7		MCW	KBEE	ONELNE		2155	M W97 J77	
7 650	7	SETLINE	LCA	K200	MVRTOP+006		2162	L W88 J24	
7 660	1		W				2169	2	PRINT A LINE
7 670	7		MCW	OVFAD5	TPREAD+008		2170	M L36 567	
7 680	4	ONELNE	NOP	NXTCTR			2177	N -30	
7 690	5		B	NXTPGE			2181	B 425	EJECT IF OVERFLO
7 700	4		B	SETPNT			2186	B -14	NEXT LINE
7 710	7	RECRMK	MCW	MVRTOP+003	E0FTST+006		2190	M J21 K17	SET GM TEST ADDR
7 720	7		A	KI99	MVRTOP+003		2197	A L42 J21	
7 730	7	PICKSW	MCW	ONE	SWITCH		2204	M W76 L43	
7 740	8	E0FTST	BWZ	GMFND	0000	1	2211	V K23 000 1	TEST FOR END BLK
7 750	4		B	MOVERC			2219	B J11	RETURN IF NOT
7 760	7	GMFND	MCW	KBEE	NOPBRN		2223	M W97 L02	SET BLOCK SWITCH
7 770	4		B	MOVERC			2230	B J11	
7 780	7	LINEPT	A	ONE	MVRTOP+003		2234	A W76 J21	
7 790	8		B	RECPNT	SKPTST	1	2241	B K66 W05 1	

PG	LN	CT	LABEL	OP	A. OPERAND	B. OPERAND	D	LOC	INSTRUCTION COMMENTS
7	800	7	NORM	MCW	FCCHAR	RECPNT-001		2249	M M06 K65 SET FORM CONTROL
7	810	8		B	RECPNT	RECPNT-001	/	2256	B K66 K65 /
7	820	2	RECPNT	CC	ONE	KNORCS	0	2264	F 0
7	830	7		A				2266	A M76 S69 BUMP NO OF RECS
7	840	1		M	OVFAD7	TPREAD+008		2273	2
7	850	7		MCW	* K200	MVRTOP		2274	M L39 S67
7	860	7		MCW	* K199	SETLINE+007		2281	M K81 J18 RESET MOVE AND
7	870	7		MCW	KENN	CNELNE		2288	M W77 J69 PRINT INSTRS
7	880	7		MCW	KENN			2295	M W93 J77
7	890	4	NOPBRN	NOP	BLKPMC	RECPNT-001	A	2302	M L23 BR IF END OF BLK
7	900	8		B	PAGEOP-005			2306	B K38 K65 A TRST NEW PAGE
7	910	5		B	NXTPGE			2314	B K25 EJECT IF OVERFLO
7	920	4		B	VARREC			2319	B X18 GET NEXT RECORD
7	930	7	BLKPMC	MCW	KENN	NOPBRN		2323	M W93 L02 RESET BLOCK SMTH
7	940	4		B	TESTOF			2330	B 700 TO BLK FORM CTL
7	950	4		B	OVFAD5	SETPNT	-14	2336	
7	960	3	OVFAD7	DSA	* *	VARREC	X18	2339	
7	970	3	KI99	DCW	* *		199	2342	
7	980	1	SWITCH	DCW	* *			2343	
7	990	1	TSTGPM	DCW	* *			2344	
8	000	1		EX	RUNOUT				B +50
8	010	8		ORG	2500				
8	020	8	ANALIA	B	VARLNE	3154		2500	B N83 A54 BR IF NOT FLDSEL
8	030	7		MCW	EXITS1	OUTSEQ-001		2508	M Q01 930 MODIFY LINKAGE
8	040	7		MCW	EXITS1+003	SUPPRS+010		2515	M 804 #60 ADDRESSES IN
8	050	7		MCW	EXITS1+006	EXCFND+003		2522	M Q07 878 MAIN LINE ROUT
8	060	7		MCW	EXITS1+009	LINKGE+003		2529	M Q10 #61
8	070	8		B	FLSSET	TEMP -002		2536	B 045 007 BR IF NO EDITING
8	080	7		MCW	KG79	RECRD +006		2544	M 096 575 ALTER MAXIMUM
8	090	7		MCW	KG79	TOFILT+006		2551	M 096 786 BLOCK LENGTH
8	100	7		MCW	KG79	RETRY +026		2558	M 096 S30
8	110	7		MCW	KG79	BKSPRD+011		2565	M 096 S30
8	120	7		MCW	KMINLG	KMAXLG		2572	B 045 089
8	130	4		B	FLSSET			2579	B 045
8	140	4	VARLNE	B	* FLSSET +005	3103	V	2583	B M95 A03 V
8	150	4		B	FLSSET			2591	B 045
8	160	7		MCW	EXITS1+012	OUTSEQ-001		2595	M Q13 930 MODIFY LINKAGE
8	170	7		MCW	EXITS1+015	SUPPRS+010		2602	M Q16 #60 ADDRESSES IN
8	180	7		MCW	EXITS1+018	EXCFND+003		2609	M Q19 878 MAIN LINE ROUT
8	190	7		MCW	EXITS1+021	LINKGE+003		2616	M Q22 #61 FOR VAR LGTH
8	200	8		B	* KENN +008	3152		2623	B 038 A52 TEST VAR LGTH
8	210	7		MCW	KENN	LINEOPT		2631	M W93 J57 ONE LINE OPTION
8	220	7		A	K200	KLINLG		2638	A 888 V85
8	230	8	FLSSET	B	* K200 +008	3111		2645	B 068 A11
8	240	7		MCW	3111	KNOFLS		2653	B A11 S78 SET NO OF FILES
8	250	7		MZ	KZEROP	KNOFLS		2660	Y W75 S78
8	260	8		B	STLINL	3115		2667	B 091 A15
8	270	7		MCW	KENN	FLSTST		2675	M W93 333
8	280	7		MCW	3119	FILE3		2682	M A19 S86
8	290	1		MCW				2689	M
8	300	1		MCW				2690	M
8	310	4	STLINL	SW	3107	KLINLG		2691	A A07
8	320	7		A	3109			2695	A A09 V85 SET LINE LENGTH

PG LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
8 330	8	TSTHLT	B	* +008	3113	1	2702	B P17 A13 1	
8 340	7		MCM	KENN	FILOPT		2710	M W93 676	SET HALT OPTION
8 350	8		B	PGNCOB	3146		2717	B R52 A46	
8 360	7		MCM	KENN	NXTPGE		2725	M W93 425	SET FIX HEAD OPT
8 370	8	PGNOOP	B	PGNOOP+015	3120		2732	B P47 A20	
8 380	7		MCM	KBEE	PAGEOP		2740	M W07 443	SET PAGE NO OPT
8 390	8		B	TRIPLE-004	3124		2747	B P69 A24	
8 400	7		MCM	NXTPGE+004	FCINST		2755	M 429 W07	SET BLOOK FORM
8 410	7		MCM	3124	FCBLKC		2762	M A24 W08	CONTROL
8 420	4		CH	FCBLKC			2769	J W08	
8 430	8	TRIPLE	B	LDANL2	TEMP		2773	B P95 099	
8 440	7		MCM	BLANK	RECRD -001		2781	M W92 568	ELIMINATE AUTO-
8 450	7		MCM	KBEE	TPREAD+005		2788	M W97 564	MATIC TRIPLE SPC
8 460	4	LDANL2	R	0056			2795	1 056	BR TO BOOTSTRAP
8 470	3	EXITST	DSA	*	SETUP1		2801		
8 480	3		DSA	*	PNHNOT		2804		
8 490	3		DSA	*	EXCPFS		2807		
8 500	3		DSA	*	PTSTUP		2810		
8 510	3		DSA	*	SETUP3		2813		
8 520	3		DSA	*	NOTPNH		2816		
8 530	3		DSA	*	EXCPVR		2819		
8 540	3		DSA	*	SETPNT		2822		
8 550			EX	ANAL1A				B N00	
8 560			ORG	2500					
8 570	8	ANAL2	B	LDANL3	3103	V	2500	B R64 A03 V	BYP VAR LENGTH
8 580	7		A	3103	KRECLG		2508	A A03 V77	SET RECRD LENGTH
8 590	7		MN	KRECLG-003	* +004		2515	D V74 N25	
8 600	7		MZ	3990	3101		2522	Y 190 A01	
8 610	7		MCM	3103	RCLCNV		2529	M A03 V92	SET CONV REC LGT
8 620	7		A	3106	TRUEBL		2536	A A04 W01	SET BLOCKING
8 630	7		MCM	TRUEBL	BLKCTR		2543	M W01 V98	
8 640	7		S	ONE	BLKCTR		2550	S W76 V98	
8 650	7		MCM	BLKCTR	KBLKNG		2557	M V98 V95	
8 660	7	TESTRL	A	KRECLG	PARAM1		2564	A V77 V81	
8 670	7		S	ONE	BLKCTR		2571	S W76 V98	
8 680	7		BWZ	TESTRL	BLKCTR	B	2578	V N64 V98	
8 690	7		C	PARAM1	KMAXLG		2586	C V81 089	ERROR IF BLOCK
8 700	5		B	ERROR4			2593	B R68 T	LGTH EXCEEDS MAX
8 710	8		B	LDANL3	3154	T	2598	B R64 A54	SET NO FIELDS
8 720	7	FLDSEL	A	3154	KFLDCT		2606	A A54 K90	
8 730	7		C	KFLDCT	K16		2613	C K90 101	
8 740	5		B	ERROR5			2620	B R72 T	ERROR IF OVER 16
8 750	7		S	ONE	KFLDCT		2625	S W76 K90	
8 760	7		LCA	ADDFLD	STORE +006		2632	L M82 Q90	SET STORE ADDR
8 770	7		A	K11	STORE +006		2639	A X00 Q90	
8 780	7		LCA	FLDANL	ANAL2 +011		2646	L M79 N11	
8 790	7		MCM	KFLDCT	FLDCTR		2653	M K90 K92	
8 800	7		LCA	ONE	ANAL2 +012		2660	L W76 N12	
8 810	7		CH	PICKUP+001	STORE +004		2667	J 075 Q88	
8 820	7	PICKUP	MCM	3165	ANAL2 +011		2674	M A65 N11	PICKUP FIELD PRM
8 830	7		SW	ANAL2 +005	ANAL2 +008		2681	J N05 N08	
8 840	7		MCM	KEMM	FLDANL		2688	M 102 M79	
8 850	8		BWZ	COMPLNE	ANAL2 +011	2	2695	V P44 N11 2	BR IF MOVE INSTR

PG LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS
8 860	8		BWZ	ZERSUP	ANAL2 +011	B	2703	V P30 N11 B BR-MV + ZERO SUP
8 870	8		BWZ	ERROR5	ANAL2 +011	S	2711	V R72 N11 S BR-INCORRECT
8 880	7		MCW	KENN	FLDANL		2719	M W95 M79 SET NOP FOR EDIT
8 890	4	ZERSUP	B	ZERSUP+007			2726	B P37
8 900	7		MCW	KZEE	FLDANL		2750	M 103 M79 SET Z FOR MCS
8 910	7		MZ	BLANK	ANAL2 +011		2737	Y W92 N11 CHECK LINE ORDER
8 920	7	COMLINE	C	ANAL2 +011	ANAL2 +012	U	2744	C N11 N12
8 930	5		B	ERROR5		S	2751	B R72 U
8 940	5		B	ADDCHR			2756	B P80 S BR IF SAME LINE
8 950	7	TSTLIN	C	KLINLG	TAPEMD	U	2761	C V85 K88 TEST LINE MAX
8 960	5		B	ERROR5			2768	B R72 U
8 970	7		MCW	CIADDR	TAPEMD		2773	M W45 K88
8 980	7	ADDCHR	A	ANAL2 +007	TAPEMD		2780	A N07 K88 ADD TO LINE CTR
8 990	7		MN	ANAL2 +011	FLDANL-004		2787	D N11 M75 SET LINE NUMBER
9 000	7		MN	ANAL2 +011	ANAL2 +012		2794	D N11 N12
9 010	7		S	ONE	ANAL2 +007		2801	S W76 N07
9 020	7		A	ANAL2 +007	ANAL2 +010		2808	A N07 N10
9 030	7		A	K200	ANAL2 +010		2815	A W88 N10
9 040	7		MCW	ANAL2 +010	FLDANL-001		2822	M N10 M78
9 050	4		SW	ANAL2 +002			2829	, N02
9 060	8		B	ZEROS	ANAL2 +004	Z	2833	B R39 N04 Z TEST-EMIT ZEROS
9 070	8		B	*	ANAL2 +001		2841	B Q63 N01
9 080	7		MN	ANAL2 +001	*		2849	D N01 Q59
9 090	7		MZ	3990	ANAL2 +002		2856	Y 190 N02
9 100	7		MCW	ANAL2 +004	FLDANL-008		2863	M N04 M71 SET HO TAPE LOC
9 110	7		A	ANAL2 +007	ANAL2 +004		2870	A N07 N04
9 120	7		MCW	ANAL2 +004	FLDANL-005		2877	M N04 M74 SET LO TAPE LOC
9 130	7	STORE	MCW	FLDANL	0000		2884	M M79 080 STORE FIELD PARS
9 140	7		S	ONE	FLDCTR		2891	S W76 K92
9 150	8		BWZ	LDANL3	FLDCTR		2898	V R64 K92 K OUT-NO MORE FLDS
9 160	7		SW	PICKUP+001	STORE +004		2906	, 075 Q88
9 170	4		CS	ANAL2 +011			2913	/ N11
9 180	4		SW	ANAL2 +001			2917	, N01
9 190	7		A	K11	PICKUP+003		2921	A X08 077 BUMP PICKUP +
9 200	7		A	K11	STORE +006		2928	A X00 Q90 STORE ADDRESSES
9 210	4		B	PICKUP-007			2935	B 067 GET NEXT FIELD
9 220	7	ZEROS	S	ANAL2 +007	ANAL2 +010		2939	S N07 N10
9 230	7		MZ	BLANK	ANAL2 +010		2946	Y W92 N10
9 240	7		MCW	ANAL2 +010	FLDANL-008		2953	M N10 M71 SET HO PRINT LOC
9 250	4	LDANL3	B	STORE -007			2960	B Q77 TO STORE
9 260	4	ERROR4	R	0056			2964	1 056 BR TO BOOTSTRAP
9 270	4	ERROR4	H	FLDSEL-008			2968	, N98 BLK EXCEEDS MAX
9 280	4	ERROR5	H	* -003			2972	, R72 FIELD SELN
9 290	1		DCW	*			2976	B N00
9 300			EX	ANAL2				
9 310			ORG	2500				
9 320	8	ANAL3	B	SEQSET	3103	V	2500	B N77 A03 V BR FOR FIELD SEL
9 330	8		B	RLVSL	3154		2508	B N20 A54 OR VAR LGTH
9 340	4		B	SEQSET			2516	B N77
9 350	7	RLVSL	C	KRECLG	KLINLG		2520	C V77 V85 COMP REC LGTH VS
9 360	5		B	* +005		U	2527	B N36 U LINE LENGTH
9 370	4		B	SEQSET			2532	B N77 OUT IF EQ OR GR
9 380	7		MCW	KZEROP	KBLKNG		2536	M W75 V95 SET BLKNG TO 001

PG LIN	CT	LABEL	OP	A. OPERAND	B. OPERAND	D	LOC	INSTRUCTION COMMENTS
9 390	7		MCW	PARAM1	KRECLG		2543	M V81 V77 SET RL TO BLK LG
9 400	4		CS	3144			2550	/ A44 ELIM SEQ+EXC+ FC
9 410	7		C	KRECLG	KLINLG		2554	C V77 V85 COMP BL VS LL
9 420	5		B	* +005			2561	B N70 U
9 430	4		B	SEQSET			2566	B N77
9 440	7		MCW	KRECLG	KLINLG		2570	M V77 V85 SET LL EQ BL
9 450	8	SEASET	B	SETFC	3144		2577	B 055 A44
9 460	7		MCW	KENN	SEQNCE		2585	M W93 879 SET SEQ BYP SWTH
9 470	7		SW	3139	3143		2592	* A39 A43
9 480	7		A	3144	HLDADD		2599	A A44 110 SET H0RD ADDRESS
9 490	7		S	ONE	3144		2606	S W76 A44
9 500	7		A	3144	3142		2613	A A44 A42
9 510	7		MN	3139	* +004		2620	D A39 030
9 520	7		MZ	3990	3140		2627	Y I90 A40
9 530	7		MCW	3142	SEQADD		2634	M A42 W41
9 540	7		MCW	HLDADD	CHKSEQ+006		2641	M 110 914
9 550	7		MCW	HLDADD	CHKSEQ+013		2648	M 110 921
9 560	8	SETFC	B	RECFC	3121		2655	B 092 A21
9 570	7		MCW	KENN	SKPSUB		2663	M W93 935
9 580	7		MCW	ONE	SKPTST		2670	M W76 W05
9 590	8		B	SETEXP	3122	I	2677	B P07 A22 I
9 600	7		MCW	KENN	SUPPRS+007		2685	M W93 997
9 610	8	RECFC	B	SETEXP	3123		2692	B P07 A23
9 620	7		MCW	3123	FCCHAR		2700	M A23 W06
9 630	8	SETEXP	B	LDANL4	3125		2707	B +33 A25
9 640	7		MCW	KENN	SUBRTN+007		2715	M W93 794
9 650	7		MN	3125	EXCPT		2722	D A25 W42
9 660	7		C	EXCPT	KTHREE		2729	C W42 X07
9 670	5		B	ERROR6			2736	B +37 T
9 680	7		MCW	3127	CHAR1		2741	M A27 W49
9 690	8		B	C1STR	3129		2748	B P70 A29
9 700	7		MN	3129	* +004		2756	D A29 P66
9 710	7		MZ	3990	3130		2763	Y I90 A30
9 720	7	C1STR	A	3132	C1ADDR		2770	A A32 W45
9 730	8		B	C2BLNK	3134		2777	B R89 A34
9 740	7	STRC2	MCW	3133	CHAR2		2785	M A33 W50
9 750	8		B	C2STR	3135		2792	B Q14 A35
9 760	7		MN	3135	* +004		2800	D A35 Q10
9 770	7		MZ	3990	3136		2807	Y I90 A36
9 780	7	C2STR	A	3138	C2ADDR		2814	A A38 W48
9 790	8		BWZ	SETY1	3128	B	2821	V +11 A28 B
9 800	8		BWZ	TSTDPI	3128	2	2829	V 052 A28 2 ZONE OR DIGIT
9 810	8		BWZ	ERROR6	3128	S	2837	V +37 A28 S INCORRECT PUNCH
9 820	7		MCW	KDEE	TESTC1		2845	M 084 833
9 830	7	TSTDPI	MZ	BLANK	3128		2852	Y W92 A28
9 840	8		B	ANDOR	3128		2859	B 086 A28 1 TEST PRESENCE CR
9 850	8		B	* +005	3128	2	2867	B Q79 A28 2 ABSENCE OF CHAR
9 860	4		B	ERROR6			2875	B +37
9 870	7		MCW	ESS	TESTC1+018		2879	M 112 851
9 880	8	ANDOR	B	D1SPN2	3126	2	2886	B R20 A26 2 TEST CONNECTIVE
9 890	8		B	* +005	3126	I	2894	B R06 A26 1 AND/OR
9 900	4		B	ERROR6			2902	B +37
9 910	7		MCW	KENN	TESTC1+019		2906	M W93 852 CHANGE OP CODE +

PG LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LCC	INSTRUCTION COMMENTS
9 920	7		MCW	EXCOSA	TESTC1+017		2913	M 083 850 OPERAND FOR AND
9 930	8	DISPN2	BWZ	SETY2	3134	B	2920	V +22 A34 B TEST SECOND CHAR,
9 940	8		BWZ	TSTD2	3134	2	2928	V R51 A34 2 ZONE OR DIGIT
9 950	8		BWZ	ERROR6	3134	S	2936	V +37 A34 S INCORRECT PUNCH
9 960	7		MCW	KDEE	TESTC2		2944	M 084 856 SET DIGIT OP CD
9 970	7	TSTD2	MZ	BLANK	3134		2951	Y W92 A34
9 980	8		B	LDANL4	3134	1	2958	B +33 A34 1 TEST PRESENCE OR
9 990	8		B	* +005	3134	2	2966	B R78 A34 2 ABSENCE OF CHAR
10 000	4		B	ERROR6			2974	B +37
10 010	7		MCW	ESS	TESTC2+018		2978	M 112 874 SET D MODR S
10 020	4		B	LDANL4			2985	B +33 BRANCH OUT
10 030	4	C2BLNK	SW	3133			2989	, A33 SET SECOND CHAR
10 040	7		MCW	3132	3138		2993	M A32 A38 SAME AS FIRST
10 050	7		MN	ONE	3126		3000	D W76 A26 SET CONNECT AND
10 060	4		B	STRC2			3007	B P85
10 070	7	SETY1	MCW	KYYY	TESTC1		3011	M 085 833 SET ZONE OP CODE
10 080	4		B	TSTD2			3018	B Q52
10 090	7	SETY2	MCW	KYYY	TESTC2		3022	M 085 856 SET ZONE OP CODE
10 100	4		B	TSTD2			3029	B R51
10 110	4	LDANL4	R	0056			3033	1 056
10 120	1	ERROR6	H				3037	
10 130	7		MCW	KBEE	SUBRTN+007		3038	M W97 794
10 140	7		MN	BLANK	EXCPT		3045	D W92 W42
10 150	4		B	LDANL4			3052	B +33
10 160	1		DCW	*			3056	
10 170			EX	ANAL3				B M00
10 180			ORG	2500				
10 190	8	ANAL4	B	STRPRG			2500	B R51 A12 D TC PROD SYS TAPE
10 200	7		SW	3145	3112		2508	, A45 197
10 210	7		A	3145	3997		2515	A A45 W04
10 220	7		MCW	3151	TAPADD		2622	M A51 N03
10 230	7		LCA	3978	ANAL4 +003		2529	L 178 080
10 240	7		LCA	3898	0080		2536	L H98 A69
10 250	8	EDITNG	B	HEADER	3169		2543	B 053 116
10 260	7		SW	LODEDT+001	ADDED1		2551	, N87 N90
10 270	7	MODIFY	A	ADDED1	LODEDT+004		2558	A 116 N89
10 280	7		A	ADDED1	LODEDT+003		2565	A 116 N92
10 290	7		LCA	LODEDT+006	LODEDT+006		2572	L N92 G83
10 300	7		CW	LODEDT+001	3783		2579	J N87 N90
10 310	7	LODEDT	LCA	ADDED0	LODEDT+004		2586	L 161 H28
10 320	7		SW	EDITNG+004	3828		2593	, N47 N59
10 330	7		SW	MODIFY+008	MODIFY+001		2600	, N66 N76
10 340	7		A	KTHREE	MODIFY+018		2607	A X07 N49
10 350	7		A	KTHREE	EDITNG+006		2614	A X07 N61
10 360	7		A	KTHREE	MODIFY+003		2621	A X07 N68
10 370	7		A	KTHREE	MODIFY+010		2628	A X07 N78
10 380	7		CW	EDITNG+004	MODIFY+020		2635	J N47 N59
10 390	7		CW	MODIFY+008	MODIFY+001		2642	J N66 N76
10 400	4		B	EDITNG	MODIFY+018		2649	B N43
10 410	8	HEADER	B	FLXHDG	ANAL4 +003		2653	B Q36 N03
10 420	7		LCA	GRPMRK	3338		2661	L 197 G38
10 430	8		LCA	LU3	3178	R	2668	L U3 A78 R READ HEADER LABEL
10 440	4		LCA	FILE4			2676	L S88

PG LIN	CT	LABEL	OP	A. OPERAND	B OPERAND	D	LOC	INSTRUCTION COMMENTS
10 450	7	LCA	LCA	FILE4	3339		2680	L 588 C39
10 460	8		B	FIXHDG	ANAL4 +003	3	2687	B Q36 N03 3 BYPASS HEADER
10 470	8		B	PNHLAB	ANAL4 +003	1	2695	B P23 N03 1 TO PRINT HEADER
10 480	8		B	PNHLAB	ANAL4 +003	2	2703	B P65 N03 2 TO PUNCH HEADER
10 490	8		B	COMLAB	ANAL4 +003	4	2711	B P95 N03 4 TO COMPR HEADER
10 500	4		B	ERROR7			2719	B Q35
10 510	4	PNHLAB	CS	0332			2723	/ 332
10 520	1		CS				2727	/
10 530	2		CC				2728	F 1
10 540	4		SW	0201			2730	, 201
10 550	1		SW				2734	,
10 560	7		MCM	3257	0280		2754	M 857 280
10 570	1		MCM				2742	M
10 580	1		W				2743	2
10 590	4		CS	0299			2744	/ 299
10 600	4		SW	0201			2748	, 201
10 610	1		SW				2752	,
10 620	7		MCM	3337	0280		2753	M C37 280
10 630	1		MCM				2760	M
10 640	4		W	FIXHDG			2761	2 Q36
10 650	4	PNHLAB	CS	0180			2765	/ 180
10 660	4		SW	0101			2769	, 101
10 670	1		SW				2773	,
10 680	7		MCM	3257	0180		2774	M 857 180
10 690	1		MCM				2781	M
10 700	1		P				2782	4
10 710	7		MCM	3337	0180		2783	M C37 180
10 720	1		MCM				2790	M
10 730	4		P	FIXHDG			2791	4 Q36
10 740	7	COMLAB	SW	COMPRE+001	COMPRE+004		2795	, Q24 Q27
10 750	7		A	ANAL4 +002	COMPRE+006		2802	A N02 Q29
10 760	7		A	ANAL4 +002	COMPRE+003		2809	A N02 Q26
10 770	7		CW	COMPRE+001	COMPRE+004		2816	I Q24 Q27
10 780	7		C	3177	3009		2823	C A77 +09
10 790	5		B	FIXHDG		S	2830	B Q36 S
10 800	1	ERROR7	H				2835	,
10 810	2	FIXHDG	CC	ONE	TAPADD	1	2856	F 1
10 820	7		S	0332			2858	S W76 W04
10 830	4		CS				2845	/ 332
10 840	1		CS				2849	/
10 850	8		BMZ	SETTPE	TAPADD	K	2850	V R22 W04 K OUT IF NO MORE
10 860	7	MCMFIX	MCM	3471	0332		2858	M D71 352
10 870	7		MCM	3472	FIXFC +001		2865	M D72 Q89
10 880	8		B	FIXFC +002	FIXFC +001		2872	B Q90 Q89
10 890	8		B	FIXFC +002	FIXFC +001	/	2880	B Q90 Q89 /
10 900	2	FIXFC	CC			0	2888	F 0
10 910	7		SW	MCMFIX+001	MCMFIX+008		2890	, 059 Q66
10 920	7		A	K133	MCMFIX+003		2897	A W91 Q61
10 930	7		A	K133	MCMFIX+010		2904	A W91 Q68
10 940	7		CW	MCMFIX+001	MCMFIX+008		2911	J Q59 Q66
10 950	4		W	FIXHDG+002			2918	2 Q38
10 960	7	SETTPE	LCA	3997	3999	R	2922	L I97 I99
10 970	8		MCM	IU3	5996		2929	M IU3 I96 R

PG LIN	CT	LABEL	OP	A. OPERAND	B. OPERAND	D	LOC	INSTRUCTION	COMMENTS
10 980	5		B	* +006		K	2937	B R47 K	TEST EOF
10 990	5		CU	(U3		B	2942	U (U3 B	BACKSPACE IF NOT
11 000	4		B	FLSTST			2947	B 333	TO OBJECT PROGRAM
11 010	4	STRPRG	CS	0080			2951	/ 080	
11 020	7		LCA	RETURN+007	0013		2955	L R94 013	SET RETURN BRNCH
11 030	1		LCA				2962	L	
11 040	1		LCA				2963	L	
11 050	8		LCA	(U1	0001	W	2964	L (U1 081 W	WRITE SYS TAPE
11 060	5		CU	(U1		M	2972	U (U1 M	
11 070	5		CU	(U1		M	2977	U (U1 M	
11 080	5		CU	(U1		R	2982	W (W1 R	
11 090	4	RETURN	H	ANAL4 +008			2987	. N08	HALT-CONTINUE
11 100	4		H	* -003			2991	. R91	
11 110	1		DCW	*			2995	/ N00 080	
11 120	1		END	ANAL4					

APPENDIX E - LISTING OF PROGRAM DECK

008015,022026,030034,041,045,053,0570731026	3001
L0721176,110106,10511761017199,027A075029J02780010270802670991,0017001117100	3002
008015,022029,036039,043047,039036	051,053,056,063M,067071,075,0011056
B425AW7S9THS9137THS91379NS91383	L032364,337,3448039
8772000	387,3921056
L0319508414K8397AW76S8083808431F1	L032396,373,3808039
MW3425/332/M4692100299MS962952	414,421,425,4291034430,405,4108039
AW76T00LV73539L102104L539522AW76522	443,447,454,4611031461,438,4428039
SW76104V59104K1520537M000538536535	483,4901056
F0M003322,537AW7539B4837332	L035496,469,4768039
FW5691LL199197L103M01RLX06B/46LB614K	519,5261056
MW22618569CRX11AW76S80F173327	544,548,555,5591029562,536,5438039
MS76299ZS692912M332M38M332S69+404T00	576,584,588,5931035597,564,5698039
CS80S7887258760B7608L199M81L103M01R	614,621,623,6271030627,605,6108039
LS888722KL0801808764M61 CW76M76LM81181	643,650,6571056
CB722J0U38L199197B333-685JN81	680,685,6921056
8724M1U3RF1.779.333MW924628879	716,724,7311056
LW04B36LM04859AW45836AM488591848857	749,756,760,7641030767,739,7448039
M00051CM51449885678875M000M52CM52M50	779,783,787,7941030797,772,7778039
B87978X6189ZFLM41911AW0911M9119181909,883,890,897,9041038907,875,8798039	819,8261056
C00000M000008931U8X36.9278+58LM04967.927.931.935,9391038945,915,9228039	852,856,8631056
AW76978967777965M000M06M92000	883,890,897,9041038907,875,8798039
CM06X018+18/MW76M626710/332/MW96203	927,931,935,9391038945,915,9228039
Z72038F58M06 B#62M0608#67M06-V#72M062	964,9711056
W#72M06K8221F#58JF#58KM68567DM06#87F0,	997,01,05,061035+12,985,9908039
8438#871B#58MN655678569M61 B425'	026,034,0421056
MM08/28F08438/2818425'B569MS13543	067,072,079,0861038#87,058,0628039
MS9561SM7656TVS0856TKU38L199197	070,071,0751056
L103M01RLX06B/60LB5938593F.B/536	077,078,079,0801056
U103BL199197L103M01RLX06.593MW97S43	084,088,093,0971032518,795,7998039
BS190909 RECORDS990+	089,093,0971056
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	098,099,103,107,1111056
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	107,108,112,116,120,1241056
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	116,117,122,126,130,1331056
	117,118,123,127,131,1341056
	118,119,124,128,132,1351056
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	122,123,128,132,136,1391056
	123,124,129,133,137,1401056
	124,125,130,134,138,1411056
	125,126,131,135,139,1421056
	126,127,132,136,140,1431056
	127,128,133,137,141,1441056
	128,129,134,138,142,1451056
	129,130,135,139,143,1461056
	130,131,136,140,144,1471056
	131,132,137,141,145,1481056
	132,133,138,142,146,1491056
	133,134,139,143,147,1501056
	134,135,140,144,148,1511056
	135,136,141,145,149,1521056
	136,137,142,146,150,1531056
	137,138,143,147,151,1541056
	138,139,144,148,152,1551056
	139,140,145,149,153,1561056
	140,141,146,150,154,1571056
	141,142,147,151,155,1581056
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	143,144,149,153,157,1601056
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	152,153,158,162,166,1691056
	153,154,159,163,167,1701056
	154,155,160,164,168,1711056
	155,156,161,165,169,1721056
	156,157,162,166,170,1731056
	157,158,163,167,171,1741056
	158,159,164,168,172,1751056
	159,160,165,169,173,1761056
	160,161,166,170,174,1771056
	161,162,167,171,175,1781056
	162,163,168,172,176,1791056
	163,164,169,173,177,1801056
	164,165,170,174,178,1811056
	165,166,171,175,179,1821056
	166,167,172,176,180,1831056
	167,168,173,177,181,1841056
	168,169,174,178,182,1851056
	169,170,175,179,183,1861056
	170,171,176,180,184,1871056
	171,172,177,181,185,1881056
	172,173,178,182,186,1891056
	173,174,179,183,187,1901056
	174,175,180,184,188,1911056
	175,176,181,185,189,1921056
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