IBM® 1401/1460 Program Library

Tape To Printer Program

1401-UT-026

IBM

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

Section No.	Name	Page No.
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

Card No.	Columns	Meaning
1	1-4 (4)	Record length - 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)	Blocking - number of records per block; leave blank for variable length records since variable blocking is permissible for variable length records.
1	8-10 (3)	Characters per line - 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)	Number of files - 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)	Program Operation - 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)	Halt Option code - 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)	First file to be printed - file number (starting from first file as file 1) when file selecting.
1	17-18 (2)	Second file to be printed - when file selecting.
1	19-20 (2)	Third file to be printed - when file selecting.
1	21 (1)	Page Number option - pages are automatically numbered unless the option is used. Punch a 1 to prevent page numbering. Otherwise, leave blank.

Card No.	Columns	Meaning
1	22 (1)	First Character Space/Skip Control - 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)	Suppress Option Code - 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)	Record Form Control Character - 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)	Block Form Control Characters - 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)	Exception Option code - 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 by-passed, 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)	Exception Type code - 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 must be punched unless only one column is to be checked.
1	28 (1)	First character configuration - the actual configuration to be checked for must be punched here (character, zone or digit).
1	29 (1)	First character disposition - 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)	First character location - the location within the tape record (assuming the start as location 0001) of the first exception character.

Card No.	Columns	Meaning
1	34 (1)	Second-character configuration - explanation same as column 28.
1	35 (1)	Second character disposition - explanation same as column 29.
1	36-39 (4)	Second character location - explanation same as columns 30-33.
1	40-43 (4)	Sequence check field location - 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)	Sequence check number of characters - the number of characters in the field to be sequence checked.
1	46 (1)	Number of lines of fixed heading - 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)	Fixed Heading print option - 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)	Number of lines of variable heading - 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)	Number of characters in header label - 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)	Disposition of header label - 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)	Variable length record single line option - 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.

Card No.	Columns	Meaning
1	54-55 (2)	Number of fields to be selected - 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)	Field 1 - high order record location - 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)	Field 1 - number of characters - the number of characters in the field to be selected or the number of zeroes to be printed.
1	63-65 (3)	Field 1 - high order print location - 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)	Field 1 - line number to be printed on - 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)	Field 2 - high order record location - see columns 56-69 for explanation.
1	71-73 (3)	Field 2 - number of characters - see columns 60-62 for explanation.
1	74-76 (3)	Field 2 - high order print location - see columns 63-65 for explanation.
1	77 (1)	Field 2 - line number to be printed on - see column 66 for explanation.
1	78 (1)	Field selection editing - 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)	Trailer label comparison - 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)	Additional Form Spacing - 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.

Card No.	Columns	Meaning
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 trys are made to read a redundant record. If after ten trys, 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 trys. At this point, again there are two courses of action possible. Setting SSG ON and depressing the start button will cause another nine trys 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:

Columns	How Punched	Meaning
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:

Columns	How Punched	Meaning	
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:

Columns	How Punched	Meaning	
	(12-zero supp.)	Line No. & Disposition Field 2	
77	B (2-line no)	Editing being used on this run.	
78	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	¤	(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:

Columns	How Punched	Meaning
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 notused. 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

	Address Displayed	Course of Action
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 trys 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 address to restart

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

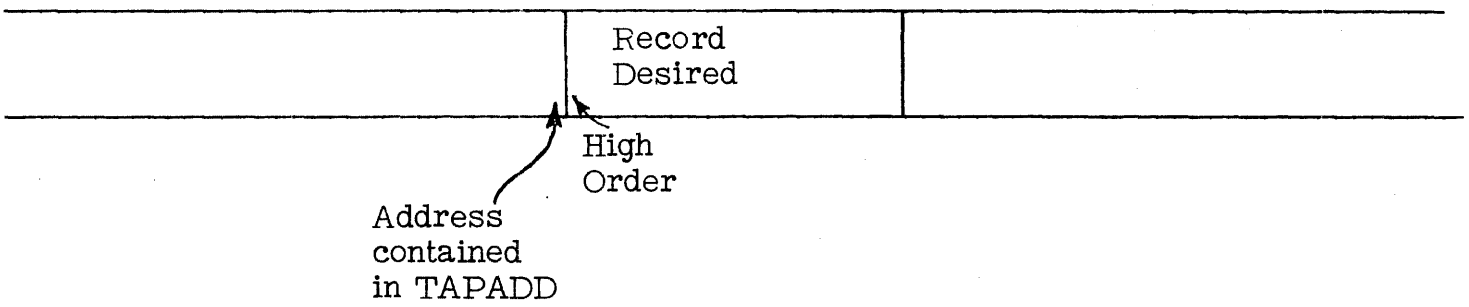
It is not possible to patch when using the Fixed Length Record Field Selection mode of operation, since there is no storage available for the patch.

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

,024␣039␣043␣0471␣071075B039

Card 2 - columns 56-66

␣0510551056

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

L0709301D 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)

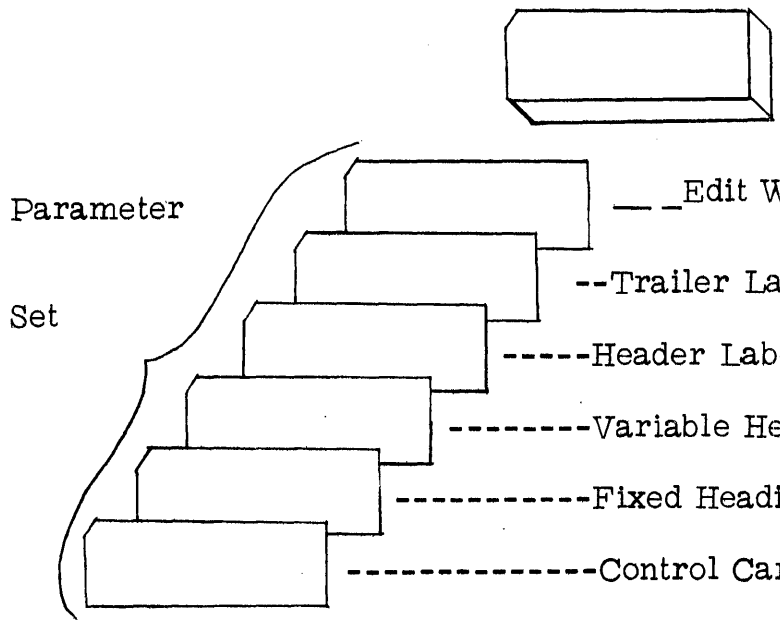
(c) If the exception option chosen is 3 (punch and print), the instruction shown in 5(a), has the same effect as 3(a), (i.e., process all records). If it is desired not to process these printed exceptions with the patch routine, one more card is needed with the card in 5(a). It should be noted, however,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



------Part II of Program
(cards 026-03-070 thru 026-03-195)

Parameter Set

__ _Edit Word Card(s) Max - 16

--Trailer Label Card Max - 1

-----Header Label Card(s) Max - 2

--------Variable Heading Card Max - 4

----------Fixed Heading Cards Max - 6

----------Control Card(s) Min - 1 Max - 3

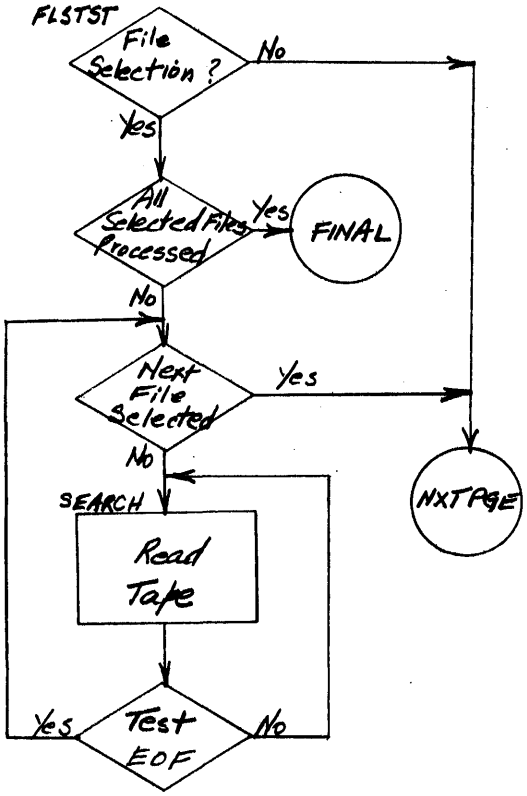
Min- 1 Max - 32

----------Part I of Program
(cards 026-03-001 thru 026-03-069)

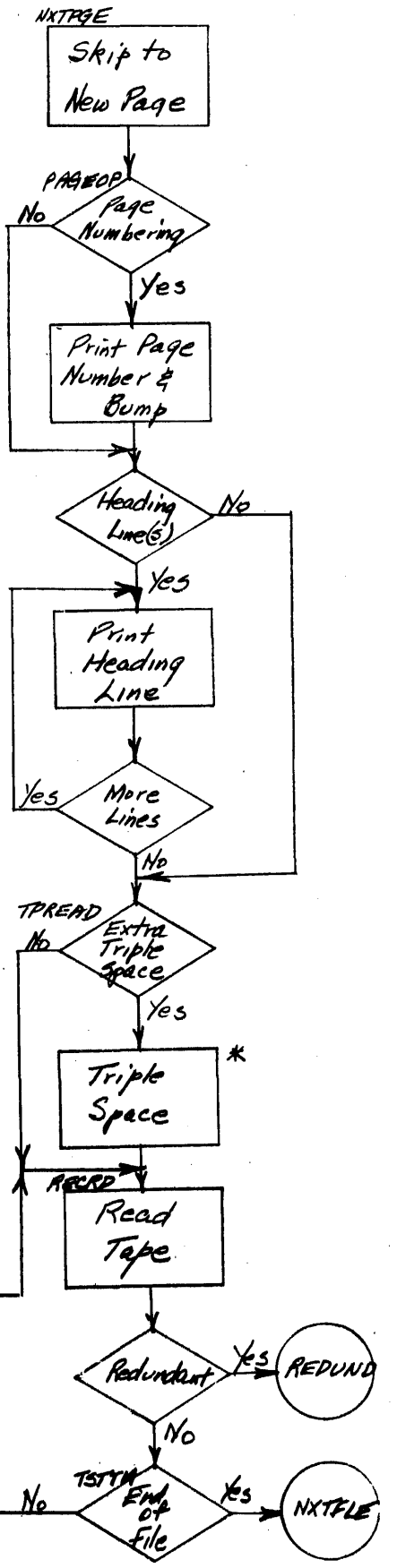
IX - FLOW CHARTS

MAIN LINE

FILE SELECTION

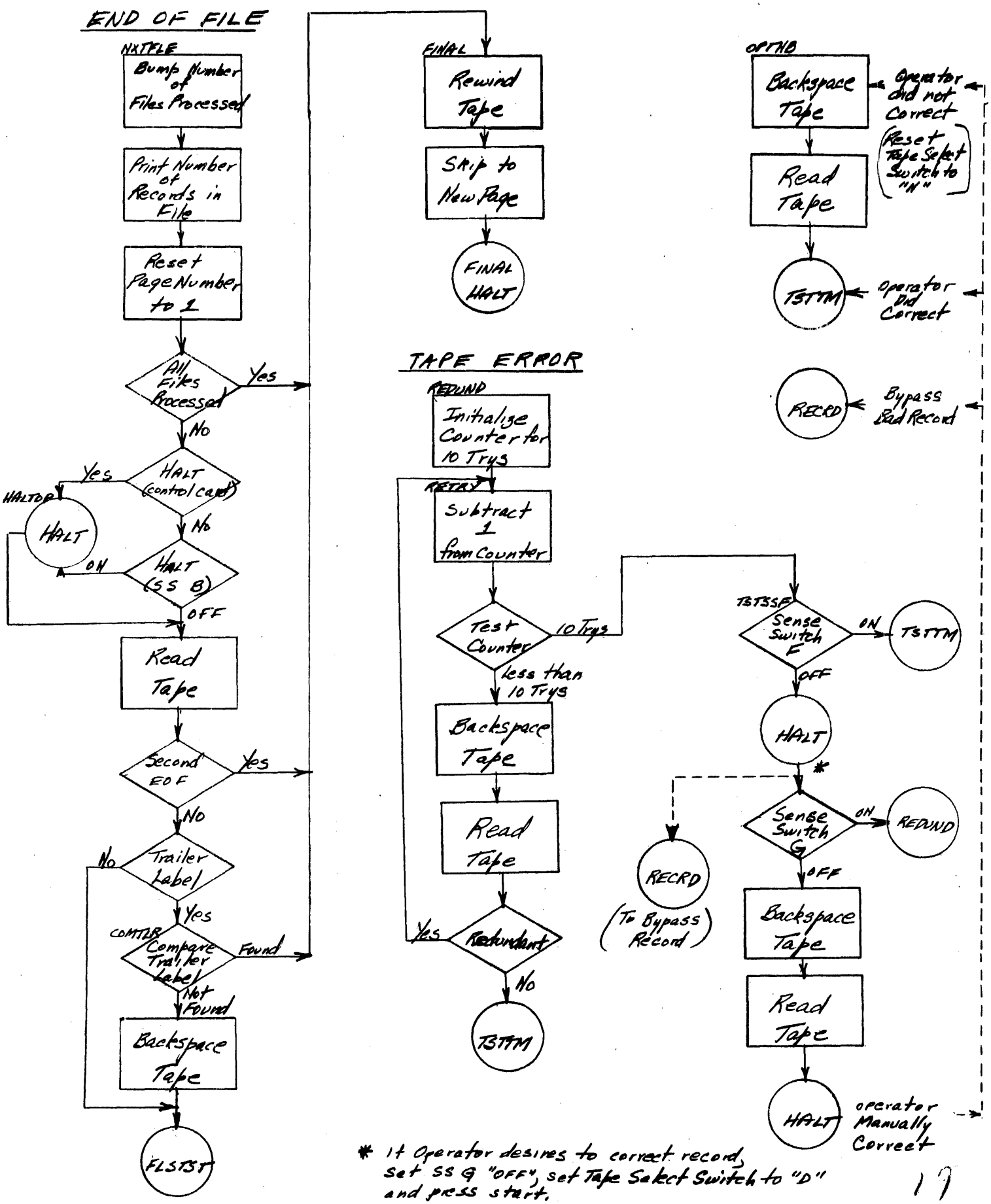


FORM SETUP & TAPE READ



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

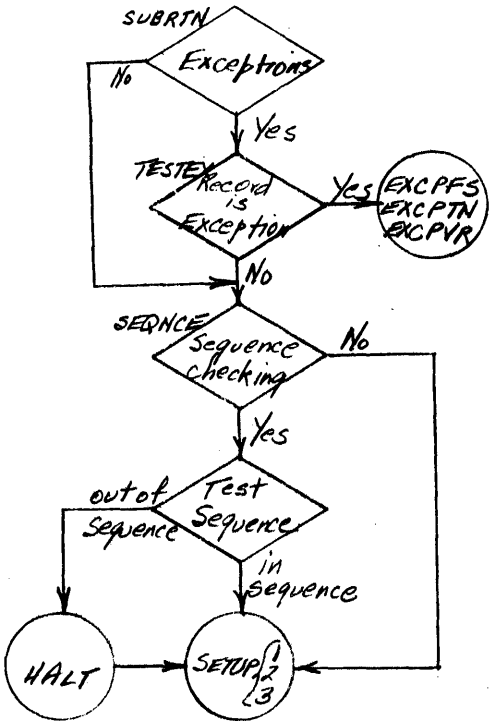
MAIN LINE (cont'd)



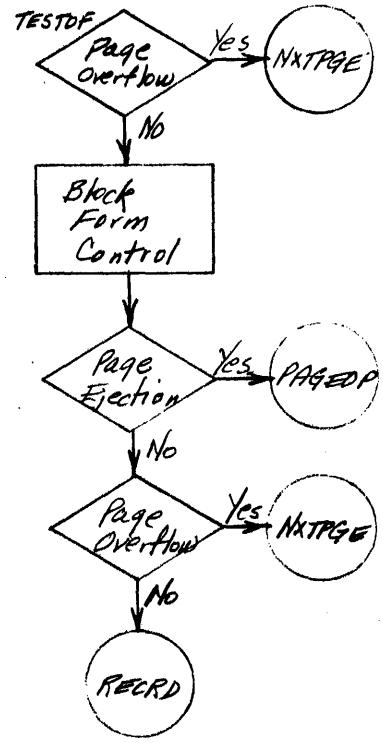
* If Operator desires to correct record, set SS G "OFF", set Tape Select Switch to "D" and press start.

MAINLINE (cont'd)

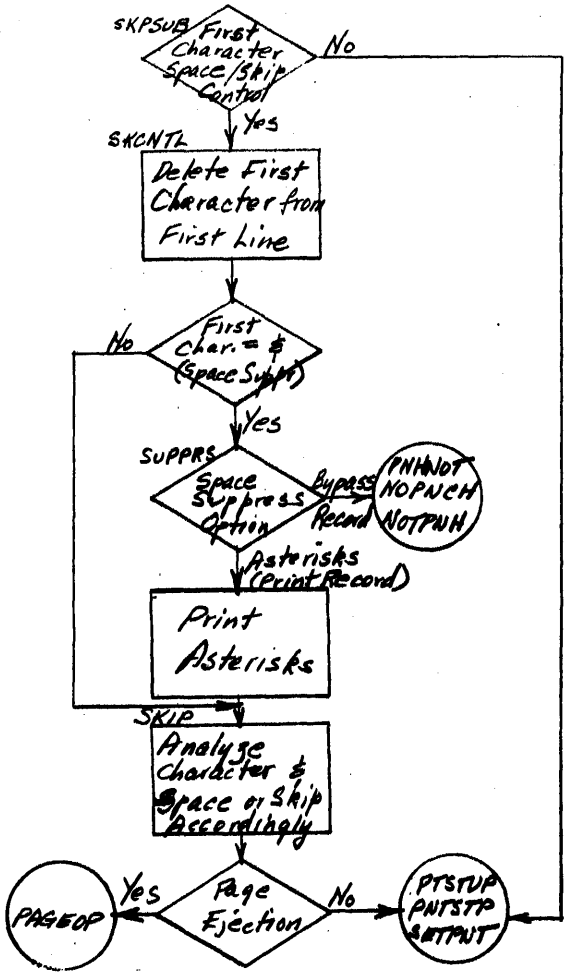
EXCEPTIONS & SEQUENCE CHECK



END OF BLOCK

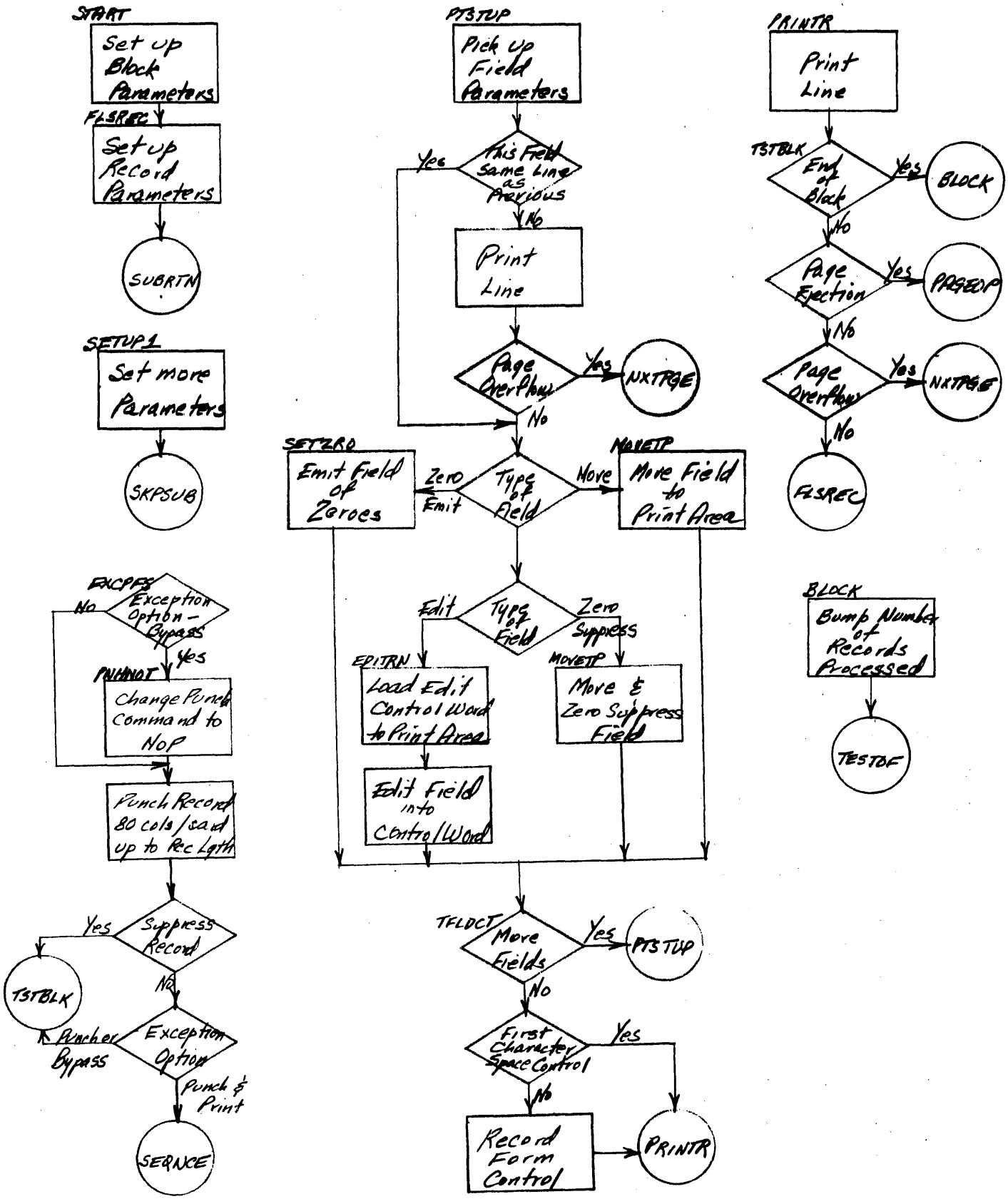


FIRST CHARACTER SPACE/SKIP CONTROL

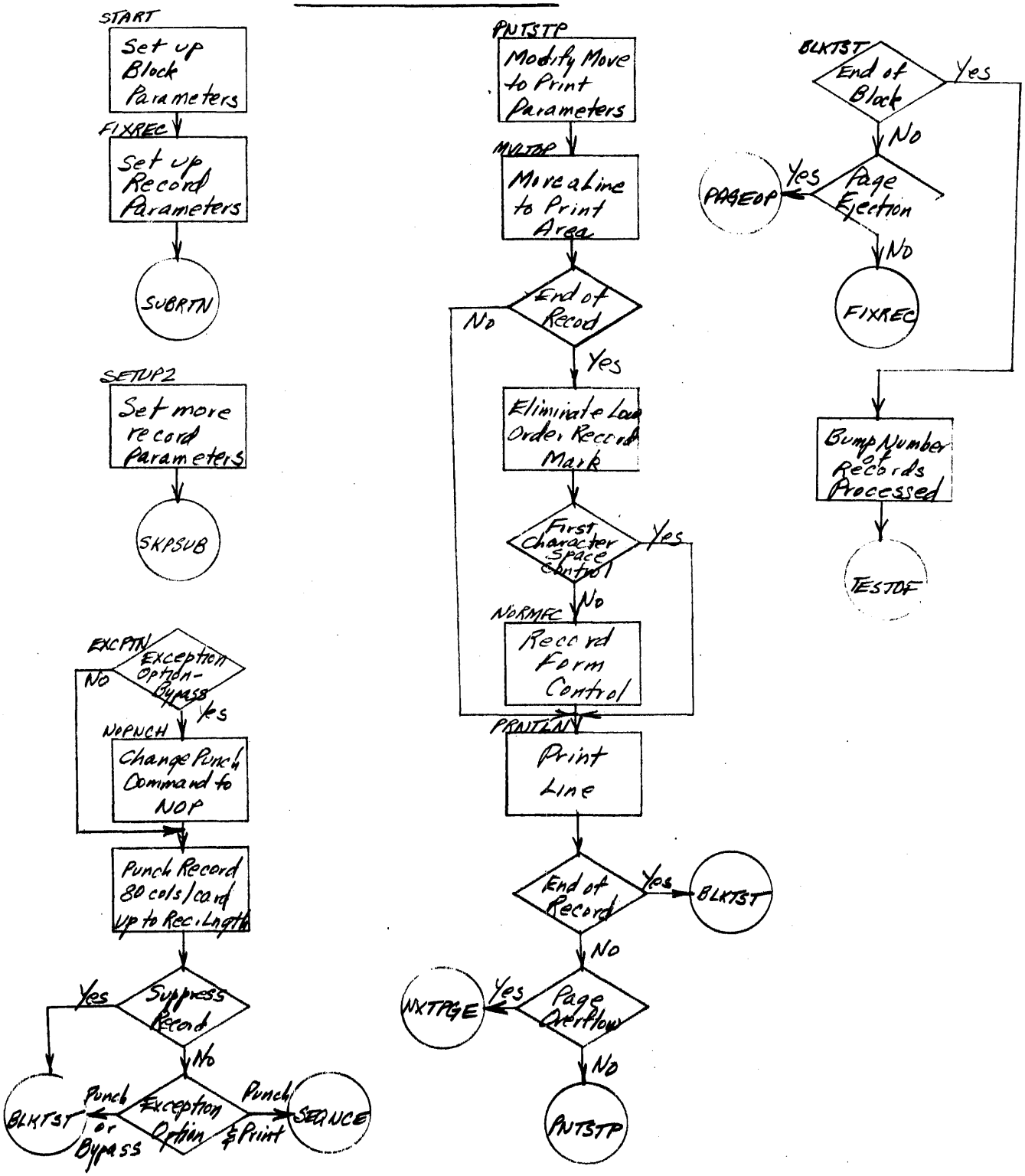


FIELD SELECTION

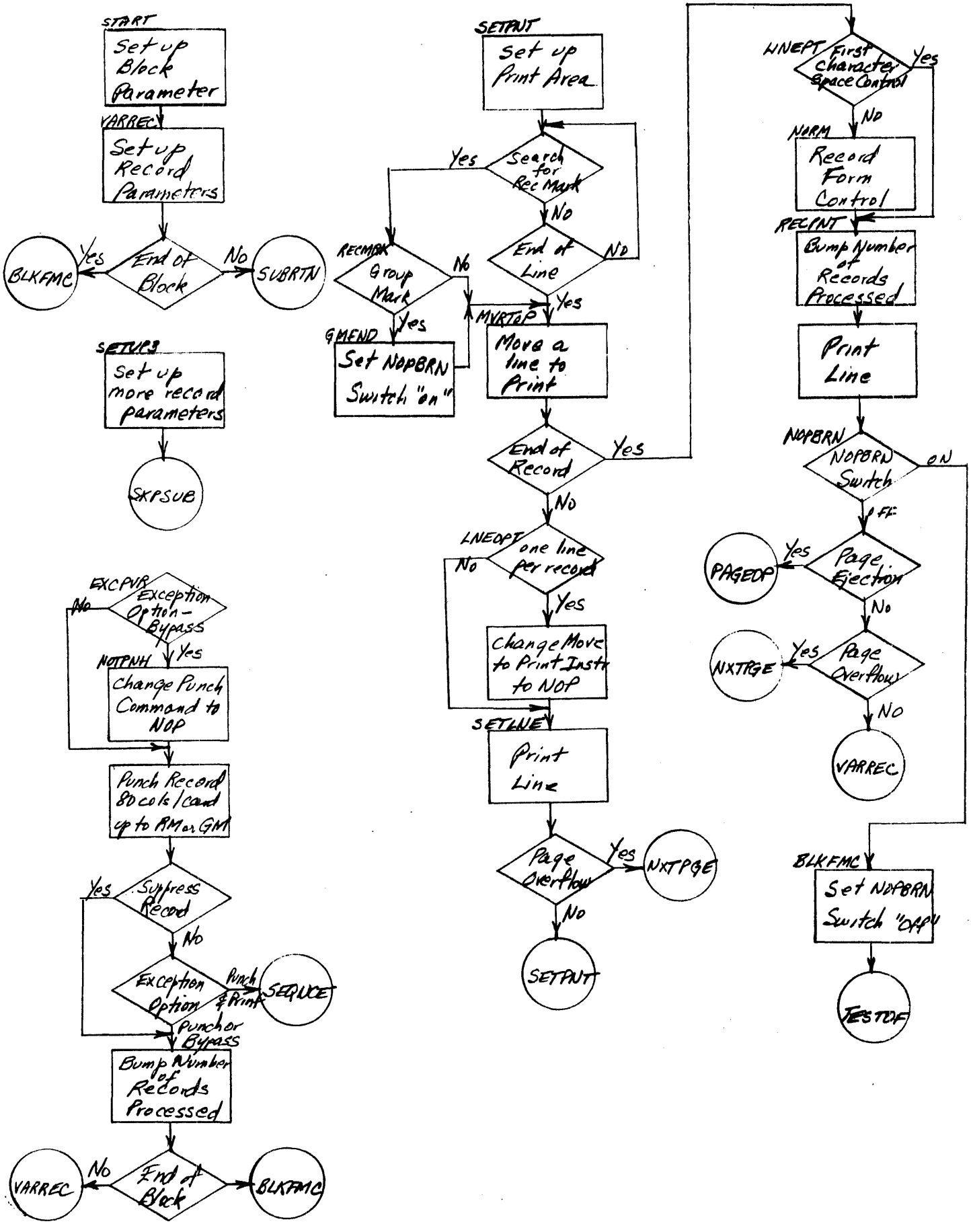
Version 3



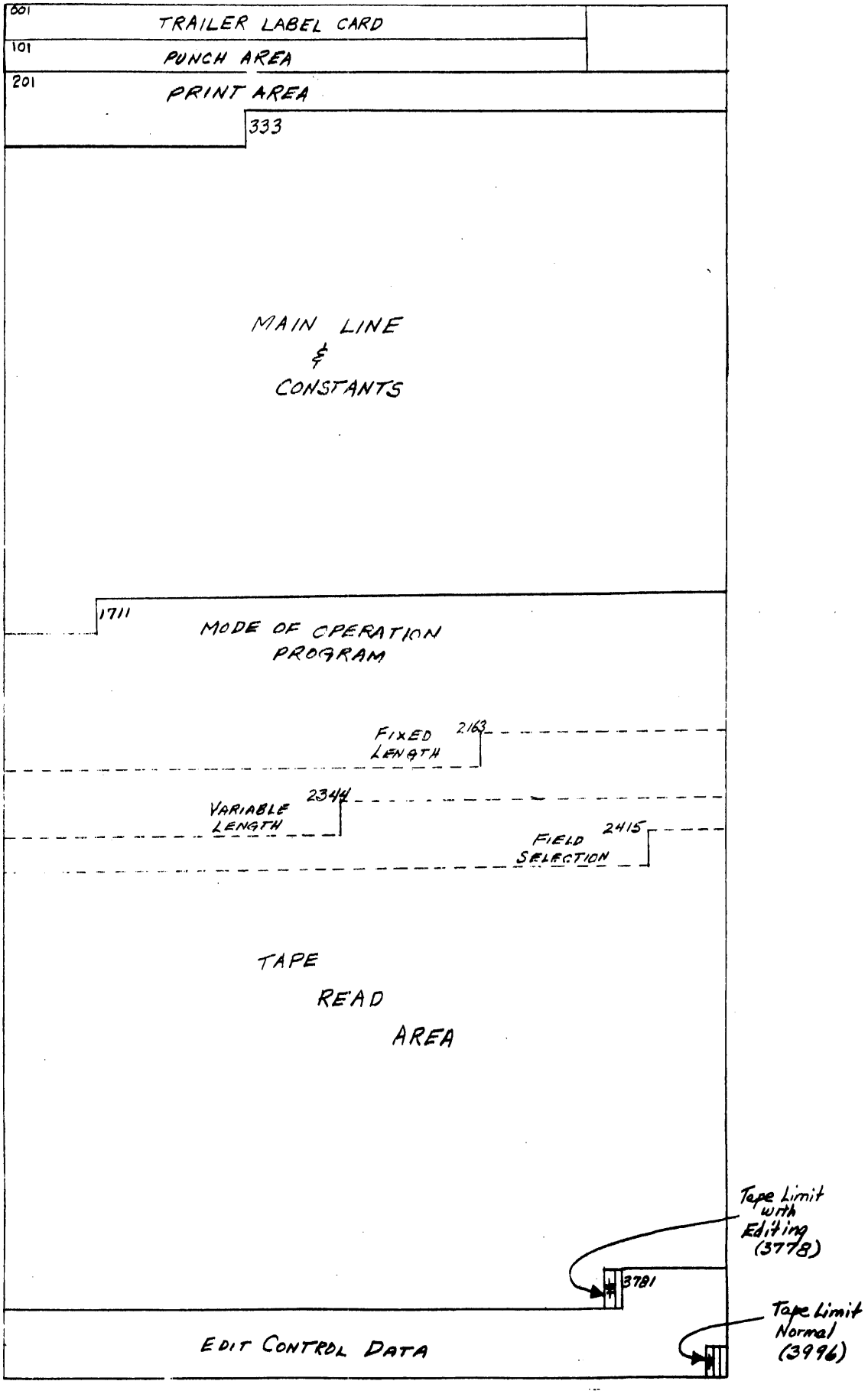
FIXED LENGTH



VARIABLE LENGTH



X STORAGE LAYOUT AT OBJECT TIME



Appendix A

List of Characters Applicable to First Character Space/Skip Control

Character	Meaning
&	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

Character	Meaning
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

Character	Meaning
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

```
CLEAR STORAGE 1     ,008015,022026,030034,041,045,053,0570731026
CLEAR STORAGE 2     L072116,110106,105117B101/I99,027A075029)027B001C270B026/0991,001/001117I00
BOOTSTRAP CARD      ,008015,022029,056063/056029                              ,0240671056

PG LIN  CT  LABEL   OP    A OPERAND        B OPERAND        D       LOC   INSTRUCTION COMMENTS
 1 010          CTL   33                                                          VERS 3 - 12/1/61
 1 020          ORG   0333
 1 030               *TAPE TO PRINTER 1401 UTILITY - MAIN LINE
 1 040   4  FLSTST  B     NXTPGE                                  0333  B 425       BR IF NO FILESEL
 1 050   7          A     KTWO             FLSELA                 0337  A W77 S91
 1 060   7          MCW   FLSELA           FILESL+006             0344  M S91 371   SET ADDRESS
 1 070   7          MCW   FLSELA           FILESL+014             0351  M S91 379   FOR NEXT
 1 080   7          MCW   FLSELA           FILESL+018             0358  M S91 383   FILE SELECTED
 1 090   8  FILESL  B     FINAL            0000                   0365  B 772 0C0   TEST FOR NOFILE
 1 100   7          S     ONE              0000                   0373  S W76 000
 1 110   7          C     0000             NOFLSP                 0380  C 000 S80   COMP FOR NXTFILE
 1 120   5          B     NXTPGE                           S     0387  B 425 S     NXTPAGE IF FOUND
 1 130   5          B     FSQERR                           U     0392  B 783 U     FILE NOS OUT SEQ
 1 140   8  SEARCH  LCA   IU3              3995             R     0397  L IU3 I95 R
 1 150   5          B     *      +005                      K     0405  B 414 K     TEST EOF
 1 160   4          B     SEARCH                                 0410  B 397       NOT YET
 1 170   7          A     ONE              NOFLSP                0414  A W76 S80   STEP NO OF FILE
 1 180   4          B     FILESL+015                             0421  B 380       RETRY COMPARE
 1 190   4  NXTPGE  B     *      +003                            0425  B 431       FIRST TIME BR
 1 200   2          CC                                     1     0429  F 1         SKIP TO NEW PAGE
 1 210   7          MCW   KENN             NXTPGE                0431  M W93 425   CHG BR TO NO-OP
 1 220   4          CS    0332                                   0438  / 332
 1 230   1          CS                                           0442  /
 1 240   4  PAGECP  NOP   HDPRNT                                 0443  N 469       PAGE NO BYPASS
 1 250   7          MCS   PAGENO           0299                  0447  Z T00 299   PRINT
 1 260   7          MCW   PAGE             0295                  0454  M S96 295   PAGE NO
 1 270   1          W                                            0461  2
 1 280   7          A     ONE              PAGENO                0462  A W76 TC0   STEP PAGE NO
 1 290   7  HDPRNT  LCA   ADDLN1           CARRCT+005            0469  L V73 539
 1 300   7          LCA   KNOLNS           LNSCTR                0476  L T02 T04   SET NO OF LINES
 1 310   7  PRINTH  LCA   CARRCT+005       HEADLN+003            0483  L 539 522   SET UP LINE ADDR
 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           K    0504  V 559 T04 K BR IF ALL LINES
 1 350   7          CW    HEADLN+001       CARRCT+003            0512  ) 520 537
 1 360   7  HEADLN  MCW   0000             CARRCT+001            0519  M 000 535   HEAD LINE FRM CT
 1 370   8          B     CARRCT+002       CARRCT+001            0526  B 536 535
 1 380   2  CARRCT  CC                                     0     0534  F 0
 1 390   7          MCW   0000             0332                  0536  M 000 332   MOVE HEAD LINE
 1 400   1          W                                            0543  2           PRINT
 1 410   4          SW    CARRCT+003                             0544  , 537
 1 420   7          A     K133             CARRCT+005            0548  A W91 539
 1 430   4          B     PRINTH                                 0555  B 483       GET NEXT HEAD LN
 1 440   4  TPREAD  CS    0332                                   0559  / 332
 1 450   1          CS                                           0563  /
 1 460   5          CC    *      +001                      L     0564  F 569 L     TRIPLE SPACE
 1 470   7  RECRD   LCA   3999             3997                  0569  L I99 I97
 1 480   8          LCA   IU3              RIAREA           R    0576  L IU3 N01 R READ TAPE BLOCK
```

PG	LIN	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 /46 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 W61	
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	ONE	NOFLSP		0614	A W76 S80	ADD 1 TO FILES
1	560	2		CC			1	0621	F 1	
1	570	4		CS	0332			0623	/ 332	
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	2	
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	PAGENO		0657	+ X04 TC0	RESET PAGE NO
1	650	7		C	NOFLSP	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	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 I99 N81	
1	700	8		LCA	(U3	RIAREA	R	0692	L (U3 N[illegible] R	READ TO CHECK
1	710	4		LCA	FILE4			0700	L S88	SECOND EOF MARK
1	720	5		B	FINAL		K	0704	B 772 K	
1	730	7		LCA	0080	0180		0709	L 080 180	
1	740	8		B	CLTRWM	RIAREA+080		0716	B 764 N81	
1	750	7	COMTLR	C	ONE	ONE		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	(U3		B	0744	U (U3 B	
1	800	7	TOFILT	LCA	3999	3997		0749	L I99 I97	
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	) N81	
1	840	4		B	COMTLR			0768	B 724	
1	850	5	FINAL	CU	(U3		R	0772	U (U3 R	REWIND TAPE
1	860	2		CC			1	0777	F 1	RESTORE FORM
1	870	4		H	* -003			0779	. 779	HALT-END OF JOB
1	880	4	FSQERR	H	FLSTST			0783	. 333	FILE NOS OUT SEQ
1	890	7	SUBRTN	MCW	BLANK	EXITCT		0787	M W92 W62	FROM OBJECT PRGM
1	900	4		B	SEQNCE			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	) 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	
2	010	7		C	TSTCH2	CHAR2		0863	C W52 W50	COMP SECOND CHAR

Version 3

PG	LIN	CT	LABEL	OP	A OPERAND	B OPERAND	D	LOC	INSTRUCTION	COMMENTS
2	020	5		B	SEQNCE		/	0870	B 879 /	BR ON PROPER CND
2	030	4	EXCFND	B	EXCPTN			0875	B X61	BR-PROCESS EXCPN
2	040	4	SEQNCE	B	OUTSEQ-004			0879	B 927	BYP IF NO SEQCHK
2	050	7		LCA	SEQADD	CHKSEQ+003		0883	L W41 911	SET UP SEQUENCE
2	060	7		A	TAPADD	CHKSEQ+003		0890	A W04 911	CHECK ADDRESS
2	070	7		MCW	CHKSEQ+003	CHKSEQ+010		0897	M 911 918	
2	080	4		CW	CHKSEQ+001			0904	) 909	
2	090	7	CHKSEQ	C	0000	0000		0908	C 000 000	CHECK SEQUENCE
2	100	7		MCW	0000	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	RECRD OUT OF SEQ
2	140	4	SKPSUB	B	LINKGE			0935	B ‡58	BYP-NOT FIRST CR
2	150	7		LCA	TAPADD	SKCNTL+003		0939	L W04 967	SET UP ADDRESS
2	160	7		A	ONE	SKCNTL+003		0946	A W76 967	OF FIRST CHAR
2	170	7		MCW	SKCNTL+003	SKCNTL+013		0953	M 967 977	
2	180	4		CW	SKCNTL+001			0960	) 965	
2	190	7	SKCNTL	MCW	0000	FCCHAR		0964	M 000 W06	PICK UP CHAR
2	200	7		MCW	BLANK	0000		0971	M W92 000	BLANK CHAR
2	210	7		C	FCCHAR	AMPRSD		0978	C W06 X01	CHECK FOR SPACE
2	220	5		B	SKIP		/	0985	B ‡18 /	SUPPRESS
2	230	7	SUPPRS	MCW	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		MCW	ASTRSK	0203		1006	M W96 203	OPTION TO PRINT
2	280	1		W				1013	2	ASTERISKS
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		MCW	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	* -008	1	1088	B 438 ‡87 1	PAGE EJECT-HDNGS
2	420	4		B	LINKGE			1096	B ‡58	
2	430	7	TESTOF	MCW	OVFAD3	TPREAD+008		1100	M W65 567	
2	440	8		B	RECRD	BYPASS		1107	B 569 W61	
2	450	5		B	NXTPGE		*	1115	B 425 *	OVERFLOW-EJECT
2	460	7		MCW	FCBLKC	* +002		1120	M W08 /28	
2	470	2		CC			0	1127	F 0	BLOCK FORM CONTL
2	480	8		B	PAGEOP-005	* -008	1	1129	B 438 /28 1	
2	490	5		B	NXTPGE		*	1137	B 425 *	OVERFLOW-EJECT
2	500	4		B	RECRD			1142	B 569	GET NEXT BLOCK
2	510	7	REDUND	MCW	TSTSSF+005	OPTNB -004		1146	M S13 S43	REDUNDANCY
2	520	7		MCW	TRYCTR-002	TRYCTR		1153	M S59 S61	SET CTR FOR TRYS
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	LIN	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 N01 R	BACKSPACE-READ
2	580	4		LCA	RMBLNK			1195	L X06	
2	590	5		B	RETRY		L	1199	B /60 L	CHECK REDUNDANCY
2	600	4		B	TSTTM			1204	B 593	RECORD GOOD
2	610	5	TSTSSF	B	TSTTM		F	1208	B 593 F	SS F -CONTINUE
2	620	1		H				1213	.	HALT-USER SET SW
2	630	5		B	RETRY -007		G	1214	B /53 G	SS G-TRY 9 MORE
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	1231	L (U3 N01 R	BACKSPACE-READ
2	670	4		LCA	RMBLNK			1239	L X06	
2	680	4		H	TSTTM			1243	. 593	HALT-USER FIX
2	690	7	OPTNB	MCW	KBEE	OPTNB -004		1247	M W97 S43	CANNOT FIX-READ
2	700	4		B	BKSPRD			1254	B S19	AND PROCESS
2	710	2		DCW	*		09	1259		
2	720	2	TRYCTR	DCW	*		09	1261		
2	730	8	KNORCS	DCW	*			1269		
2	740	7	RECLEG	DCW	*		RECORDS	1276		
2	750	2	KNOFLS	DCW	*		99	1278		
2	760	2	NOFLSP	DCW	*		0+	1280		
2	770	2	FILE1	DCW	*			1282		
2	780	2	FILE2	DCW	*			1284		
2	790	2	FILE3	DCW	*			1286		
2	800	2	FILE4	DCW	*			1288		
2	810	3	FLSELA	DSA	*	FILE1 -002	S80	1291		
2	820	5	PAGE	DCW	*		PAGE	1296		
2	830	4	PAGENO	DCW	*		1	1300		
2	840	2	KNOLNS	DCW	*		00	1302		
2	850	2	LNSCTR	DCW	*			1304		
2	860	1	LINE1	DCW	*			1305		
2	870	79	LINE1A	DS	*			1384		
2	880	52	LINE1B	DS	*			1436		
2	890	1	LNE1FC	DCW	*			1437		
2	900	1	LINE2	DCW	*			1438		
2	910	79	LINE2A	DS	*			1517		
2	920	52	LINE2B	DS	*			1569		
2	930	1	LNE2FC	DCW	*			1570		
2	940	3	ADDLN1	DSA	*	LINE1B	U36	1573		
2	950	4	KRECLG	DCW	*		0000	1577		
2	960	4	PARAM1	DCW	*			1581		
2	970	4	KLINLG	DCW	*		0000	1585		
2	980	4	PARAM2	DCW	*			1589		
2	990	3	RCLCNV	DCW	*			1592		
3	000	3	KBLKNG	DCW	*		000	1595		
3	010	3	BLKCTR	DCW	*			1598		
3	020	3	TRUEBL	DCW	*		000	1601		
3	030	3	TAPADD	DCW	*			1604		
3	040	1	SKPTST	DCW	*			1605		
3	050	1	FCCHAR	DCW	*		/	1606		
3	060	1	FCINST	DCW	*		N	1607		
3	070	1	FCBLKC	DCW	*		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	*	RECRD	569	1665	
3	220	3	ADLINK	DSA	*	LINKGE	+58	1668	
3	230	3	KRRR	DSA	*	RIAREA-001	N00	1671	
3	240	4	KZEROP	DCW	*		000+	1675	
3	250	1	ONE	DCW	*		1	1676	
3	260	1	KTWO	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	*		B	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		RIAREA	DS	2501			2501	
3	430			ORG	0081				
3	440	3	EXCDSA	DSA	*	SEQNCE	879	0083	
3	450	1	KDEE	DCW	*		D	0084	
3	460	1	KYYY	DCW	*		Y	0085	
3	470	4	KMAXLG	DCW	*		1496	0089	
3	480	4	KMINLG	DCW	*		1279	0093	
3	490	3	KG79	DCW	*		G79	0096	
3	500	3	TEMP	DCW	*			0099	
3	510	2	K16	DCW	*		16	0101	
3	520	1	KEMM	DCW	*		M	0102	
3	530	1	KZEE	DCW	*		Z	0103	
3	540	4	TABLE	DCW	3993		2SKB	3993	
3	550	1	GRPMRK	DCW	3997			3997	
3	560	2	K03	DCW	*		03	0105	
3	570	2	K10	DCW	*		10	0107	
3	580	3	HLDADD	DSA	*	SEQHLD-030	W08	0110	
3	590	1	SLASH	DCW	*		/	0111	
3	600	1	ESS	DCW	*		S	0112	

Version 3

-6-

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PG LIN  CT  LABEL   OP    A OPERAND      B OPERAND      D       LOC   INSTRUCTION COMMENTS

 3 610   1  TEE     DCW   *                                T  0113
 3 620   3  ADDED1  DCW   *                                   0116
 3 630   3          DCW   *                                   0119
 3 640   3          DCW   *                                   0122
 3 650   3          DCW   *                                   0125
 3 660   3          DCW   *                                   0128
 3 670   3          DCW   *                                   0131
 3 680   3          DCW   *                                   0134
 3 690   3          DCW   *                                   0137
 3 700   3          DCW   *                                   0140
 3 710   3          DCW   *                                   0143
 3 720   3          DCW   *                                   0146
 3 730   3          DCW   *                                   0149
 3 740   3          DCW   *                                   0152
 3 750   3          DCW   *                                   0155
 3 760   3          DCW   *                                   0158
 3 770   3  ADDEDO  DCW   *                                   0161
 3 780  80  EDTWDA  DS    *                                   0241
 3 790  80  EDTWDB  DS    *                                   0321
 3 800   3  ADDSTR  DCW   *                              H28  0324
 3 810   3  EDTTST  DSA   *              EDTWDB            321  0327
 3 820              ORG   2500
 3 830   4  ANAL1   CS    0080                                2500  / 080
 3 840   4          SW    0001                                2504  , 001
 3 850   7          SW    3472           3605                 2508  , D72 F05
 3 860   7          SW    3738           3739                 2515  , G38 G39
 3 870   4          SW    3899                                2522  , H99
 3 880   1          R                                          2526  1
 3 890   2          SS                                1        2527  K 1
 3 900   8          B     ERROR1         0004                 2529  B +62 004   CHECK FOR RECORD
 3 910   8          B     ERROR1         0010                 2537  B +62 010   LENGTH + LINE LG
 3 920   7          LCA   0080           3179                 2545  L 080 A79   STORE CC 1
 3 930   7          MCW   0080           TEMP                 2552  M 080 099
 3 940   8          B     STORFH         3154                 2559  B 018 A54   BR IF NOT FLDSEL
 3 950   7          MCW   ONE            DECKSL+007           2567  M W76 +34   SET FIELD SELPGM
 3 960   7          C     3154           K03                  2574  C A54 105
 3 970   5          B     STORFH                        U      2581  B 018 U
 3 980   1          R                                          2586  1
 3 990   2          SS                                1        2587  K 1
 4 000   7          LCA   0077           3253                 2589  L 077 B53   STORE CC 2
 4 010   7          C     3154           K10                  2596  C A54 107
 4 020   5          B     STORFH                        U      2603  B 018 U
 4 030   1          R                                          2608  1
 4 040   2          SS                                1        2609  K 1
 4 050   7          LCA   0077           3330                 2611  L 077 C30   STORE CC 3
 4 060   7  STORFH  MN    3145           LNSCTR               2618  D A45 T04
 4 070   7          C     3145           KTHREE               2625  C A45 X07   CHK NO OF LINES
 4 080   5          B     ERROR2                        T      2632  B +63 T     OF FIX HEADING
 4 090   7  NXTFHD  S     ONE            LNSCTR               2637  S W76 T04
 4 100   8          BWZ   STORVH         LNSCTR         K      2644  V P26 T04 K BR IF ALL LINES
 4 110   1          R                                          2652  1
 4 120   2          SS                                1        2653  K 1
 4 130   7  FIXCD1  LCA   0080           3419                 2655  L 080 D19   FIX HEAD CARD 1
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Version 3

-7-

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PG LIN  CT  LABEL   OP    A OPERAND       B OPERAND       D       LOC   INSTRUCTION COMMENTS

 4 140   1          R                                               2662  1
 4 150   2          SS                                      1       2663  K 1
 4 160   7  FIXCD2  MCW   0052            3471                    2665  M 052 D71    FIX HEAD CARD 2
 4 170   7          MCW   0080            3472                    2672  M 080 D72
 4 180   7          SW    FIXCD1+004      FIXCD2+004              2679  , 059 069
 4 190   4          SW    FIXCD2+011                              2686  , 076
 4 200   7          A     K133            FIXCD1+006              2690  A W91 061
 4 210   7          A     K133            FIXCD2+006              2697  A W91 071
 4 220   7          A     K133            FIXCD2+013              2704  A W91 078
 4 230   7          CW    FIXCD1+004      FIXCD2+004              2711  ) 059 069
 4 240   4          CW    FIXCD2+011                              2718  ) 076
 4 250   4          B     NXTFHD                                  2722  B 037        GET NEXT FIX HDG
 4 260   7  STORVH  MN    3147            KNOLNS                  2726  D A47 T02
 4 270   7          ZA    KNOLNS          LNSCTR                  2733  + T02 T04    CHK NO OF LINES
 4 280   7          C     3147            KTWO                    2740  C A47 W77    OF VAR HEADING
 4 290   5          B     ERROR3                          T       2747  B +64 T
 4 300   7  NXTVHD  S     ONE             LNSCTR                  2752  S W76 T04
 4 310   8          BWZ   STORHL          LNSCTR          K       2759  V Q27 T04 K BR IF ALL LINES
 4 320   1          R                                               2767  1
 4 330   2          SS                                      1       2768  K 1
 4 340   7  VARCD1  LCA   0080            LINE1A                  2770  L 080 T84    VAR HEAD CARD 1
 4 350   1          R                                               2777  1
 4 360   2          SS                                      1       2778  K 1
 4 370   7  VARCD2  MCW   0052            LINE1B                  2780  M 052 U36    VAR HEAD CARD 2
 4 380   8          B     *      +008     0080            /       2787  B Q02 080 /
 4 390   7          MCW   0080            LNE1FC                  2795  M 080 U37
 4 400   7          MCW   ADDL2A          VARCD1+006              2802  M +70 P76
 4 410   7          MCW   ADDL2B          VARCD2+006              2809  M +73 P86
 4 420   7          MCW   ADDL2F          VARCD2+021              2816  M +76 Q01
 4 430   4          B     NXTVHD                                  2823  B P52        GET NEXT VAR HDG
 4 440   8  STORHL  B     *      +005     3151            4       2827  B Q39 A51 4
 4 450   4          B     STORTL                                  2835  B Q79        NO HDR LABEL CDS
 4 460   1          R                                               2839  1
 4 470   2          SS                                      1       2840  K 1
 4 480   7          LCA   0080            3818                    2842  L 080 H18    HEADER LABEL 1
 4 490   4          SW    3148                                    2849  , A48
 4 500   7          C     K80             3150                    2853  C W82 A50
 4 510   5          B     *      +005                     U       2860  B Q69 U
 4 520   4          B     STORTL                                  2865  B Q79
 4 530   1          R                                               2869  1
 4 540   2          SS                                      1       2870  K 1
 4 550   7          MCW   0080            3898                    2872  M 080 H98    HEADER LABEL 2
 4 560   8  STORTL  B     EDITST          TEMP  -001              2879  B Q97 098
 4 570   1          R                                               2887  1
 4 580   2          SS                                      1       2888  K 1
 4 590   7          LCA   0080            3978                    2890  L 080 I78    TRAILER LABEL
 4 600   8  EDITST  B     SELPGM          TEMP  -002              2897  B +04 097
 4 610   7          SW    0002            0004                    2905  , 002 004
 4 620   1  NXTEDT  R                                               2912  1
 4 630   8          B     *      +012     0001            )       2913  B R32 001 ) BR IF EDIT WORD
 4 640   7          CW    0002            0004                    2921  ) 002 004    NO MORE EDIT
 4 650   4          B     SELPGM+001                              2928  B +05        WORD CARDS
 4 660   2          SS                                      1       2932  K 1
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PG LIN  CT  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 , R67
 4 700   7          A    0003           STEDIT+006            2952 A 003 R69   MOD STORE ADDRS
 4 710   4          CW   STEDIT+004                           2959 1 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    STEDIT+006     EDTIST                2984 C R69 327   TEST OVER 160
 4 760   5          B    ERREDT                       T      2991 B +00 T     COLUMNS
 4 770   4          B    NXTEDT                              2996 B R12       GET NEXT EDIT CD
 4 780   4  ERREDT  H    *      -003                         3000 . +00       OVER 160 COLUMNS
 4 790   1  SELPGM  R                                        3004 1
 4 800   7          SW   0024           0056                  3005 , 024 056   RESTORE BOOTSTRP
 4 810   7          SW   0063           0067                  3012 , 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 1 +27       SEARCH IF NOT
 4 850   7  VARRCD  MCW  KTHREE         DECKSL+007            3039 M X07 +34   SET VAR LNG PRGM
 4 860   4          B    DECKSL                              3046 B +27
 4 870   8  RUNOUT  B    0056           0076                  3050 B 056 076   TO LOAD PROGRAM
 4 880   4          R    RUNOUT                              3068 1 +50
 4 890   1  ERROR1  H                                        3062 .           NO REC OR LN LGT
 4 900   1  ERROR2  H                                        3063 .           OVER 3 FIX HEAD
 4 910   4  ERROR3  H    *      -003                         3064 . +64       OVER 2 VAR HEAD
 4 920   3  ADDL2A  DSA  *              LINE2A           V17  3070
 4 930   3  ADDL2B  DSA  *              LINE2B           V69  3073
 4 940   3  ADDL2F  DSA  *              LNE2FC           V70  3076
 4 950              EX   ANAL1                                     B N00
 4 960              ORG  1711
 4 970                   *TAPE TO PRINTER 1401 UTILITY - FIELD SELECTION
 4 980   7  START   MCW  KBLKNG         BLKCTR                1711 M V95 V98   SET BLOCK CTR
 4 990   7          MCW  KRRR           TAPEMD                1718 M W71 K88   SET TAPE ADDRS
 5 000   7  FLSREC  MCW  ONE            COMPRL+007            1725 M W76 Z71   SET LINE NO EQ 1
 5 010   7          MCW  KG83           EDITAD                1732 M X10 M85   SET EDIT WORD AD
 5 020   7          MCW  TAPEMD         TAPADD                1739 M K88 W04
 5 030   4          B    SUBRTN                              1746 B 787       BR TO EXC + SEQ
 5 040   7  SETUP1  MCW  KFLDCT         FLDCTR                1750 M K90 K92   SET NO OF FIELDS
 5 050   7          LCA  ADDFLD         PTSTUP+014            1757 L M82 Z85
 5 060   4          B    SKPSUB                              1764 B 935       BR TO FORM CTL
 5 070   8  EXCPFS  B    PNHNOT         EXCOPT         1      1768 B Z10 W42 1 EXCOPT 1-BYPASS
 5 080   7          MCW  K80            PNHLGT                1776 M W82 W56
 5 090   7          MCW  KRECLG         TPELGT                1783 M V77 W60
 5 100   7          LCA  TAPEMD         TAPEPN+003            1790 L K88 Y65   SET UP ADDRESSES
 5 110   7  NXTCD   LCA  K100           TAPEPN+006            1797 L W85 Y58   FOR MOVE INSTR
 5 120   7          C    TPELGT         PNHLGT                1804 C W60 W56
 5 130   5          B    ADDLGT                       T      1811 B Y23 T     SET CARD LENGTH
 5 140   7          MCW  TPELGT         PNHLGT                1816 M W60 W56   EQ REC IF LESS
 5 150   7  ADDLGT  A    PNHLGT         TAPEPN+003            1823 A W56 Y55   MODIFY MOVE
 5 160   7          A    PNHLGT         TAPEPN+006            1830 A W56 Y58   ADDRESSES
 5 170   4          CS   0180                                1837 / 180
 5 180   4          SW   0101                                1841 , 101
 5 190   7          CW   TAPEPN+001     TAPEPN+004            1845 1 Y53 Y56
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PG LIN  CT  LABEL   OP   A OPERAND      B OPERAND      D      LOC   INSTRUCTION COMMENTS   1

 5 200   7  TAPEPN  MCW  0000           0000                  1852  M 000 000   MOVE REC TO CARD
 5 210   4          SW   TAPEPN+001                           1859  , Y53
 5 220   1          P                                         1863  4           PUNCH OR NOP
 5 230   7          S    PNHLGT         TPELGT                1864  S W56 W60
 5 240   7          C    TPELGT         KZEROP                1871  C W60 W75   TEST FOR ZERO
 5 250   5          B    NXTCD                         /      1878  B K97 /     ANOTHER IF NOT
 5 260   7          MCW  KFOUR          TAPEPN+011            1883  M W78 Y63
 5 270   8          B    TSTBLK         EXITCT         1      1890  B J18 W62 1 SPACE SUPPR RECD
 5 280   8          B    SEQNCE         EXCOPT         3      1898  B 879 W42 3 OPT-PUNCH + PRNT
 5 290   4          B    TSTBLK                               1906  B J18       BYPASS PRINTING
 5 300   7  PNHNOT  MCW  KENN           TAPEPN+011            1910  M W93 Y63   BYPASS OR SUPPRS
 5 310   4          B    EXCPFS+008                           1917  B X76
 5 320   7  PTSTUP  A    K11            PTSTUP+014            1921  A X00 Z35   MODIFY FIELD
 5 330   4          CW   PTSTUP+012                           1928  ) Z33       PARAM PICKUP
 5 340   7          LCA  0000           FLDANL                1932  L 000 M79   PICKUP FLD PARAM
 5 350   7          MCW  ONE            BYPASS                1939  M W76 W61
 5 360   7          SW   PTSTUP+012     FLDANL-003            1946  , Z33 M76
 5 370   7          SW   FLDANL-004     FLDANL-007            1953  , M75 M72
 5 380   4          SW   FLDANL                               1960  , M79
 5 390   8  COMPRL  B    OVFRT1+005     FLDANL-004     0      1964  B Z90 M75 0 FIELD SAME LINE
 5 400   1          W                                         1972  2           PRINT IF NOT
 5 410   7          MCW  OVFAD1         TPREAD+008            1973  M K82 567
 5 420   5          B    NXTPGE                        *      1980  B 425 *     EJECT IF OVERFLO
 5 430   4  OVFRT1  CS   0332                                 1985  / 332
 5 440   1          CS                                        1989  /
 5 450   8          B    SETZRO         FLDANL-005     Z      1990  B J80 M74 Z TEST ZERO EMIT
 5 460   7          A    TAPEMD         FLDANL-005            1998  A K88 M74   MODIFY ADDRESSES
 5 470   7          A    TAPEMD         FLDANL-008            2005  A K88 M71   TO MOVE FIELD TO
 5 480   7          MCW  FLDANL         MOVETP+004            2012  M M79 -44   PRINT AREA
 5 490   7          MCW  FLDANL-001     MOVETP+010            2019  M M78 -50
 5 500   7          MCW  FLDANL-005     MOVETP+007            2026  M M74 -47
 5 510   7          MCW  FLDANL-008     MOVETP+003            2033  M M71 -43
 5 520   4  MOVETP  SW   0000                                 2040  , 000
 5 530   7          MCW  0000           0000                  2044  M 000 000   MCW,MCS OR NOP
 5 540   8          B    EDITRN         FLDANL         N      2051  B K20 M79 N BR TO EDIT-NOP
 5 550   7  TFLDCT  MCW  FLDANL-008     *     +004            2059  M M71 -69
 5 560   4          CW   0000                                 2066  ) 000
 5 570   7          S    ONE            FLDCTR                2070  S W76 K92   SUBT 1-NO FIELDS
 5 580   7          MCW  FLDANL-004     COMPRL+007            2077  M M75 Z71   RESET LINE NO
 5 590   8          BWZ  PTSTUP         FLDCTR         B      2084  V Z21 K92 B NEXT FIELD-PLUS
 5 600   8          B    PRINTR         SKPTST         1      2092  B J17 W05 1
 5 610   7  NORMAL  MCW  FCCHAR         PRINTR-001            2100  M W06 J16   SET FORM CONTROL
 5 620   8          B    PRINTR         PRINTR-001     /      2107  B J17 J16 /
 5 630   2          CC                                 0      2115  F 0
 5 640   1  PRINTR  W                                         2117  2           PRINT LINE
 5 650   4  TSTBLK  CS   0332                                 2118  / 332
 5 660   1          CS                                        2122  /
 5 670   7          MCW  OVFAD6         TPREAD+008            2123  M K85 567
 5 680   7          S    ONE            BLKCTR                2130  S W76 V98
 5 690   7          A    RCLCNV         TAPEMD                2137  A V92 K88   BUMP TAPE ADDRS
 5 700   8          BWZ  BLOCK          BLKCTR         K      2144  V J69 V98 K BR IF END OF BLK
 5 710   8          B    PAGEOP         PRINTR-001     A      2152  B 443 J16 A
 5 720   5          B    NXTPGE                        *      2160  B 425 *     EJECT IF OVERFLO
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PG LIN  CT  LABEL   OP    A OPERAND       B OPERAND       D       LOC   INSTRUCTION COMMENTS   1

 5 730   4          B     FLSREC                                  2165  B X25       GET NEXT RECORD
 5 740   7  BLOCK   A     TRUEBL          KNORCS                  2169  A W01 S69   BUMP NO OF RCRDS
 5 750   4          B     TESTOF                                  2176  B /00       TO BLK FORM CTL
 5 760   7  SETZRO  MCW   FLDANL-008      *     +004              2180  M M71 J90
 5 770   4          SW    0000                                    2187  , 000
 5 780   7          MCW   FLDANL-001      ZEROST+006              2191  M M78 K11   SET ADDRESS FOR
 5 790   7          MCW   FLDANL-001      ZEROST+010              2198  M M78 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 M78 K61   SET UP ADDRESSES
 5 840   7          MCW   FLDANL-001      LDEDIT+013              2227  M M78 K68   OF FIELD FROM
 5 850   7          MCW   FLDANL-005      LDEDIT+010              2234  M M74 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 ADDRS
 5 910   4          B     TFLDCT                                  2276  B -59       TO BUMP NO FLDS
 5 920   3  OVFAD1  DSA   *               OVFRT1            Z85   2282
 5 930   3  OVFAD6  DSA   *               FLSREC            X25   2285
 5 940   3  TAPEMD  DCW   *                                       2288
 5 950   2  KFLDCT  DCW   *                                  00   2290
 5 960   2  FLDCTR  DCW   *                                       2292
 5 970  11  FIELD1  DCW   *                                       2303
 5 980  11          DCW   *                                       2314
 5 990  11          DCW   *                                       2325
 6 000  11          DCW   *                                       2336
 6 010  11          DCW   *                                       2347
 6 020  11          DCW   *                                       2358
 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  FIELDO  DCW   *                                       2468
 6 130  11  FLDANL  DCW   *                                       2479
 6 140   3  ADDFLD  DSA   *               FIELD1-011        K92   2482
 6 150   3  EDITAD  DCW   *                                       2485
 6 160              EX    RUNOUT                                        B +50
 6 170              ORG   1711
 6 180                   *TAPE TO PRINTER 1401 UTILITY - FIXED LENGTH
 6 190   7  START   MCW   KBLKNG          BLKCTR                  1711  M V95 V98   SET BLOCK CTR
 6 200   7          LCA   KRRR            MVLTOP+003              1718  L W71 Z61   SET TAPE ADDRS
 6 210   7  FIXREC  MCW   MVLTOP+003      TAPADD                  1725  M Z61 W04
 6 220   4          B     SUBRTN                                  1732  B 787       BR TO EXC + SEQ
 6 230   7  SETUP2  MCW   KRECLG          PARAM1                  1736  M V77 V81   SET UP RECORD
 6 240   7          MCW   KLINLG          PARAM2                  1743  M V85 V89   LENGTH,LINE LGTH
 6 250   7          LCA   K200            MVLTOP+006              1750  L W88 Z64
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PG LIN  CT  LABEL   OP    A OPERAND       B OPERAND       D      LOC   INSTRUCTION COMMENTS   2

 6 260   4          B     SKPSUB                                 1757  B 935        BR TO FORM CTL
 6 270   8  EXCPTN  B     NOPNCH          EXCOPT          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                 1797  C W60 W56
 6 330   5          B     ADDPNL                          T      1804  B Y16 T      SET CARD LENGTH
 6 340   7          MCW   TPELGT          PNHLGT                 1809  M W60 W56    EQ REC IF LESS
 6 350   7  ADDPNL  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          SW    0101                                   1834  , 101
 6 390   7          CW    TPTOPN+001      TPTOPN+004             1838  1 Y46 Y49
 6 400   7  TPTOPN  MCW   0000            0000                   1845  M 000 000    MOVE REC TO CARD
 6 410   4          SW    TPTOPN+001                             1852  , Y46
 6 420   1          P                                            1856  4            PUNCH OR NOP
 6 430   7          S     PNHLGT          TPELGT                 1857  S W56 W60
 6 440   7          C     TPELGT          KZEROP                 1864  C W60 W75    TEST FOR ZERO
 6 450   5          B     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          EXCOPT          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     BLKTST                                 1906  B J09
 6 510   7  NOPNCH  MCW   KENN            TPTOPN+011             1910  M W93 Y56    BYPASS OR SUPPRS
 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          SW    0201                                   1947  , 201
 6 590   7          CW    MVLTOP+001      MVLTOP+004             1951  1 Z59 Z62
 6 600   7  MVLTOP  MCW   0000            0000                   1958  M 000 000    MOVE TO PRINT
 6 610   7          SW    MVLTOP+001      MVLTOP+004             1965  , 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 1
 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                                            2047  2            PRINT LINE
 6 750   7          MCW   OVFAD4          TPREAD+008             2048  M J60 567
 6 760   5          B     NXTPGE                          '      2055  B 425 '      EJECT IF OVERFLO
 6 770   7  OVFRT4  S     PARAM2          PARAM1                 2060  S V89 V81
 6 780   7          C     PARAM1          KZEROP                 2067  C V81 W75    TEST END OF REC
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Version 3


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PG LIN  CT  LABEL   OP    A OPERAND       B OPERAND       D       LOC   INSTRUCTION COMMENTS   2

 6 790   5          B     BLKTST                          S       2074  B J09 S      OUT IF TRUE
 6 800   7          C     PARAM1          PARAM2                  2079  C V81 V89    TEST REC LGTH
 6 810   5          B     *      +008                     T       2086  B -98 T      LESS THAN LINE
 6 820   7          MCW   PARAM1          PARAM2                  2091  M V81 V89    SET LL EQ RL
 6 830   7          LCA   K200            MVLTOP+006              2098  L W88 Z64
 6 840   4          B     PNTSTP                                  2105  B Z21        GET NEXT LINE
 6 850   7  BLKTST  S     ONE             BLKCTR                  2109  S W76 V98
 6 860   8          BWZ   NEWPGE          BLKCTR          B       2116  V J35 V98 B  TEST END OF BLK
 6 870   7          A     TRUEBL          KNORCS                  2124  A W01 S69    BUMP NO OF RCRDS
 6 880   4          B     TESTOF                                  2131  B /00        TO BLK FORM CTL
 6 890   7  NEWPGE  MCW   ADFIXR          TPREAD+008              2135  M J63 567
 6 900   8          B     PAGEOP-005      PRNTLN-001      A       2142  B 438 -46 A  TEST NEW PAGE
 6 910   4          B     FIXREC                                  2150  B X25        NEXT RCRD IF NOT
 6 920   4  ERROR   H     *      -003                             2154  . J54        ERROR-L GR N
 6 930   3  OVFAD4  DSA   *               OVFRT4            -60   2160
 6 940   3  ADFIXR  DSA   *               FIXREC            X25   2163
 6 950              EX    RUNOUT                                        B +50
 6 960              ORG   1711
 6 970                   *TAPE TO PRINTER 1401 UTILITY - VARIABLE LENGTH
 6 980   7  START   LCA   KRRR            MVRTOP+003              1711  L W71 J21    SET TAPE ADDRS
 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          CW    COMPND+004                              1739  ) X47
 6 994   7  COMPND  C     RMBLNK-001      0000                    1743  C X05 000    Q. END OF BLOCK
 6 995   5          B     BLKFMC                          S       1750  B L23 S      OUT IF YES
 7 000   4          B     SUBRTN                                  1765  B 787        BR TO EXC + SEQ
 7 010   7  SETUP3  LCA   K200            MVRTOP+006              1759  L W88 J24    SET PRINT ADDRS
 7 020   4          B     SKPSUB                                  1766  B 935        BR TO FORM CTL
 7 030   8  EXCPVR  B     NOTPNH          EXCOPT          1       1770  B Z96 W42 1  EXCOPT 1-BYPASS
 7 040   7          LCA   MVRTOP+003      TAPPNH+003              1778  L J21 Y65    SET REC ADDR
 7 050   7          MCW   BLANK           TSTGPM                  1785  M W92 L44
 7 060   4  NEWCRD  CS    0180                                    1792  / 180
 7 070   4          SW    0101                                    1796  , 101
 7 080   7          LCA   K100            TAPPNH+006              1800  L W85 Y68    SET CARD ADDR
 7 090   7  GETCHR  A     ONE             TAPPNH+003              1807  A W76 Y65    BUMP RECORD AND
 7 100   7          A     ONE             TAPPNH+006              1814  A W76 Y68    CARD ADDRESSES
 7 110   7          MCW   TAPPNH+003      *      +007             1821  M Y65 Y34
 7 120   8          B     RMFND           0000            ‡       1828  B Y85 000 ‡  TEST FOR RECMRK
 7 130   7          C     NEWCRD+003      TAPPNH+006              1836  C X95 Y68    TEST END OF CARD
 7 140   5          B     GETCHR                          T       1843  B Y07 T      NEXT CHAR IF NOT
 7 150   7          MCW   BLANK           SWITCH                  1848  M W92 L43
 7 160   7  LOADPH  CW    TAPPNH+001      TAPPNH+004              1855  ) Y63 Y66
 7 170   7  TAPPNH  MCW   0000            0000                    1862  M 000 000    MOVE ONE CARD
 7 180   4          SW    TAPPNH+001                              1869  , Y63
 7 190   8          B     PNCHCD          SWITCH          1       1873  B Z36 L43 1
 7 200   4          P     NEWCRD                                  1881  4 X92        PUNCH + RETURN
 7 210   7  RMFND   MCW   TAPPNH+003      TSTEOF+006              1885  M Y65 Z05    SET GM TEST ADDR
 7 220   7          MCW   ONE             SWITCH                  1892  M W76 L43
 7 230   8  TSTEOF  BWZ   GRMFND          0000            1       1899  V Z11 000 1  TEST FOR END BLK
 7 240   4          B     LOADPH                                  1907  B Y55        RETURN IF NOT
 7 250   7  GRMFND  MCW   ONE             TSTGPM                  1911  M W76 L44
 7 260   7          A     KI99            TAPPNH+003              1918  A L42 Y65    SUBT 1 FROM
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PG LIN  CT  LABEL   OP    A OPERAND      B OPERAND      D      LOC   INSTRUCTION COMMENTS   3

 7 270   7          A     KI99           TAPPNH+006            1925  A L42 Y68   MOVE ADDRESSES
 7 280   4          B     LOADPH                               1932  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     SEQNCE         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            1974  M Z05 J21   BYPASS PRINTING
 7 360   8          B     BLKFMC         TSTGPM         1      1981  B L23 L44 1 TO BLK FORM CTL
 7 370   7          CS    VARREC         0203                  1989  / X18 203   OR NEXT RECORD
 7 380   7  NOTPNH  MCW   KENN           PNCHCD                1996  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     RECMRK         0000           ‡      2044  B J90 000 ‡ TEST FOR REC MRK
 7 480   7          A     ONE            MVRTOP+006            2052  A W76 J24   BUMP PRNT ADDRS
 7 490   7          C     KLINLG         MVRTOP+006            2059  C V85 J24   TEST FULL LINE
 7 500   5          B     NXTCTR                        T      2066  B -30 T     NEXT CHAR IF NOT
 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+006     EOFTST+006            2092  M J09 K17   IN NEXT POSITION
 7 550   4          CW    LKAHED+004                           2099  ) J07
 7 560   8  LKAHED  B     PICKSW         0000           ‡      2103  B K04 000 ‡ BRANCH IF RN NXT
 7 570   7  MOVERC  CW    MVRTOP+001     MVRTOP+004            2111  ) 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 RECRD
 7 610   4  LNEOPT  B     SETLNE                               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           SETLNE+007            2148  M W93 J69   PRINT INSTRS
 7 640   7          MCW   KBEE           ONELNE                2155  M W97 J77
 7 650   7  SETLNE  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  RECMRK  MCW   MVRTOP+003     EOFTST+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  EOFTST  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
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PG LIN  CT  LABEL   OP    A OPERAND       B OPERAND       D        LOC   INSTRUCTION COMMENTS   3

 7 800   7  NORM    MCW   FCCHAR          RECPNT-001               2249  M W06 K65   SET FORM CONTROL
 7 810   8          B     RECPNT          RECPNT-001       /       2256  B K66 K65 /
 7 820   2          CC                                     0       2264  F 0
 7 830   7  RECPNT  A     ONE             KNORCS                   2266  A W76 S69   BUMP NO OF RECDS
 7 840   1          W                                              2273  2           PRINT LAST LINE
 7 850   7          MCW   OVFAD7          TPREAD+008               2274  M L39 567
 7 860   7          MCW   *      -006     MVRTOP                   2281  M K81 J18   RESET MOVE AND
 7 870   7          MCW   KTWO            SETLNE+007               2288  M W77 J69   PRINT INSTRS
 7 880   7          MCW   KENN            CNELNE                   2295  M W93 J77
 7 890   4  NOPBRN  NOP   BLKFMC                                  2302  N L23       BR IF END OF BLK
 7 900   8          B     PAGEOP-005      RECPNT-001       A       2306  B 438 K65 A TEST NEW PAGE
 7 910   5          B     NXTPGE                           *       2314  B 425 *     EJECT IF OVERFLO
 7 920   4          B     VARREC                                   2319  B X18       GET NEXT RECORD
 7 930   7  BLKFMC  MCW   KENN            NOPBRN                   2323  M W93 L02   RESET BLOCK SWTH
 7 940   4          B     TESTOF                                   2330  B /00       TO BLK FORM CTL
 7 950   3  OVFAD5  DSA   *               SETPNT             -14   2336
 7 960   3  OVFAD7  DSA   *               VARREC             X18   2339
 7 970   3  KI99    DCW   *                                  I99   2342
 7 980   1  SWITCH  DCW   *                                        2343
 7 990   1  TSTGPM  DCW   *                                        2344
 8 000              EX    RUNOUT                                         B +50
 8 010              ORG   2500
 8 020   8  ANAL1A  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 Q04 #00   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 096 765   BLOCK LENGTH
 8 100   7          MCW   KG79            RETRY +026               2558  M 096 /86
 8 110   7          MCW   KG79            BKSPRD+011               2565  M 096 S30
 8 120   7          MCW   KMINLG          KMAXLG                   2572  M 093 089
 8 130   4          B     FLSSET                                   2579  B 045
 8 140   8  VARLNE  B     *      +005     3103             V       2583  B N95 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 #00   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     *      +008     3152                     2623  B 038 A52   TEST VAR LGTH
 8 210   7          MCW   KENN            LNEOPT                   2631  M W93 J37   ONE LINE OPTION
 8 220   7          A     K200            KLINLG                   2638  A W88 V85
 8 230   8  FLSSET  B     *      +008     3111                     2645  B 060 A11
 8 240   7          MCW   3111            KNOFLS                   2663  M 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   STORE SELECTED
 8 290   1          MCW                                            2689  M           FILE NUMBERS
 8 300   1          MCW                                            2690  M
 8 310   4  STLINL  SW    3107                                     2691  , A07
 8 320   7          A     3109            KLINLG                   2695  A A09 V85   SET LINE LENGTH
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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          MCW   KENN            FILOPT                   2710  M W93 676    SET HALT OPTION
 8 350   8          B     PGNOOP          3146                     2717  B P32 A46
 8 360   7          MCW   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          MCW   KBEE            PAGEOP                   2740  M W97 443    SET PAGE NO OPT
 8 390   8          B     TRIPLE-004      3124                     2747  B P69 A24
 8 400   7          MCW   NXTPGE+004      FCINST                   2755  M 429 W07    SET BLOCK FORM
 8 410   7          MCW   3124            FCBLKC                   2762  M A24 W08    CONTROL
 8 420   4          CW    FCBLKC                                   2769  ) W08
 8 430   8  TRIPLE  B     LDANL2          TEMP                     2773  B P95 099
 8 440   7          MCW   BLANK           RECRD -001               2781  M W92 568    ELIMINATE AUTO-
 8 450   7          MCW   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  EXITS1  DSA   *               SETUP1             X50   2801
 8 480   3          DSA   *               PNHNOT             Z10   2804
 8 490   3          DSA   *               EXCPFS             X68   2807
 8 500   3          DSA   *               PTSTUP             Z21   2810
 8 510   3          DSA   *               SETUP3             X59   2813
 8 520   3          DSA   *               NOTPNH             Z96   2816
 8 530   3          DSA   *               EXCPVR             X70   2819
 8 540   3          DSA   *               SETPNT             -14   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 LNGTH
 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 I90 A01
 8 610   7          MCW   3103            RCLCNV                   2529  M A03 V92    SET CONV REC LGT
 8 620   7          A     3106            TRUEBL                   2536  A A06 W01    SET BLOCKING
 8 630   7          MCW   TRUEBL          BLKCTR                   2543  M W01 V98
 8 640   7          S     ONE             BLKCTR                   2550  S W76 V98
 8 650   7          MCW   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   8          BWZ   TESTRL          BLKCTR          B        2578  V N64 V98 B
 8 690   7          C     PARAM1          KMAXLG                   2586  C V81 089    ERROR IF BLOCK
 8 700   5          B     ERROR4                          T        2593  B R68 T      LGTH EXCEEDS MAX
 8 710   8          B     LDANL3          3154                     2598  B R64 A54
 8 720   7  FLDSEL  A     3154            KFLDCT                   2606  A A54 K90    SET NO FIELDS
 8 730   7          C     KFLDCT          K16                      2613  C K90 101
 8 740   5          B     ERROR5                          T        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          MCW   KFLDCT          FLDCTR                   2653  M K90 K92
 8 800   7          LCA   ONE             ANAL2 +012               2660  L W76 N12
 8 810   7          CW    PICKUP+001      STORE +004               2667  ) 075 Q88
 8 820   7  PICKUP  MCW   3165            ANAL2 +011               2674  M A65 N11    PICKUP FIELD PRM
 8 830   7          SW    ANAL2 +005      ANAL2 +008               2681  , N05 N08
 8 840   7          MCW   KEMM            FLDANL                   2688  M 102 M79
 8 850   8          BWZ   COMLNE          ANAL2 +011      2        2695  V P44 N11 2 BR IF MOVE INSTR
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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 W93 M79	SET NOP FOR EDIT
8	890	4		B	ZERSUP+007			2726	B P37	
8	900	7	ZERSUP	MCW	KZEE	FLDANL		2730	M 103 M79	SET Z FOR MCS
8	910	7		MZ	BLANK	ANAL2 +011		2737	Y W92 N11	
8	920	7	COMLNE	C	ANAL2 +011	ANAL2 +012		2744	C N11 N12	CHECK LINE ORDER
8	930	5		B	ERROR5		U	2751	B R72 U	
8	940	5		B	ADDCHR		S	2756	B P80 S	BR IF SAME LINE
8	950	7	TSTLIN	C	KLINLG	TAPEMD		2761	C V85 K88	TEST LINE MAX
8	960	5		B	ERROR5		U	2768	B R72 U	
8	970	7		MCW	C1ADDR	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	SET LO PRINT LOC
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	* +015	ANAL2 +001		2841	B Q63 N01	
9	080	7		MN	ANAL2 +001	* +004		2849	D N01 Q59	
9	090	7		MZ	3990	ANAL2 +002		2856	Y I90 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 000	STORE FIELD PARS
9	140	7		S	ONE	FLDCTR		2891	S W76 K92	
9	150	8		BWZ	LDANL3	FLDCTR	K	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 X00 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		B	STORE -007			2960	B Q77	TO STORE
9	260	4	LDANL3	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		
9	300			EX	ANAL2				B N00	
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	RLVSLL	3154		2508	B N20 A54	OR VAR LGTH
9	340	4		B	SEQSET			2516	B N77	
9	350	7	RLVSLL	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		U	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	SEQSET	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 HOLD 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	SET SEQ ADDRESS
9	540	7		MCW	HLDADD	CHKSEQ+006		2641	M 110 914	MODIFY SEQUENCE
9	550	7		MCW	HLDADD	CHKSEQ+013		2648	M 110 921	CHECK INSTRS
9	560	8	SETFC	B	RECFC	3121		2655	B 092 A21	
9	570	7		MCW	KENN	SKPSUB		2663	M W93 935	SET FIRST CHAR
9	580	7		MCW	ONE	SKPTST		2670	M W76 W05	FORM CTL PARAMS
9	590	8		B	SETEXP	3122	1	2677	B P07 A22 1	
9	600	7		MCW	KENN	SUPPRS+007		2685	M W93 997	SET SUPPR OPTN
9	610	8	RECFC	B	SETEXP	3123		2692	B P07 A23	
9	620	7		MCW	3123	FCCHAR		2700	M A23 W06	SET REC FORM CTL
9	630	8	SETEXP	B	LDANL4	3125		2707	B +33 A25	OUT IF NO EXCPTN
9	640	7		MCW	KENN	SUBRTN+007		2715	M W93 794	SET BYP SWITCH
9	650	7		MN	3125	EXCOPT		2722	D A25 W42	STORE + CHECK
9	660	7		C	EXCOPT	KTHREE		2729	C W42 X07	EXCEPTION OPTION
9	670	5		B	ERROR6		T	2736	B +37 T	
9	680	7		MCW	3127	CHAR1		2741	M A27 W49	STORE FIRST CHAR
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	STORE FIRST ADDR
9	730	8		B	C2BLNK	3134		2777	B R89 A34	
9	740	7	STRC2	MCW	3133	CHAR2		2785	M A33 W50	STORE SECND CHAR
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	STORE SECND ADDR
9	790	8		BWZ	SETY1	3128	B	2821	V +11 A28 B	TEST FIRST CHAR,
9	800	8		BWZ	TSTDP1	3128	2	2829	V Q52 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	SET DIGIT OP CD
9	830	7	TSTDP1	MZ	BLANK	3128		2852	Y W92 A28	
9	840	8		B	ANDOR	3128	1	2859	B Q86 A28 1	TEST PRESENCE OR
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	SET D MODR S
9	880	8	ANDOR	B	DISPN2	3126	2	2886	B R20 A26 2	TEST CONNECTIVE
9	890	8		B	* +005	3126	1	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 +

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PG LIN  CT  LABEL   OP    A OPERAND       B OPERAND       D      LCC   INSTRUCTION COMMENTS

 9 920   7          MCW   EXCDSA          TESTC1+017             2913  M 083 850   OPERAND FOR AND
 9 930   8  DISPN2  BWZ   SETY2           3134            B      2920  V +22 A34 B TEST SECND CHAR,
 9 940   8          BWZ   TSTDP2          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  TSTDP2  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 SECND 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     TSTDP1                                 3018  B Q52
10 090   7  SETY2   MCW   KYYY            TESTC2                 3022  M 085 856   SET ZONE OP CODE
10 100   4          B     TSTDP2                                 3029  B R51
10 110   4  LDANL4  R     0056                                   3033  1 056       BR TO BOOTSTRAP
10 120   1  ERROR6  H                                            3037  .           EXCEPTION ERROR
10 130   7          MCW   KBEE            SUBRTN+007             3038  M W97 794
10 140   7          MN    BLANK           EXCOPT                 3045  D W92 W42
10 150   4          B     LDANL4                                 3052  B +33
10 160   1          DCW   *                                      3056
10 170              EX    ANAL3                                        B N00
10 180              ORG   2500
10 190   8  ANAL4   B     STRPRG          3112            D      2500  B R51 A12 D TO PROD SYS TAPE
10 200   7          SW    3145            3997                   2508  , A45 I97
10 210   7          A     3145            TAPADD                 2515  A A45 W04
10 220   7          MCW   3151            ANAL4 +003             2522  M A51 N03
10 230   7          LCA   3978            0080                   2529  L I78 080   SET UP TRAILER
10 240   7          LCA   3898            3169                   2536  L H98 A69
10 250   8  EDITNG  B     HEADER          ADDED1                 2543  B 053 116   OUT IF NO EDIT
10 260   7          SW    LODEDT+001      LODEDT+004             2551  , N87 N90
10 270   7  MODIFY  A     ADDED1          LODEDT+003             2558  A 116 N89   MODIFY MOVE EDIT
10 280   7          A     ADDED1          LODEDT+006             2565  A 116 N92   WORDS INSTR
10 290   7          LCA   LODEDT+006      3783                   2572  L N92 G83   STORE EDWD ADDRS
10 300   7          CW    LODEDT+001      LODEDT+004             2579  ) N87 N90
10 310   7  LODEDT  LCA   ADDEDC          3828                   2586  L 161 H28   STORE EDIT WORD
10 320   7          SW    EDITNG+004      MODIFY+001             2593  , N47 N59
10 330   7          SW    MODIFY+008      MODIFY+018             2600  , N66 N76
10 340   7          A     KTHREE          EDITNG+006             2607  A X07 N49   BUMP STORE ADDRS
10 350   7          A     KTHREE          MODIFY+003             2614  A X07 N61
10 360   7          A     KTHREE          MODIFY+010             2621  A X07 N68
10 370   7          A     KTHREE          MODIFY+020             2628  A X07 N78
10 380   7          CW    EDITNG+004      MODIFY+001             2635  ) N47 N59
10 390   7          CW    MODIFY+008      MODIFY+018             2642  ) N66 N76
10 400   4          B     EDITNG                                 2649  B N43       NEXT EDIT WORD
10 410   8  HEADER  B     FIXHDG          ANAL4 +003             2653  B Q36 N03   BR IF NO HEADER
10 420   7          LCA   GRPMRK          3338                   2661  L I97 C38
10 430   8          LCA   (U3             3178            R      2668  L (U3 A78 R READ HEADER LABL
10 440   4          LCA   FILE4                                  2676  L S88
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PG LIN  CT  LABEL    OP   A OPERAND        B OPERAND        D      LOC   INSTRUCTION COMMENTS

10 450   7          LCA  FILE4            3339                    2680  L S88 C39
10 460   8          B    FIXHDG           ANAL4 +003       3      2687  B Q36 N03 3 BYPASS HEADER
10 470   8          B    PNTLAB           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       INCORRECT DISP
10 510   4  PNTLAB  CS   0332                                     2723  / 332
10 520   1          CS                                           2727  /
10 530   2          CC                                     1     2728  F 1
10 540   4          SW   0201                                   2730  , 201
10 550   1          SW                                           2734  ,
10 560   7          MCW  3257             0280                    2735  M B57 280
10 570   1          MCW                                          2742  M
10 580   1          W                                            2743  2           PRINT FIRST 80
10 590   4          CS   0299                                   2744  / 299
10 600   4          SW   0201                                   2748  , 201
10 610   1          SW                                           2752  ,
10 620   7          MCW  3337             0280                    2753  M C37 280
10 630   1          MCW                                          2760  M
10 640   4          W    FIXHDG                                  2761  2 Q36       PRINT SECND 80
10 650   4  PNHLAB  CS   0180                                   2765  / 180
10 660   4          SW   0101                                   2769  , 101
10 670   1          SW                                           2773  ,
10 680   7          MCW  3257             0180                    2774  M B57 180
10 690   1          MCW                                          2781  M
10 700   1          P                                            2782  4           PUNCH FIRST 80
10 710   7          MCW  3337             0180                    2783  M C37 180
10 720   1          MCW                                          2790  M
10 730   4          P    FIXHDG                                  2791  4 Q36       PUNCH SECND 80
10 740   7  COMLAB  SW   COMPRE+001        COMPRE+004              2795  , Q24 Q27
10 750   7          A    ANAL4 +002       COMPRE+006              2802  A N02 Q29   SET ADDRESSES
10 760   7          A    ANAL4 +002       COMPRE+003              2809  A N02 Q26   FOR COMPARE
10 770   7          CW   COMPRE+001        COMPRE+004              2816  ) Q24 Q27
10 780   7  COMPRE  C    3177             3009                    2823  C A77 +09   COMPARE
10 790   5          B    FIXHDG                           S      2830  B Q36 S     BR IF EQUAL
10 800   1  ERROR7  H                                            2835  .           UNEQUAL COMP
10 810   2  FIXHDG  CC                                     1     2836  F 1         EJECT PAGE
10 820   7          S    ONE              TAPADD                  2838  S W76 W04
10 830   4          CS   0332                                     2845  / 332
10 840   1          CS                                           2849  /
10 850   8          BWZ  SETTPE           TAPADD           K      2850  V R22 W04 K OUT IF NO MORE
10 860   7  MCWFIX  MCW  3471             0332                    2858  M D71 332
10 870   7          MCW  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         FIX HEAD FORM CT
10 910   7          SW   MCWFIX+001       MCWFIX+008              2890  , Q59 Q66
10 920   7          A    K133             MCWFIX+003              2897  A W91 Q61
10 930   7          A    K133             MCWFIX+010              2904  A W91 Q68
10 940   7          CW   MCWFIX+001       MCWFIX+008              2911  ) Q59 Q66
10 950   4          W    FIXHDG+002                               2918  2 Q38       PRINT + RETURN
10 960   7  SETTPE  LCA  3997             3999                    2922  L I97 I99
10 970   8          MCW  (U3              3996             R      2929  M (U3 I96 R
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Version 3


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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 PROGRM
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 001 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  U (U1 R
11 090   4  RETURN  H     ANAL4 +008                              2987  . N08        HALT-CONTINUE
11 100   4          H     *      -003                             2991  . R91
11 110   1          DCW   *                                       2995
11 120              END   ANAL4                                         / N00 080
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,008015,022026,030034,041,045,053,0570731026                                                    3001
L0721116,TTOTO6,TO51176101/I99,027A075029)027B0010270B026/0991,0017001117I00                    3002
,008015,022029,036039,043047/039036    ,051,055,056,063N,067071,075,0011056                     3003
B425AW77S9IMS9137IMS9137MS91383        ,351,3581056      L032364,337,344B039                    3004
B772000 SW76000C000S80B425SB785U       ,387,3921056      L032396,373,380B039                    3005
C(U3I95R8414KB397AW76S80B380B431F1     ,414,421,425,4291L034430,405,410B039                     3006
MW93425/332/N469ZT00299MS962952        ,443,447,454,4611L031461,438,442B039                     3007
AW76T00LV73539LT02T04L539522AW76522    ,483,4901056      L035496,469,476B039                    3008
SW76T04V559T04K)520537M0005358536535   ,519,5261056      L037533,504,512B039                    3009
FOM0003322,537AW9T539B4837332          ,544,548,555,5591L029562,536,543B039                     3010
/F569LLI99I97L(U3N01RLx06B/46LB614K    ,576,584,588,5931L035597,564,569B039                     3011
MW92W61B569CBXTTAW76S80FT/3327         ,614,621,623,6271L030627,605,610B039                     3012
MS76299ZS692912M332W38M332S69+X04T00   ,643,650,6571056  L036663,635,642B039                    3013
CS80S78B772SB760B760BLI99N81L(U3N01R   ,680,685,6921056  L036699,671,676B039                    3014
LS88B772KL080180B764N81 CW76W76LN81181,716,724,7311056   L038737,704,709B039                    3015
CB772SU(U3BLI99I97B333.685)N81         ,749,756,760,7641L030767,739,744B039                     3016
B724U(U3RF1.779.333MW92W62B879         ,779,783,787,7941L030797,772,777B039                     3017
LW04836LW04859AW45836AW48859I834857    ,819,8261056      L035832,805,812B039                    3018
M000W51CW51W49B856/B875M000W52CW52W50  ,852,856,8631056  L037869,840,847B039                    3019
B879/BX61B927LW4T9TTAW0491TM9TT9I81909,883,890,897,9041L038907,875,879B039                     3020
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