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

December 13, 1961

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

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 56-59 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

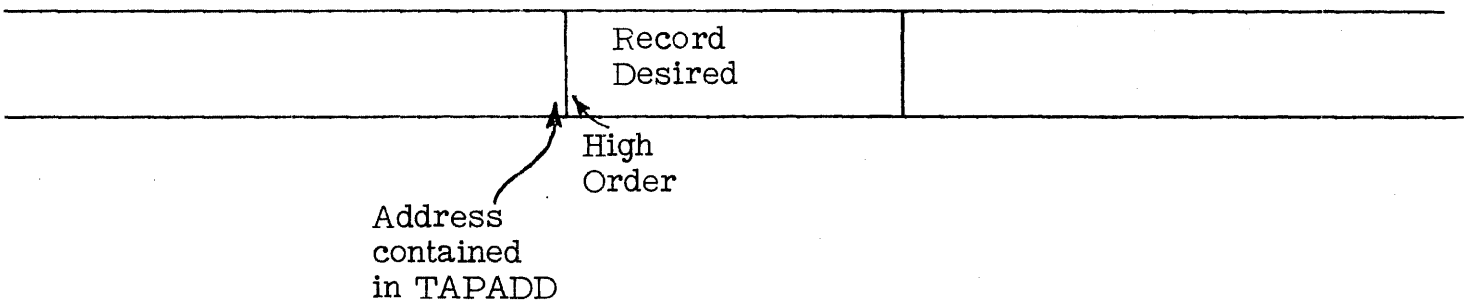
It is not possible to patch when using the Fixed Length Record Field Selection mode of operation, since there is no storage available for the patch.

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)

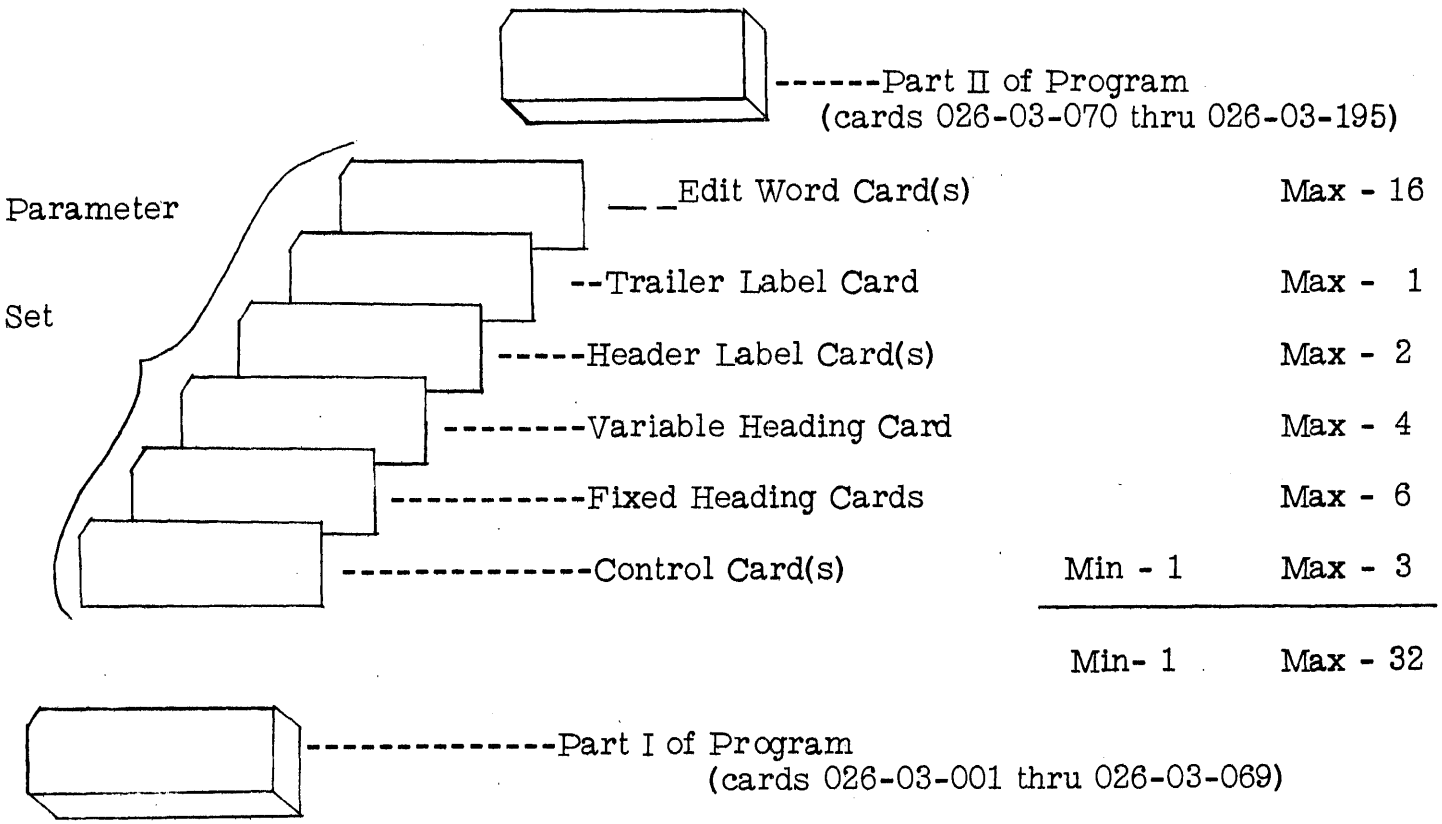
(c) If the exception option chosen is 3 (punch and print), the instruction shown in 5(a), has the same effect as 3(a), (i.e., process all records). If it is desired not to process these printed exceptions with the patch routine, one more card is needed with the card in 5(a). It should be noted, however,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

columns 56-74

L074Z661056BX59W423

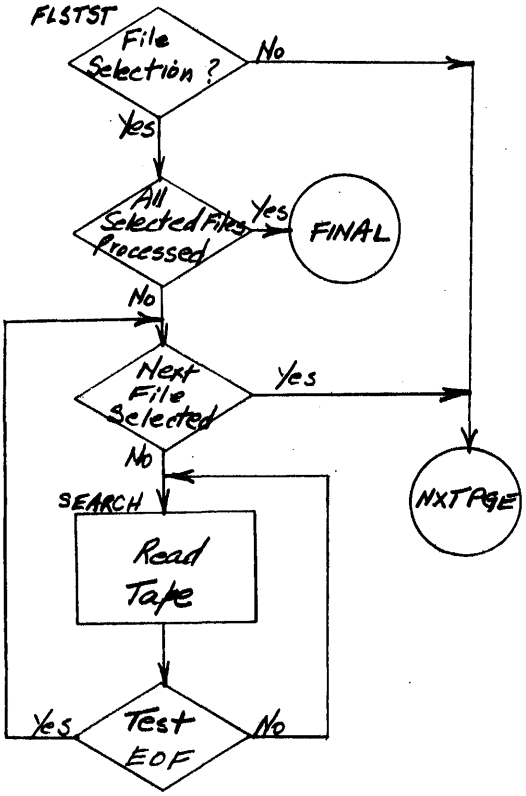
Instructions 5 (a) and 5 (b) are not affected.

VIII Deck Complement

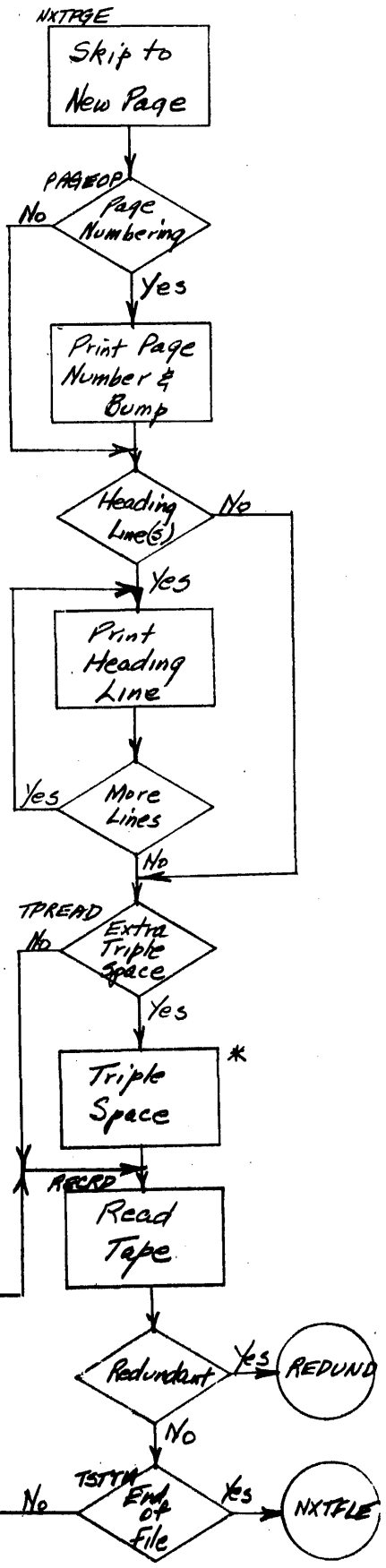


IX - FLOW CHARTS

MAIN LINE

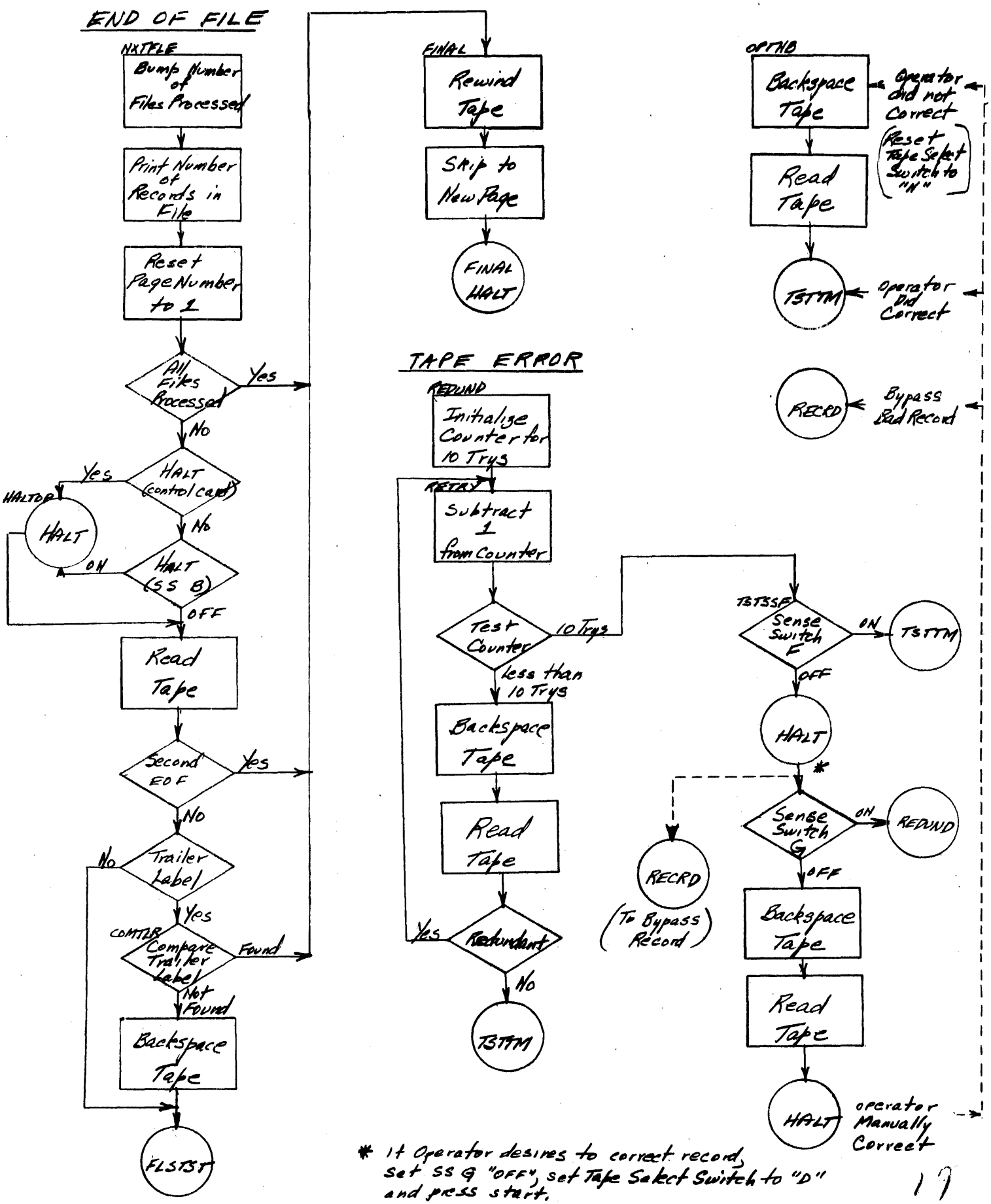


FORM SETUP & TAPE READ



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

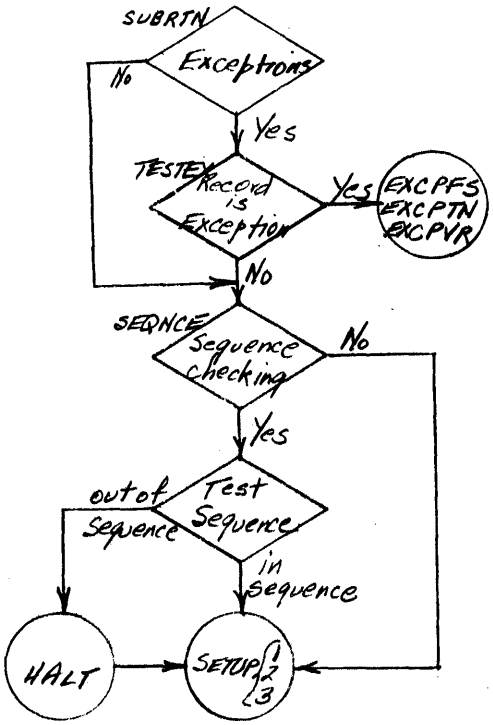
MAIN LINE (cont'd)



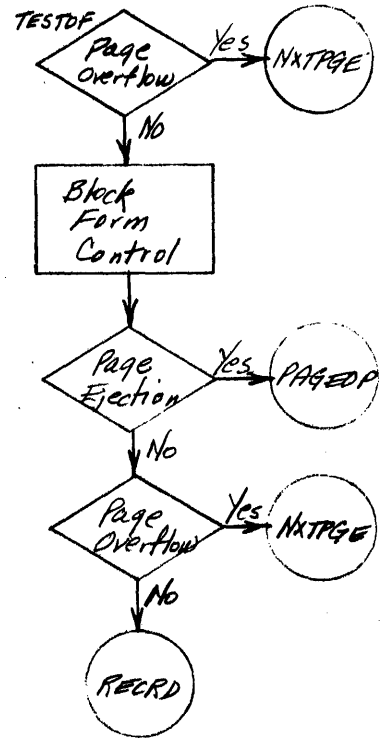
* If Operator desires to correct record, set SS G "OFF", set Tape Select Switch to "D" and press start.

MAINLINE (cont'd)

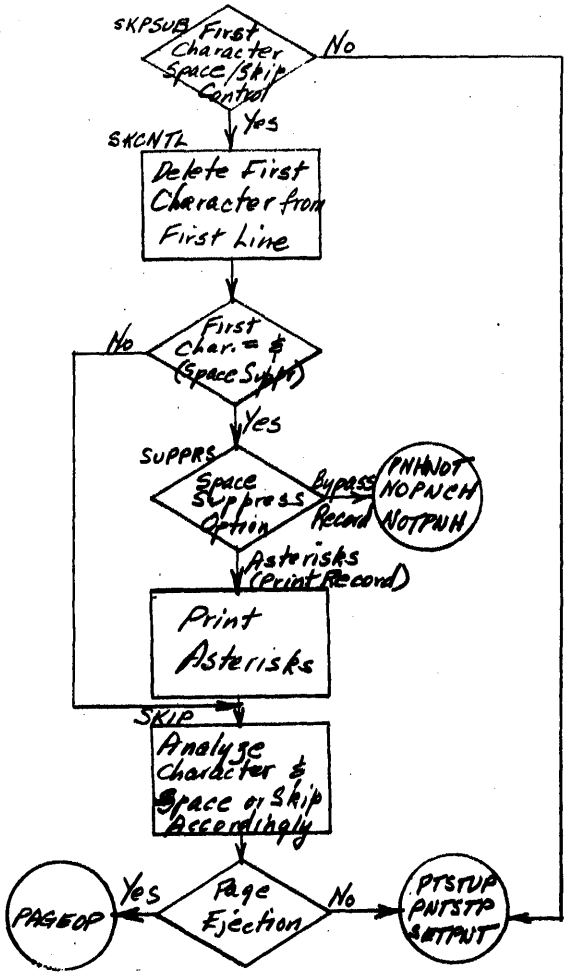
EXCEPTIONS & SEQUENCE CHECK



END OF BLOCK

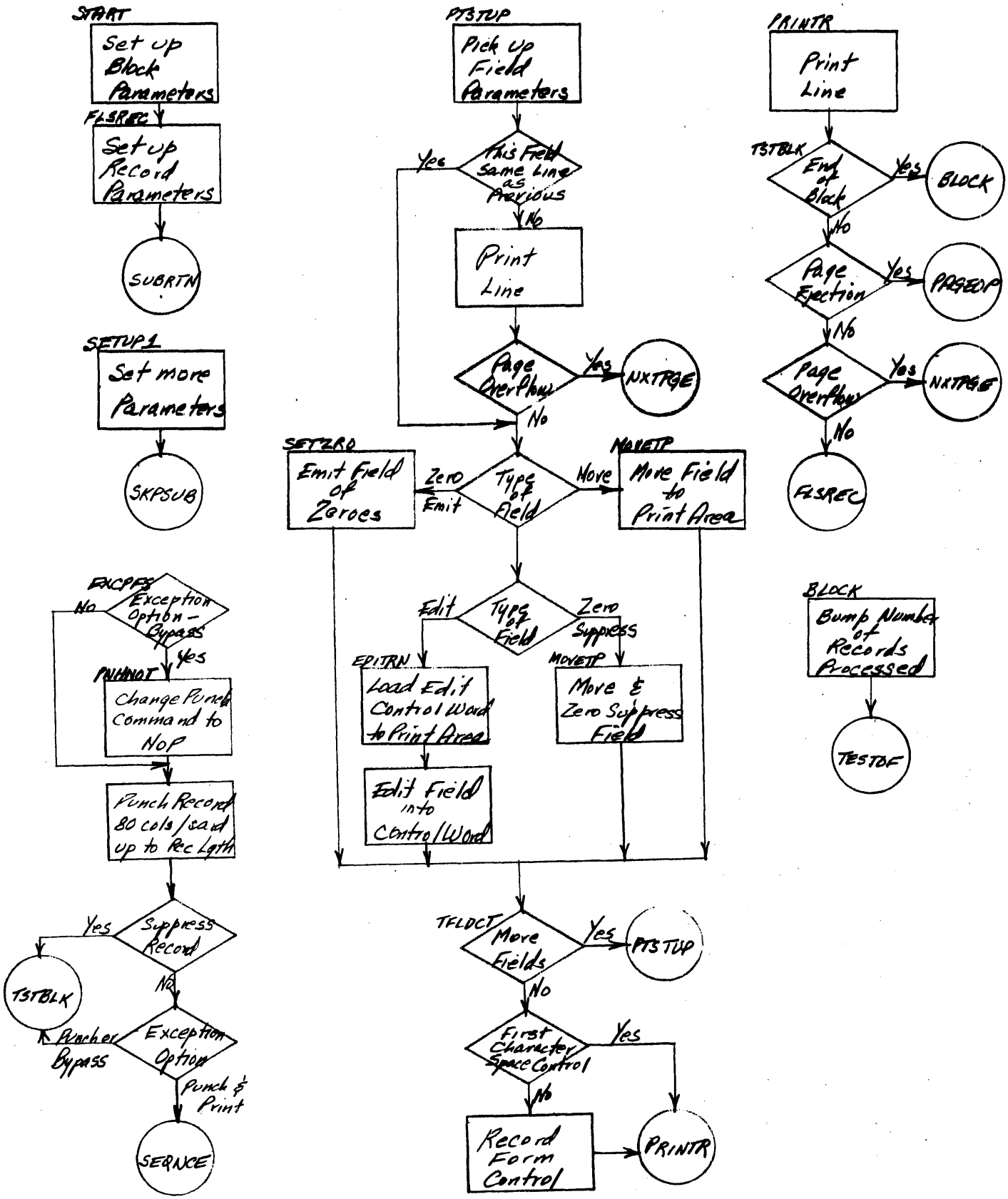


FIRST CHARACTER SPACE/SKIP CONTROL

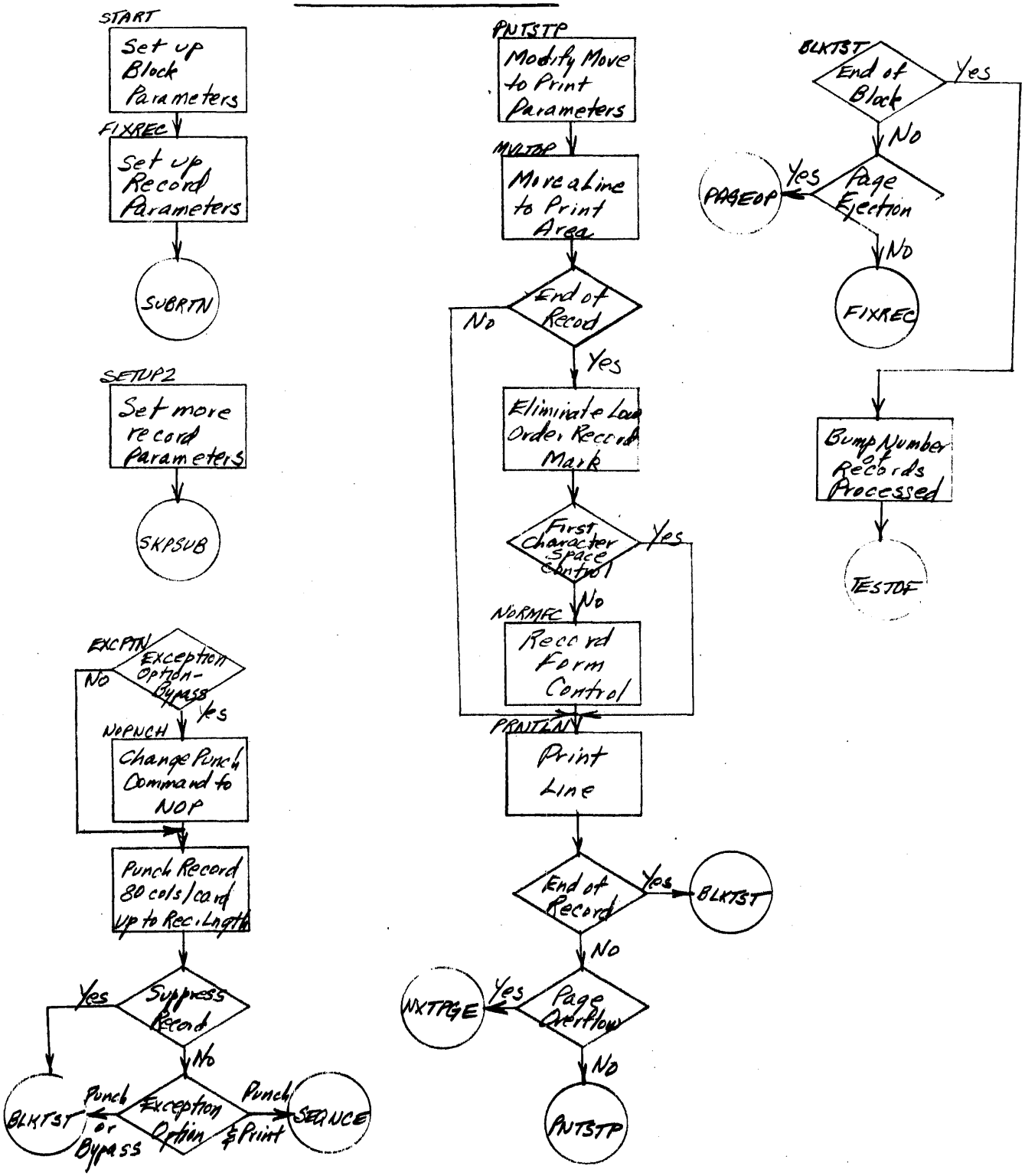


FIELD SELECTION

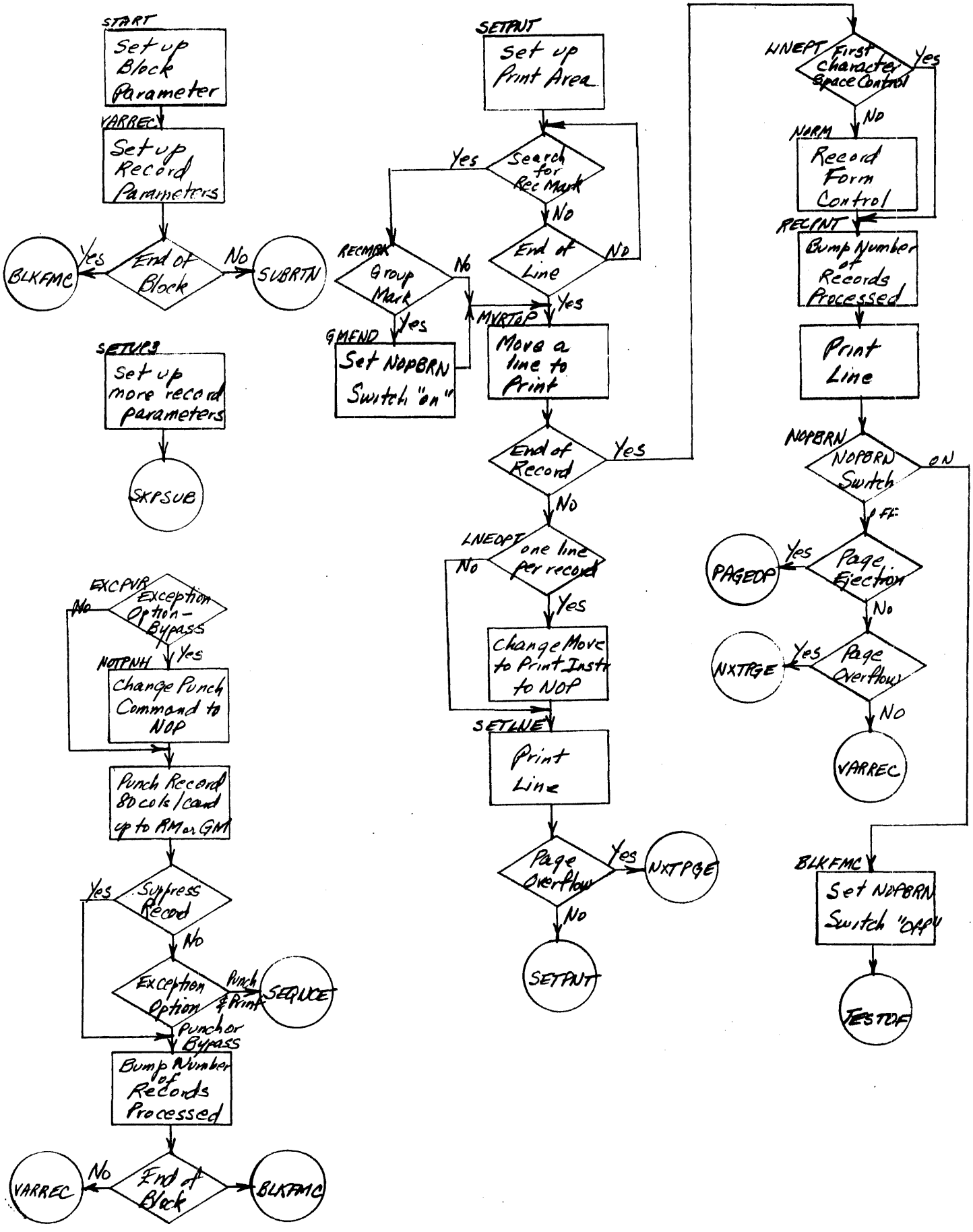
Version 3



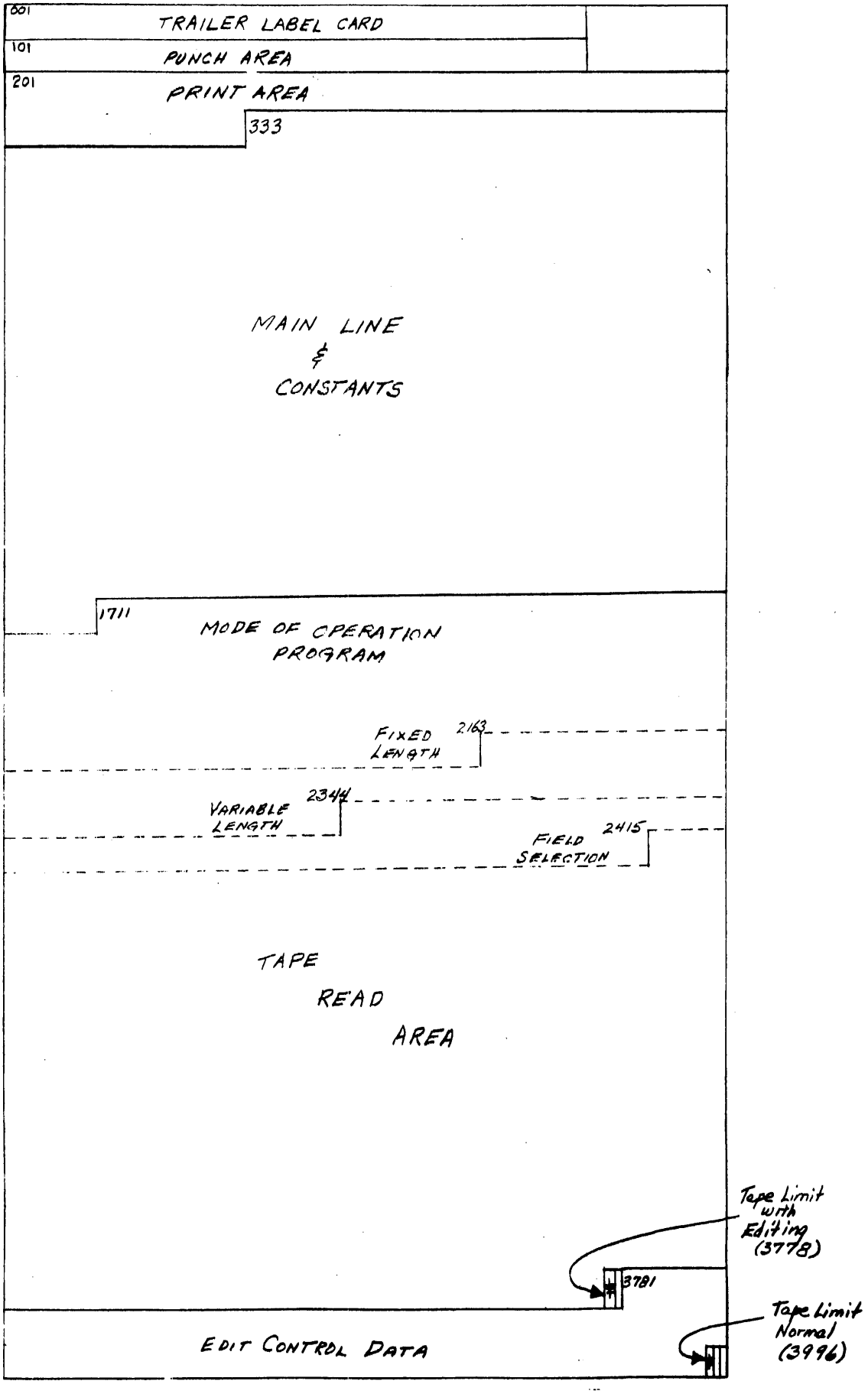
FIXED LENGTH



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     068C  B 760 B     CONT CO 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 N81 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     EXCEND                                 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
```

```
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
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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	

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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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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   KQ3              STEDIT+003               2934  M 105 R66   SET WP 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  ) 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 W05   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 W82 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 W40
 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 W40 W56
 5 130   5          B     ADDLGT                             T      1811  B Y23 T     SET CARD LENGTH
 5 140   7          MCW   TPELGT           PNHLGT                   1816  M W40 W56   EQ REC IF LESS
 5 150   7  ADDLGT  A     PNHLGT           TAPEPN+003               1823  A W56 Y65   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 EXIT
 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                    1731  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  ) 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  ) 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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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 S67
 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 0C0 ‡ 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 M06 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 M76 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 #G0   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 M95 A03 V
 8 150   4          B    FLSSET                                     2591  B 045
 8 160   7          MCW  EXITS1+012       OUTSEQ-001                2595  M Q13 930   MODIFY LINKAGE
 8 170   7          MCW  EXITS1+015       SUPPRS+010                2602  M Q16 #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 P52 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 W07 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
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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      LOC   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 CO
 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  TC 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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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
```

APPENDIX E - LISTING OF PROGRAM DECK

Version 3


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,008015,022026,030034,041,045,053,0570731026                                       3001
L072116,T10T06,T051176101/I99,027A075029]027B0010270B02670991,0017001117I00       3002
,008015,022029,036039,043047/039036     ,051,055,056,063N,067071,075,0011056      3003
B425AW77S91MS91371MS91379MS91383        ,351,3581056       L032364,337,344B039    3004
B772000 SW76000C000SB0B425SB783U        ,387,3921056       L032396,373,380B039    3005
L(U3I95RB414KB397AW76S80B380B431F1      ,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)520537M000535B536535    ,519,5261056       L037533,504,512B039    3009
F0M0003322,537AW91539B4837332           ,544,548,555,5591L029562,536,543B039      3010
/F569LLI99I97L(U3N01RLX06B/46LB614K     ,576,584,588,5931L035597,564,569B039      3011
MW92W61B569CBX11AW76S80F1/332/          ,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
LW04836LW04859AW45836AW48859]834857     ,819,8261056       L035832,805,812B039    3018
M000W51CW51W49B856/B875M000W52CW52W50 ,852,856,8631056 L037869,840,847B039        3019
B879/BX61B927LW4191IAW0491IM91I918]909,883,890,897,9041L038907,875,879B039        3020
C000000M000000B931UBX36.927B‡58LW04967,927,931,935,9391L038945,915,922B039        3021
AW76967M967977]965M000W06MW92000        ,964,9711056       L032977,953,960B039    3022
CW06X01B‡18/MW76W62BZ10/332/MW96203     ,997,‡01,‡05,‡061L035‡12,985,990B039      3023
2/203B‡58W06 B‡62W060B‡67W06-V‡72W062 ,‡26,‡34,‡421056 L037‡49,‡14,‡18B039        3024
V‡72W06KBZ21F‡58JF‡58KMW68567DW06‡87F0,‡67,‡72,‡79,‡861L038‡87,‡58,‡62B039        3025
B438‡871B‡58MW65567B569W61 B425'        ,/07,/151056       L032/19,‡96,/00B039    3026
MW08/28F0B438/281B425'B569MS13S43       ,/37,/42,/461056 L033/52,/27,/29B039      3027
MS59S61SW76S61VS08S61KU(U3BLI99I97      ,775,7801056       L034786,760,767B039    3028
L(U3N01RLX06B/60LB593B593F.B/53G        ,S04,S08,S13,S141L032S18,/95,/99B039      3029
U(U3BLI99I97L(U3N01RLX06.593MW97S43     ,S39,S43,S471056 L035S53,S24,S31B039      3030
BS190909         RECORDS990+            ,S62,S70,S77,S791L027S80,S58,S60B039      3031
         S80PAGE    T                   ,S87,S89,S92,S971L020T00,S83,S85B039      3032
00                                                          L005T05,T03,T051056    3033
                                                            L002U38,U381056        3034
 U360000      0000                      ,V78,V82,V86,V901L023V92,V71,V74B039      3035
000    000     /N                       ,W02,W05,W06,W071L015W07,V96,V99B039      3036
0                                    000,W42,W431056       L038W45,W09,W39B039    3037
000                                     ,W51,W52,W53,W571L015W60,W49,W50B039      3038
  569‡58N00000+1                        ,W66,W69,W72,W761L016W76,W62,W63B039      3039
24008010020013                          ,W83,W86,W89,W921L016W92,W78,W79B039      3040
N***B011+001‡                           ,W98,X01,X02,X051L014X06,W94,W97B039      3041
3G83                                                        L004X10,X081056        3042
879DY14961279G79                        ,086,090,094,0971L019099,084,085B039      3043
T6MZ                                                        L004T03,T02,T031056    3044
2SKB                                                        L004I931056            3045
                                                            L001I971056            3046
0310W08/ST                              ,111,112,113,1141L013116,106,108B039      3047
                                        ,126,129,132,1351L021137,120,123B039      3048
                                        ,147,150,153,1561L021158,141,144B039      3049
                                                            L003161T056            3050
H28321                                                      L006327,3251056        3051
7080,001,072F05,G38G39,H991K1           ,N15,N22,N26,N271L029N28,N04,N08B039      3052
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Version 3

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