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TM-(L)-734/017/00



TECHNICAL MEMORANDUM

(TM Series)

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1604 Simulation Program Descriptions
Milestone 11

SYSTEM

Data Reduction and Output Processing System
Control Program for Augmentation
(DROPSA)

DEVELOPMENT

CORPORATION

by

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2500 COLORADO AVE.

15 March 1963

SANTA MONICA

Approved

CALIFORNIA

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1.0 SUBROUTINE IDENTIFICATION

1.1 Title

Data Reduction and Output Processing System Control Program for Augmentation (DROPSA)

Ident: K19, Mod. 04

1.2 Programmed

11 January 1963, J. G. Hillhouse, System Development Corporation

1.3 Documented

15 February 1963, J. G. Hillhouse, System Development Corporation

2.0 PURPOSE

DROPSA is used to reduce data on the two simulated data input tapes written by the SIPSA system and the recording tape produced by SIMSTN. All message types, listed in TM-(L)-834/000/01 and 01A, Bird Buffer Combined Milestone 3 and 4 (see Section 9.3), are recognized and listed in a specified format with added identifying information.

3.0 USAGE

3.1 Calling Sequence

L	NOP		
	SLJ	4	DROPSA
L+1	SLJ	0	ALPHA
	ZRØ		NN
L+2	ZRØ		0
	ZRØ		P ₁
L+3	ZRØ		0
	ZRØ		P ₂

L+4	P ₃	0
	ZRØ	0
L+5	ZRØ	0
	ZRØ	P ₄

where:

ALPHA = Return address when DROPSA is completed.

NN = Number of parameters.

P₁ = Designation of unit to be used to read input processing requests: 0 for reader, 2-12 for tape.

P₂ = Designation of unit for tape to be processed: 2-12.

P₃ = Type of tape being processed:

FS = 1604 Transfer Tape

BB = 160-A Simulation Tape

R = Recording Tape.

P₄ = Designation of unit to be used to record the listable reduced data output: 2-12. If printer (13) is chosen, data will also be listed on Tape Unit 3.

3.2 On-Line Messages

3.2.1 Each of the request cards is listed after it is read.

3.2.2 A card contains an illegal request code, i.e., the octal number representing message type to be processed.

ILLEGAL REQUEST CODE

(Card in Error)

SET JUMP KEY 2 TO IGNORE THIS CARD AND CONTINUE PROCESSING WITH NEXT CARD.

IF INPUT IS FROM READER, CORRECT AND RELOAD ERROR CARD,
START.

If tape is being used as input, it is suggested that Key 2 be set to process the next card image on the tape. If Key 2 is not set, the tape will be backspaced one record and then re-read.

3.2.3 Columns 1-4 on card do not contain LIST or HALT.

INCORRECT FORMAT
(Card in Error)

SET JUMP KEY 2 TO IGNORE THIS CARD AND CONTINUE
PROCESSING WITH NEXT CARD.

IF INPUT IS FROM READER, CORRECT AND RELOAD ERROR
CARD, START.

The tape input comments for 3.2.2 apply to this error.

3.2.4 Select Error

CHECK P₁ ON FUNCTION CARD FOR PROPER INPUT DEVICE
INDICATOR. IF CORRECT, DEPRESS START AND TRY AGAIN.

An error was incurred by the INPUT program in trying to select the request cards' input source. Check the first parameter on the DROPSA function card for correct value: 0 for reader, 2-12 for tape.

3.2.5 Parity or Buffer Length Error

READ ERROR

IF YOU WISH TO TRY AGAIN FOR INPUT DEVICE = 1) READER--
RELOAD ERROR CARD AND DEPRESS START, 2) TAPE--DEPRESS
START.

Error occurred while trying to read the request cards. If input is from tape and the start key is depressed, the tape will be backspaced one record and re-read.

3.2.6 Incorrect Request Card Format

One of the following messages will be printed:

- a. TOO MANY OCTAL CHARACTERS. INCORRECT REQUEST CARD FORMAT.

SET JUMP KEY 2 TO IGNORE THIS CARD AND CONTINUE PROCESSING WITH NEXT CARD.

IF INPUT IS FROM READER, CORRECT AND RELOAD ERROR CARD, START.

- b. ILLEGAL CHARACTER IN FIELD. INCORRECT REQUEST CARD FORMAT.

SET JUMP KEY 2 TO IGNORE THIS CARD AND CONTINUE PROCESSING WITH NEXT CARD.

IF INPUT IS FROM READER, CORRECT AND RELOAD ERROR CARD, START.

Refer to Section 3.2.2 for tape input comments.

3.2.7 Illegal Tape Type

ILLEGAL TAPE TYPE REQUESTED. CORRECT P₃ ON FUNCTION CARD AND REINITIATE JOB.

The third parameter, type of data tape to be processed, on the DROPSA function card is illegal. Acceptable codes for this field are: FS, BB, or R.

3.2.8 Parity Error

PARITY ERROR ON PROCESS TAPE. REINITIATE JOB.

Data tape is probably bad.

3.2.9 Tape Type Error

TAPE TO BE PROCESSED IS NOT SAME AS REQUESTED ON FUNCTION CARD.

OCTAL DUMP OF INCORRECT RECORD ON PROCESS TAPE FOLLOWS.
CORRECT P₃ ON FUNCTION CARD AND/OR CHANGE PROCESS TAPE.
REINITIATE JOB.

It appears that either

1. the third parameter, process tape type, on the DROPSA function card is incorrect; or
2. the wrong process tape was mounted.

It is possible to check the next record by gently depressing the start key.

3.2.10 No End-of-File Record on Recording Tape

FOUR ILLEGAL RECORDING TAPE RECORDS HAVE BEEN READ.

ASSUMING EOF.

At this point, DROPSA will assume that the Recording Tape being processed does not contain an end-of-file record and that all good data on the tape has been processed.

3.2.11 Terminal Comment

DROPSA HAS COMPLETED OPERATIONS. PLEASE LIST TAPE ON LOGICAL UNIT_____.

DROPSA will now return control to COP. The output tape should be listed.

3.3 Control Cards

3.3.1 Function Card

*N DROPSA P₁ P₂ P₃ P₄

where: N = Unit designated for storage analysis (if blank, storage analysis is written on Tape Unit 3).

P₁-P₄ = same as described in Section 3.1.

3.3.2 Data Processing Requests

The data processing requests can be on punched IBM cards or their images recorded on magnetic tape. There are two types of input cards.

3.3.2.1 Data Request Cards

These cards are used by DROPSA to determine which message types on the process tape are to be extracted, reduced, and listed. The format for this card is:

LIST	M ₁
------	----------------

<u>Columns</u>	<u>Content</u>	<u>Meaning</u>
1-4	LIST	Name of request
6-7	M ₁	Octal number representing acceptable message type of data to be extracted and processed. If M ₁ is blank, all messages on the tape will be listed in their pre-specified formats.

3.3.2.2 Termination Request

This card indicates to DROPSA that all request cards have been read.
The format for this card is:

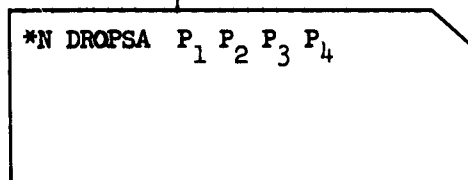
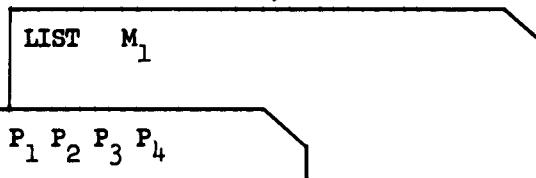


<u>Columns</u>	<u>Content</u>	<u>Meaning</u>
1-4	HALT	Terminal card

3.3.3 Operational Card Deck



Other "Processing Request" Cards



3.4 Input Tape

Any one of the following three tapes can be used as an input to DROPSA:

- a. Bird Buffer Simulated Data Input Tape with one end-of-file record indicating the end of data written by the SIPSA program;
- b. Bird Buffer 1604 Transfer Tape for Flight Support Simulation with two end-of-file records indicating the end of data written by the SIPSA system;
- c. Bird Buffer Recorded Output Data Tape written by SIMSTN. This tape will not contain an end-of-file record. Four consecutive illegal records indicate end of data.

The formats of these tapes are given in TM-(L)-734/015/00, Computer Program Design Specifications for the Simulation of the Augmented SCF Environment at the STA and CPDC (Milestone 4). (See Section 9.2.)

3.5 Output Tape

DROPSA output consists of formatted data, listed on-line by the 1612 printer and/or on a listable magnetic tape.

3.5.1 Headers

XX TAPE PROCESSED BY DROPSA

where XX = process tape type: BB, FS, or R.

3.5.1.1 Bird Buffer Simulated Data Input Tape

TAPE I.D. = _ _ _ _ _

STATION	VEHICLE NO.	REVOLUTION NO.	PREPASS OPTION	TRK COMPUTER NO.	TLM COMPUTER NO.	TLM MODE
XXXXXXXX	XXXX	XXXX.X	X	X	X	XXXX
(BCD)	(BCD)	(BCD)	(O C T A L)

3.5.1.2 1604 Transfer Tape for Flight Support Simulation

BB-1604 TRANSFER DATA

STATION	VEHICLE NO.	ANTENNA1	DELTA		DELTA REVOLUTION		DATE		
			T1	ANTENNA2	T2	NO.	XX	XXX	XXX
XXXXXXXX	XXX	XXXXXXXX	XXX	XXXXXXXX	XXX	XXX.X	XX	XXX	XXX
(BCD)	(BCD)	(BCD)	(DEC.)	(BCD)	(DEC.)	(BCD)	(DAY	MO.	YR.)
							TIME-A.M.	(or)	
							P.M.		

3.5.2 Messages

DROPSA references the following modules to process, format, and output the message data:

- a. SOLVET--site-on-line and vehicle time messages. See TM-(L)-734/018/00 (Section 9.4) for the output message formats.
- b. STEXT--text and status/alarm messages. See TM-(L)-734/019/00 (Section 9.5) for the output message formats.
- c. STRK--tracking message. See TM-(L)-734/021/00 (Section 9.6) for the output message formats.
- d. SOCT--octal dump of other messages. See TM-(L)-734/020/00 (Section 9.7) for the output message format.

3.6 Jump Key Settings

SLJ Key 2 is used for error recovery action (See Sections 3.2.2, 3.2.3, and 3.2.6).

4.0 METHOD

The system is brought into the computer from the augmentation SUM Master Tape by the Utility Control Program. Initializations are performed and status of the equipment to be used is checked. The request cards are read into core and checked for correct format and legal request type. Table MODTAB

is used for legality checking the request cards (see Appendix B). A schedule is prepared containing the legal message types requested for listing and the address of the module (see Sections 9.4, 9.5, 9.6, and 9.7) which will reduce and list the data for each message type requested. Card reading terminates when a "HALT" card is read. If 30 cards are read without encountering a terminal card, these 30 requests are processed; then the succeeding request cards are read, checked, and processed in the same manner.

DROPSA references its subroutine, SDRP (see Appendix A), to read the input tape and extract and process the requested message data.

All tapes are rewound with interlock at the completion of the run.

5.0 RESTRICTIONS

5.1 Equipment

Three 1607 tape units.

On-line printer.

Card reader.

5.2 Subroutines

DROPSA utilizes the following subroutines contained on the augmentation SUM Master Tape:

TAPE	SOCT
EOT	STRK
INPUT	STEXT
OUTPUT	SOLVET
OUTERR	

5.3 Output Volume

The amount of data listed by DROPSA is dependent upon the amount of data on the input tape which is requested for listing.

5.4 Reference Pool Items

The following Reference Pool items are used:

ABCD	SBCD
MOBCD	TTTT

5.5 Input Tape

End of good data on the process tapes must be indicated to DROPSA in the following way:

- a. Two consecutive end-of-file records on the 1604 Transfer Tape,
- b. One end-of-file record on the 160-A Simulation Tape,
- c. One end-of-file record or four illegal records on the Recording Tape.

6.0 TIMING

DROPSA requires approximately one minute to process all messages contained on a 300 record input tape.

7.0 STORAGE REQUIREMENTS

	<u>Decimal</u>	<u>Octal</u>
Main Program	606	1134
Tables and Constants	425	651
Subroutines	<u>2439</u>	<u>4607</u>
Total Storage Requirement	3470	6614

8.0 VALIDATION TESTS

8.1 Test 1

8.1.1 Input

All (26_{10}) legal message types (1-32₈) were requested from the card reader for processing from a Bird Buffer Recording Tape with no end-of-file

record. Each message type was requested with an individual card. Tape Unit 7 was requested for output.

8.1.2 Results

All data was processed correctly and the data was listed as presented in Section 3.5.

8.2 Test 2

8.2.1 Input

The input for this test was the same as that used for Test 1, with the following exceptions:

- a. The input tape was placed on a different unit, and
- b. A LIST request card was used, rather than an individual card for each message type.

8.2.2 Results

Same as for Test 1.

8.3 Test 3

8.3.1 Input

All legal message types were requested for listing, except message type 14_g, tracking data. The control deck, which consisted of more than 30 request cards (some of the request cards were duplicated), was prestored on tape to check out the tape input option. A 1604 Transfer Tape with three files of good data was used as the process tape. Both on- and off-line output was requested.

8.3.2 Results

Same as Test 1.

8.4 Test 4

8.4.1 Input

The control deck, which consisted of 30 request cards with at least one request for each legal message type, was read from the card reader. A 160-A Simulated Data Tape was used as the process tape. Only tape output was requested.

8.4.1 Results

Same as Test 1.

8.5 Error Checks

The following errors were built into a series of DROPSA runs:

- a. Illegal request code,
- b. Incorrect request card format,
- c. Select error, and
- d. Illegal tape type.

All possible recovery actions were exercised for these errors and were found to operate correctly. See Section 3.2 for a more complete description of these errors and the possible recovery actions.

9.0 REFERENCES

9.1 CPL Catalogue Number 75919

9.2 TM-(L)-734/015/00, Computer Program Design Specifications for the Simulation of the Augmented SCF Environment at the STA and CPDC, System Development Corporation, 21 November 1962.

9.3 TM-(L)-834/000/01 and 01A, Bird Buffer Combined Milestone 3 and 4, System Development Corporation, 17 December 1962.

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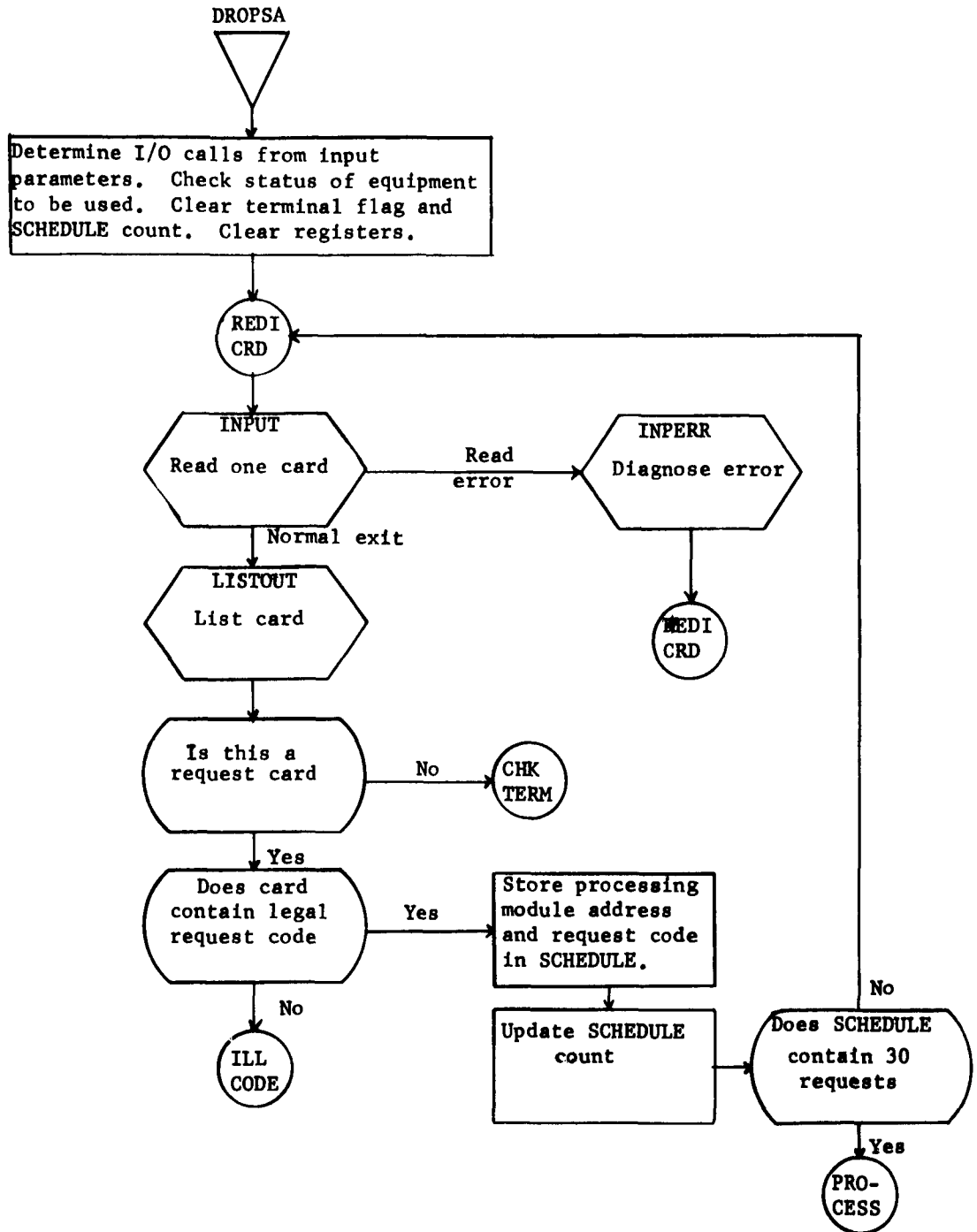
9.4 TM-(L)-734/018/00, Site-On-Line and Vehicle Time Message Processor (SOLVET), System Development Corporation, 15 March 1963.

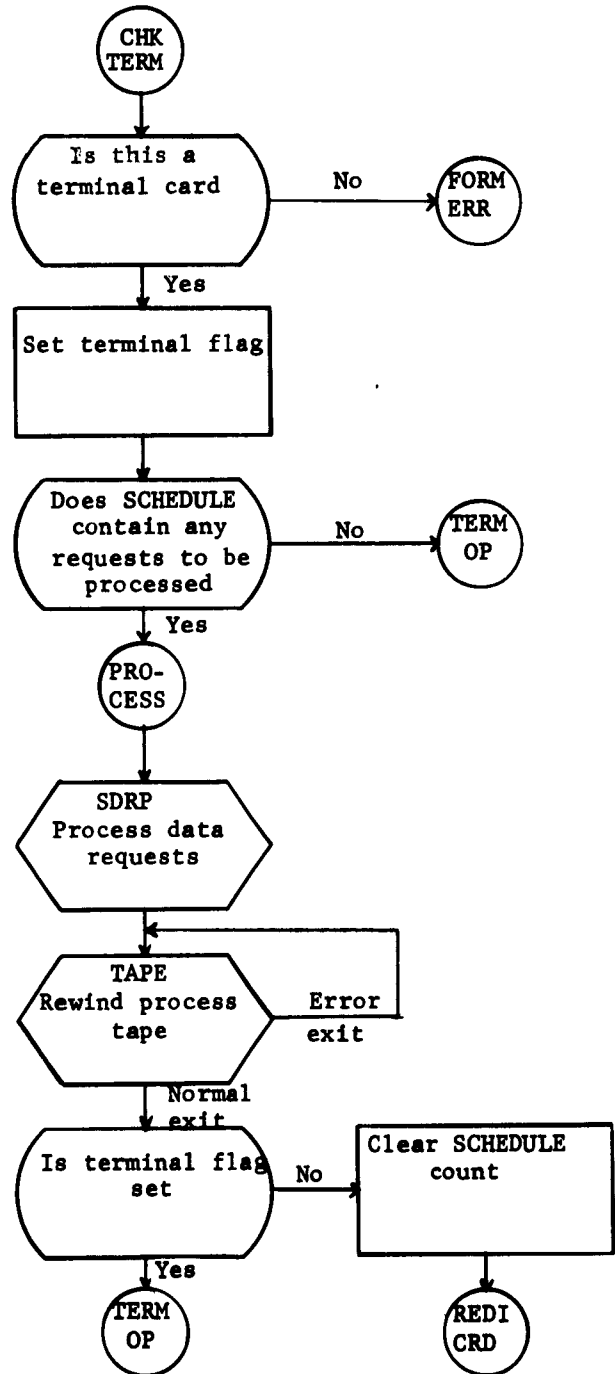
9.5 TM-(L)-734/019/00, Text and Status/Alarm Message Processor (STEXT), System Development Corporation, 12 March 1963.

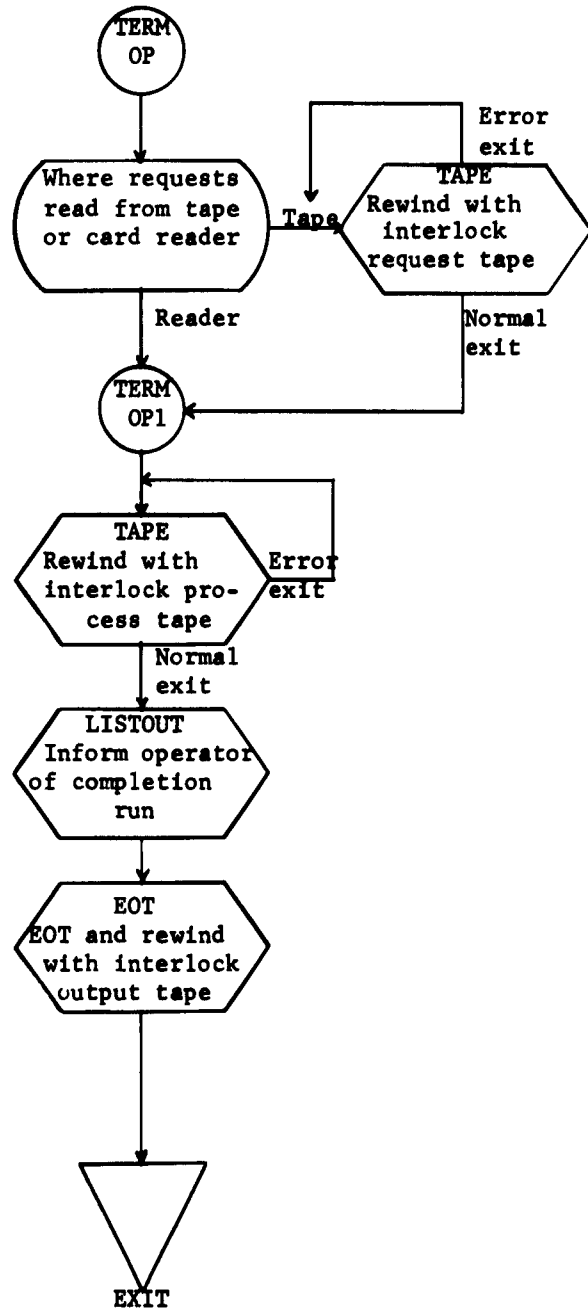
9.6 TM-(L)-734/021/00, Tracking Report Processor (STRK), System Development Corporation, 13 March 1963.

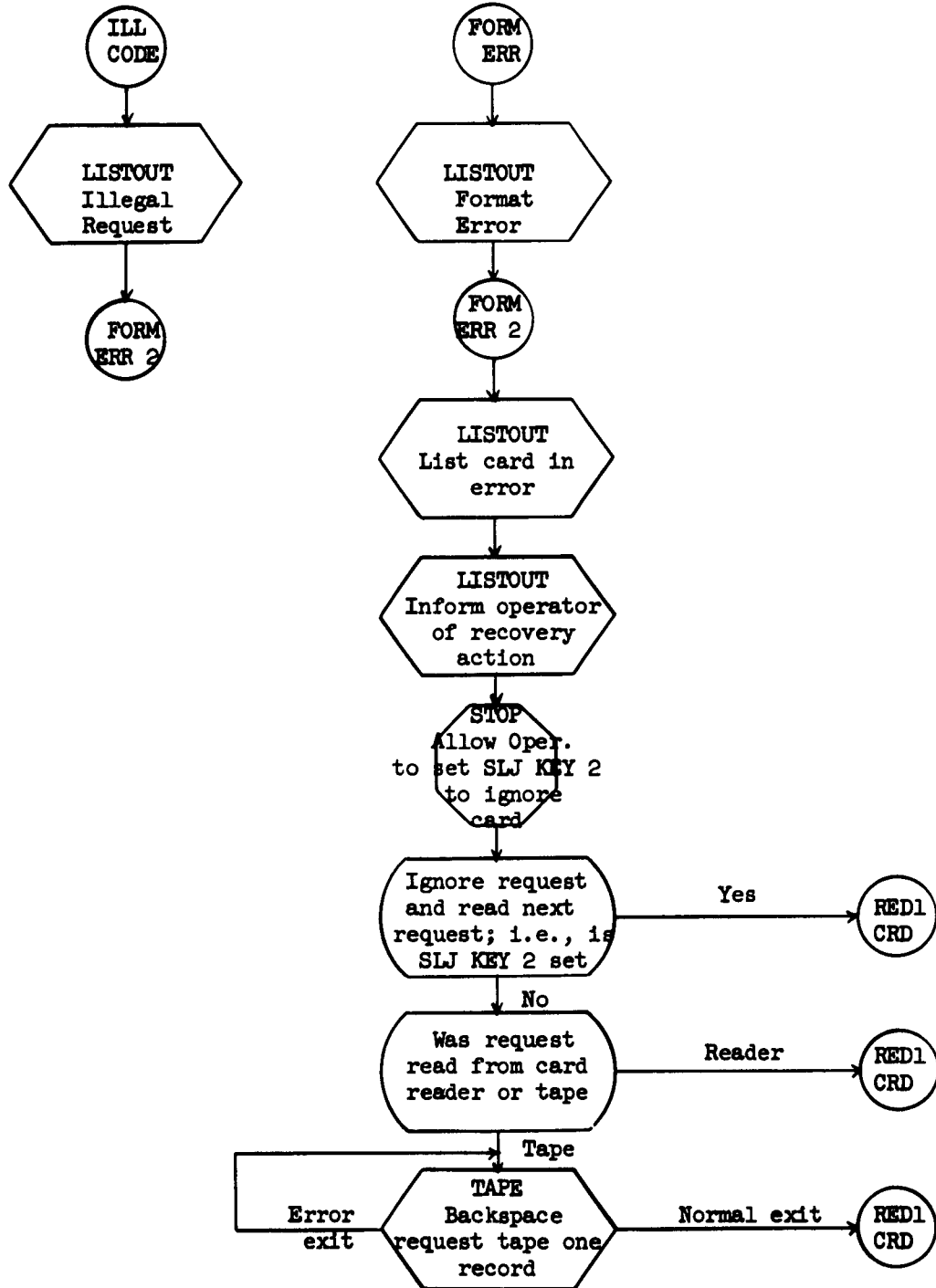
9.7 TM-(L)-734/020/00, Octal Dump for Simulation Augmentation Messages (SOCT), System Development Corporation, 15 March 1963.

10.0 FLOW DIAGRAM









APPENDIX A

1.0 CONTENTS

This appendix contains descriptions and flow diagrams of subroutines which were programmed as an integral part of DROPSA.

1.1 Name

CONZRO

1.1.1 Description

This routine checks the contents of the A register for leading BCD and octal zeroes (12_8 and 00) which are converted to BCD blanks (20_8), and imbedded octal zeroes which are converted to BCD zeroes (12_8). The result is left in the A register.

1.1.2 Calling Sequence

A register = data word to be checked.

L	NOF		
	SLJ	4	CONZRO

1.1.3 Registers Destroyed

None

1.1.4 Subroutines Used

None

1.1.5 Flow Diagram (See Page 25)

1.2 Name

INPERR

1.2.1 Description

This routine diagnoses request card read errors incurred by the INPUT utility routine, prints appropriate error comments on-line, and executes recovery action initiated by the operator.

1.2.2 Calling Sequence

A register = failing format specification

Q register = error code

L	SLJ	4	INPERR
	ZRØ	0	P ₁

where: P₁ = 0 if input is from card reader.

= tape unit number if input is from a prestored tape.

1.2.3 Registers Destroyed

A register

Q register

Index registers 2, 3, and 4.

1.2.4 Subroutines Used

LISTOUT
TAPE
OUTPUT
OUTERR

1.2.5 Flow Diagram (See Page 26)

1.3 Name

LISTOUT

1.3.1 Description

This routine lists a line of data on tape and/or on the printer, ejects a page if the line counter indicates a full page of data, and updates the line counter.

1.3.2 Calling Sequence

A register + index register 2 = base address of data line to be listed.
 Index register 6 = number of lines previously listed on this page.

L	SLJ	4	LISTOUT
	P ₁	0	1000P ₂ + P ₃

where:

P₁ = 00 if this is not an on-line comment.

= 01 if this is an on-line comment. (If the on-line output option is requested on the DROPSA function card, then this parameter is ignored.)

P₂ = number of words to be listed.

P₃ = rightmost print position.

1.3.3 Registers Destroyed

A register

Q register

1.3.4 Subroutines Used

OUTPUT
 OUTERR

1.3.5 Flow Diagram (See Page 30)

1.4 Name

SDRP

1.4.1 Description

This routine reads the input tape, extracts, and processes the requested message types.

1.4.2 Calling Sequence

L	SLJ	4	SDRP
	ZRØ	0	0
L+1	O1	CN	TN
	ZRØ	UN	CC
L+2		P ₁	

where:

- CN = channel number of output tape.
- TN = tape unit number of output tape.
- UN = cabinet number of output tape.
- CC = 12₈ (double space).
- P₁ = 0 for output on tape only.
- = 13₈ for output on tape and printer.

1.4.3 Registers Destroyed

A register

Q register

Index registers 2, 3, 4, 5, and 6.

1.4.4 Subroutines Used

LISTOUT	CONZRO	STRK	OUTPUT
TAPE	TYPEPCD	STEXT	OUTERR
UNON	SOCT	SOLVET	

1.4.5 Flow Diagram (See Page 31)

1.5 Name

TYPEBCD

1.5.1 Description

This routine converts the contents of the A register from 161 typewriter code to BCD. Leading zeroes are converted to BCD blanks. The result is left in the A register.

1.5.2 Calling Sequence

A register = data word in 161 typewriter code to be converted to BCD.

L	NOP		
	SLJ	4	TYPEBCD

1.5.3 Registers Destroyed

Q register

1.5.4 Subroutines Used

None

1.5.5 Flow Diagram (See Page 41)

1.6 Name

UNON

1.6.1 Description

If the A register is filled with BCD Blanks, the BCD configuration for "UNKNOWN" is stored, right justified, in the A register. Otherwise, the value is simply right justified.

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1.6.2 Calling Sequence

A register = data word in BCD.

L	NOF		
	SLJ	4	UNON

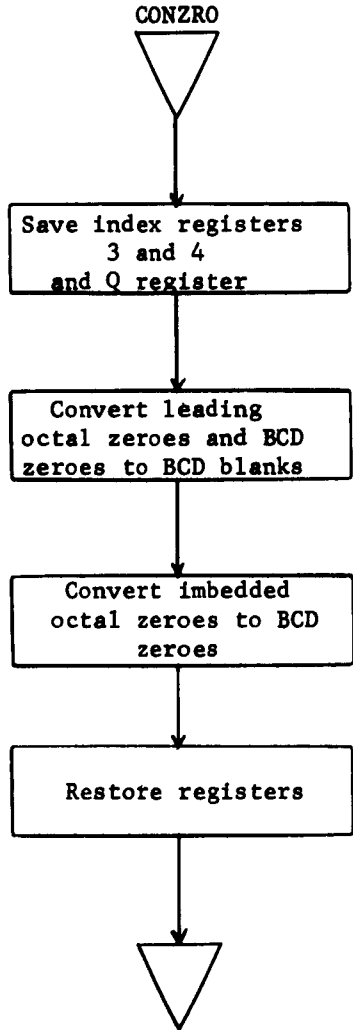
1.6.3 Registers Destroyed

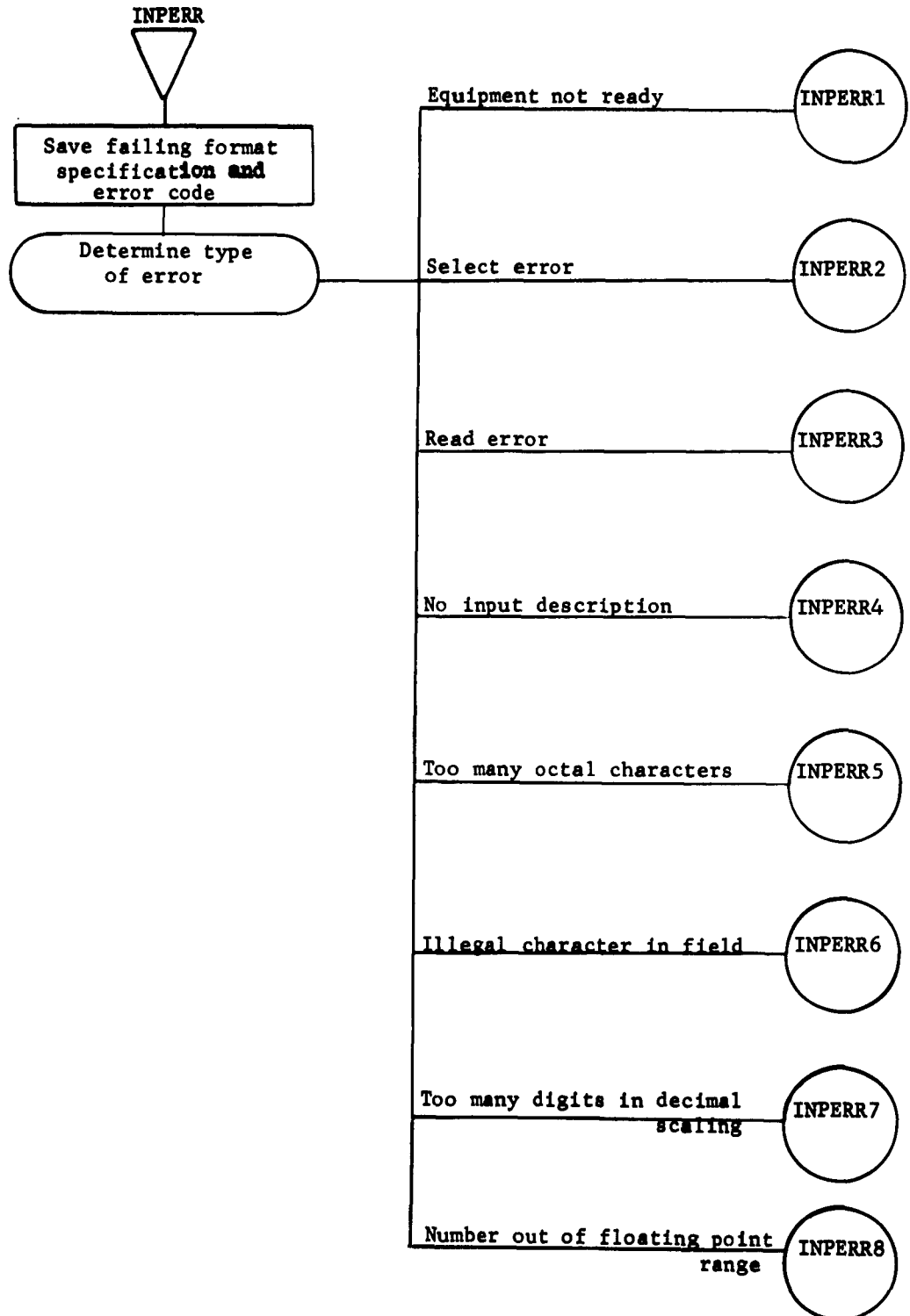
None

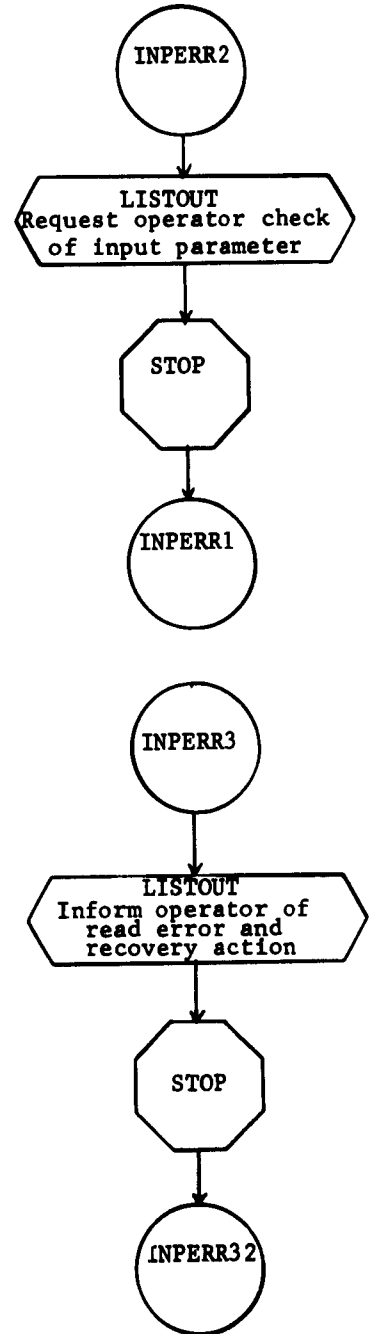
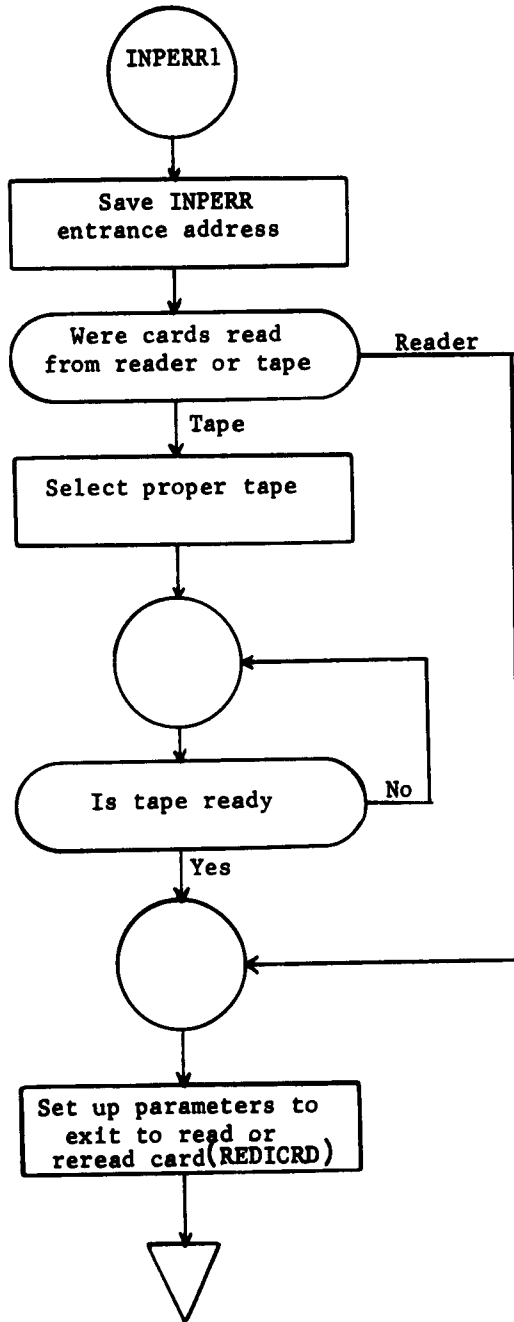
1.6.4 Subroutines Used

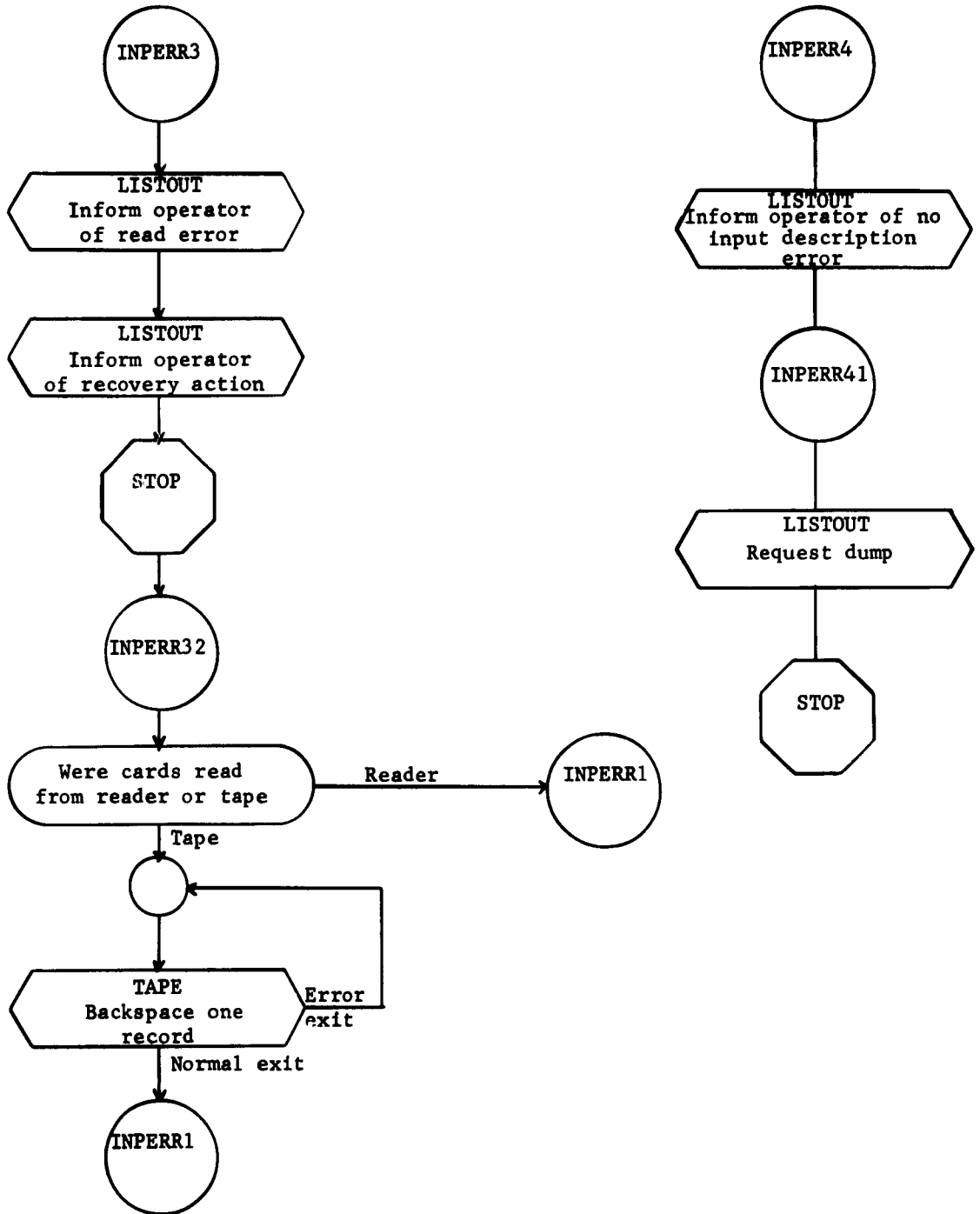
None

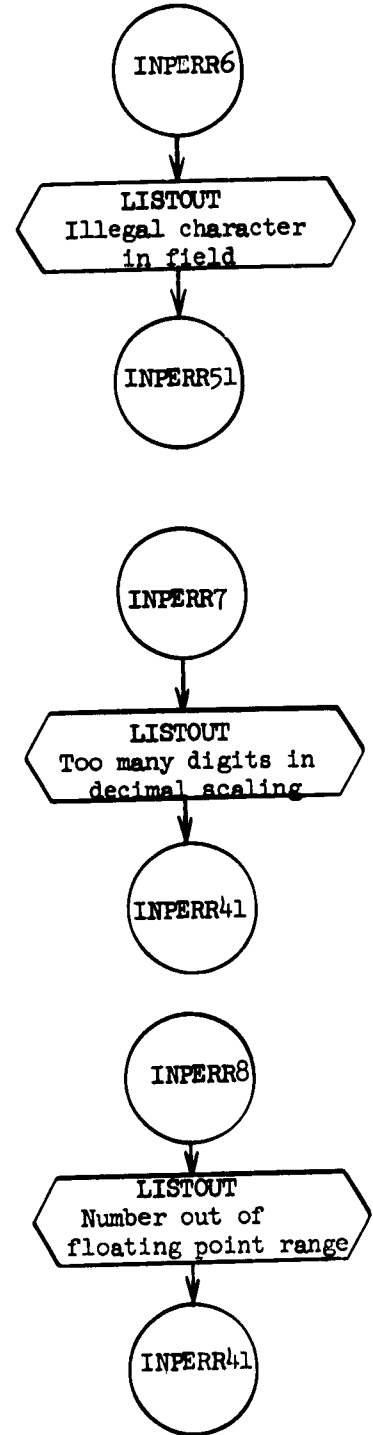
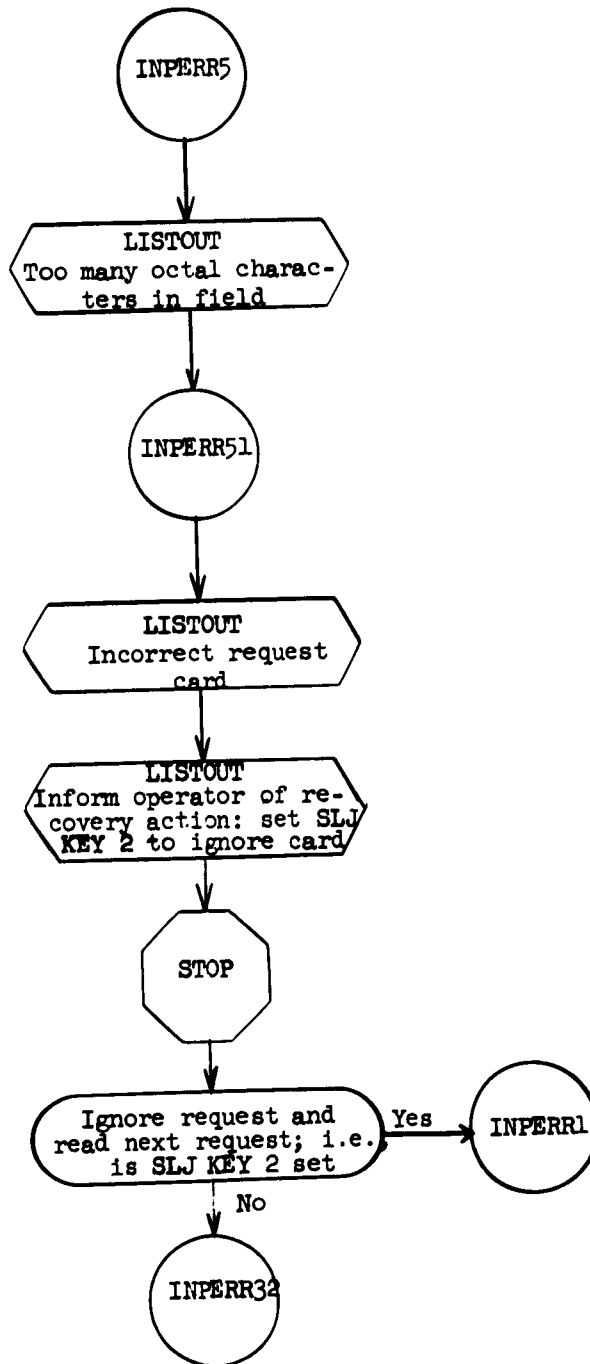
1.6.5 Flow Diagram (See Page 42)

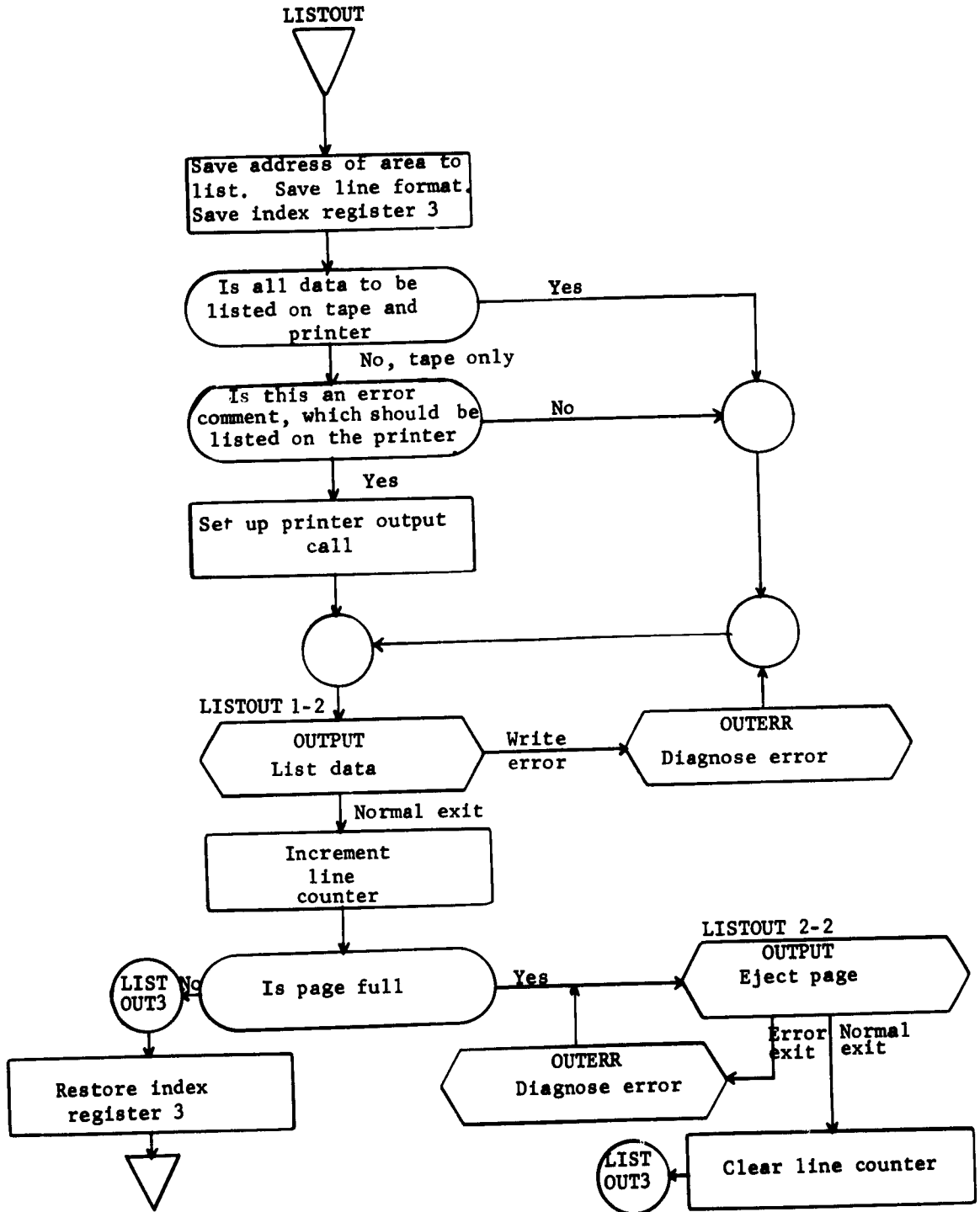


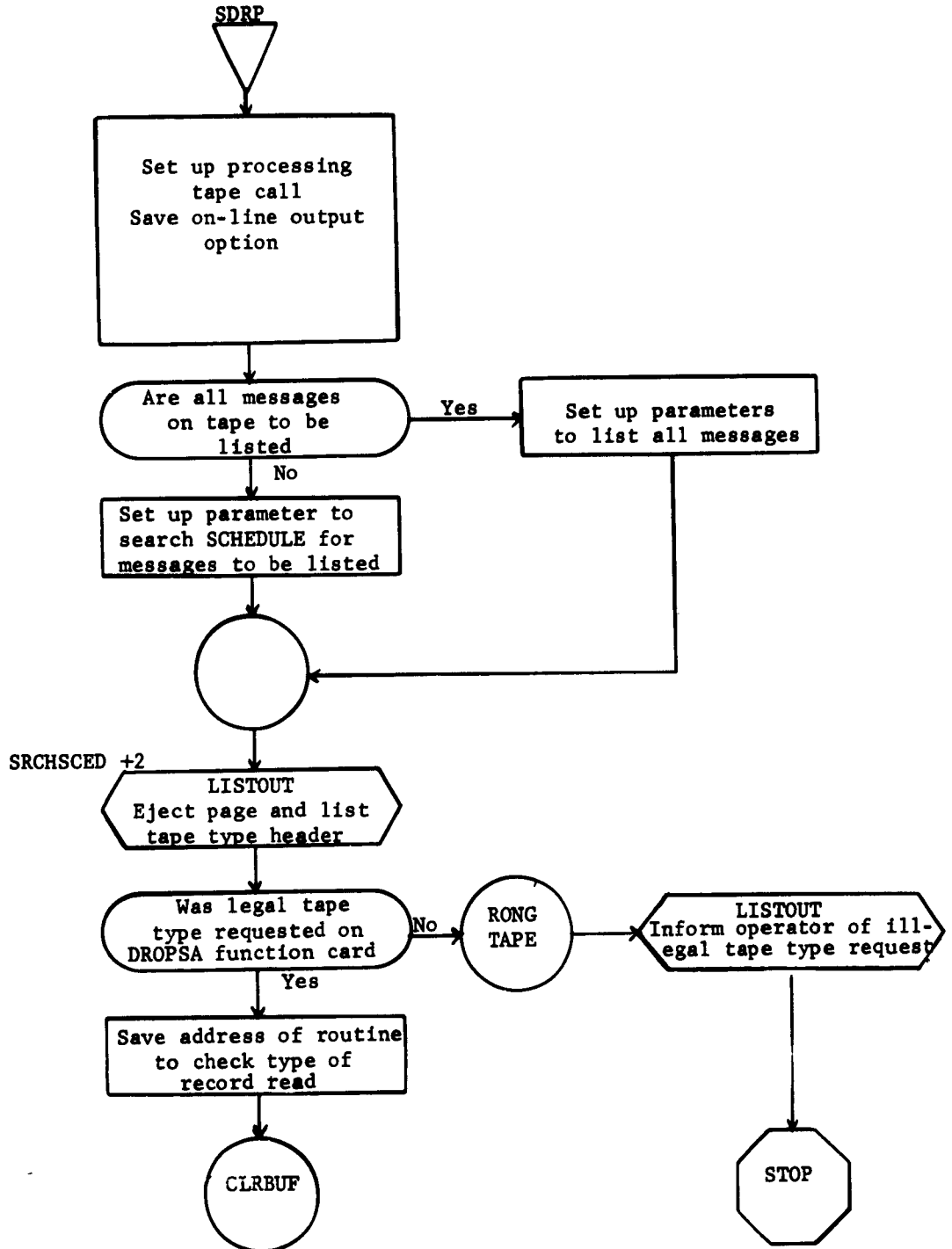


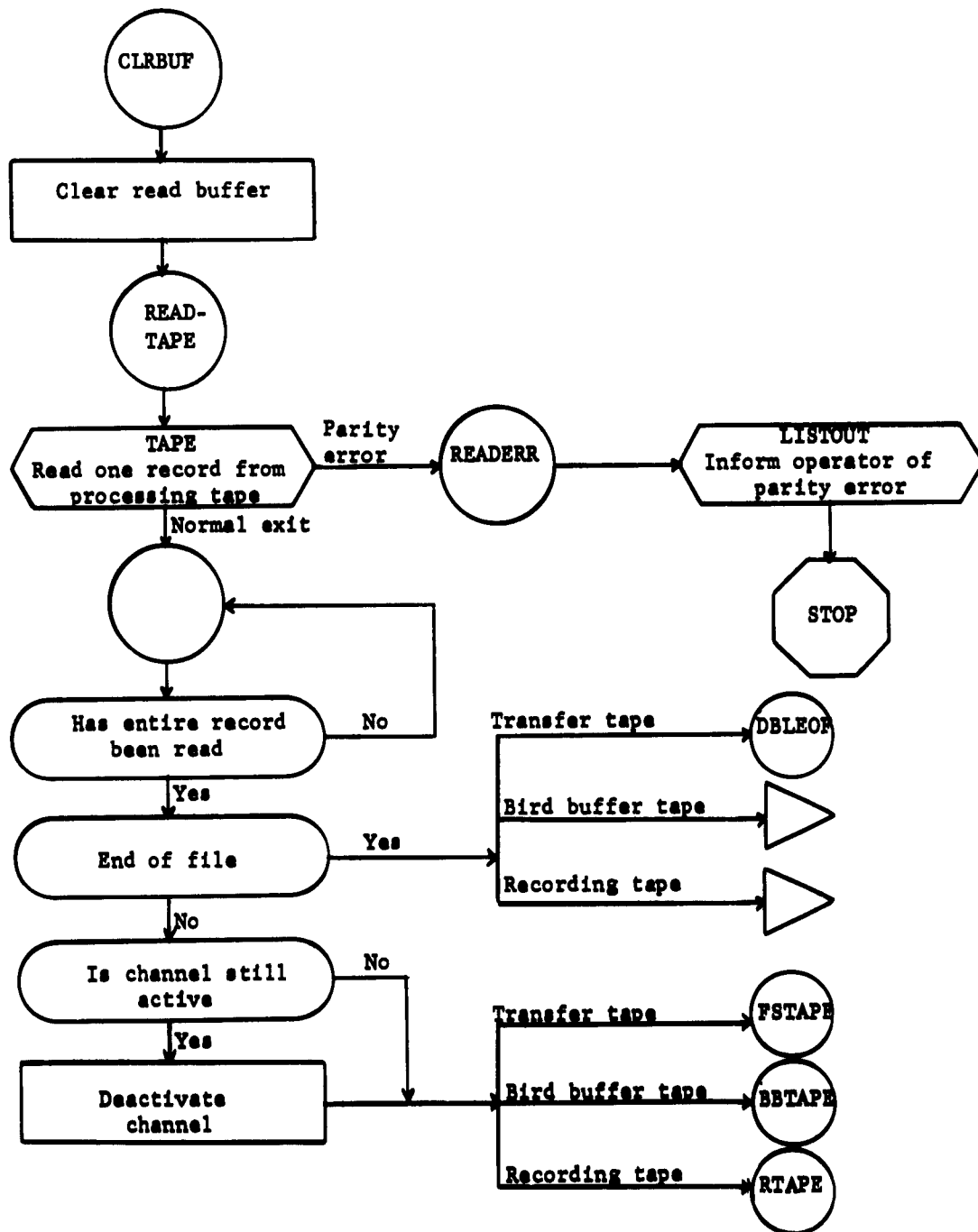


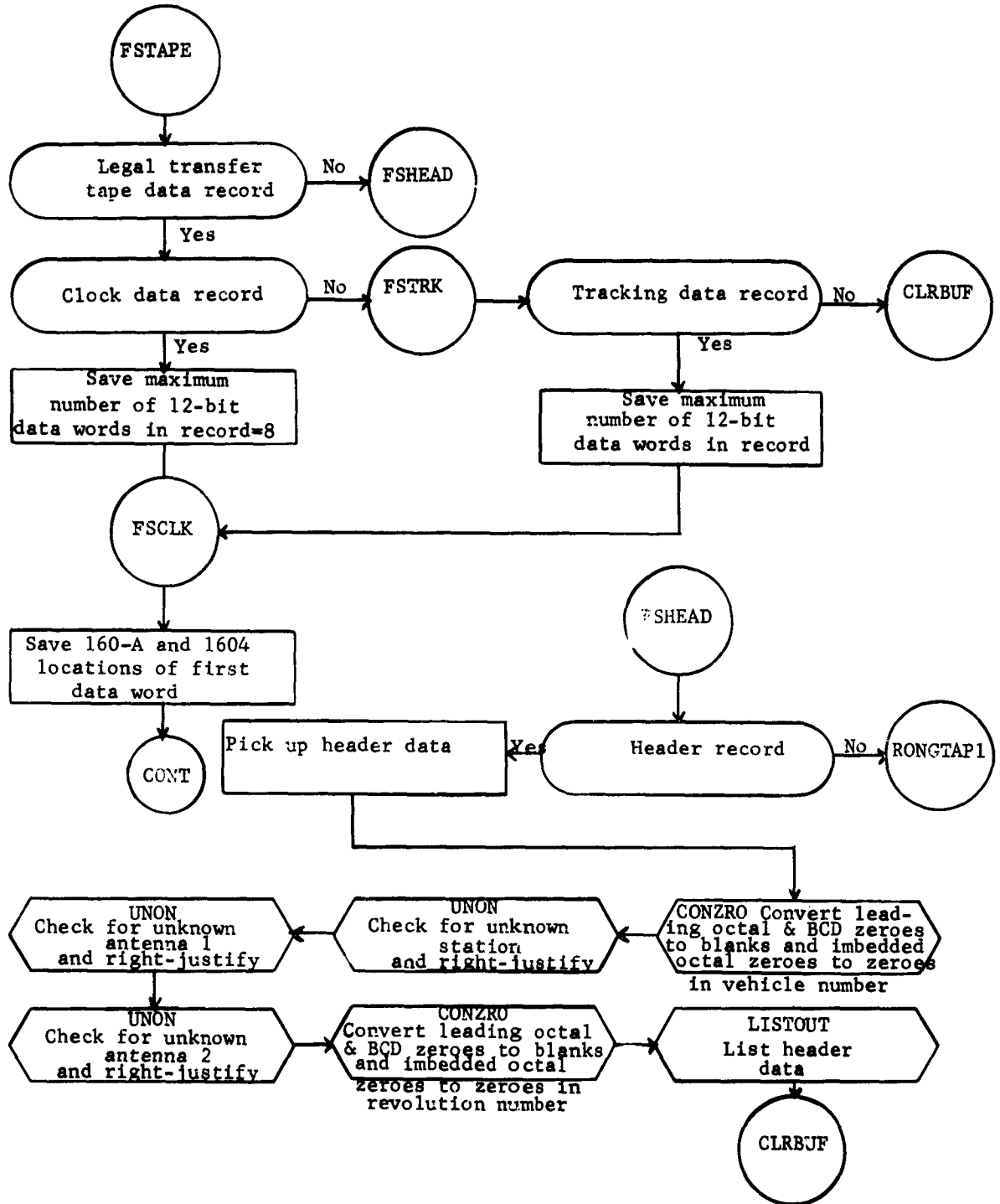


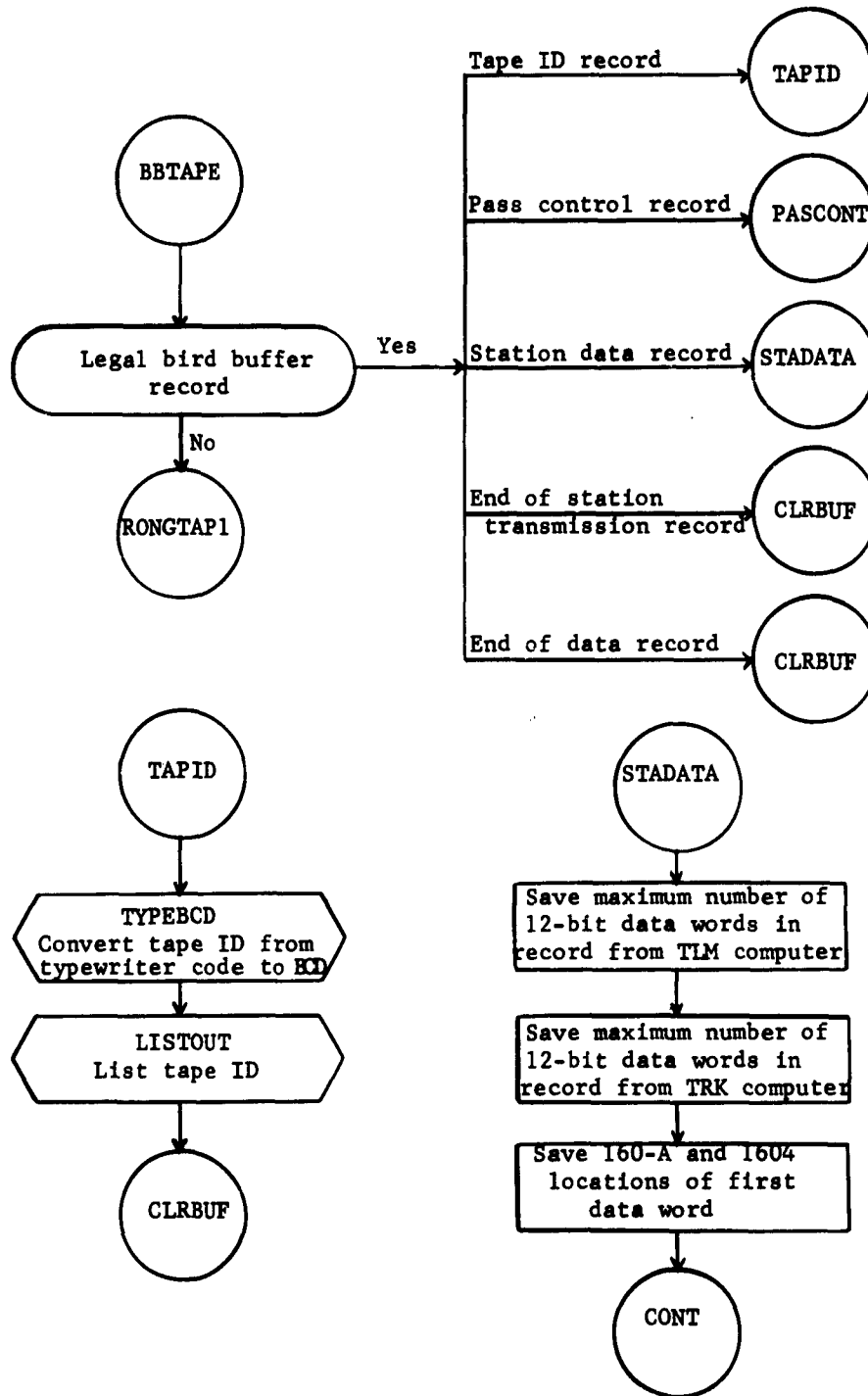


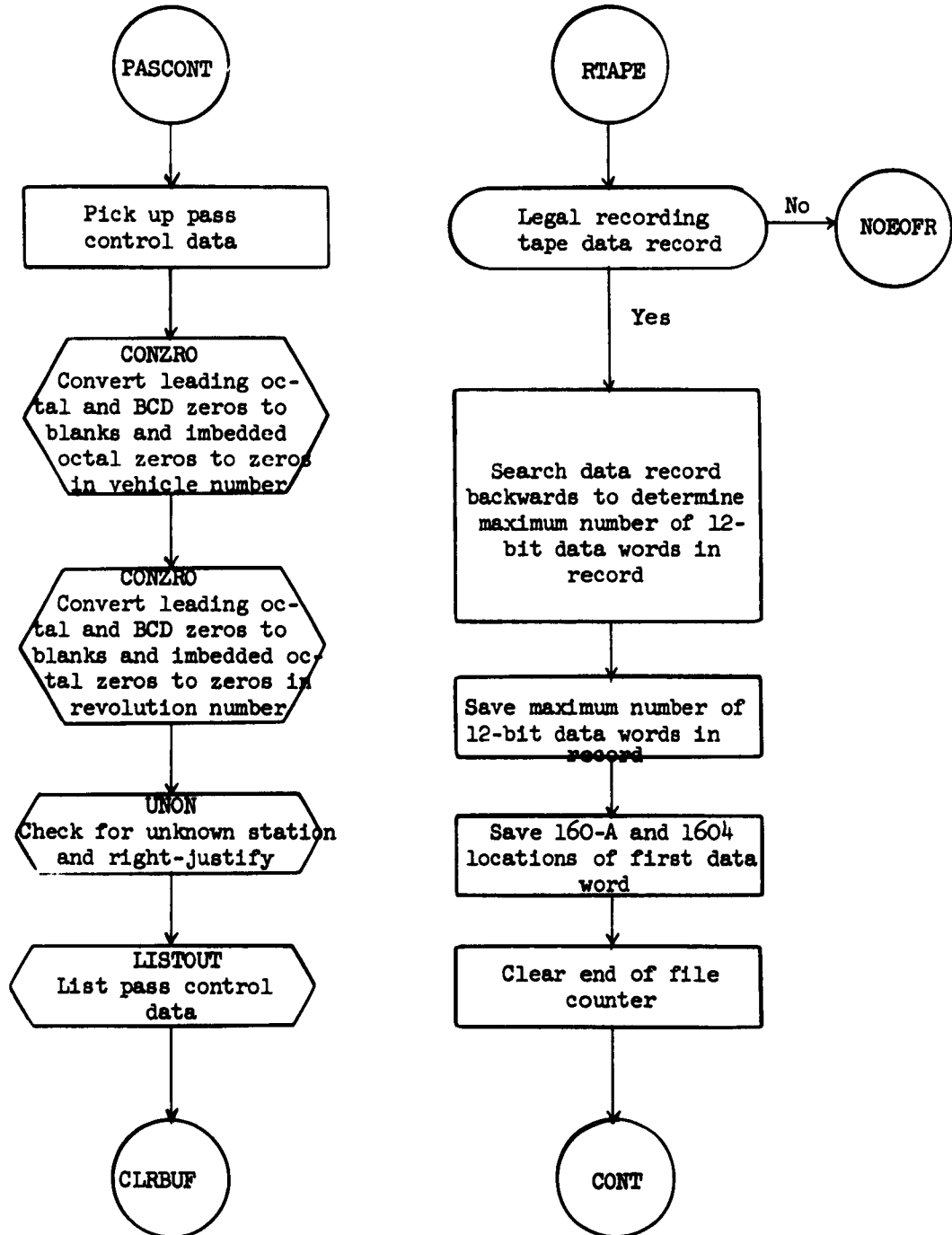


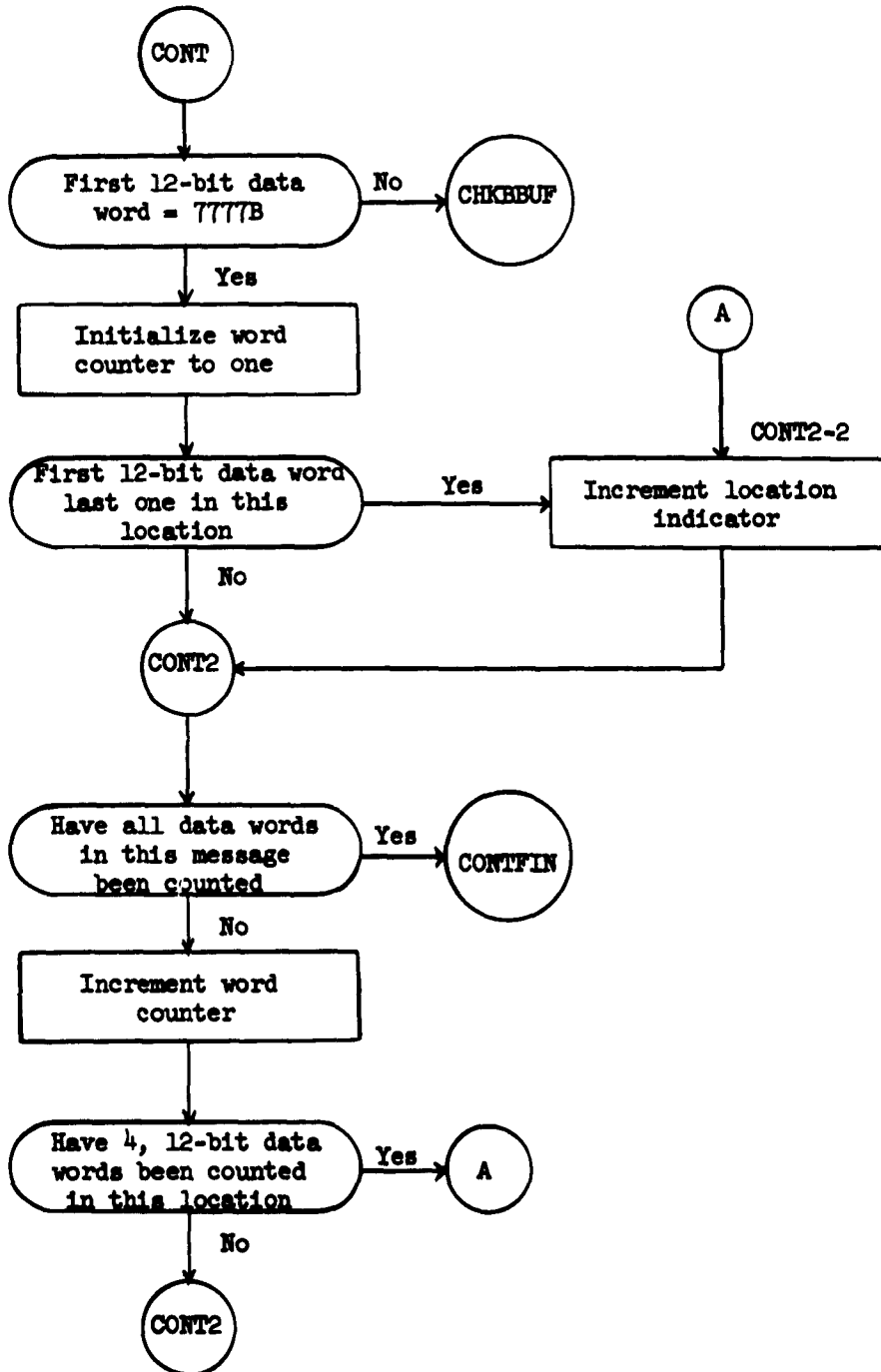


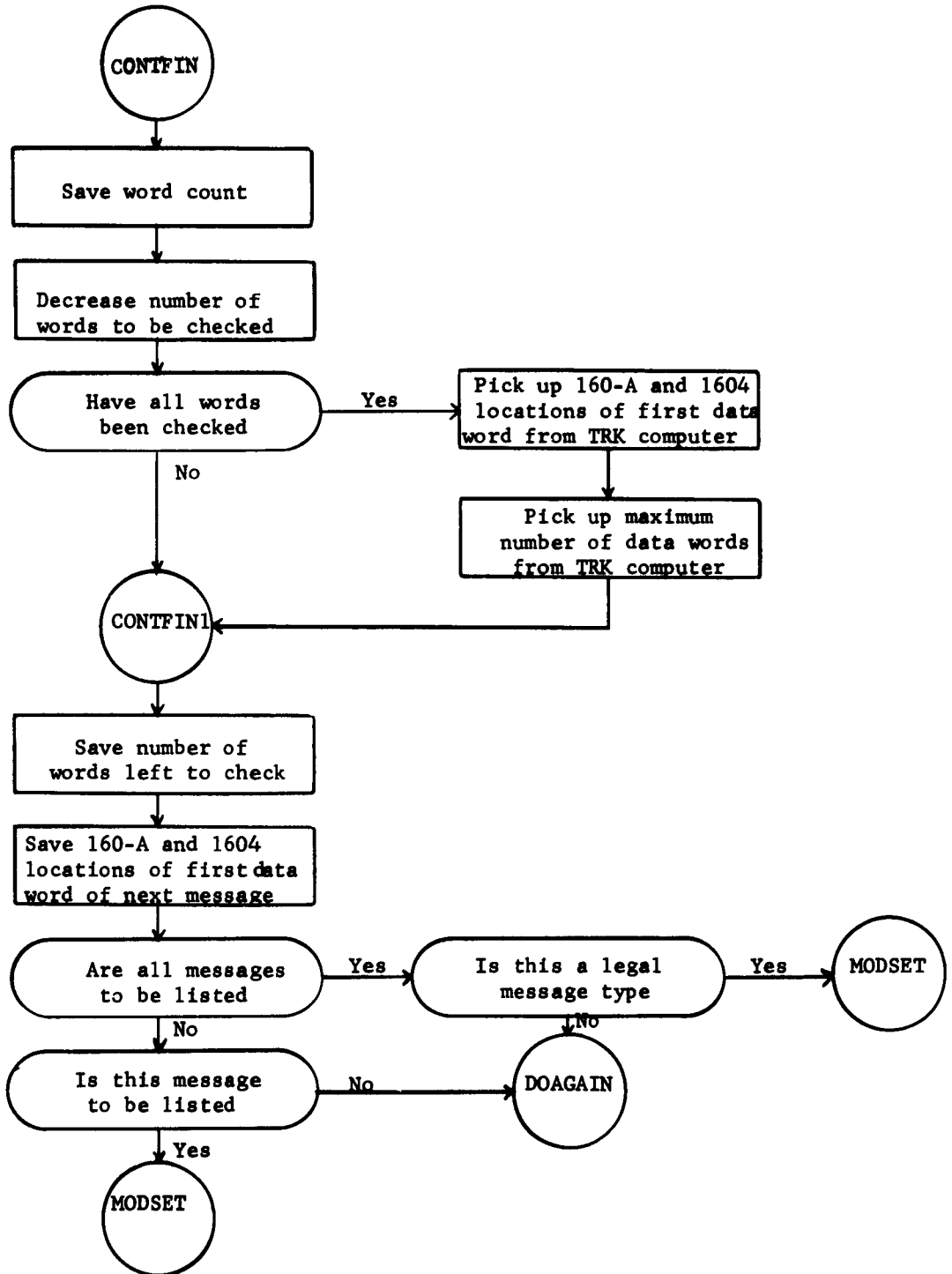


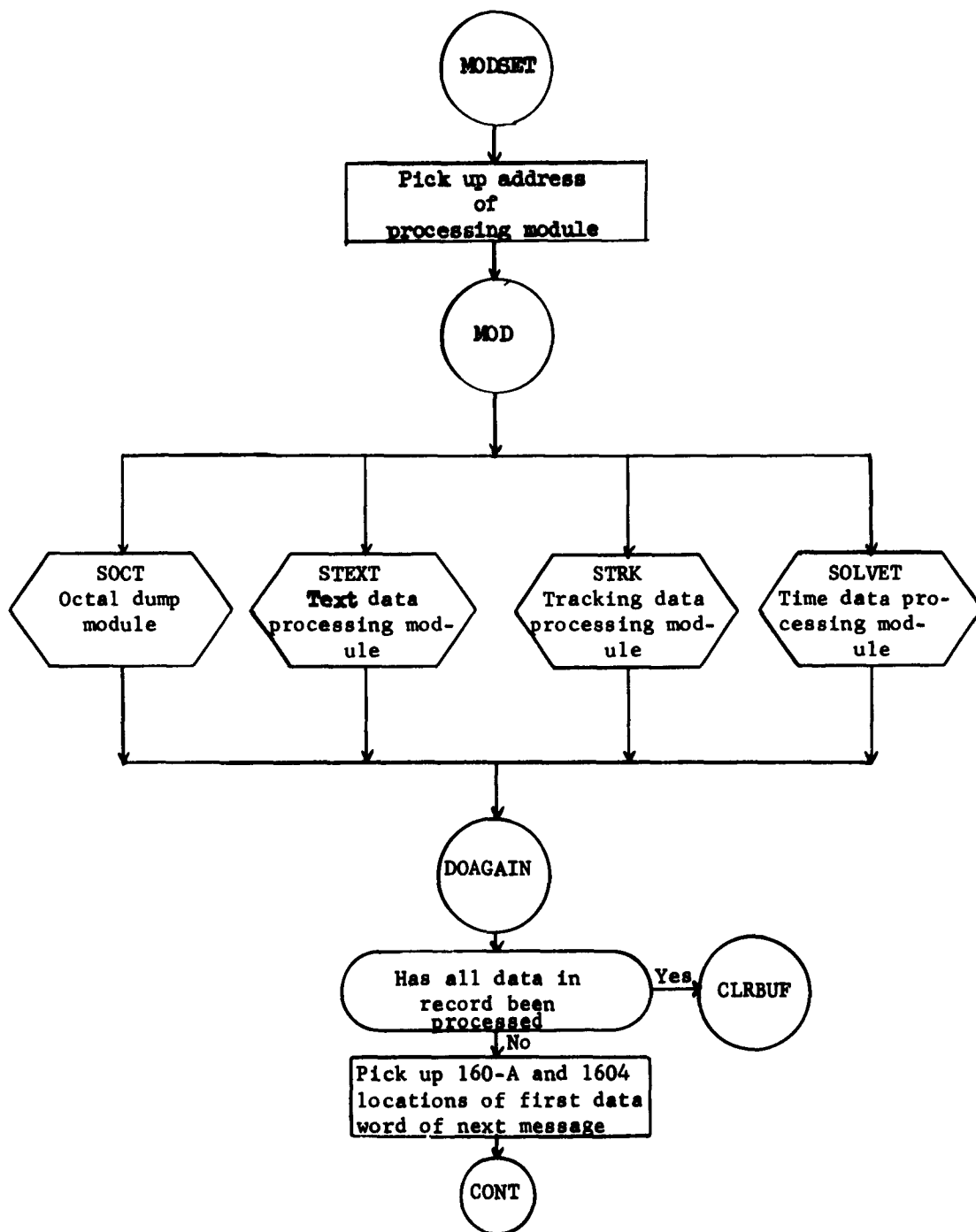


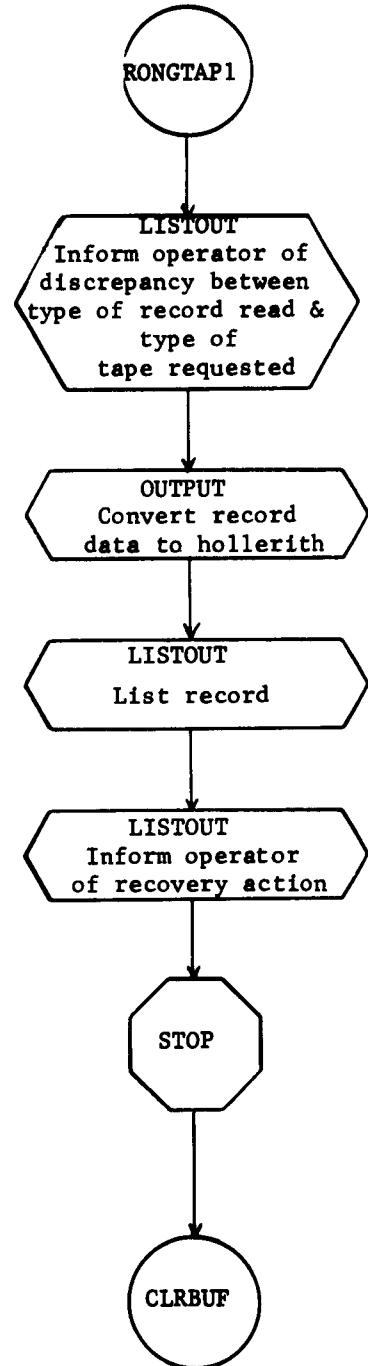
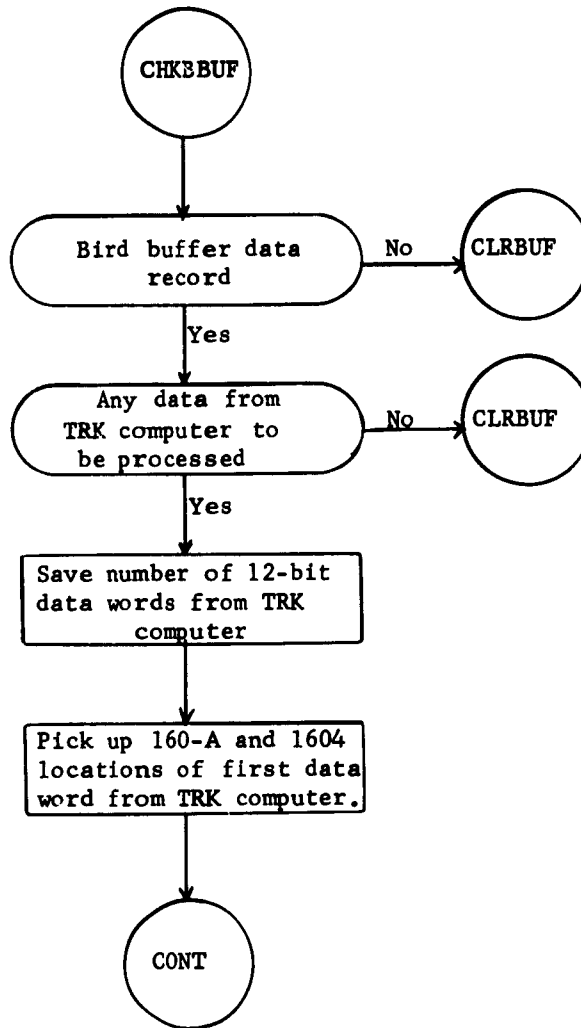


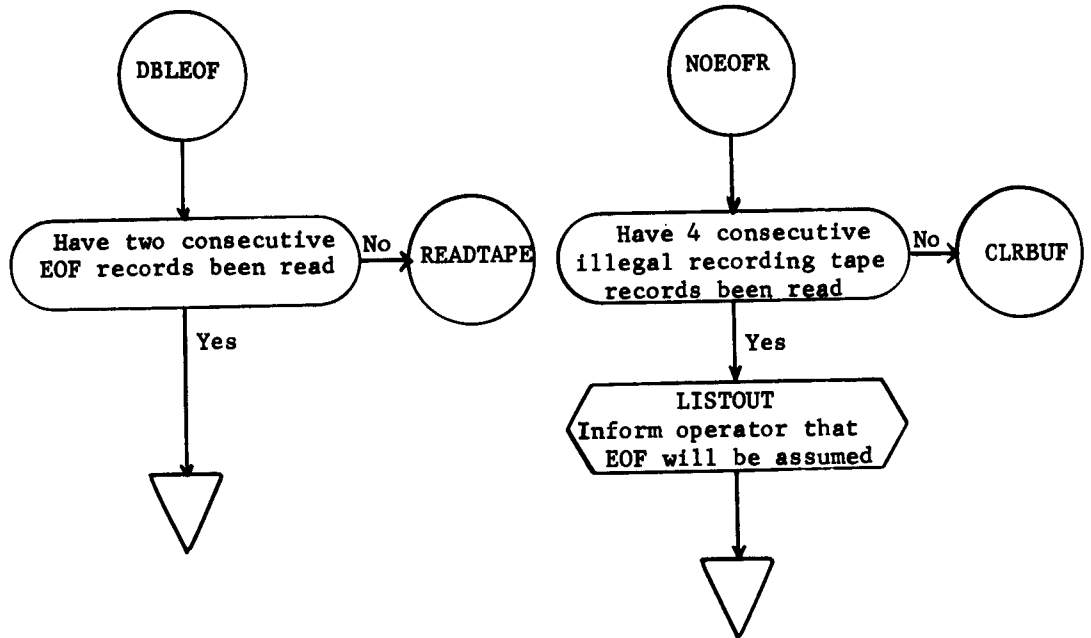


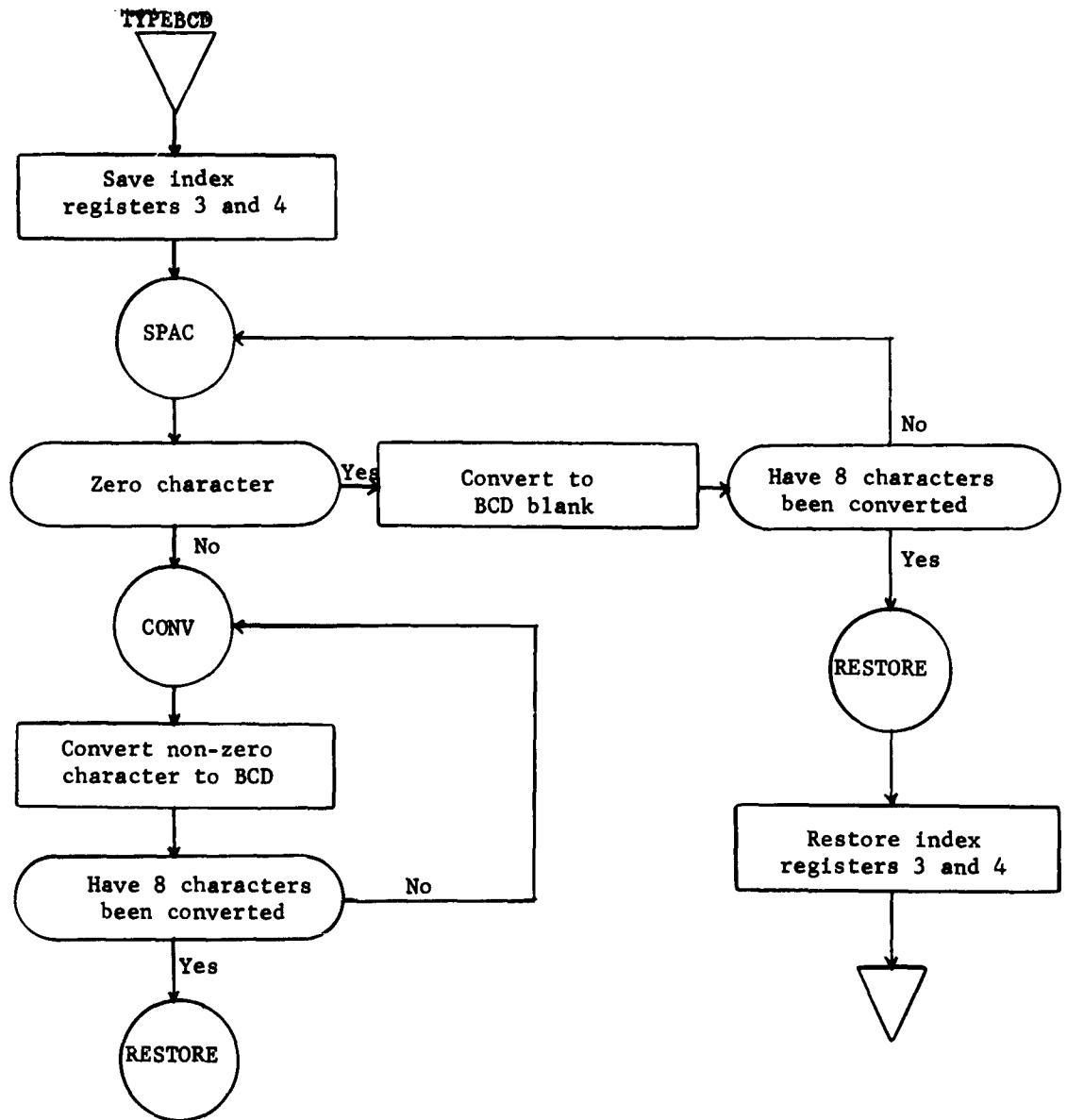








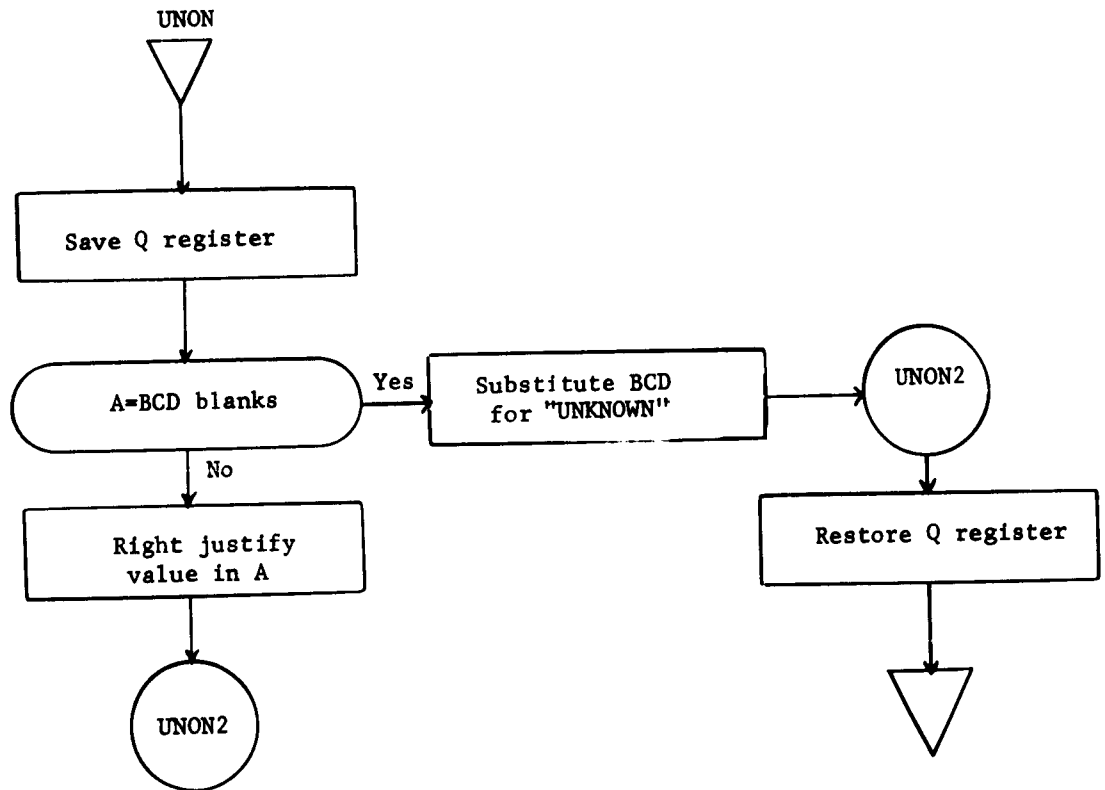




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APPENDIX B

1.0 The 26 message types listed in TM-(L)-834/000/01 and 01A (See Section 9.3) can be requested for listing. Table MODTAB in DROPSA contains the legal message types, 01-32 (octal), and the module address for processing each of the messages.

38	24	14	0
	Message Type		Processing Module Address

MODTAB Format

The following procedure can be used to modify this table in order to add or delete message types to be recognized by DROPSA:

- a. Modify the execution address of card number 137 to contain the total number of legal message types plus one.
- b. Modify table MODTAB:
 - 1) Delete Message Type - Remove the two cards containing the message type to be deleted and the name of its processing module.
 - 2) Add Message Type - Insert two cards containing the message type to be added and the name of its processing module.

1.1 **EXAMPLE 1:** Assume 25 legal message types.

Message Type 52₈, to be processed by the SOCT module, is to be added to MODTAB.

- a. Change card number 137 to read:

ENI 3 27

Index 3 now contains the modified number of legal message types +1.

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b. Add the following two cards to the end of MODTAB:

ZRØ	0	52B
ZRØ	0	SOCT

DROPSA will now recognize 52₈ as a legal message type.

1.2 **EXAMPLE 2:** Assume 25 legal message types.

Message types 1, 2, 3, 22₈, 23₈, 24₈, and 27₈ are to be deleted. All of these messages are processed by the SOCT module.

a. Change card number 137 to read:

ENI	3	19
-----	---	----

b. Delete the following cards from MODTAB:

ZRØ	0	1
ZRØ	0	SOCT
ZRØ	0	2
ZRØ	0	SOCT
ZRØ	0	3
ZRØ	0	SOCT
ZRØ	0	22B
ZRØ	0	SOCT
ZRØ	0	23B
ZRØ	0	SOCT
ZRØ	0	24B
ZRØ	0	SOCT
ZRØ	0	27B
ZRØ	0	SOCT

DROPSA will now reject requests for message types 1, 2, 3, 22₈, 23₈, 24₈, and 27₈.

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(3)

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<u>NAME</u>	<u>ROOM</u>
D. Reilly	24121
A. Robinson	24132
M. Rockwell	24086
J. Schroeder	24124
R. Scott	24110
C. Seacat	Sunnyvale
H. Seiden	22126
R. Shapiro	24110
S. Shoel	23007
R. Skelton	22152
N. Speer	24086
E. Stone	24058
M. Sweeney	25026
W. Jaber	22101
T. Tennant	27029
J. Thompson	24088
C. Toche	24121
R. Totschek	24120
A. Tucker	22109
A. Vorhaus	24076
M. Weinstock	22131
S. Weems	22109
G. West	Sunnyvale
G. P. West	22116
H. Williams	22110
G. Wilson	24124
M. Winsor	22156
J. Winter	24117
R. Wise	22085
J. Wong	Sunnyvale
C. Zubris	24075
AFCPL	(5) 14059

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<u>NAME</u>	<u>ROOM</u>	<u>NAME</u>	<u>ROOM</u>
D. Allfree	24083	J. Haake	22153
J. Aldana	22131	D. Henley	22094
L. Alexander	22134	C. Hill	22101
N. Alperin	22153	J. Hillhouse	22078
E. Armstrong	24123	H. Holzman	24065
		G. Hudson	24126
C. Becerra	24082		
D. Biggar	24118	R. Johnson	22125
R. Bilek	23007		
L. Brenton	24103	P. Kastama	22076
B. Burke	24086	M. Katz	25014
R. Burke	22158	F. Kayser	24109
R. Busch	22088	J. Keddy	24105
C. Bustya	22134	D. Key	23013
		R. Keyes	24073
M. Champaign	22152	J. Kneemeyer	22088
C. Chiadini	24091	R. Knight	22119
B. Ciaccia	24082	L. Kolbo	22155
R. Clements	22109		
B. Cline	24127	J. Laughlin	24073
J. Cogley	22156	J. LaVine	24093
L. Conger	24088	H. Lewis	23010
P. Cooley	24086	J. Little	24088
D. Crum	24105	F. Long	22156
		J. Lytton	24077
L. DeCuir	24053		
W. Derango	24082	G. Madrid	22081
G. Dexter	25016	G. Mahon	24089
R. Disse	23014	J. Marioni	24076
G. Dobbs	22116	R. Marshall	22160
W. Dobrusky	24065	W. Martin	24127
R. Dugas	22125	J. McKeown	23013
		J. Milanese	22155
R. Ellis	22131	J. Munson	22087
R. Ericksen	22113	G. Myers	22095
H. Feldstein	24128	P. Nelson	24075
C. Francis	25013	J. Ng	22077
H. Franks	24122	L. Ngou	24127
R. Frey	22078		
L. Friedman	22122	M. Olson	22161
S. Gardner	25026	L. Padgett	24110
V. Gergen	25014	E. Patin	Sunnyvale
I. Greenwald	22094	D. Persico	24083
		T. Polk	24113

UNCLASSIFIED

System Development Corporation,
Santa Monica, California
1604 SIMULATION PROGRAM DESCRIPTIONS
MILESTONE 11 DATA REDUCTION AND OUTPUT
PROCESSING SYSTEM CONTROL PROGRAM FOR
AUGMENTATION (DROPSA).
Scientific rept., TM(L)-734/017/00, by
J. G. Hillhouse. 15 March 1963, 44p.
(Contract AF 19(628)-1648, Space Systems
Division Program, for Space Systems
Division, AFSC)

Unclassified report

DESCRIPTORS: Programming (Computers).
Satellite Networks.

UNCLASSIFIED

Reports that DROPSA (Data Reduction
and Output Processing System Control
Program for Augmentation) is used to
reduce data on the two simulated
data input tapes written by the SIPSA
(Simulated Input Preparation System for
Augmentation) system and the recording
tape produced by SIMSTW (Augmented
Tracking Station Simulation Program).

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