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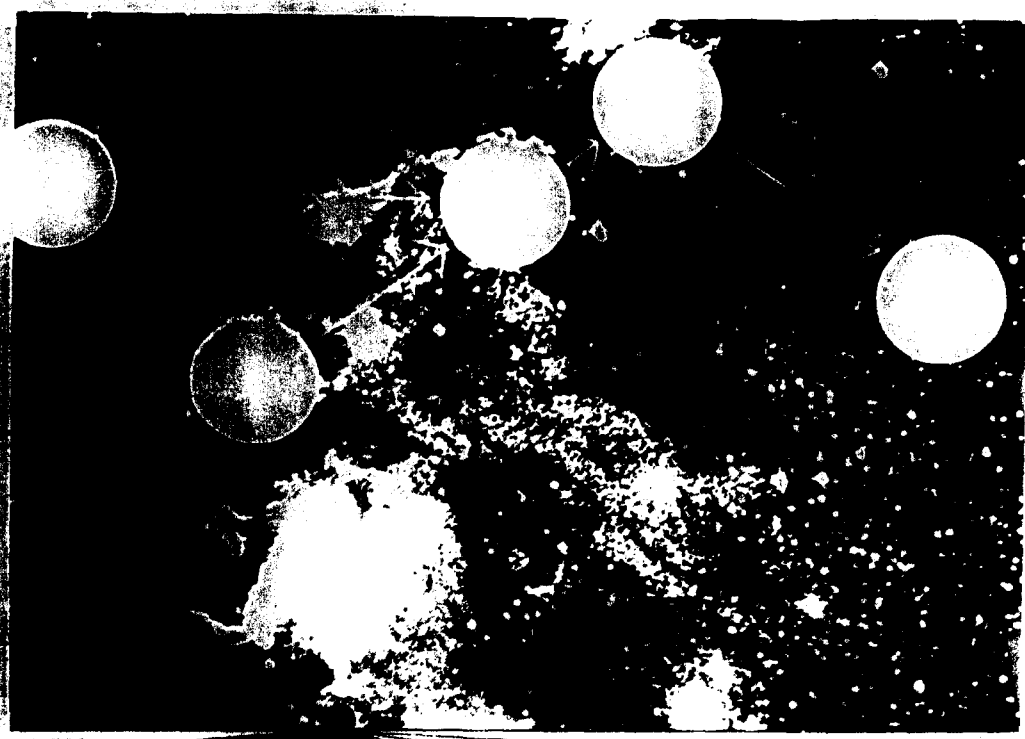
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PERT COST SYSTEM COMPUTER PROGRAM HANDBOOK

(PART II)

Programmer's Guide

ADVANCE COPY FOR AFSC IMPLEMENTATION



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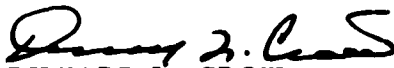
FOREWORD

This manual is Volume IV, Part II of the USAF PERT series. It serves as a companion publication to Volume II, USAF PERT Time System Computer Handbook, dated September 1963.

This document provides a programmer-oriented, complete with flow diagrams, of the IBM 7090 computer program developed to process data for the USAF PERT Cost System. The schedule information input to the program is externally generated from the USAF PERT Time program or any comparable computer program. The cost information input is obtained through the use of input forms or externally generated tapes.

This program produces all of the output reports described in the USAF PERT Cost System Description Manual, dated December 1963, and Supplement #1 of the DOD and NASA Guide to PERT Cost, dated March 1963.

Comments concerning any part of this publication are solicited from both government and industry sources, and should be forwarded to Hq AFSC (SCCSS), Andrews Air Force Base, Washington 25, D. C. 20331.


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USAF PERT

VOLUME IV

PERT COST SYSTEM COMPUTER PROGRAM HANDBOOK

(PART II)

Programmer's Guide

DECEMBER 1963

USAF has produced a series of PERT documents to provide understanding of the USAF PERT TIME and PERT COST Systems presently in use. This manual is the fifth volume in the USAF PERT series.

VOLUME I	USAF PERT TIME SYSTEM DESCRIPTION MANUAL
VOLUME II	USAF PERT TIME SYSTEM COMPUTER HANDBOOK
VOLUME III	USAF PERT COST SYSTEM DESCRIPTION MANUAL
VOLUME IV	USAF PERT COST SYSTEM COMPUTER PROGRAM HANDBOOK, PART I
	USAF PERT COST SYSTEM COMPUTER PROGRAM HANDBOOK, PART II
VOLUME V	USAF PERT IMPLEMENTATION MANUAL

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CHAPTER I

GENERAL SYSTEM DESCRIPTION

CHAPTER I

GENERAL SYSTEM DESCRIPTION

I-A CAPABILITIES

PERT Time Data

The system derives its schedule information from tapes generated by various PERT Time systems. This is accomplished through the use of the PERT Time Tape Description Input Forms.

Output Reports

The module produces all of the reports currently described in the USAF PERT Cost System Description Manual. The user may select the type and level of report to be generated with each computer run.

Error Editing

The module has an extensive error editing capability in each of its 4 phases.

Calendar Routine

The system uses a calendar routine which excludes all weekends and holidays from its computations.

Master File

Time and cost data are maintained in a master file which may be automatically updated.

Computer Run Options

There are 7 types of options which permit the user to start and stop the program at various points in the processing cycle. These options are discussed in Subsec. I-C.

Cost Data Only

The program processes cost data without using PERT Time information. This means that the PERT Cost reports will not contain the customary schedule information.

Capacity

The capacity of the program is generally stated as follows:

(a) Work Breakdown Structure

The program will process a work breakdown structure composed of 16 levels. The maximum amount of change or summary numbers that may be associated with a particular parent number is 63.

(b) PERT Network

The system is capable of processing data derived from multiple PERT networks. There is no limit as to the number of activities contained in these networks. However, all of the PERT time data must be contained on a single tape.

(c) Performing Organization / Resource Code Combinations

There is no limit as to the number of Performing Organization / Resource Code combinations that may be associated with a particular charge or summary number.

(d) Activities

There is no limit as to the number of activities that may be associated with a particular charge or summary number.

(e) Cost Data

The system will retain budgeted, estimated, and actual costs in the master file in monthly increments. The maximum number of monthly increments for a particular performing organization / resource code combination is 60.

(f) Rate Table

The maximum number of resource codes or combinations that may be entered in the rate table is 266. The maximum number of rates that may be distributed among these combinations is 1600.

(g) Rainbow Categories

The maximum number of rainbow categories that may be entered in the system is 20. The maximum number of resource codes that may be distributed among these 20 categories is 200. A resource code may not be associated with more than one rainbow category.

(h) Cost Categories

The maximum number of cost categories that may be entered in the system is 200. The maximum number of resource codes that may be distributed among these categories is 200. A resource code may not be associated with more than one cost category.

PERT COST MODULE-LOGIC FLOW

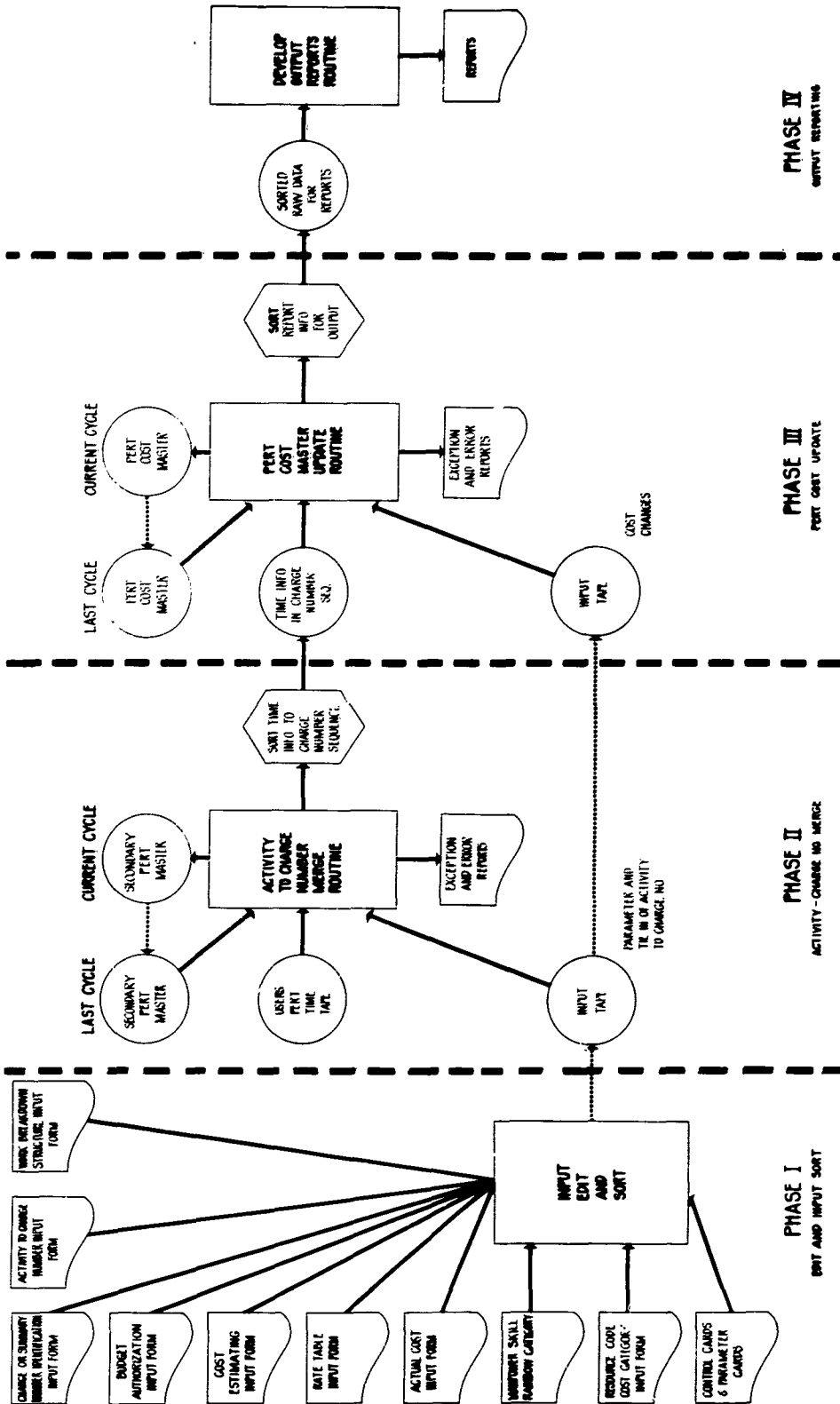


Figure I-B-1 PERT Cost Module - Logic Flow

I-B PROGRAM LOGIC

The program is divided into four phases as shown in Fig. I-B-1. These phases are generalized as follows:

Phase I: Edit and Input Sort

In Phase I, the program reads in all of the input data. Each card is edited for errors. These errors are written on the output tape. An edited data tape is produced and subsequently sorted into card number sequence. The final product of Phase I is a sorted data tape.

Phase II: Activity to Charge Number Merge

In Phase II, the link between the PERT Time system and the PERT Cost module is formed. The PERT Cost Secondary Master File contains the network activities and their associated charge numbers. There is no time information such as T_E , T_L , slack, etc., in this file. This time information is provided by the users PERT Time tape.

In Phase II a sorted time tape and a new Secondary Master File are generated. This is accomplished in the following manner:

- (a) The program will read in the new PERT Time parameter cards from the sorted data tape. If there are no parameter cards, then this information is read in from the PERT Cost Secondary Master File.
- (b) The user's PERT Time tape is read into the system through the use of this parameter data. If the PERT Time tape is not in the proper sequence, then each record is written in a prescribed format on another tape. This tape is then sorted into the proper sequence.
- (c) The program then proceeds to merge these three tapes; that is, the sorted data tape, the user's PERT time tape, and the secondary master tape are matched one activity at a time.

- (d) The Type 2 cards (Activity/Charge Number card), if present on the sorted data tape, are used to update the Old PERT Cost Secondary Master File. As this master is being generated.
- (e) Wherever an activity on the secondary master matches an activity on the user's PERT Time tape, that activity with its associated charge number and time information are placed on an activity - time tape.
- (f) This process continues until all of the activities on the new secondary master have been matched with the user's PERT Time tape. This process results in the generation of an activity - time tape and a new secondary master tape.
- (g) The activity - time tape is then sorted into charge number sequence to be used in Phase III.

Errors encountered during the time merge phase are written on the System Error Tape or on the on-line printer. Messages on the System Error Tape will not stop the processing. However, at the conclusion of this phase, the errors will be totaled and printed on-line. The computer will halt, indicating an option to continue. Some errors will cause the computer to halt during the processing cycle. These errors are written on-line and must be rectified prior to rerun.

Phase III: PERT Cost Update

In Phase III the PERT Cost Master File is either established or updated from the data contained in the sorted activity - time tape and the sorted data tape. This phase also generates a sorted report tape which contains all of the data necessary for the final reporting phase. This is accomplished in the following manner:

- (a) A record is read into the system from each of the three tapes. More clearly, the information relating to one charge number is read in from each of the tapes, i. e., the PERT Cost Master, the sorted data tape, and the sorted activity - time tape.
- (b) The Old PERT Cost master is updated and a new PERT Cost master is generated. The sorted activity - time tape is interrogated to obtain all of the time information associated with each activity assigned to the current charge number.
- (c) This time and cost data are written on the report tape.
- (d) The report tape is then sorted, to be used in Phase IV.

The errors that are encountered during this phase are written on the System Error Tape or on the on-line printer. Messages on the System Error Tape will not stop the processing. However, at the conclusion of this phase the errors will be totaled and printed on-line. The computer will halt, indicating an option to continue. Some errors will cause the computer to halt during the processing cycle. These errors are written on-line and must be rectified prior to rerun.

Phase IV: Output Reporting

In Phase IV the output reports are generated and written on the output tape. Some errors will cause the computer to halt during the processing cycle. These errors are written on-line and must be rectified prior to rerun.

I-C Computer Run Options

The user is provided with seven options that permit the program to be started and stopped at various points in the processing cycle. The letter indicating the desired option is placed in column 2 of the main control card. These options are briefly described below.

Option A

The input data will be read into the computer and edited for errors. An edited tape will be produced. The errors found during this edit will be placed on the output tape.

Option B

The program will perform those functions described in Option A. In addition, it will sort the edited data into card and type code sequence, thus producing a sorted input tape.

If errors have been uncovered during the edit phase the computer will halt after the edited tape has been generated. The number of errors will be printed on-line. If the user does not deem the number to be excessive, the start key on the console is depressed and processing continues until the sorted input tape is produced. If no errors have been encountered, the program will automatically continue into the next phase.

Option C

The program will perform those functions described in Option B. In addition, it will update the activity-charge number data contained in the Secondary Master Tape; i. e., the first file of the PERT Cost Master Tape. This file is then merged with the user's PERT Time tape to produce a merged time tape. This tape contains each activity, its time

data, and its associated charge number. The merged time tape is then sorted into charge number sequence, producing the sorted time tape.

Errors encountered during the merge phase will be printed on the output tape. If errors have been encountered, the merged time tape will be written and the computer will halt. The number of errors will be printed on-line. If the user does not deem this number to be excessive, the start key on the console is depressed and processing continues until the Work Package/Activity Report is generated. If errors have not been encountered the system will continue processing until the Work Package/Activity Report is generated.

Option D

Option D is used to run from the start to the end of the entire program. The program will perform those functions described in Option C except that the Work Package/Activity Report is not automatically produced. It must be requested by the user through the use of the Report Selection Card.

In addition, the program will use the data contained on the sorted time tape to update the PERT Cost master tape. During this updating phase, the data necessary for the output reports are written on a tape. This tape is sorted to form the sorted output tape. Finally, the program generates all of the output reports requested by the user.

If errors in the data are encountered during this updating phase, they will be printed on the output tape. The computer will halt and the number of errors will be printed on-line. If the user does not deem this number to be excessive, the start key on the console is depressed and processing continues until all of the output reports are generated.

Option E

Option E is selected if the user has previously used Option B and now wishes to continue through Option C; that is, Option E is used if a

sorted input tape has been generated as a result of Option B and the user now wishes to continue processing to obtain the information that would have resulted from Option C (e. g., error messages or the Work Package/Activity Report).

Option F

Option F is selected if the user has previously used Option B and now wishes to go through the entire system to obtain the output reports.

Option G

If the user has generated a sorted time tape as a result of using Options C or E and now wishes to continue through the system, Option G is used. This option is also used if the user wishes to produce the PERT Cost reports without using PERT Time data. Therefore, the reports generated will not contain the customary PERT Time information.

CHAPTER II

OPERATING PROCEDURES

CHAPTER II

OPERATING PROCEDURES

II-A IBSYS MONITOR

The USAF PERT Cost system uses the IBSYS Basic Monitor system. The official designation of this monitor is the IBM 7090/7040 IBSYS Processor 7090-PR-130, Version 8.

System Unit Function Table, SYSUNI

Systems operating under the IBSYS monitor must use certain tape units to carry out specific functions such as library, job input, and output. Tape units, therefore, are assigned certain symbolic names which are indicative of their functions. These symbolic names and their corresponding tape units are maintained by the monitor in a table designated as the System Unit Function Table, or SYSUNI. Since the assignment of tapes may vary with each computer installation, the monitor provides for the modification of this table through the use of the Unit Assignment Control Cards.

The IBSYS Master used by Aerospace Corporation uses the following SYSUNI table.

SYSLB1	A1	SYSPPI	A5
SYSOU1	A2	SYSUT2	B1
SYSIN1	A3	SYSUT3	B2
SYSUT1	A4	SYSUT4	B3

All other tape units are unassigned.

II-B TAPE ASSIGNMENT

The USAF PERT Cost program distributed by Aerospace Corporation uses the tape assignments shown in Fig. II-B-1.

Channel A

1	2	3	4	5	6	7	8
IBSYS Master	Output List	PERT Cost PGM. input deck	Utility		Change tape and NEW P/C MASTER FILE	Utility	
SYSLB1	SYSOU1	SYSIN1	SYSUT1				

Channel B

1	2	3	4	5	6	7	8
Utility	Utility		PERT Time Data	Utility (edited input)	OLD P/C MASTER FILE (only for updating)		
SYSUT2	SYSUT3						

Fig. II-B-1 Tape Assignments

II-C TAPE REASSIGNMENT

The tapes shown in Fig. II-B-1 may be reassigned to other units and channels through the use of either of the following two procedures:

- (a) The Tape Reassignment Card (Control Card D) described in Chapter III of the USAF PERT Cost System - Cost Module, Volume IV Part I) may be used.
- (b) A permanent change may be effected by recompiling the program, using the change cards shown in Fig. II-C-1. The asterisks shown in the variable field portion of these cards refer to the entries in Table II-C-1.

LOCATION	OPERATION	ADDRESS	TAS	DECREMENT	COUNT	COMMENTS	T2	T3	T4
TA1	PZE	*	*	*	*	INPUT - NEW MASTER			00245000
TA3	PZE	*	*	*	*	INPUT - SORT			00245100
TA4	PZE	*	*	*	*	SORT			00245200
TA5	PZE	*	*	*	*	OUTPUT (SYS.QUE)			00245300
TB1	PZE	*	*	*	*	CHANGE			00245400
TB2	PZE	*	*	*	*	OLD MASTER			00245500
TB4	PZE	*	*	*	*	USER'S PERT TIME TAPE			00245600
TB5	PZE	*	*	*	*	SORT			00245700
TB6	PZE	*	*	*	*	SORT			00245800

Fig. II-C-1 Change Cards for Tape Reassignment

Important Points

It is important to observe that:

- (a) TA5 must correspond to the SYSOU1 tape
- (b) TA3 and TA4 should be on opposite channels from TB5 and TB6 for efficiency in sorting.

Table II-C-1
Variable Field Entries for Assigning Tapes

<u>PHYSICAL UNIT</u>	<u>VARIABLE FIELD (COLS 16-21)</u>
A1	641, 1
A2	642, 1
A3	643, 1
A4	644, 1
A5	645, 1
A6	646, 1
A7	647, 1
A8	648, 1
B1	1153, 1
B2	1154, 1
B3	1155, 1
B4	1156, 1
B5	1157, 1
B6	1158, 1
B7	1159, 1
B8	1160, 1

Tape Assignments With ASD Basic Monitor

In the event that the USAF PERT Cost program is run in conjunction with the version of the IBSYS Basic Monitor used at the Aeronautical Systems Division (ASD), the user may consider it advantageous to permanently change the tape assignments in the PERT Cost program. In this case the following modifications are suggested.

- (a) Recompile the PERT Cost program using the change cards shown in Figure II-C-2.

LOCATION	OPERATION	ADDRESS TAG	DECREMENT	COUNT	COMMENTS	LABEL
TA1	PFE	687	1		A7	INPUT - NEW MASTER 00245000
TA3	PFE	686	1		A6	SORT 00245100
TA4	PFE	685	1		A5	SORT 00248200
TA5	PFE	1155	1		B3	OUTPUT 00245300
TA1	PFE	1154	1		B2	CHANGE 00245400
TA2	PFE	1156	1		B4	OLD MASTER 00245500
TA4	PFE	1159	1		B7	USER'S TAPE 00245600
TA5	PFE	1158	1		B6	SORT 00245700
TA6	PFE	1157	1		B5	SORT 00245800

Fig. II-C-2. Change Cards for Conversion to the ASD Version of IBSYS

(b) Modify the SYSUNI table through the use of the following cards:

Col 1	8	16	21
\$ RELEASE		SYSCK 1	
\$ RELEASE		SYSCK 2	
\$ RELEASE		SYSOU 2	
\$ RELEASE		SYSPP 2	

II-D IBSYS COMPILING PROCEDURES

Input Deck Set-up

The input deck consists of the following cards in the following sequence.

Card	Columns	1	7	8	16	73	80
(a)		\$IBSYS					
(b)		\$ATTACH			A7		
(c)		\$AS			SYCKI		
(d)		\$REWIND			SYCKI		
(e)		\$ATTACH			B7		
(f)		\$AS			SYCK 2		
(g)		\$REWIND			SYCK 2		
(h)		\$EXECUTE			FORTRAN		
(i)		\$ID					
(j)		*		PACK			
(k)		*		FAP			
(l)				UPDATE	9, 10		
(m)				DELETE		0000010	
(n)				COUNT	30000	0000250	
(o)				(Correction cards)			

Correction cards are used to update the symbolic program cards. Serialization must be entered in columns 73-80. See the FAP manual for the precise format of these cards.

End Card

An end card must be inserted with the following format:

Card	Column	8	73	80
(p)		END	99999999	

IBSYS Control Cards

Card Columns 1 16
 (q) § IBSYS
 (r) § REMOVE SYSCK 1
 (s) § REMOVE SYSCK 2
 (t) § STOP

Tape Assignments

The tape assignments for compilation are shown in Fig. II-D-1

Channel A							
1	2	3	4	5	6	7	8
IBSYS Master	Output list	Input deck	Utility	Punch		Old blocked update tape (symbolics)	
SYSLB 1	SYSOU 1	SYSIN 1	SYSUT 1	SYSPP 1		SYSCK 1	

Channel B							
1	2	3	4	5	6	7	8
Utility	Utility	Utility				New blocked update tape (symbolics)	
SYSUT 2	SYSUT 3	SYSUT 4				SYSCK 2	

Fig. II-D-1. Tape Assignments for Compilation

Peripheral Input

Place the card deck described on Page II-D-1 on tape, using an IBM 1401 card-to-tape program. Place this tape on unit A3 as indicated in Fig. II-D-1.

Console Operation

- (a) Reset.
- (b) Clear and load tape.

- (c) On-line printer message will indicate the number of errors.
- (d) Save B7 (new, updated symbolic tape).

Peripheral Output

- (a) Program listing is on A2 (SYSOU 1).
- (b) Absolute FAP deck is on punch tape A5 (SYSPP 1).

Compilation Using ASD IBSYS Monitor

The tape assignments for compiling the PERT Cost module using the ASD version of IBSYS are shown in Fig. II-D-2.

Channel A							
1	2	3	4	5	6	7	8
IBSYS Master SYSLB 1		Input deck SYSIN 1		SYSUT 1	SYSUT 3	Old blocked update tape (symbolics) SYSCK 1	

Channel B							
1	2	3	4	5	6	7	8
Punch Tape SYSPP 1		Output List SYSOU 1		SYSUT 2	SYSUT 4	New blocked update tape SYSCK 2	

Fig. II-D-2. Tape Assignments for Compilation Using the ASD Version of IBSYS

Peripheral Output

- (a) Program listing is on B3 (SYSOU 1).
- (b) Absolute FAP deck is on punch tape B1 (SYSPP 1).
- (c) Due to the size of the program the symbolic reference table will not be generated.

II-E IBSYS OPERATING PROCEDURES

Input Deck Set-up--Program

The PERT Cost program deck consists of the following cards in the following sequence.

IBSYS Control Cards

Card	Columns	1	7	8	16
(a)		\$IBSYS			
(b)		\$EXECUTE			
(c)		End-of-file card			
(d)		#ID			
(e)		# XEQ			

Program Cards

(a) First program section
(b) Card Columns 1 7
DATA
(c) Remaining program sections

IBSYS Control Cards

Card Columns 1

(a) \$IBSYS
(b) \$STOP

Input Deck Set-up--PERT Cost Data

The PERT Cost data cards must be assembled in the following sequence.

(a) UNSORTED RAW DATA TAPE (Columns 1-22)
(b) Control Card A #
(c) Control Card B #
(d) All other control cards if required *
(e) Cost Data (sort not required) #
(f) EOF Card

* See USAF PERT Cost Volume IV Part I for precise format.

Tape Assignments

The tape assignments required for operation of this program are shown in Fig. II-B-1.

Peripheral Input

- (a) Place deck described as "Program Deck" on tape. Place tape on A3.
- (b) Place deck described as "Cost Data " on tape. Place tape on A6.

Console Operation

- (a) Reset.
- (b) Clear and load tape.
- (c) Follow on-line printer instructions.

Program Halt

Should the program be aborted (due to machine malfunction, etc.) after operating the PERT Cost edit sort phase, logical tape unit B-5 must be switched with A6 in order to restart without having to rewrite the tape containing the PERT Cost data. An on-line message will indicate when this portion of the program has been operated.

II-F IBSYS CONVERSION MACROS

This PERT Cost program was initially programmed, compiled, and checked out using the Aerospace System B monitor. In order to distribute the program for use with the IBSYS monitor, a compatibility package was written. This package channels all of the I/O through IOEX (the trap supervisor employed by IBSYS) through the use of macro instructions. It is used to start and stop all I/O operations as well as to check for redundancies and initiate recovery procedures. This package was used to compile the PERT Cost program using IBSFAP by placing the card deck containing the macros in front of the PERT Cost program.

The following macros were used:

- (a) LODMIT - Brings successive program sections from SYSIN1 into core.
- (b) OUTPUT - Writes on-line and off-line messages
- (c) BACKR - Backspace a record (s)
- (d) BACKF - Backspace a file (s)
- (e) READ - Read a record
- (f) WRITE - Write a record
- (g) WEOF - Write an end-of-file mark
- (h) REWND - Rewind a tape
- (i) UNLOAD - Rewind and unload a tape
- (j) CARDS - Read a card image from SYSIN1
- (k) STEPR - Skip a record (s)
- (l) STEPF - Skip a file (s)
- (m) TAPESN - Returns the address of the unit control block for the tape unit indicated in the address of the accumulator

CHAPTER III

PROGRAM PHASE DESCRIPTION

CHAPTER III
PROGRAM PHASE DESCRIPTION

III-A OUTLINE OF PROGRAM PHASE DESCRIPTION

Section III of this Programmer's Manual will discuss the operations of the phases used in the PERT Cost Program and will indicate all messages forthcoming from these phases, as well as the tape configurations and actions. The topical subheadings are listed below with the corresponding page references.

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III-B INPUT/OUTPUT

The input/output routines will handle the complete I/O operations that are used during the edit, edit sort, PERT Time merge, and updating phases of the system. The writing of the SYSTEM ERROR TAPE, OUTPUT REPORT TAPE, and the on-line messages will be done outside of this phase. All reading and writing done in these subroutines, outside of the tables, will be double-buffered.

READ Subroutines

The READ subroutines will accomplish the reading function for the following set of tapes:

(a) SORTED DATA TAPE (RCHG)

The edited data information, which is the first file on this tape, is bypassed to get to the point where the sorted data begins. Up to nine of these tapes can be read but they must be in proper sequence—i. e. , the order of their creation. If more than one EDITED DATA TAPE is created, only the last one of this edited data series, which also contains the first portion of the SORTED DATA TAPE, need be set onto the tape unit. Each time this tape is read, the location of the record in the buffer is set into CHHLD. CHHLD is originally set to all ones, and at end-of-file (E. O. F.) it is set to all zeros.

(b) OLD PERT COST MASTER (ROPM)

Up to nine of these tapes can be read but they must be set up in their order of creation. The information read by this subroutine will be of a variable nature.

(c) OLD SECONDARY MASTER (ROSM)

Up to nine of these tapes can be read but they must be set up in their order of creation. The data on this tape is blocked but of a fixed length per block.

(d) INPUT DATA TAPE (RRWD)

Up to nine of these tapes can be read and they can be in any order desired, except that the tape containing the control cards must be set on first. After reading is completed the last two tapes are either rewound and unloaded or just rewound, dependent on the option selected.

(e) EDITED DATA TAPE (REDD)

Up to nine of these tapes can be read but they must be set up in their order of creation. After the reading of these tapes the last one is not rewound, since the SORTED DATA TAPE is set onto this tape as a second file.

(f) SORTED TIME TAPE (RSTT)

Up to nine of these tapes can be read in Option G, but they must be set up in order of creation. If Option C, D, E, or F is in effect, this read will be a pickup of the sort information from the activity to charge number sort. For Options C and E only, the pickup of information from the sort and the creation of this SORTED TIME TAPE are accomplished.

(g) USER'S TIME TAPE (PMRD)

This tape is read for Options C, D, E, and F during the Time Merge phase, and its control area will be located in PD70 of the PMRD routine.

All of the above subroutines will use the common read area (RCOM) where all the error messages and I/O macros are centered. Each of the above subroutines modifies certain locations in the RCOM area (as indicated on Page III-B-38). Operating all the reads through a standard routine gives a uniformity to all I/O messages set out in this system. Each of the above subroutines will have a block of data that sets up information for reading and label checking. This block of information is 31 words long and takes the following form:

(1) XXDTE - 1 Word

The date set on this tape is from the previous cycle. It is picked up from the "A" control card.

(2) XXTPE - 1 Word

This is the tape unit number. It indicates the tape unit on which this tape is to be found. This information is set in this location in RCOM after the tape selection routine.

- (3) R(X)60 - 3 Words
This location will be the link to the XXTPE information which is used in reading. If the operation code is PZE the tape is read in the binary mode. If the code is MZE the tape is read in the BCD mode. Following the R(X)60 location will be the read commands for picking up the label.
- (4) R(X)70 - 1 Word
This word is the exit that is used when E. O. F. is found.
- (5) R(X)62 - 2 Words
These words will contain the read communication information.
- (6) R(X)90 - 10 Words
The label read from the tape is set into this location.
- (7) R(X)93 - 6 Words
The XXDTE is placed into this line. This record is then compared to the label that was set into R(X)90. At each comparison the tape number is increased by one.
- (8) R(X)95 - 4 Words
This portion of a message is used for some of the messages set out during the I/O operation. The tape number is set into the last word of this message.
- (9) R(X)97 - 1 Word
This location will hold the actual tape number in the form of X0000N, where X is the channel and N is the unit number.
- (10) R(X)98 - 1 Word
In case of read error the reason for error is saved in this location.
- (11) R(X)99 - 1 Word
This location will indicate whether this is the first time through this particular read subroutine. A non-zero value indicates this is not the first time through.

In the above, the X's indicate that this block is repeated for each read subroutine and each block will have a different letter in place of the (X).

WRITE Subroutines

The WRITE subroutines will accomplish the writing function for the following set of tapes. All of these tapes are produced in the binary mode except where indicated.

(a) NEW PERT COST MASTER (WNPM)

Up to nine of these tapes can be written during a cyclic or file establishment run. The records on this tape will be of variable length.

(b) NEW SECONDARY MASTER (WNSM)

Up to nine of these tapes can be written during a cyclic or file establishment run. The record size is fixed but is set into blocks of 600 words.

(c) EDITED DATA TAPE (WRWD)

Up to nine of these tapes can be written during a cyclic or file establishment run. The records are written one at a time and are unblocked. This tape is developed in the BCD mode.

(d) SORTED TIME TAPE (WSTT)

This operation is accomplished for use in Option G, with up to nine of these tapes being created during Options C or E. The records on this tape are of fixed length, but are grouped in blocks of 576 words.

(e) SORTED DATA TAPE (WCHG)

This tape write will be the second file following the EDITED DATA TAPE. Up to nine of these tapes can be created during a cyclic or file establishment run. The records on this tape are grouped in blocks of 200 words and are written in the binary mode. The two files on this physical tape are written in different write modes, that is the EDITED DATA TAPE is in BCD, and the SORTED DATA TAPE is in binary.

All of the above subroutines will use the common write area (WCOM) where all the error messages and I/O macros are centered. Each of the above subroutines modifies certain locations in the WCOM area (as indicated on Page III-B-63). Operating all the writes through a standard routine gives a uniformity to all I/O messages set out in this system. The above subroutines

also have a block of data that sets up information for writing data and labels. This block of information is 22 words long and takes the following form:

(1) XXTPE - 1 Word

This identifies the tape unit on which this tape is to be found. This information is set in this location in WCOM after the tape selection routine.

(2) W(X)60 - 3 Words

This location will be the link to the XXTPE information which is used in writing. If the operation code is PZE the tape is written in the binary mode. If the code is MZE the tape is written in the BCD mode. Following the W(X)60 location will be the write commands for writing the label.

(3) W(X)62 - 2 Words

These words will contain the write communication information.

(4) W(X)80 - 2 Words

These words are parameters to be used with the write routine (see Subsec. 4.6). They will contain the location of the two buffers plus the blocking involved and individual record size if not variable.

(5) W(X)82 - 2 Words

This location will be the link to the XXTPE information which is used in writing the "NOTEOF" message at the physical end of a tape that is to be continued. The location following W(X)82 is the write command.

(6) W(X)93 - 6 Words

The new master file as-of date is set into this line and these six words will become the first label record on the tape.

(7) W(X)95 - 4 Words

This portion of a message is used for some of the messages set out during the I/O operation. The tape number is set into the last word of this message.

(8) W(X)97 - 1 Word

This location will hold the actual tape number in the form of X0000N, where X is the channel and N is the unit number.

(9) W(X)99 - 1 Word

This location will indicate whether this is the first time through this particular write subroutine. A non-zero value indicates this is not the first time through.

In the above, the X's indicate that this block is repeated for each write subroutine and each block will have a different letter in place of the (X).

READ and WRITE Error Messages On-Line

During the read and write operations certain error conditions are checked upon. If any of these conditions are found the message is printed out on-line, and the system will come to an unrecoverable stop. The same messages will be used for all reads except that the tape unit number will indicate the unit in trouble. The same will apply to writes. The following error messages are used with the input/output routines.

(a) ERROR IN READING FIRST RECORD OF

SORTED INPUT TAPE	XX
PRTCO MASTER TAPE	XX
SECONDARY PC TAPE	XX
SORTED TIME TAPE	XX
UNSORTED DATA TAPE	XX
EDITED DATA TAPE	XX
USERS PERT TIME TP	XX

If any combination of the first line and one of the next seven lines is set out on the on-line printer the system is stopped. This message will indicate that in trying to read the label record an error condition was found. The reason for this error condition is set into RM98 and the code breakdown is:

- 1 - Redundancy in reading
- 2 - End-of-file condition on first record

(b) ERROR IN WRITING FIRST RECORD OF

PRTCO MASTER TAPE	XX
SECONDARY PC TAPE	XX
EDITED DATA TAPE	XX

PRTCO CHANGE TAPE XX
SORTED TIME TAPE XX

If any combination of the first line and one of the next five lines is set out on the on-line printer the system is stopped. This message will indicate that in trying to write the label record an error condition was found.

(c) THE SYSTEM WAS NOT ABLE TO READ TAPE XX
CORRECTLY

When a redundancy is found in reading the data on the indicated tape this message is set out and the system is stopped.

(d) THE SYSTEM WAS NOT ABLE TO WRITE TAPE XX
CORRECTLY

When a write error is determined this message is set out on the on-line printer and the system is stopped.

(e) PROGRAM ERROR IN READER ROUTINE

If there is an illogical combination of conditions existing for the reader routine, this message is set out on the on-line printer and the system is stopped. The reason for this stop is set into R(X)98 (Page III-B-3(10)).

(f) PROGRAM ERROR IN WRITER ROUTINE

If there is an illogical combination of conditions existing for the writer routine, this message is set out on the on-line printer and the system is stopped. The reason for this stop is set into WP98. The codes will be explained in the writer routine

(g) THE SYSTEM WAS NOT ABLE TO WRITE THE
NOTE OF MESSAGE ON PERT COST TAPE XX
NOTE OF MESSAGE ON SECONDARY TAPE XX
NOTE OF MESSAGE ON NEW EDIT TAPE XX
NOTE OF MESSAGE ON SRTD DATA TAPE XX
NOTE OF MESSAGE ON SRTD TIME TAPE XX

When this situation occurs the program will come to a complete halt. This message will indicate write problems for the tape shown.

- (h) THE SYSTEM WAS NOT ABLE TO READ TAPE XX AFTER THE EOF

In looking for the continue message or a second E. O. F. the system encountered a redundancy error. This error is recoverable and, prior to halting, a second line to the above message is printed:

IF LABEL IS TO BE IGNORED HIT START BUTTON TO CONTINUE

The program assumes this is a legitimate EOF condition and if the START button is hit it will handle this tape as though it had two EOF's in a row.

- (i) ATTEMPTING TO READ SORTED CHANGE TAPE AND CANNOT LOCATE END OF FILE ON EDITED TAPE XX

This message indicates that there is not any EOF to separate the edited information from the sorted. It will be followed by two additional messages with a recovery mode. These messages are:

VERIFY THAT THE PROPER REEL IS ON THIS UNIT
IF PROPER REEL IS PLACED ON UNIT HIT START

After printing out this last message the system will stop. If the right reel for this information is located, and set on its proper unit, the START button can be hit. The program will then continue searching through this new reel for the split between the information.

Tape Labels

Each of the tapes created during any processing run will have a label set on as its first two records. This label will indicate the type of tape, the date it was created, the tape series number, and the program this tape is associated with. A label will also be set at the end of a physical tape that is to be continued. The only variance from the label described above will be the INPUT DATA TAPE, which will use a 4-word label indicating the type of data (see Subsec. III-D), and the USERS TIME TAPE, whose label is variable and depends upon the time system used. The following will describe the common makeup of the tape label.

(a) LABEL FIRST RECORD - WRITE

The first record of every created tape after the tables (see Page III-B-11), other than the SYSTEM OUTPUT TAPE, will be six words long. This record will contain the Master File as-of date in the date slot and will begin numbering the tapes with 1 up to 9. This label will take one of the following forms:

```
PERT COST MASTER FILE DDMMYY TPE X
SECONDARY MASTER FILE DDMMYY TPE X
EDITED RAW DATA TAPE DDMMYY TPE X
PERT COST CHANGE FILE DDMMYY TPE X
PERT COST TIME INPUT DDMMYY TPE X
```

During some options the Secondary or PERT Cost tapes are duplicated without updating. If this is the case the first record of the label written out will be the same as the record read in; that is, the master file date for that tape will remain the same.

(b) LABEL SECOND RECORD - WRITE

The second record of every created tape after the tables, aside from the SYSTEM OUTPUT TAPE, will be four words long and will contain the program name found on control card "A". In any case, even for the duplication effort as explained above, the new or current program name will be set into this record.

(c) LABEL FIRST RECORD - READ AND COMPARE

For the input data tapes, only the first four words of the label are checked. For all others except the USERS TIME TAPE, the entire first record is read into R(X)90 and is verified against R(X)93. The date set into R(X)93 is set in from the "A" control card. The following will indicate the dates from the "A" card used for checking the label.

For SORTED INPUT TAPE: The new Master File as-of date since this tape was created for this run.

For PERT COST MASTER TAPE: The PERT Cost master date on the "A" control card. If Option C or E, the label is not verified.

For SECONDARY MASTER TAPE: The secondary master date on the "A" control card. If Option G, the label is not verified.

For PERT COST TIME INPUT: In Option G, the PERT TIME TAPE date on the "A" control card. On other options where the USER TIME TAPE is used, the PERT TIME date on the "A" control tape is verified with the report date on the Users tape.

For INPUT DATA TAPE: No date verification is made on this set of tapes.

For EDITED DATA TAPE: The new master file as-of date since this tape was created for this run.

(d) LABEL SECOND RECORD - READ AND COMPARE

The last four words in R(X)90 are compared to the old program name in PNHD2. If there has been no program name change, the current name in PNHL D will be set into PNHD2. If there has been a name change PNHL D will contain the new name for the labels written out and PNHD2 will contain the old name for comparing.

(e) END LABEL - WRITE

If a tape is to be continued onto another reel after hitting the end-of-tape indication, a 1-word record is set up after the end-of-file. This record will appear as:

NOTEOF

Following this record will be another end-of-file.

(f) END LABEL - READ AND COMPARE

If a tape is being read and an end-of-file is encountered, the next record is checked for "NOTEOF." If it contains this record, the program will continue to read the next tape of the series set on the unit. If, instead of NOTEOF, the program finds another end-of-file it will assume the tape is actually at end-of-file.

Label On-Line Messages

All messages referring to labels will be set out on-line. Most of the label errors can be circumvented and the processing continued by action at the

console. The messages that are involved with label problems are listed and described below:

(a) THE LABEL DID NOT CHECK IN READING TAPE XX

The line following the above message will indicate the label record being compared. All 10 words of this record will be printed out on a single line. For example:

PERT COST MASTER FILE 010563 TPE 1 (Program Name)

After this message the following information is printed out:

VERIFY THAT PROPER REEL IS ON THIS UNIT.

IF LABEL IS TO BE IGNORED HIT START BUTTON TO CONTINUE.

At this point the system will stop. If this label is to be ignored, pressing the START button on the console will continue the program.

(b) THE CONTINUE LABEL DID NOT CHECK IN THE READING OF

SORTED INPUT TAPE XX

PRTCO MASTER TAPE XX

SECONDARY PC TAPE XX

SORTED TIME TAPE XX

EDITED DATA TAPE XX

Any combination of the first line and one of the following lines of the message will indicate on which tape the end label was not legitimate. This message will be followed by another message as follows:

IF LABEL IS TO BE IGNORED HIT START BUTTON TO CONTINUE.

If the start button is hit, the program assumes that another tape of this series is being set on this unit.

READ and WRITE of Tables

The double-buffered read or write routine is not used for the reading and writing of the tables. Since most of these tables are one record long, a nonbuffered read or write is used. Each table will carry its own label, which

will be located just prior to the main record. The following will be the format on these labels:

PERT TIME INPUT PARAMETERS DDMMYY
RATE TABLE PARAMETERS DDMMYY
SKILL CODE TO RAINBOW GROUP DDMMYY

These labels will each be one record of six words, and the date carried in the label is picked up from the "A" control card. When the label is being written out for the tables on the new masters, the date used is the new master file date on control card "A". When the labels are being read and compared, the secondary master file date is set into the input parameter record from control card "A" located in the record at R(X)40 of the information tables of RCOM2. The rate table and skill table will use the PERT COST master date. The same conditions that apply to the read and writing of the PERT Cost and Secondary Master labels (see Page III-B-9 (c)) will apply to the tables located on their respective tapes.

The read and write subroutines will accomplish the reading and writing function for the following tables:

- (a) INPUT PARAMETERS READ (RINP)
A record of 350 words will make up the input parameters. This is the first record on the secondary master. This routine will bring this record off of tape into core.
- (b) INPUT PARAMETERS WRITE (WINP)
This routine will pick up these data in one record block, except for the label which is a separate record, and set it out on tape.
- (c) RATE TABLE READ (RRTB)
A record of 4003 words will make up the rate table. This is the first record on the PERT Cost master. This routine will bring the record off of tape into core.
- (d) RATE TABLE WRITE (WRTB)
This routine will pick up these data in one record block, except for the label, which is a separate record, and set it out on tape.

(e) SKILL TABLE READ (RSTR)

A record of 1080 words will make up the skill table. This is the third record following the rate table label and rate table on the PERT Cost master. This routine will bring the record off of tape into core.

(f) SKILL TABLE WRITE (WSTR)

This routine will pick up these data in one record block, except for the label, which is a separate record, and set it out on tape.

All of the above subroutines will use the common read area (RCOM2) or the common write area (WCOM2), where all the error messages and I/O macros are centered. Each of the above subroutines modifies certain locations in either the RCOM2 area (See Page III-B-51) or WCOM2 area (see Page III-B-72). Operating all the I/O from a standard routine will give a uniformity to all messages set out in the system. Each of the above subroutines will have a block of data for reading or writing and label checking and setup. This block of information for RCOM2 is 21 words long, according to the following form:

(1) R(X)25 - 3 Words

The first word of this set will indicate the location that will contain the tape unit number for reading, plus the communication cells. The next location will be the label read followed by the table read.

(2) R(X)28 - 2 Words

These words will contain the read communication information.

(3) R(X)30 - 1 Word

This word contains the tape unit number indicating the unit this tape is to be found on. This information is set in this location in RCOM2 after the tape selection routine.

(4) R(X)40 - 6 Words

The label read from tape is set into this location.

(5) R(X)41 - 6 Words

The secondary master date or PERT Cost master date from control card "A" is set into its respective location in this record and it is verified with R(X)40.

(6) R(X)70 - 3 Words

This portion of a message is used with some of the messages set out during this read operation.

The block of information for WCOM2 is 6 words long, and takes the following form:

(i) W(X)25 - 3 Words

The first word of this set will indicate the location that will contain the tape unit number for writing, plus the communication cells. The last location of this set will be the core area plus the number of words that are to be written preceded by the label write.

(ii) W(X)28 - 2 Words

These words will contain the write communication information.

(iii) W(X)30 - 1 Word

This word contains the tape unit number that indicates which unit this tape is to be found on. This information is set in this location in WCOM2 after the tape selection routine.

The X's indicate that this block is repeated for each read or write (R(X) for reads, W(X) for writes), but each block will have a different letter in place of the (X).

Table On-Line Messages

The table on-line messages will be set out during the reading or writing of the table records and their labels. If the error is an I/O problem the message will be printed out and the system will completely stop. If the error is a label problem a message will be printed out and the system will halt with an option to continue if the label is to be ignored. The following are the messages that will be forthcoming.

- (a) THE LABEL DOES NOT AGREE IN READING
INPUT PARAMETERS
RATE TABLE
SKILL TABLE

The first line of the above message plus any one of the next three lines will be followed by the message:

IF LABEL IS TO BE IGNORED HIT START BUTTON
TO CONTINUE

At this point the system will stop. If this label is to be ignored, pressing the start button on the console will continue the program.

- (b) READIN ERROR ENCOUNTERED ON
INPUT PARAMETERS
RATE TABLE
SKILL TABLE

If any combination of the first line and one of the next three lines is set out on the on-line printer, the system is stopped. This message will indicate that in trying to read the label or table an I/O error condition was found.

- (c) WRITE ERROR ENCOUNTERED ON
INPUT PARAMETERS
RATE TABLE
SKILL TABLE

If any combination of the first line and one of the next three lines is set out on the on-line printer, the system is stopped. This message will indicate that in trying to write the label or table an I/O error condition was found.

WRITE Finish-up Routines

After completing the writing of all newly created tapes, a finish-up process is initiated. This sets up the E. O. F. 's and unloads the tapes by means of the following subroutines:

- (a) FINISH UP NEW PERT COST MASTER (WDNP)

The double E. O. F. and the rewinding and unloading of the last NEW PERT COST MASTER are accomplished in this subroutine.

(b) FINISH UP NEW SECONDARY MASTER (WDNS)

The double E. O. F. for the last NEW SECONDARY MASTER is accomplished in this subroutine. This tape is never rewound or unloaded, since the NEW PERT COST MASTER will begin where it finishes off.

(c) FINISH UP EDITED DATA TAPE (WDNE)

The double E. O. F. for the last EDITED DATA TAPE is accomplished in this subroutine. This tape is never rewound or unloaded, except in Option A, since the SORTED DATA TAPE will begin where it finishes off.

(d) FINISH UP SORTED DATA TAPE (WDST)

The double E. O. F. and the rewinding and unloading of the last SORTED DATA TAPE are accomplished in this subroutine.

(e) FINISH UP SORTED TIME TAPE (WDTT)

The double E. O. F. and the rewinding and unloading of the last SORTED TIME TAPE are accomplished in this subroutine.

The only I/O problem that can occur in the above subroutines is in writing the two E. O. F. 's. The error messages that will be forthcoming for this error will be:

```
THE SYSTEM WAS NOT ABLE TO WRITE THE
E. O. F. ON THE PRTCO TAPE    XX
E. O. F. ON SECONDARY TAPE   XX
E. O. F. ON THE EDITED TAPE  XX
E. O. F. ON SORTED DATA TAPE XX
E. O. F. ON SORTED TIME TAPE XX
```

The first line of the above message plus any one of the next five lines will be followed by the message:

```
MANUALLY WRITE E. O. F. TWICE ON THE ABOVE TAPE
UNIT THEN HIT START.
```

At this point the system will stop. After complying with the last message, the START button on the console is hit to continue the program.

INPUT/OUTPUT by Options

Table III-B-1 will show the input/output subroutines used for any particular option. It will also show the labels that are to be verified, as well as the labels that are to be set out on the output tapes. The following is an explanation of the fields used:

OPTION (Column 1)

The program option selected is found in this field.

TAPES (Column 2)

This field contains the name of the tape that is involved in an input/output operation. Where more than one tape is involved, it will refer to the grouping of tapes and only the Remarks field will have any bearing.

BCD OR BINARY (Column 3)

This field indicates the mode of reading or writing: BCD = BCD mode; BIN = binary mode.

TYPE OF I/O (Column 4)

This field indicates whether the action for that particular tape is read (R) or write (W).

READER OR WRITER USAGE (Column 5)

An "X" in this field indicates that for this particular tape the reader or writer subroutine is used.

I/O LINKAGE WITH XR 4 (Column 6)

This field gives the name of the subroutine where the input/output action for this tape takes place. All TSX's into the input/output subroutines use Index Register 4.

REWIND (Column 7)

An "X" indicates that this particular tape will be rewound at the end of its processing.

UNLOAD (Column 8)

An "X" indicates that this particular tape will be rewound at the end of its processing.

LABELS (Column 9)

This field shows the label that is to be checked in read-in or the label that is set out on the output tapes.

LABEL RECORDS (Column 10)

A number in this field indicates the number of physical records that make up the label for a particular tape.

LABEL WORDS (Column 11)

This column shows the number of words that will make up the physical record indicated in the preceding column.

BLOCKING USE (Column 12)

This field will indicate by a "Yes" or a "No" whether the data for a particular tape contains blocked or unblocked records, respectively.

NUMBER OF LOGICAL RECORDS PER BLOCK (Column 13)

If blocking is indicated, the maximum number of records in any one block is shown in this column. If it is variable a "V" will indicate this condition.

BLOCK SIZE (Column 14)

If blocking is indicated, the maximum size of the blocked record is shown here.

REMARKS (Column 15)

Any remark that is pertinent to that particular tape during a particular option is noted here. For the case where the information on a tape is the same as in a lower option, the tape is referenced to that option.

Option (1)	Tapes (2)	BCD or Binary (3)	Type I/O (4)	Read or Write Usage (5)	I/O to or from Library (6)	Re- wind (7)	Un- load (8)	Labels (9)	Label			Blocking		Remarks (15)
									No. Rec- ords (10)	No. Words (11)	Use (12)	No. Logi- cal Records (13)	Block Size (14)	
A	Input data tape	BCD	R	X	RRWD	X	X	Actual raw data tape Unsorted raw data tape Edited raw data tape DDMMYY TYPE *	1	4	No			Alternating tapes Only check last 4 words
									1	4				
	Edited data tape	BCD	W	X	WRWD	X	X	Edited raw data tape DDMMYY TYPE *	2	6	No			Same as Option A. If the second of the alter- nating tapes is used it is not unloaded since it will be used for the sort phase Same as Option A (except) if more than one tape has been created this tape is unloaded and the first of the series is set on into sort routine
									2	6				
B	Input data tape	BCD	R	X	RRWD	X	X	Program name	4	4	No			Same physical tape as edited tape (second file) after sort completion
									2	6	No	10	200	
	Edited data tape	BCD	W	X	WRWD	X	X	Program name	4	4	Yes			Same as Option A (except) The last two input tapes are unloaded since they will be used for the new master and sort tapes. Same as Option B Same as Option B Same as Option B (except) Read past first file to begin picking up sorted input data
									2	6	Yes	10	200	
C	Input data tape	BCD	R	X	RRWD	X	X	Program name	4	4	No			One record will make up the input parameters
									1	6	No			
	Old input parameters	BIN	R	X	RRWD	X	X	Secondary master file DDMMYY TYPE *	2	6	Yes			Not reloaded since old PERT Cost master is 2nd file on this tape One record will make up the input parameters
									1	6	No			
	Old secondary master	BIN	R	X	RRWD	X	X	Program name	4	4	Yes			One record will make up the input parameters
									1	6	No			
	New input parameters	BIN	W	X	WRWD	X	X	PERT Time input param- eters DDMMYY	1	6	No			One record will make up the input parameters
									1	6	No			

(Continued)

Table III-B-1 INPUT/OUTPUT Tape Usage by Option Selection

Option (1)	Tapes (2)	BCD or Binary (3)	Type of I/O (4)	Read or Write Usage (5)	I/O to XR 4 Linkage (6)	Re- wind (7)	Dis- load (8)	Labels (9)	Label			Blocking		Remarks (15)
									No. Rec- ords (10)	No. Words (11)	Use (12)	No. Logical Records (13)	Block Size (14)	
C cont.	New secondary master	BIN	W	X	WNSM			Secondary master file DDMMVY Tape #	2	6	Yes	75	600	Not reword since new PERT Cost master is 2nd file on this tape
	Old PERT Cost master	MIN	R	X	ROVM	X	X	Program name PERT Cost master file DDMMVY Tapes	2	6	Yes	Y	600	Skip over rate table and skill table to cost data info - interested only in responsible orgn. and charge no descrip- tion in cost data record for work package/activity worksheet.
	User's time tape		R	X	PMHD	X	X	Program name						Information regarding this tape is dependent upon input parameters. Check its I/O operations in PERT merge phase.
	Sorted time tape	MIN	W	X	WSTT	X	X	PERT Cost time input DDMMVY Tapes	2	6	Yes	16	576	This tape is developed after the completion of the sort. It can be on one of two tapes depending on the merge passes of the sort.
	PERT Cost master info.	MIN	R/W		WNSM WRTH WSTR RRTM RSTR			Program name		4				
D	Input data tape	BCD	R	X	RRWD	X					No			Same as Option A (unload) Do not unload last 2 input tapes - to be used for new PERT Cost master and one of the sort tapes
	Filled data tape	BCD	W	X	WRWD	X					No			Same as Option B
	Edited data tape	BCD	R	X	REDD	X					No			Same as Option B
	Sorted data tape	MIN	W	X	WCKI	X	X				Yes	10	200	Same as Option B
	Sorted data tape	MIN	R	X	JGIG	X	X				Yes	10	200	Same as Option C
	Old input parameters	MIN	R	X	RINP						No			Same as Option C
	Old secondary master	MIN	R	X	ROSM						Yes	75	600	Same as Option C
	New input parameters	MIN	W	X	WINP						No			Same as Option C
	New secondary master	MIN	W	X	WNSM		X	X			Yes	75	600	Same as Option C
	User time tape	MIN	R	X	PMHD		X	X	Rate table parameters DDMMVY	1	6	No		
Old rate table	MIN	R	X	RRTH										One record will make up the skill table On old PERT Cost master
Old skill table	MIN	R	X	RSTR				Skill code to Rainbow Group DDMMVY	1	6	No			One record will make up the skill table On old PERT Cost master

(Continued)

Table III-B-1 INPUT/OUTPUT Tape Usage by Option Selection (Continued)
III-B-20

Table 3 L-9

Option (1)	Tapes (2)	BCD or Binary (3)	Type of I/O (4)	Read or Write Usage (5)	I/O to SR 4 Language (6)	Rt. wind load (7)	Un- load (8)	Labels (9)	Label		Blocking		Remarks (10)	
									No. Rec- ords (10)	No. Words (11)	Use (12)	No Logical Records (13)		Block Size (14)
D cont	Old PERT Cost master New rate table	BIN	R	X	ROPM	X	X	Rate table parameters DDMMYY	1	6	Yes	V	Same as Option C (remarks One record will make up the rate table. On new PERT Cost master	
		BIN	W		WRPW						No			
	New skill table	BIN	W		WSTR			SKILL code to Rainbow Group DDMMYY	1	6	No		One record will make up the skill table On new PERT Cost master	
E	Sorted data tape Old input parameters Old secondary master New input parameters New secondary master Old PERT Cost master Users time tape Sorted time tape PERT Cost master info.	BIN	R	X	RCRG	X	X				Yes	10	Same as Option C	
		BIN	R	X	RINI	X	X				Yes	7 1/2	Same as Option C	
		BIN	R	X	ROSM	X	X				No	7 1/2	Same as Option C	
		BIN	W		WRNI						Yes	7 1/2	Same as Option C	
		BIN	W	X	WNSM	X	X				Yes	V	600	Same as Option C
		BIN	R	X	ROPM	X	X				Yes	V	600	Same as Option D
		BIN	R	X	UMRD	X	X				Yes	V	600	Same as Option C
		BIN	W	X	WSTR	X	X				Yes	V	600	Same as Option C
		BIN	W	X	WRPW	X	X				Yes	V	600	Same as Option C
		BIN	R/W		R/W									Same as Option C
F	Sorted data tape Old input parameters Old secondary master New input parameters New secondary master Users time tape Old rate table Old skill table Old PERT Cost master New rate table New skill table New PERT Cost master	BIN	R	X	RCRG	X	X				Yes	10	Same as Option C	
		BIN	R	X	RINI						No		Same as Option C	
		BIN	R	X	ROSM						Yes	7 1/2	Same as Option C	
		BIN	W		WRNI						No	7 1/2	Same as Option C	
		BIN	W	X	WNSM	X	X				Yes	7 1/2	Same as Option C	
		BIN	R	X	UMRD	X	X				No			Same as Option D
		BIN	R	X	RSTP	X	X				No			Same as Option D
		BIN	R	X	ROPM	X	X				Yes	V	600	Same as Option D
		BIN	W	X	WRPW	X	X				No			Same as Option D
		BIN	W	X	WSTR	X	X				Yes	V	600	Same as Option D
G	Input data tape Sorted data tape	BIN	R	X	RRWD	X	X				No		Same as Option A (initial) The last two input tapes are not unloaded since they will be used for the new master and sort tapes Same as Option B	
		BIN	W	X	WRWD	X	X				No			

(Continued)

Table III-B-1 INPUT/OUTPUT Tape Usage by Option Selection (Continued)

Option (1)	Tapes (2)	BCD or Binary (1)	Type of I/O (4)	Read or Write Usage (5)	I/O to XR-4 Linkage (6)	Re- wind (7)	Use- load (8)	Labels (9)	Label		Blocking		Remarks (16)	
									No. Rec- ords (10)	No. Words (11)	Use (12)	No. Logical Records (13)		Block Size (14)
G cont	Edited data tape	BCD	R	X	RCDD	X	X				No	10	200	Same as Option B
	Sorted data tape	BIN	W	X	WCIG	X	X				Yes	10	200	Same as Option B
	Sorted data tape	BIN	R	X	RCIG	X	X				Yes	10	200	Same as Option C
	Sorted time tape	BIN	R	X	RCST	X	X	PERT Cost time input DUMMY TAPS	1	6	Yes	10	576	If fields are not this type can be bypassed during this option
	Old rate table		R					Program name		4	No			Same as Option D
	Old skill table		R								No			Same as Option D
	Old PERT Cost master		R				X				No	Y	600	Same as Option D
	New rate table		W								Yes			Same as Option D
	New skill table		W								No			Same as Option D
	New PERT Cost master		W				X				No			Same as Option D
Secondary master info.		BIN	R/W				X				Yes	Y	600	Duplicate this data as first 300 of new PERT Cost master. Label dates will remain the same
N/A	Edited data tape	BCD	W		WDRF									
	Sorted data tape	BIN	W		WDRS									
	New secondary master	BIN	W		WDRS									
	Sorted time tape	BIN	W		WDRS									
	New PERT Cost master	BIN	W		WDRS									
								Finish up the writing of these tapes						

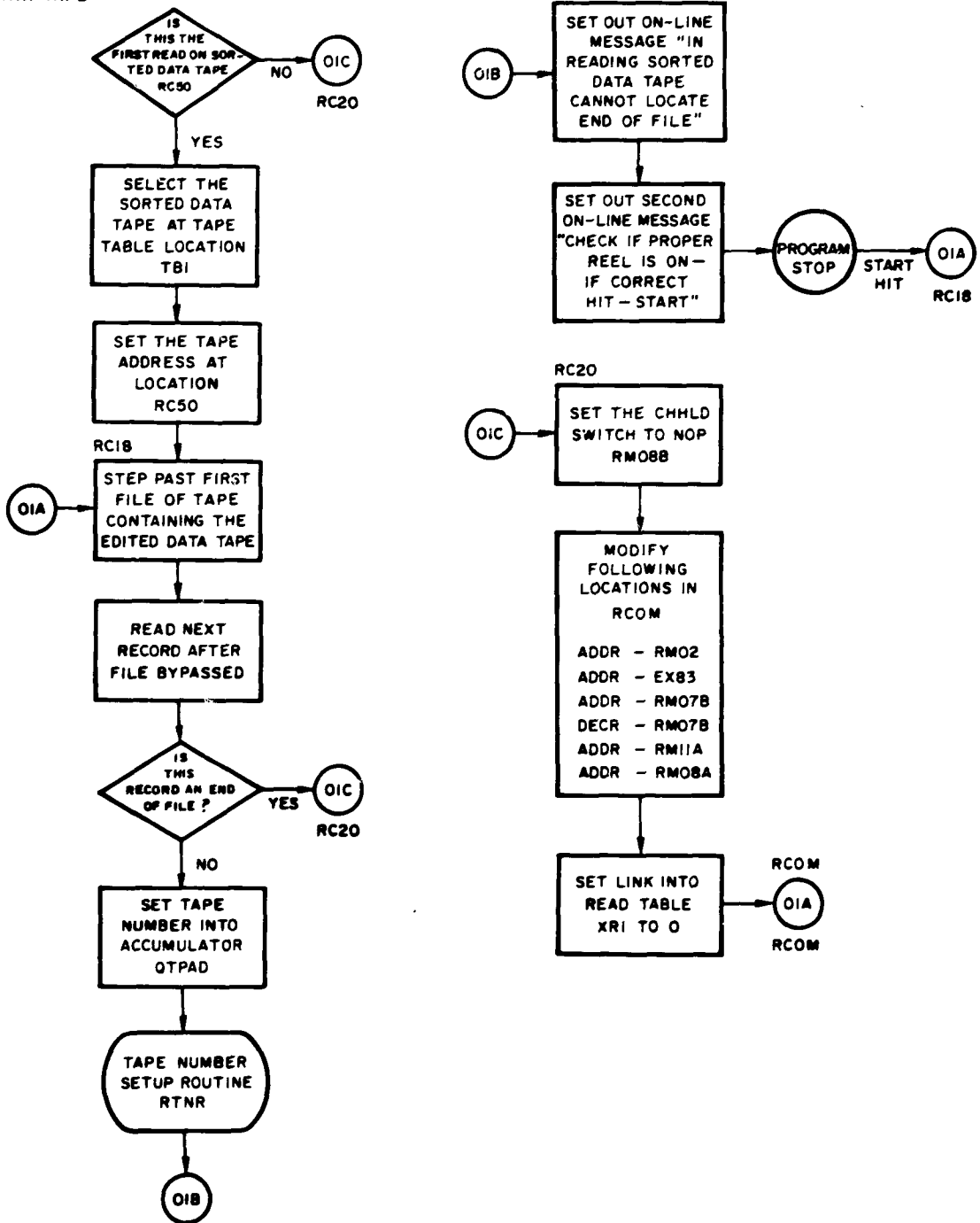
Table III-B-1 INPUT/OUTPUT Tape Usage by Option Selection (Continued)

INPUT/OUTPUT Region Descriptions

The following region specifications will describe the major subroutines used in the input/output region.

REGION RCHG

READ SORTED
DATA TAPE



Region ROPM

EXPLANATION OF REGION:

This routine will read the **OLD PERT COST MASTER**, which is the second file preceding the secondary information.

CALLING SEQUENCE:

L **TSX ROPM, 4**
L + 1 **Normal return**

INPUT:

OLD PERT COST MASTER

OUTPUT:

The location of the next logical record is in the address of the accumulator. The number of words contained in this record is in the decrement.

STORAGE USED:

PCDAT - RP99 - 31 words

SUBREGIONS AND SUBROUTINES USED:

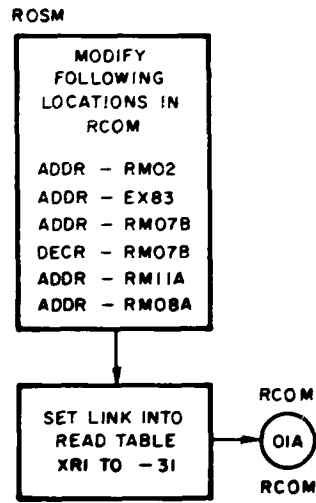
RCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the on-line printer and the program is stopped. If an **E. O. F.** is encountered the program will automatically go into its **E. O. F. exit.**

REGION ROPM

READ OLD
PERT COST
MASTER TAPE



Region ROSM

EXPLANATION OF REGION:

This routine will read the OLD SECONDARY MASTER which is the first file of the OLD PERT COST MASTER

CALLING SEQUENCE:

L TSX ROSM, 4
L + 1 Normal return

INPUT:

OLD PERT COST MASTER

OUTPUT:

The location of the next logical record is in the address of the accumulator. The number of words contained in this record is in the decrement.

STORAGE USED:

SMDAT - RS99 - 31 words

SUBREGIONS AND SUBROUTINES USED:

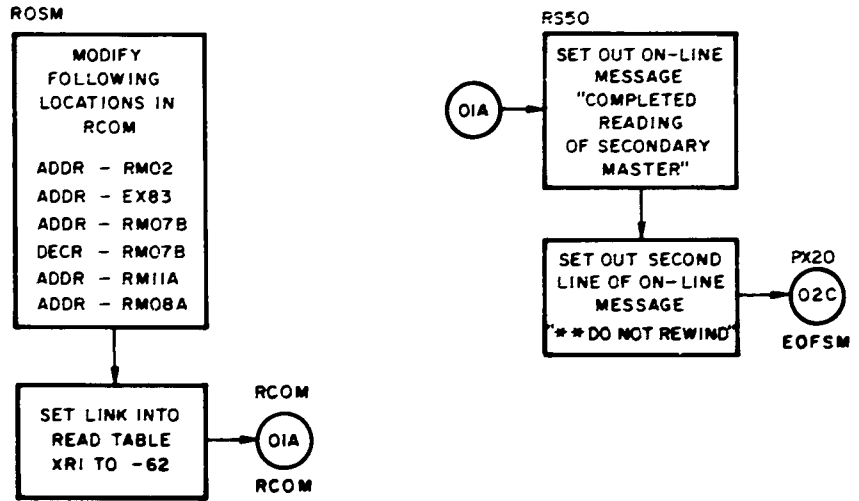
RCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the on-line printer and the program is stopped. If an E. O. F. is encountered the program will automatically go into its E. O. F. exit.

REGION ROSM

READ OLD
SECONDARY
MASTER TAPE



Region RRWD

EXPLANATION OF REGION:

This routine will read the INPUT DATA TAPE one record at a time.

CALLING SEQUENCE:

L TSX RRWD, 4
L + 1 Normal return

INPUT:

INPUT DATA TAPES

OUTPUT:

The location of the next logical record is in the address of the accumulator, the number of words contained in this record is in the decrement.

STORAGE USED:

RDDAT - RW99 - 31 words

SUBREGIONS AND SUBROUTINES USED:

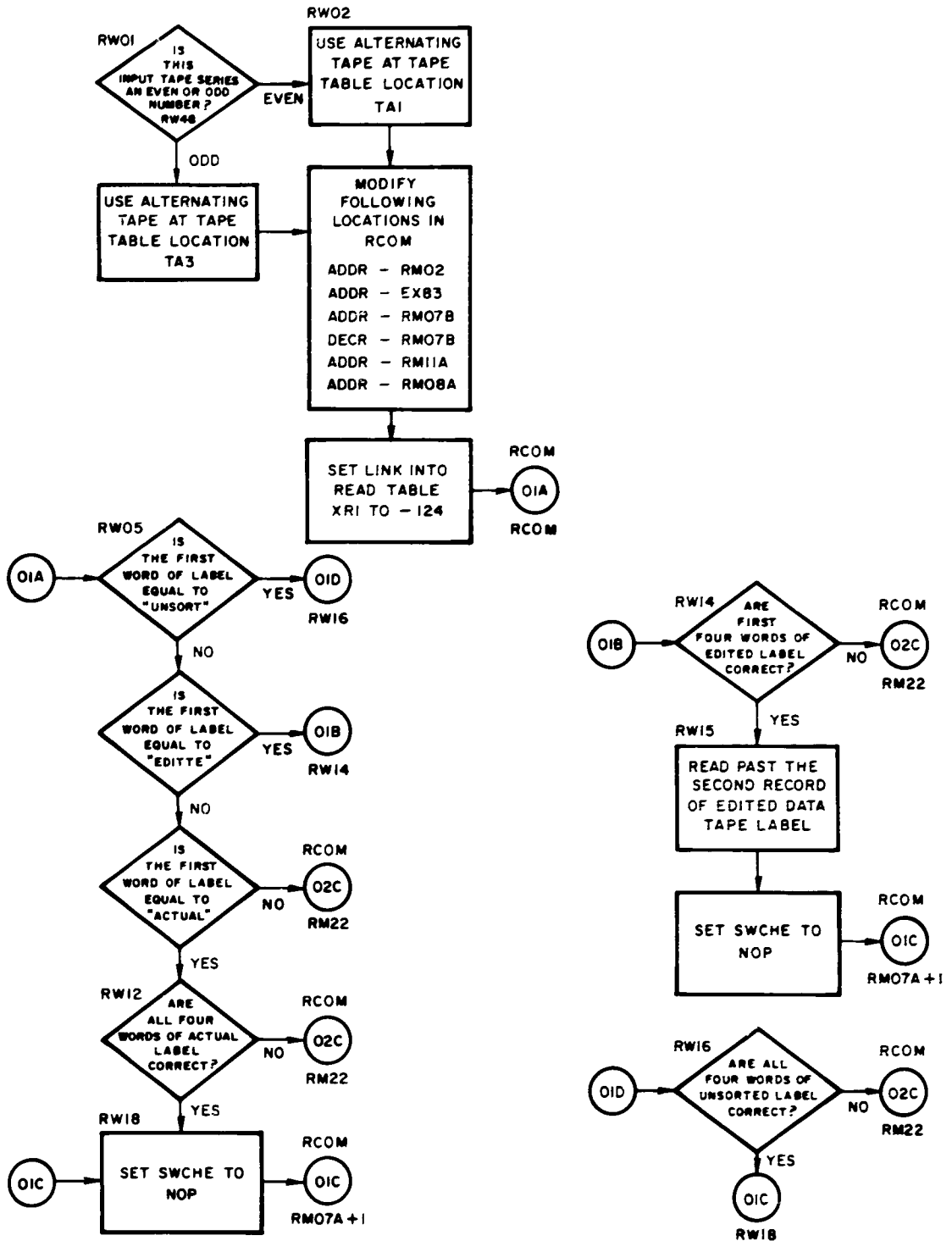
RECOM

EXPLANATION OF CALLING SEQUENCE:

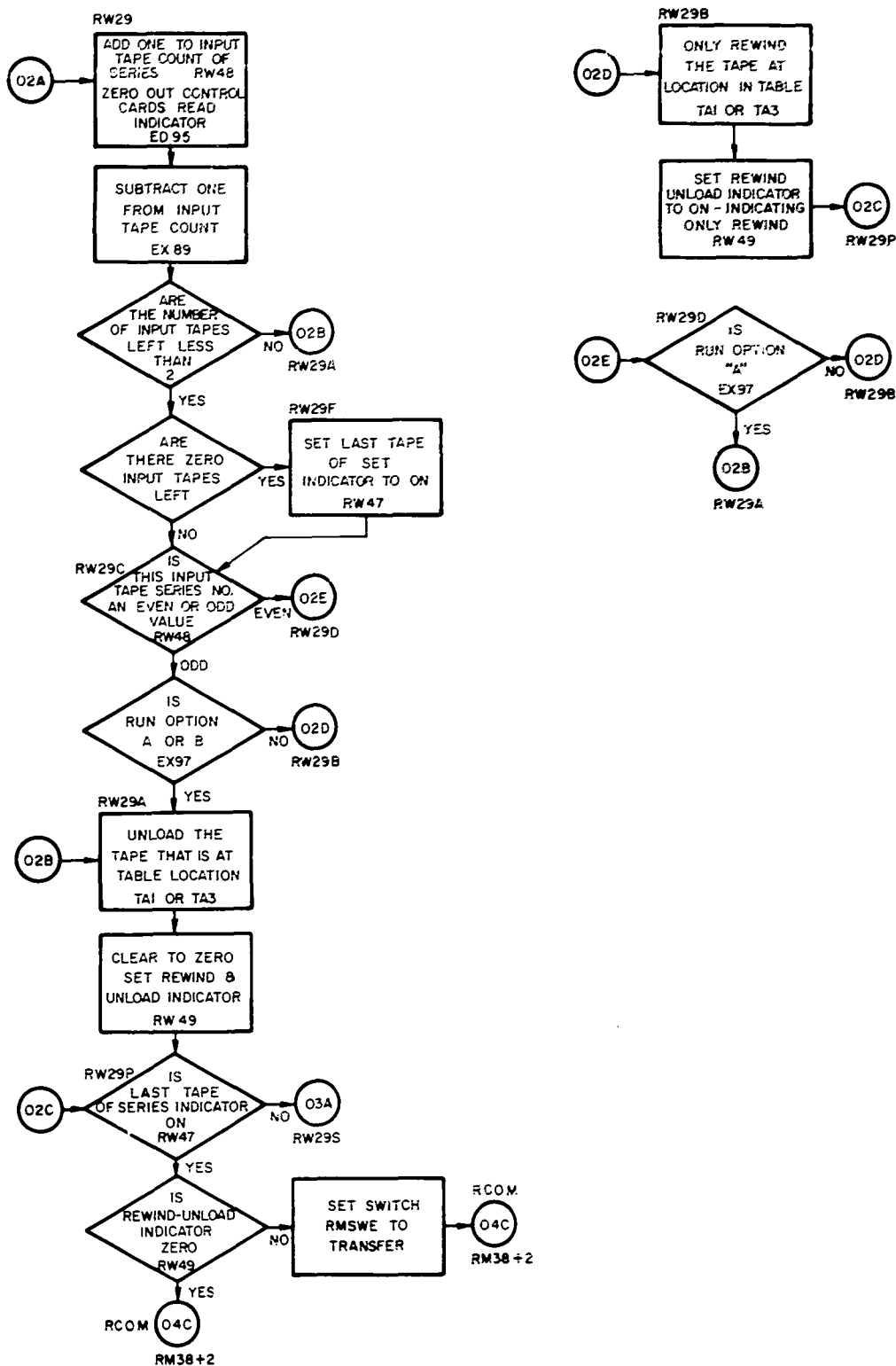
If an error is determined in reading, a message is set out on the on-line printer and the program is stopped. If an E. O. F. is encountered the program will automatically go into its E. O. F. exit.

REGION RRWD

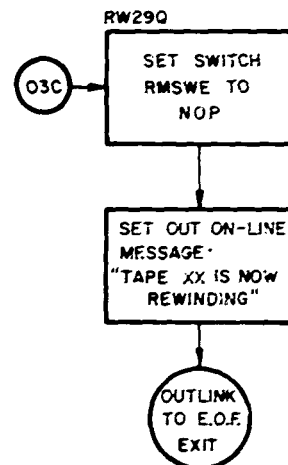
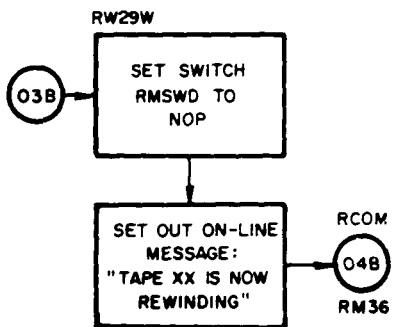
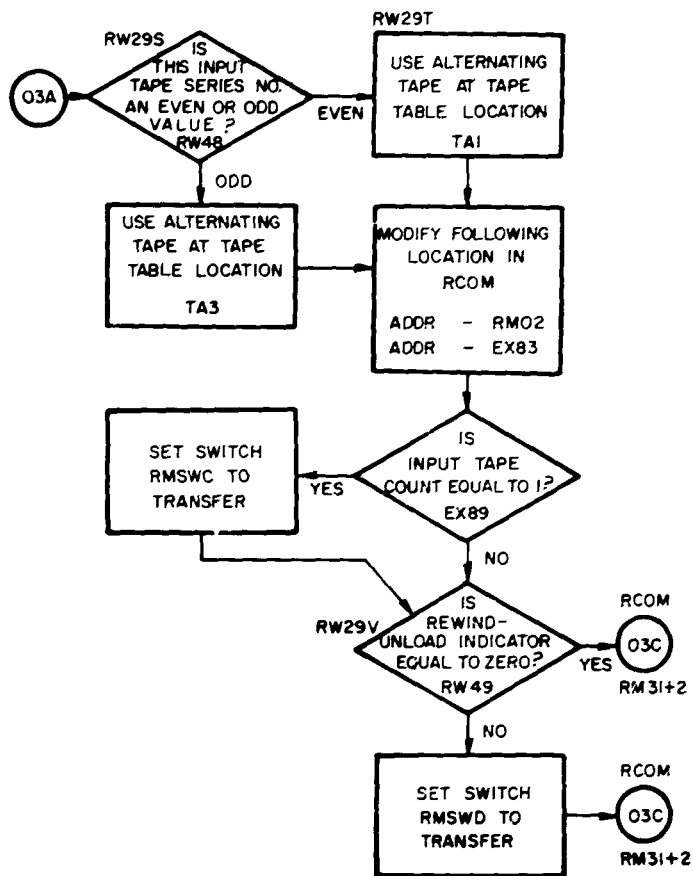
READ THE RAW
DATA TAPE



REGION RRWD



REGION RRWD



Region REDD

EXPLANATION OF REGION:

This routine will read the EDITED DATA TAPE for input into the sort routine.

CALLING SEQUENCE:

L TSX REDD, 4
L + 1 Normal return

INPUT:

EDITED DATA TAPE

OUTPUT:

The location of the next logical record is in the address of the accumulator. The number of words contained in this record is in the decrement.

STORAGE USED:

EDDAT - RE99 - 31 words

SUBREGIONS AND SUBROUTINES USED:

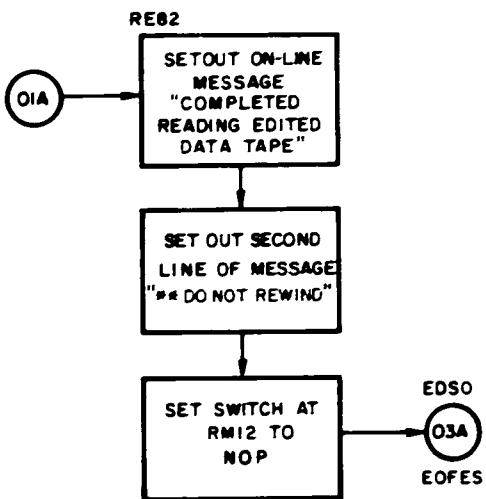
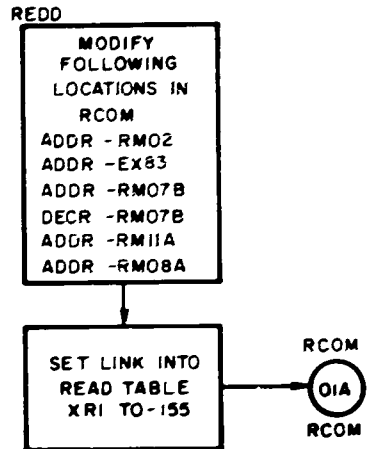
RCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the on-line printer and the program is stopped. If an E. O. F. is encountered the program will automatically go into its E. O. F. exit.

REGION REDD

READ EDITED
DATA TAPE



Region RSTT

EXPLANATION OF REGION:

This routine will read the SORTED TIME TAPE. If the option is C or E it will create at this time a physical SORTED TIME TAPE to be read during option G.

CALLING SEQUENCE:

L TSX RSTT, 4
L + 1 Normal return

INPUT:

SORTED TIME TAPE

OUTPUT:

The location of the next logical record is in the address of the accumulator. The number of words contained in this record is in the decrement.

STORAGE USED:

SPDAT - RA99 - 31 words

SUBREGIONS AND SUBROUTINES USED:

RCOM
WSTT
WDTT

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the on-line printer and the program is stopped. If an E. O. F. is encountered the program will automatically go into its E. O. F. exit.

Region RCOM

EXPLANATION OF REGION:

This routine will set up all the error messages and operate the read routine for the PERT Cost program.

CALLING SEQUENCE:

L TRA RCOM

INPUT:

The following locations are to be modified in the subroutine that uses this routine:

RM09	- Save XR1	RM07B	} Indirect location of tape no.
RM 10	- Save XR4	RM11A	
RM02	- Location of tape no.	RM08A	
RM07B	- Decr - Location of buffers		

OUTPUT:

The first time this routine is entered for a tape, an on-line message is printed out indicating that the program is reading this tape. All unloads or rewinds are also set out on the printer.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

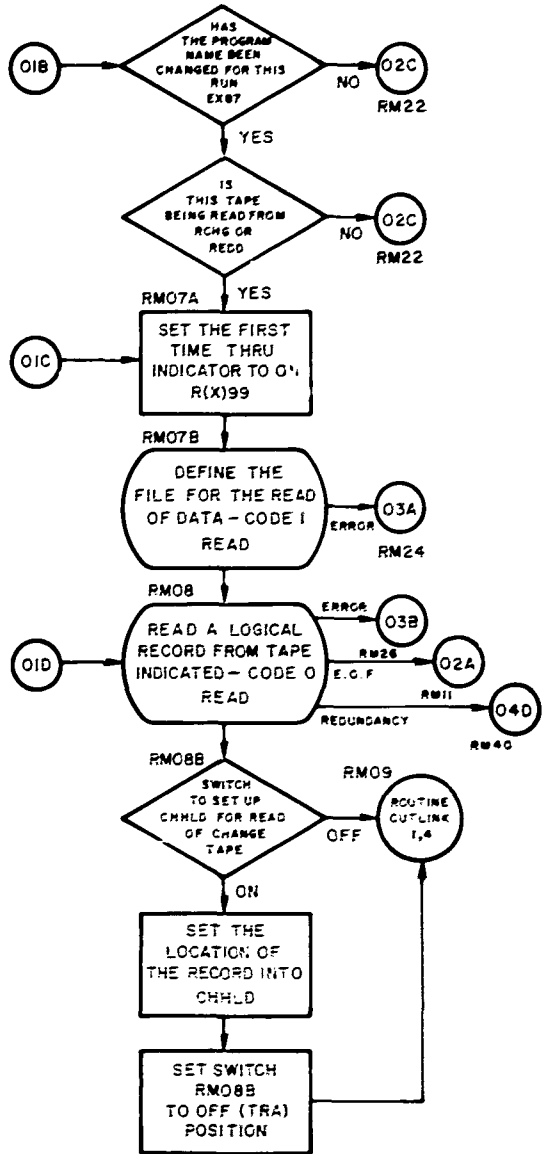
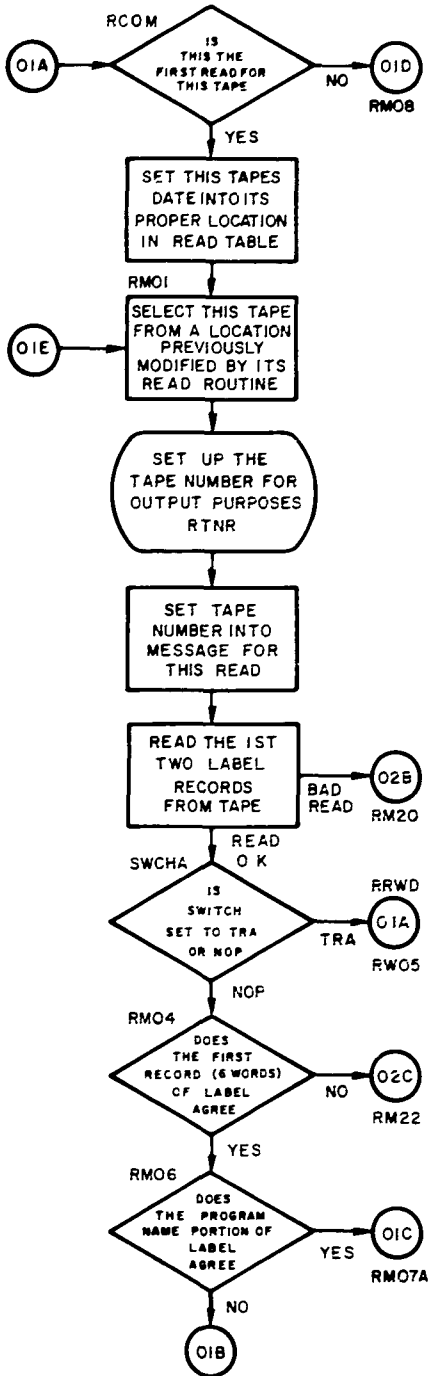
RTNR
TAPSN
READ

EXPLANATION OF CALLING SEQUENCE:

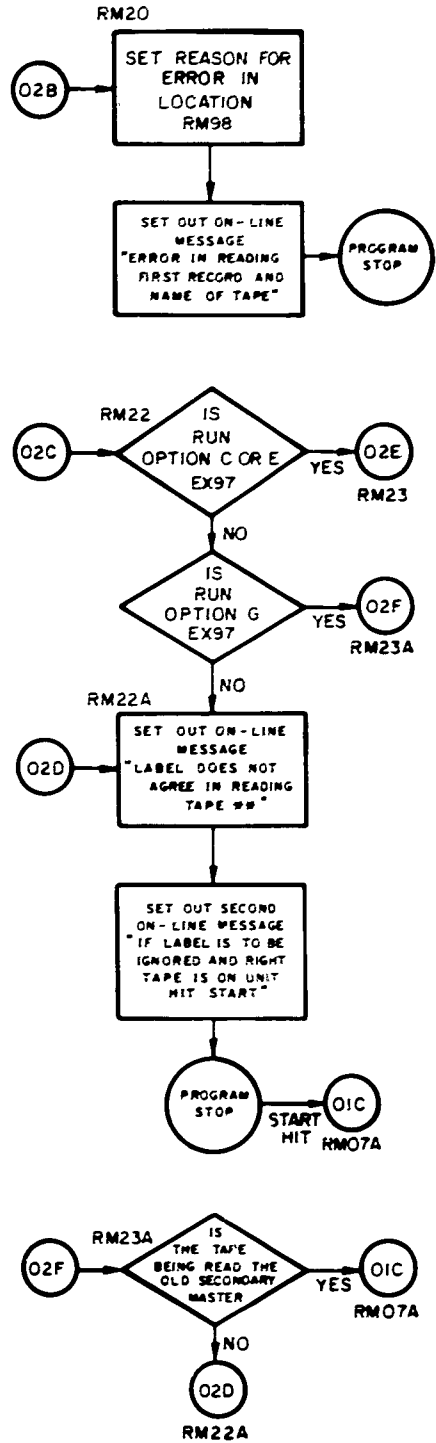
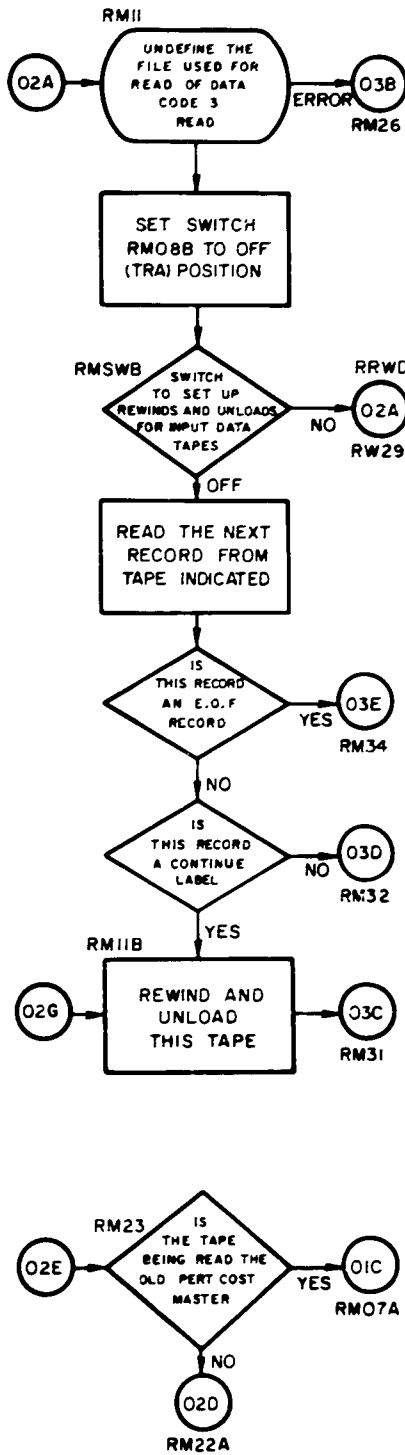
If an error is determined in reading, a message is set out on the on-line printer and the program is stopped. The outlink to this routine is the location set up by the subroutines that use this routine.

REGION RCOM

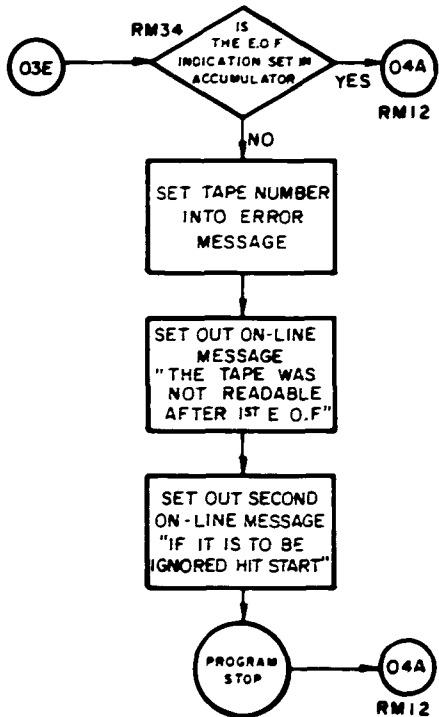
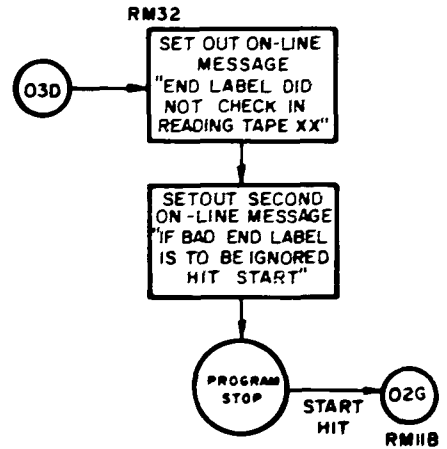
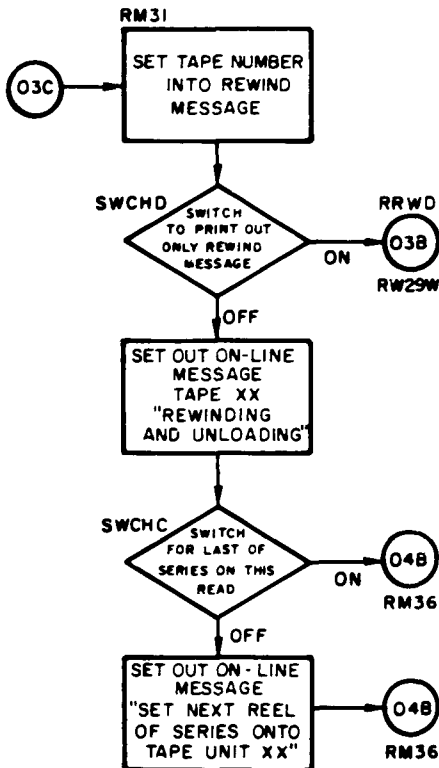
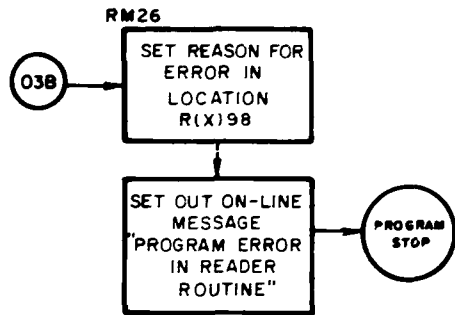
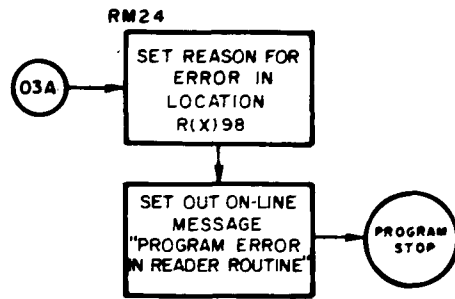
COMMON READ AREA



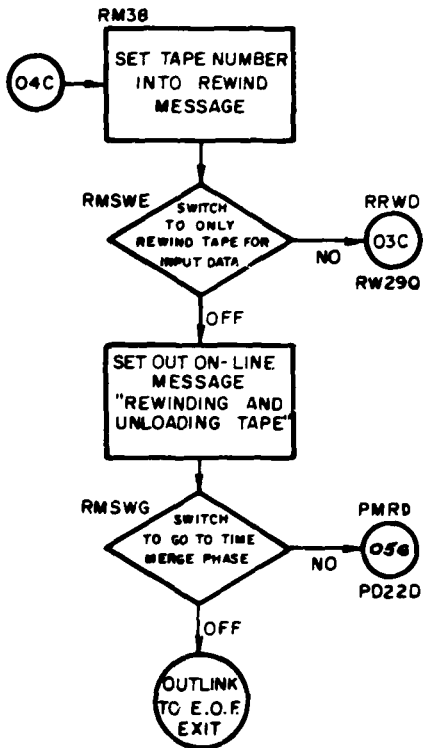
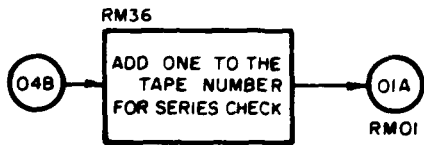
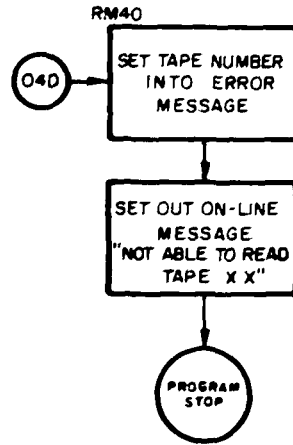
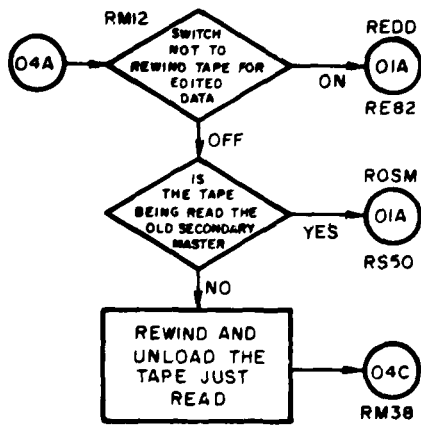
REGION RCOM



REGION RCOM



REGION RCDM



Region RTNR

EXPLANATION OF REGION:

This routine will set up the tape number and beginning read messages.

CALLING SEQUENCE:

L TSX RTNR, 4
L + 1 Normal return

INPUT:

Input is the tape number right-justified in the accumulator

OUTPUT:

Output is the beginning read message on the on-line printer and the set up of tape number into other messages.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

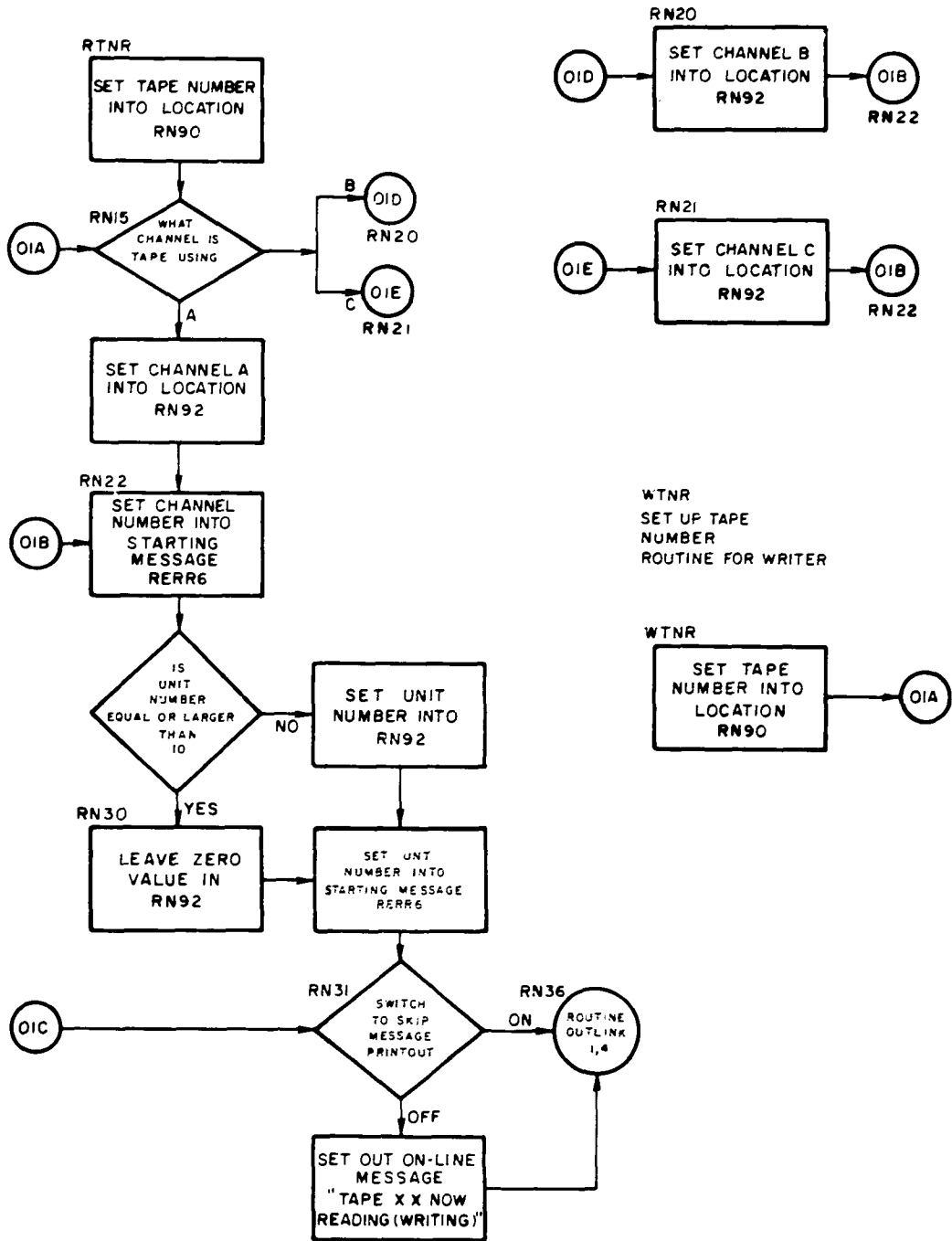
Not applicable

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION RTNR

SETUP TAPE
NUMBER
ROUTINE



Region RINP

EXPLANATION OF REGION:

This routine will read the USERS TIME TAPE input parameters into the system.

CALLING SEQUENCE:

L TSX RINP, 4
L + 1 Normal return

INPUT:

OLD PERT COST MASTER

OUTPUT:

The input parameters will be set into its location in core.

STORAGE USED:

RI25 - RI70 - 21 words

SUBREGIONS AND SUBROUTINES USED:

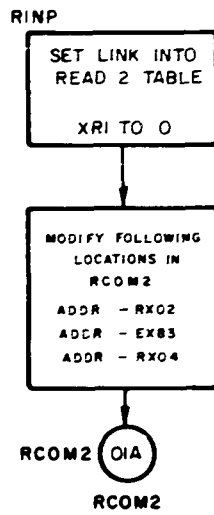
RCOM?

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the on-line printer and the program is stopped.

REGION RINP

READ INPUT
PARAMETERS



Region RRTB

EXPLANATION OF REGION:

This routine will read the rate table into the system from the OLD PERT COST MASTER.

CALLING SEQUENCE:

L TSX RRTB, 4
L + 1 Normal return

INPUT:

OLD PERT COST MASTER

OUTPUT:

The rate table will be set into its location in core.

STORAGE USED:

RR25 - RR70 - 21 words

SUBREGIONS AND SUBROUTINES USED:

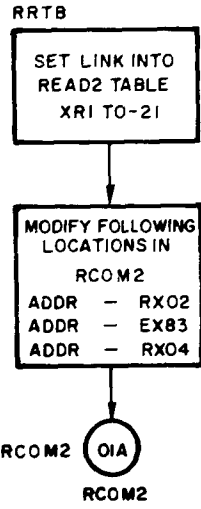
RCOM2

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the on-line printer and the program is stopped.

REGION RRTB

READRATE
TABLE



Region RSTR

EXPLANATION OF REGION:

From the old PERT COST MASTER, this routine will read into the system the skill table tied to rainbow category and cost category.

CALLING SEQUENCE:

L TSX RSTR, 4
L + 1 Normal return

INPUT:

OLD PERT COST MASTER

OUTPUT:

The skill table will be set into its location in core.

STORAGE USED:

RT25 - RT70 - 21 words

SUBREGIONS AND SUBROUTINES USED:

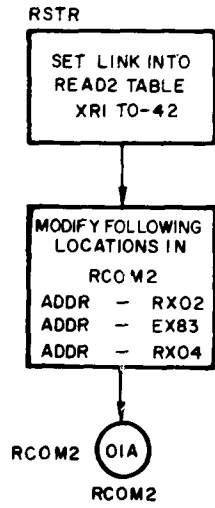
RCOM2

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the on-line printer and the program is stopped.

REGION RSTR

READ SKILL
TABLE



Region RCOM2

EXPLANATION OF REGION:

This routine will handle the control for the PERT COST TABLES.
It will also produce the error messages and operate the read macros.

CALLING SEQUENCE:

L TRA RCOM2

INPUT:

The following locations are to be modified in the subroutine that uses
this routine:

RX09 - Save XR4	RX04 - Location of secondary master
RX02 - Location of tape no.	Date

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

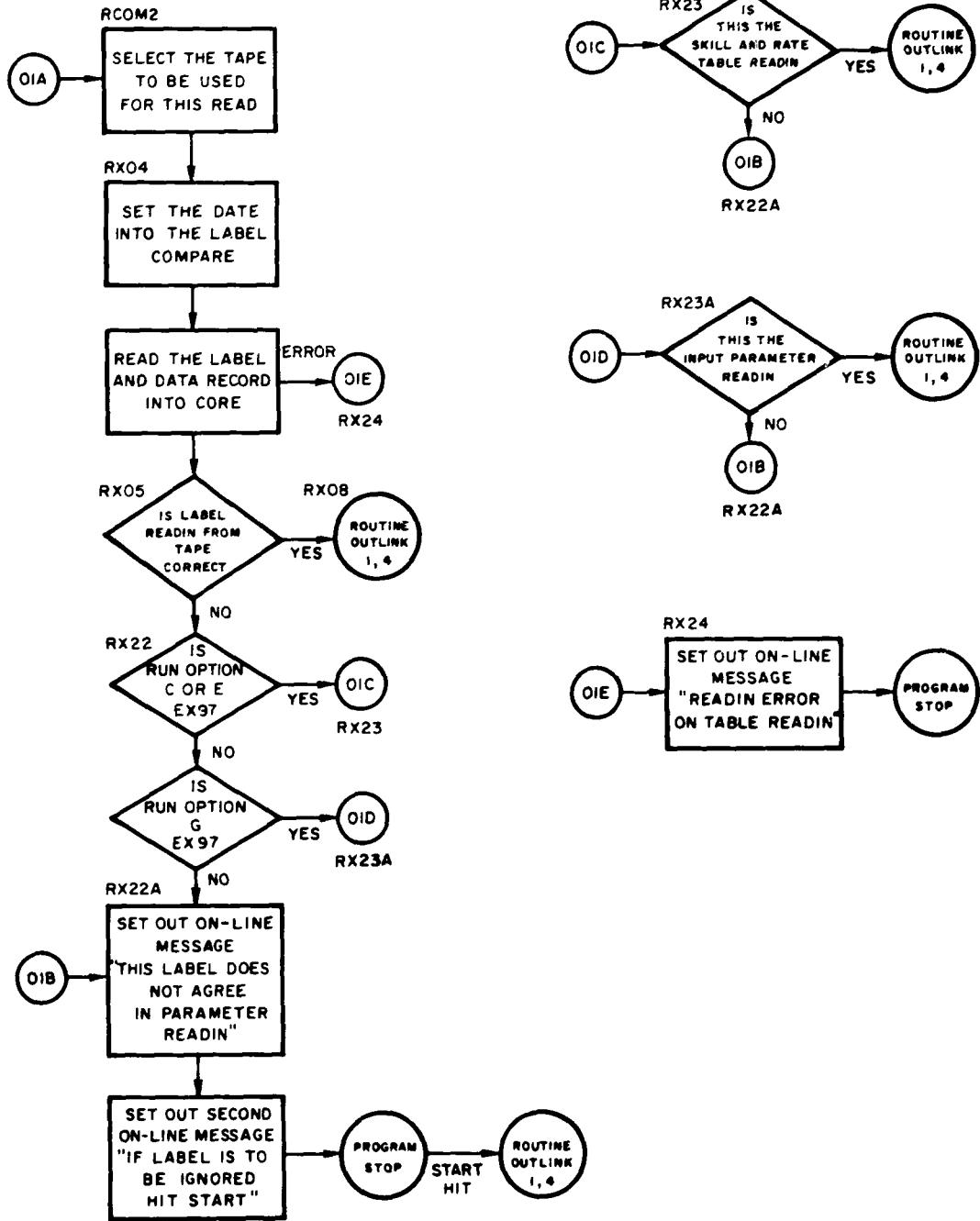
TAPSN (AC)

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in reading, a message is set out on the
on-line printer and the program is stopped. The outlink to this
routine is the location set up by the subroutines that use this routine.

REGION RCOM2

COMMON READ
FOR TABLES



Region WNPM

EXPLANATION OF REGION:

This routine will write the NEW PERT COST MASTER, which is a variable record from a location in core into a blocked record.

CALLING SEQUENCE:

L TSX WNPM, 4
L + 1 Normal return

INPUT:

Location WP91 will contain the location of where the record begins plus the word count.

OUTPUT:

NEW PERT COST MASTER

STORAGE USED:

OPTPE - WP99 - 22 words

SUBREGIONS AND SUBROUTINES USED:

WCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. If end of tape is reached the program will automatically rewind/unload and continue on after setting on a new tape.

REGION WNPM

WRITE NEW
PERT COST
MASTER TAPE

WNPM

SET INDEX
REGISTERS FOR
WRITE TABLES
XR1 TO 0
XR2 TO 0

MODIFY
FOLLOWING
LOCATIONS IN
WCOM

ADDR - WMO8A
DECR - WMO8A
ADDR - WMO4
DECR - WMO4
ADDR - WMO3
ADDR - EX83
ADDR - WM54
DECR - WM54

SET UP COUNT
IN LOCATION
WP9I

WCOM
OIA
WCOM

Region WNSM

EXPLANATION OF REGION:

From a location in core, this routine will write the NEW SECONDARY MASTER, which is a fixed size record, into a blocked record.

CALLING SEQUENCE:

L TSX WNSM, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

NEW PERT COST MASTER (first file)

STORAGE USED:

OSTPE - WS99 - 22 words

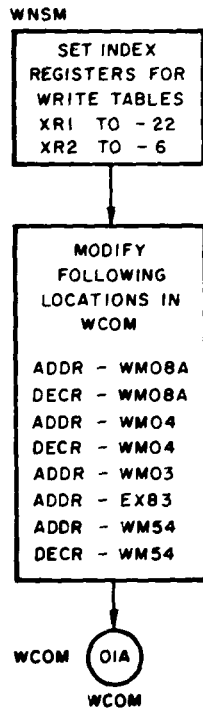
SUBREGIONS AND SUBROUTINES USED:

WCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. If end of tape is reached, the program will automatically rewind/unload and continue on after setting on a new tape.

WRITE NEW
SECONDARY
MASTER TAPE



Region WRWD

EXPLANATION OF REGION:

This routine will write the edited data one record at a time onto the EDITED DATA TAPE.

CALLING SEQUENCE:

L TSX WRWD, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

EDITED DATA TAPE (first file)

STORAGE USED:

EDTPE - WW99 - 22 words

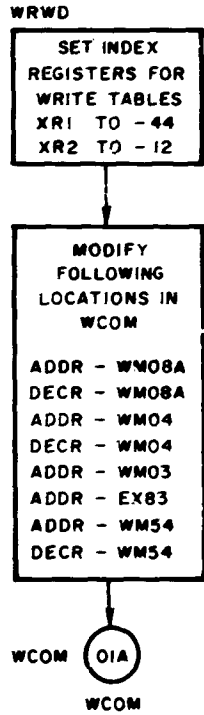
SUBREGIONS AND SUBROUTINES USED:

WCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. If end of tape is reached, the program will automatically rewind/unload and continue on after setting on a new tape.

WRITE EDITED
DATA TAPE



Region WSTT

EXPLANATION OF REGION:

This routine will write the SORTED TIME TAPE in blocks of 600 words during Option C or E.

CALLING SEQUENCE:

L TSX WSTT, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

SORTED TIME TAPE (for use in Option G)

STORAGE USED:

SOTPE - WA99 - 22 words

SUBREGIONS AND SUBROUTINES USED:

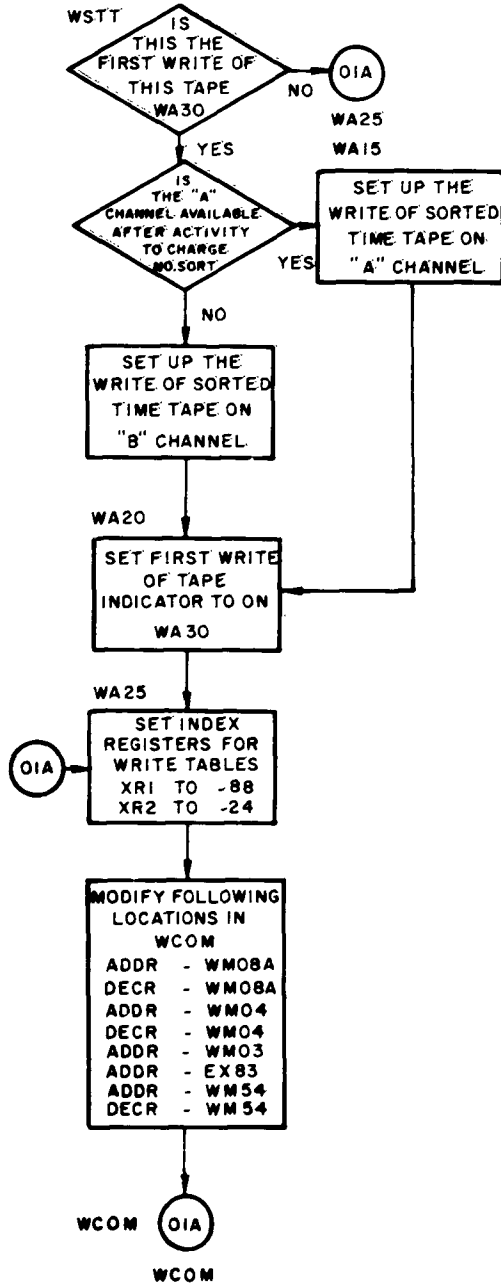
WCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. If end of tape is reached, the program will automatically rewind/unload and continue on after setting on a new tape.

REGION WSTT

WRITE SORTED
TIME TAPE



Region WCHG

EXPLANATION OF REGION:

This routine will write the SORTED DATA TAPE in blocks of 200 words.

CALLING SEQUENCE:

L TSX WCHG, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

SORTED DATA TAPE (second file - after EDITED DATA TAPE)

STORAGE USED:

OCTPE - WC99 - 22 words

SUBREGIONS AND SUBROUTINES USED:

WCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. If end of tape is reached, the program will automatically rewind/unload and continue on after setting on a new tape.

REGION WCHG

WRITE SORTED
DATA TAPE

WCHG

SET INDEX
REGISTERS FOR
WRITE TABLES
XR1 TO -66
XR2 TO -18

MODIFY FOLLOWING
LOCATIONS IN
WCOM

ADDR	-	WMO8A
DECR	-	WMO8A
ADDR	-	WMO4
DECR	-	WMO4
ADDR	-	WMO3
ADDR	-	EX83
ADDR	-	WM54
DECR	-	WM54

WCOM

OIA

WCOM

Region WCOM

EXPLANATION OF REGION:

This routine will set up all the error messages and operate the write routine for the PERT COST PROGRAM.

CALLING SEQUENCE:

L TRA WCOM

INPUT:

The following locations are to be modified in the subroutine that uses this routine:

WM09 - Save XR1	WM03 - Location of tape no.	
WM09A - Save XR2	WM04	
WM10 - Save XR4	WM08A	} Indirect location of tape no.
WM04 - Decr - Address of location of output buffers	WM54 - Addr WM54 - Decr	

OUTPUT:

The first time this routine is entered for a tape, an on-line message is printed out indicating that the program is writing this tape. All unloads or rewinds are also set out on the printer.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

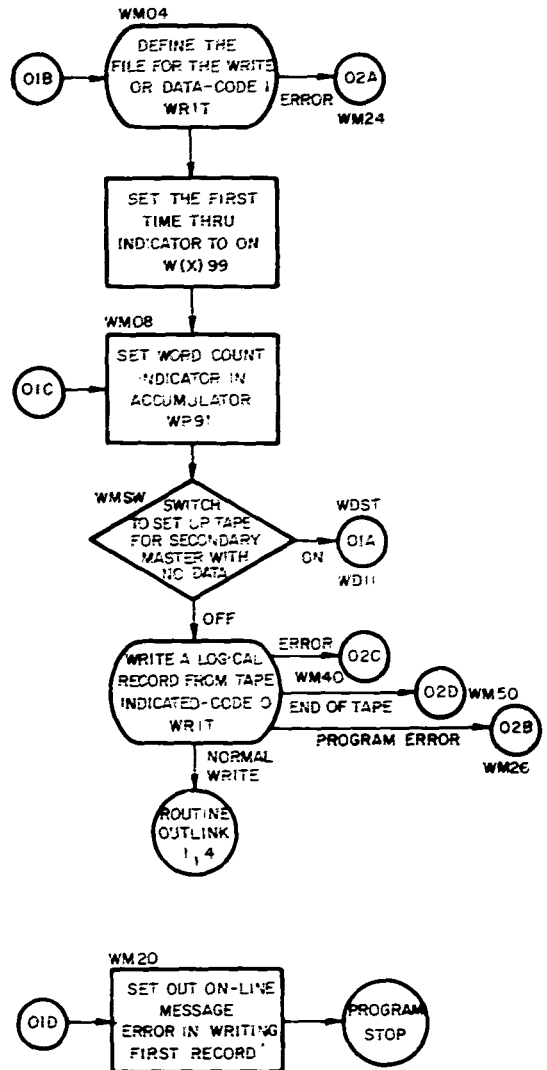
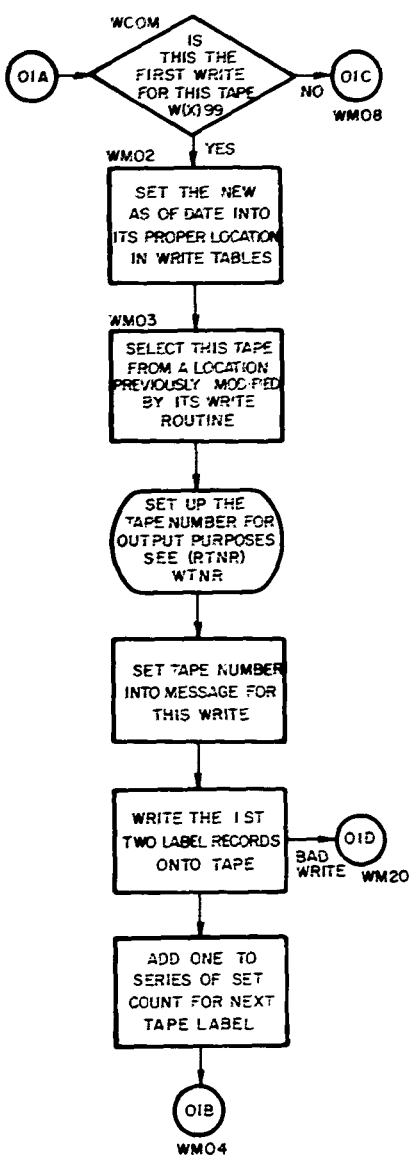
TAPSN
WRIT

EXPLANATION OF CALLING SEQUENCE:

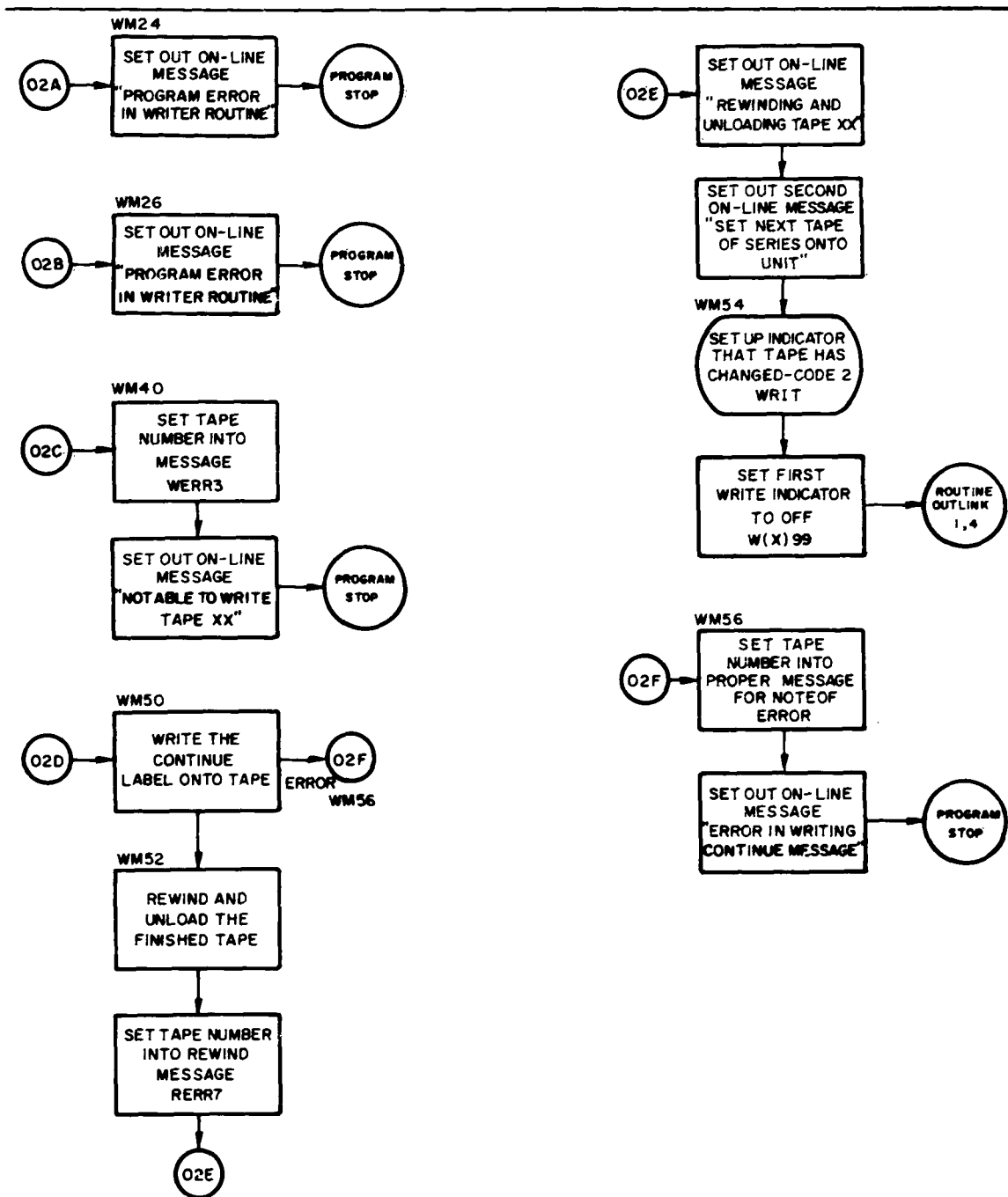
If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. The outlink to this routine is the location set up by the subroutines that use this routine.

REGION WCOM

COMMON WRITE
ROUTINE



REGION WCOM



Region WINP

EXPLANATION OF REGION:

This routine will write the **USERS TIME TAPE** input parameters from core onto tape.

CALLING SEQUENCE:

L **TSX WINP, 4**
L + 1 **Normal return**

INPUT:

The input parameters in core

OUTPUT:

NEW PERT COST MASTER (first file)

STORAGE USED:

WI25 - WI30 - 6 words

SUBREGIONS AND SUBROUTINES USED:

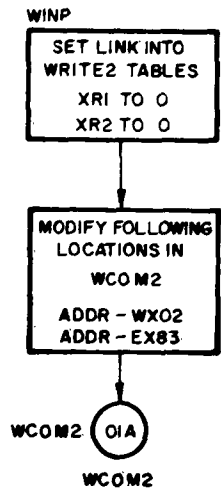
WCOM2

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped.

REGION WINP

WRITE INPUT
PARAMETERS



Region WRTB

EXPLANATION OF REGION:

This routine will write the rate table from core onto the NEW PERT COST MASTER.

CALLING SEQUENCE:

L TSX WRTB, 4
L + 1 Normal return

INPUT:

The rate table in core

OUTPUT:

NEW PERT COST MASTER (second file)

STORAGE USED:

WR25 - WR30 - 6 words

SUBREGIONS AND SUBROUTINES USED:

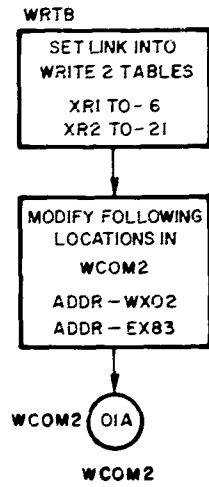
WCOM2

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped.

REGION WRTB

WRITE RATE
TABLE



Region WSTR

EXPLANATION OF REGION:

This routine will write the skill table, tied to rainbow category and cost category, from core onto the NEW PERT COST MASTER.

CALLING SEQUENCE:

L TSX WSTR, 4
L + 1 Normal return

INPUT:

The skill table in core

OUTPUT:

NEW PERT COST MASTER (second file)

STORAGE USED:

WT25 - WT30 - 6 words

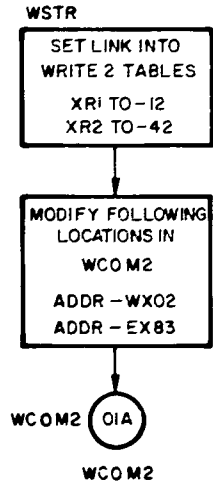
SUBREGIONS AND SUBROUTINES USED:

WCOM2

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped.

WRITE SKILL
TABLE



Region WCOM2

EXPLANATION OF REGION:

This routine will write out the tables for the PERT Cost program, according to the modifications set up by the subroutines that use this routine.

CALLING SEQUENCE:

L TRA WCOM2

INPUT:

The following locations are to be modified in the subroutine that uses this routine:

WX04 - Save XR1

WX02 - Location of tape no.

WX05 - Save XR2

WX06 - Save XR4

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

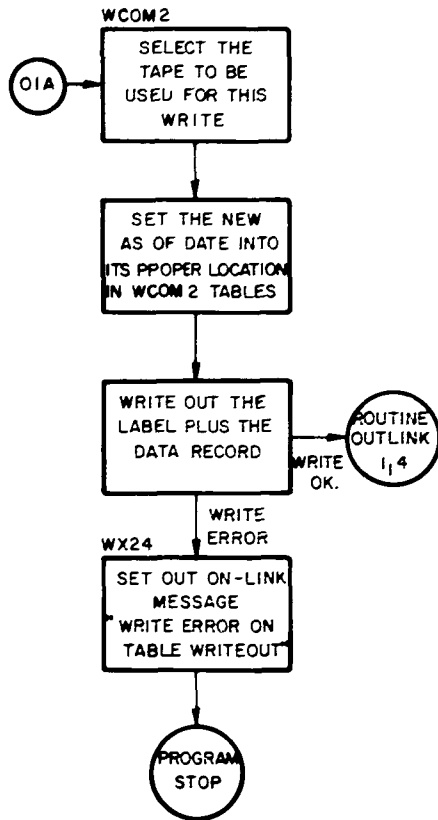
SUBREGIONS AND SUBROUTINES USED:

TAPSN

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. The outlink to this routine is the location set up by the subroutines that use this routine.

COMMON WRITE
FOR TABLES



Region WDNP

EXPLANATION OF REGION:

This routine will write the E. O. F. and accomplish the rewind/unloads, for the NEW PERT COST MASTER.

CALLING SEQUENCE:

L TSX WDNP, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

A completed NEW PERT COST MASTER TAPE rewind and unloaded (second file)

STORAGE USED:

Not applicable

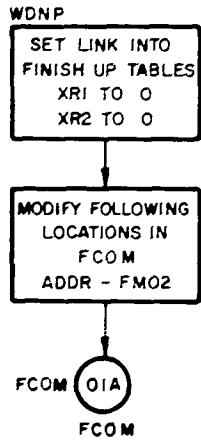
SUBREGIONS AND SUBROUTINES USED:

FCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in finishing up this tape, a message is set out on the on-line printer and the program is stopped.

FINISH UP
PERT COST TAPE



Region WDNS

EXPLANATION OF REGION:

This routine will write the E. O. F. for the NEW SECONDARY MASTER TAPE.

CALLING SEQUENCE:

L TSX WDNS, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

A completed NEW SECONDARY MASTER TAPE (first file of the
NEW PERT COST MASTER TAPE)

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

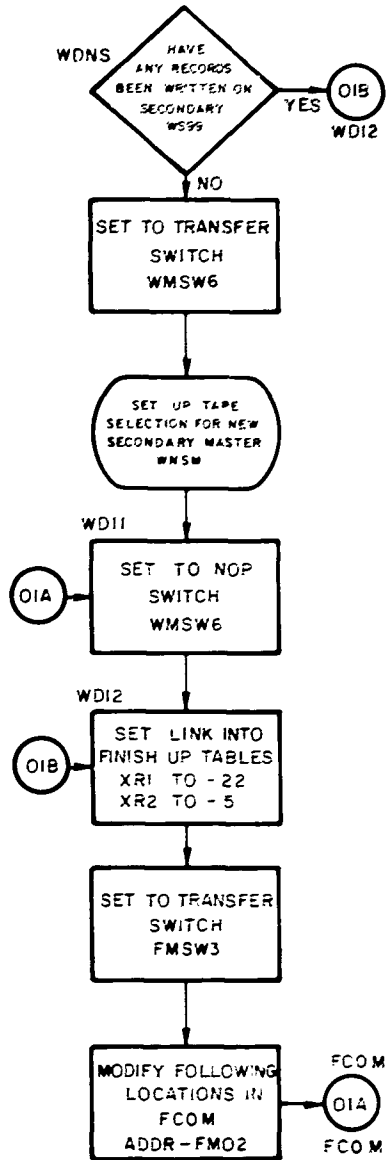
FCOM (AB)

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in finishing up this tape, a message is set out on the on-line printer and the program is stopped

REGION WDNS

FINISH UP
SECONDARY TAPE



Region WDNE

EXPLANATION OF REGION:

This routine will accomplish the finishing activities for the EDITED DATA TAPE.

CALLING SEQUENCE:

L TSX WDNE, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

A completed EDITED DATA TAPE (first file, prior to SORTED DATA TAPE)

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

FCOM

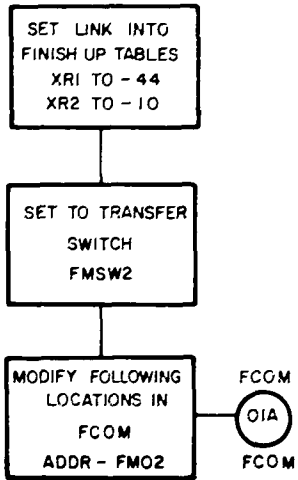
EXPLANATION OF CALLING SEQUENCE:

If an error is determined in finishing up this tape, a message is set out on the on-line printer and the program is stopped

REGION WONE

FINISH UP
EDITED TAPE

WONE



Region WDST

EXPLANATION OF REGION:

This routine will accomplish the finishing activities for the SORTED DATA TAPE.

CALLING SEQUENCE:

L TSX WDST, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

A completed SORTED DATA TAPE (second file, following EDITED DATA TAPE)

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

FCOM

EXPLANATION OF CALLING SEQUENCE:

If an error is determined in finishing up this tape, a message is set out on the on-line printer and the program is stopped.

REGION WDST

FINISH UP SORTED
DATA TAPE

WDST

SET LINK INTO
FINISH UP TABLES
XR1 TO -66
XR2 TO -15

SET TO TRANSFER
SWITCH
FMSW

MODIFY FOLLOWING
LOCATIONS IN
FCOM
ADDR - FMO2

FCOM
O1A
FCOM

Region WDTT

EXPLANATION OF REGION:

This routine will accomplish the finishing activities for the SORTED TIME TAPE in Options C or E.

CALLING SEQUENCE:

L TSX WDTT, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

A completed SORTED TIME TAPE to be used for Option G

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

FCOM

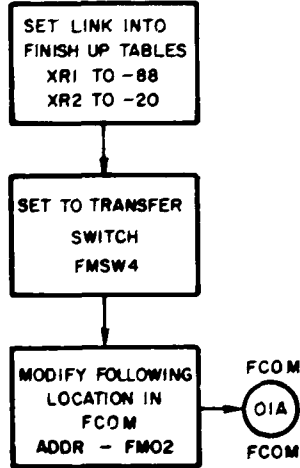
EXPLANATION OF CALLING SEQUENCE:

If an error is determined in finishing up this tape, a message is set out on the on-line printer and the program is stopped.

REGION WDTT

FINISH UP SORTED
TIME TAPE

WDTT



Region FCOM

EXPLANATION OF REGION:

This routine is the common routine for all finish-up subroutines. This routine will write the ending E. O. F. and rewind and unload according to the option requested.

CALLING SEQUENCE:

L TRA FCOM

INPUT:

The following locations are modified by the subroutines that use this routine:

FM07 - Save XR1

FM02 - Indirect location of tape no.

FM08 - Save XR2

FM09 - Save XR4

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

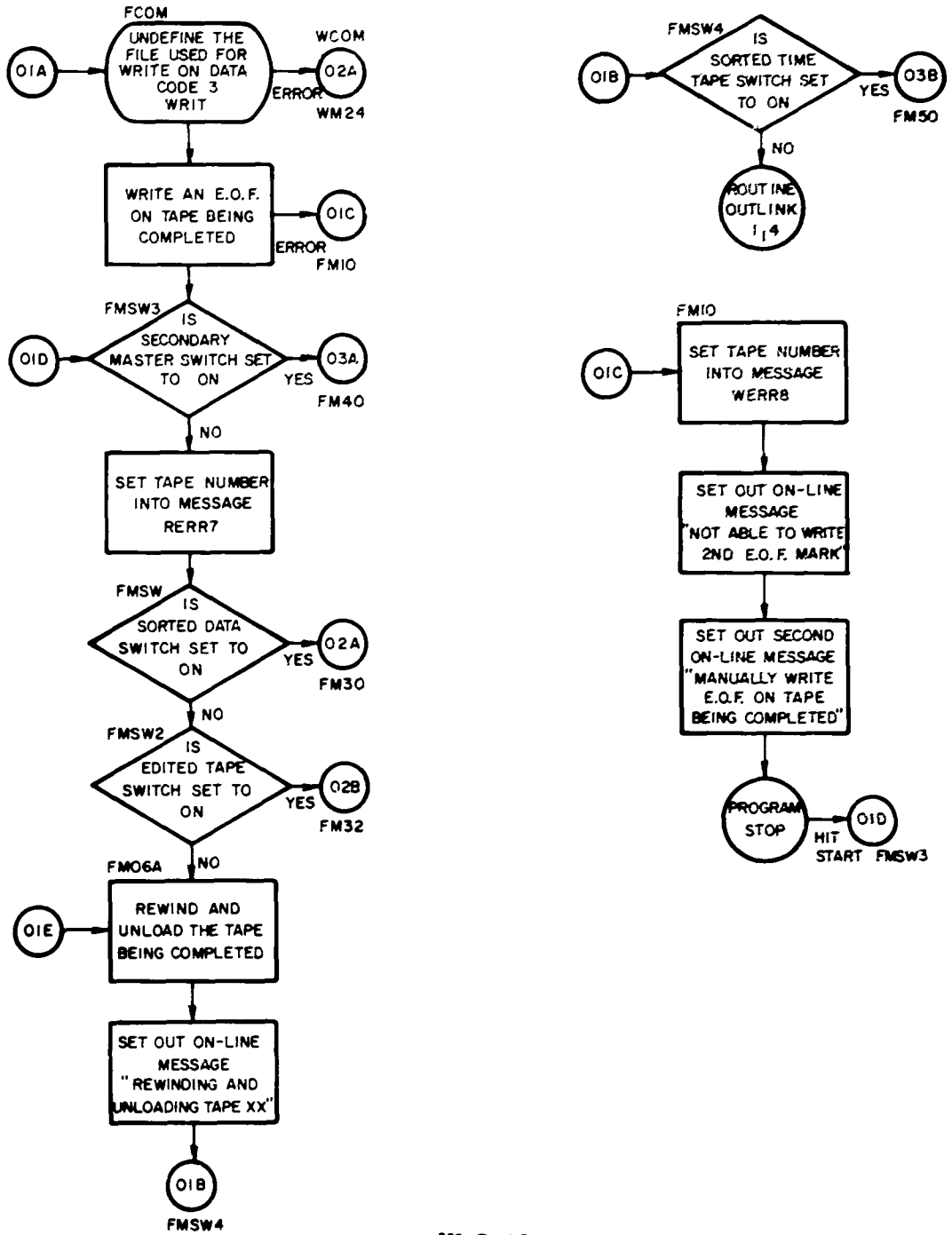
WRIT

EXPLANATION OF CALLING SEQUENCE:

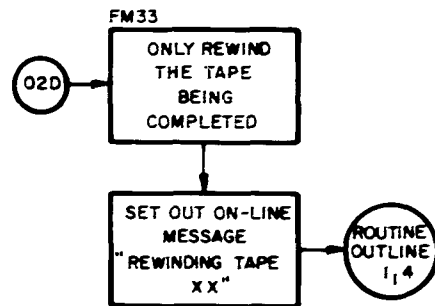
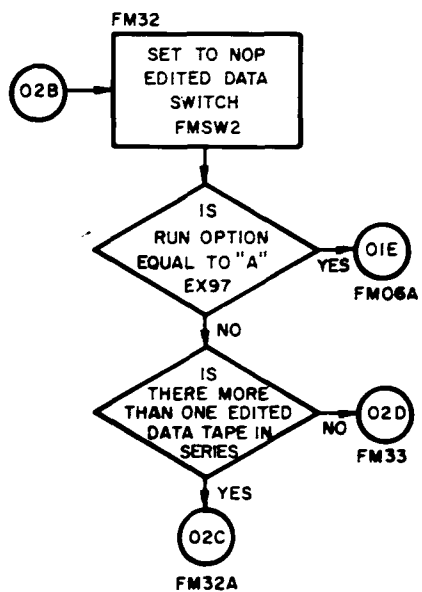
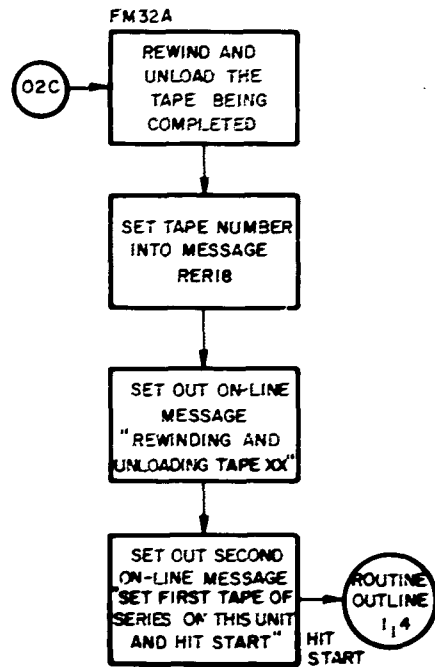
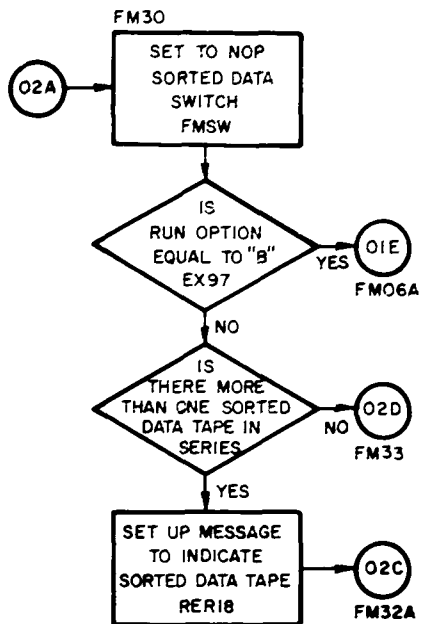
If an error is determined in writing, a message is set out on the on-line printer and the program is stopped. The outlink to this routine is the location set up by the subroutines that use this routine.

REGION FCOM

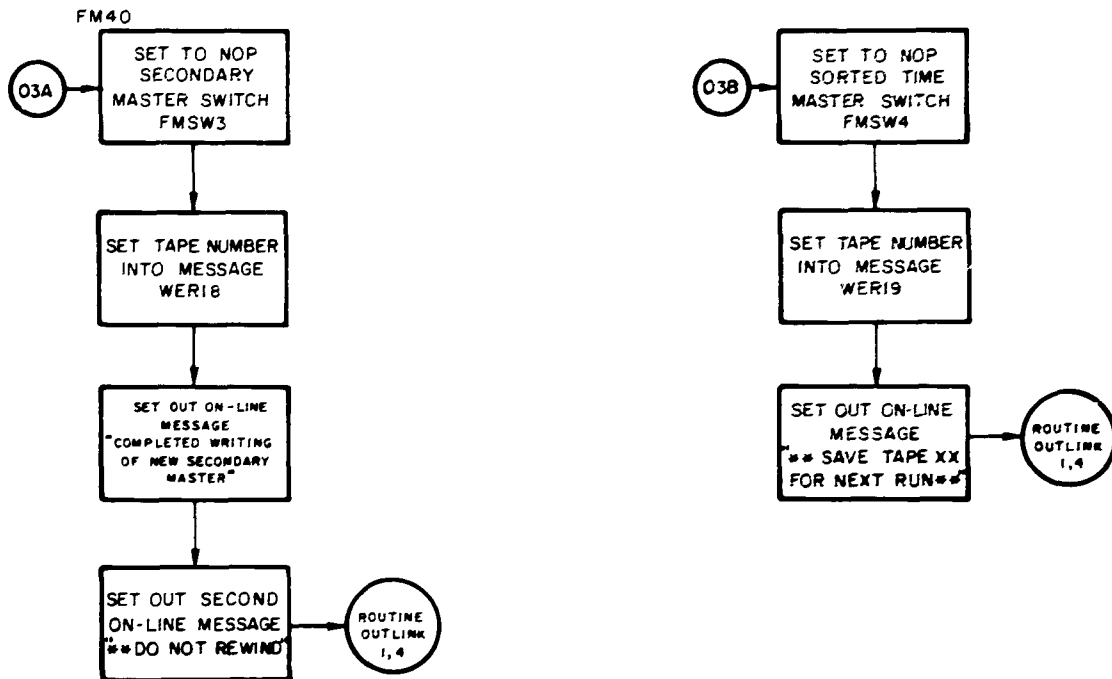
COMMON WRITE
FINISHUP ROUTINE



REGION FCOM



REGION FCOM



Region TAPSN

EXPLANATION OF REGION:

This routine will select the tapes and set the indicated density.

CALLING SEQUENCE:

L	TSX	TAPSN, 4
L + 1	PZE	A
L + 2		Normal return

INPUT:

Not applicable.

OUTPUT:

The tape number in the address of the accumulator in the form of XN.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

A is the location of a word of the following format:

PZE T,I

where T is the physical tape address and I is the indicated density.

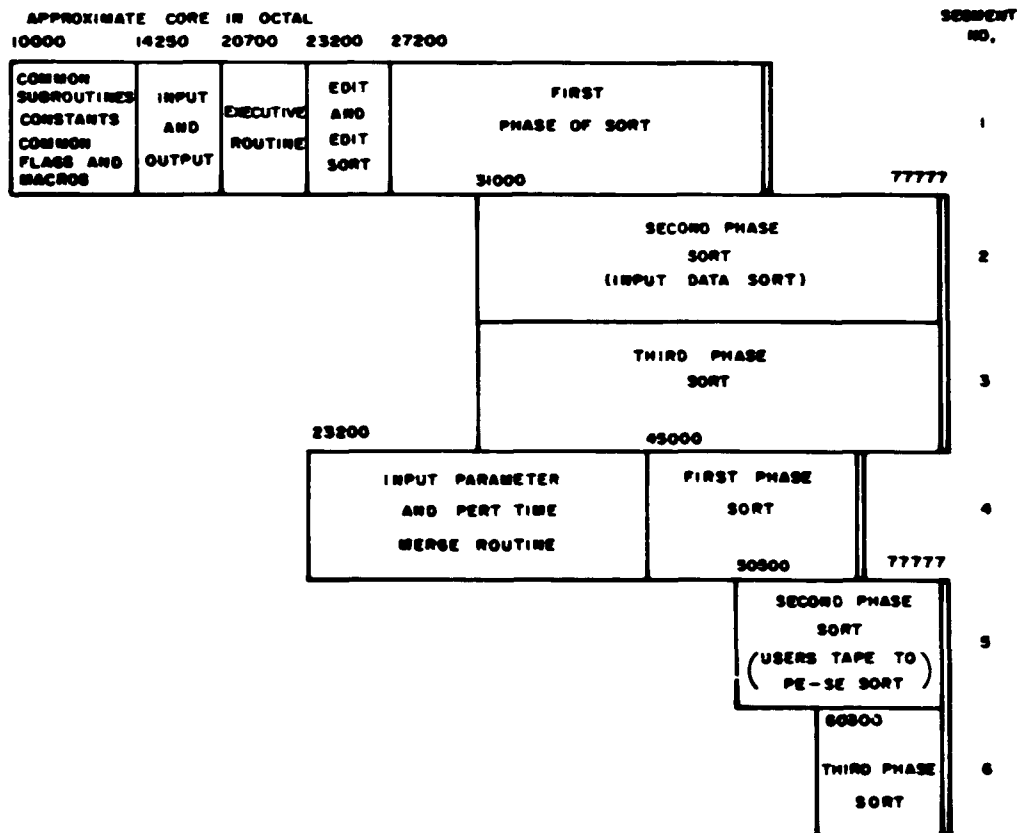
III-C PERT COST EXECUTIVE

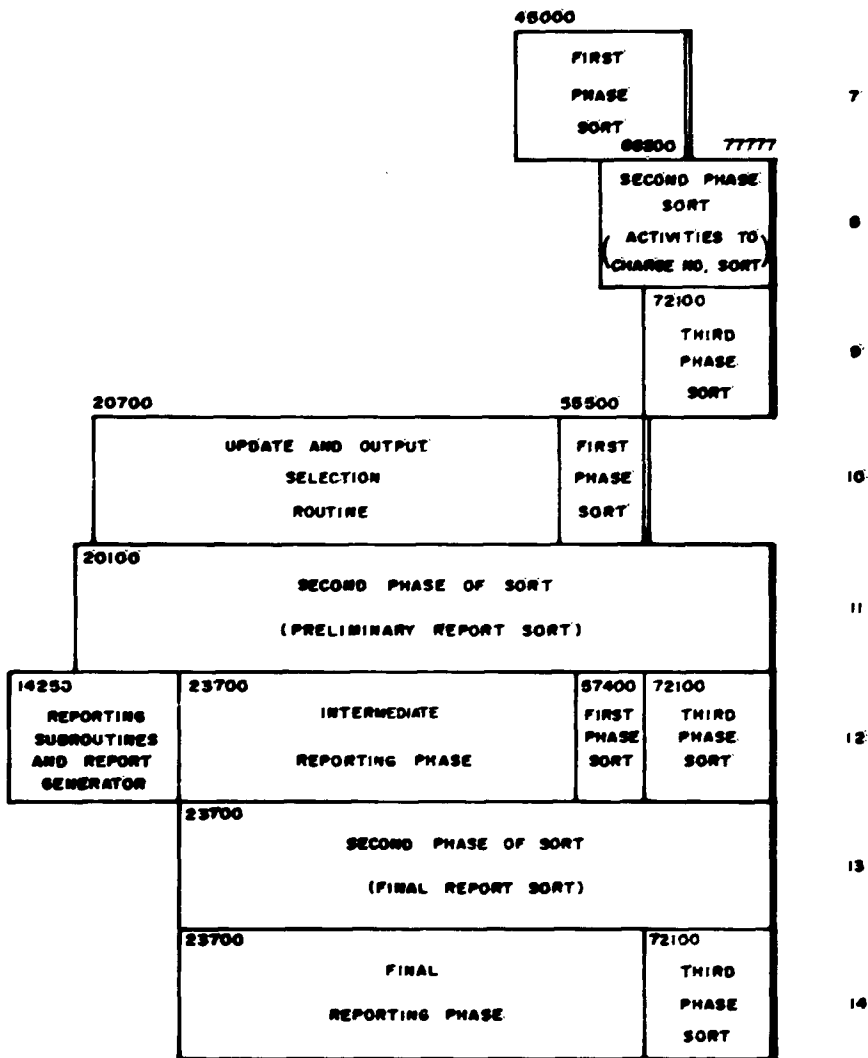
The executive routine will control the loading of the program segments into core, plus the editing of the program control cards. All option control and checks are developed in this routine as well as the initial tape rewinds at program start.

Program Segmentation

The program can be broken down into five basic segments, excluding the sorts, of which each segment itemized below will overlay core area used by the previous segment. The option used will dictate which segments will go into core or be bypassed. Discussed below are each option and the segments used, including the output phase which is not controlled by the executive routine.

a. The Complete Program Segmentation





b. Option A Program Segment Usage

Only segment number 1 is brought into core.

c. Option B Program Segment Usage

Segment 1 is first brought into core. After completion of the edit phase, segment 2 is brought in to sort the input data in the required sequence. At the last pass of the sort, segment 3 is moved into its core location to pull in the sorted information and create the SORTED DATA TAPE.

d. Option C Program Segment Usage

The Option B program segment usage will also hold true for this option. After the creation of the SORTED DATA TAPE, segment 4 is brought in. If it is requested that the USERS TIME TAPE be sorted, segments 5 and 6 are moved in, after which a PSEUDO USERS TIME TAPE is created and segment 7 is moved in. If the USERS TIME TAPE does not have to be sorted, segments 5 and 6 are bypassed and segment 7 is brought in. After completion of the merge phase, segment 8 is brought in to sort the activities into charge number sequence. At the last pass of the sort, segment 9 is moved into its core location to pull in the sorted information and create the SORTED TIME TAPE. (For Option C, segment 10 is brought in to pick up certain information from the OLD PERT COST MASTER TAPE and to duplicate it onto the NEW PERT COST MASTER TAPE. In this option, segment 10 does no updating.) After completing this phase, segment 11 is brought in to sort the WORK PACKAGE/ACTIVITY REPORT (which is the only output from this option) into its proper order. At the last pass of the sort, segment 12 is moved into its core location to create the report and set it out on the OUTPUT REPORT TAPE.

e. Option D Program Segment Usage

The Option B program segment usage will also hold true for this option. After the creation of the SORTED DATA TAPE, segment 4 is brought in. If it is requested that the USERS TIME TAPE be sorted, segments 5 and 6 are moved in, after which a PSEUDO USERS TIME TAPE is created and segment 7 is moved in. If the USERS TIME TAPE does not have to be sorted, segments 5 and 6 are bypassed and segment 7 is moved in. After completion of the merge phase, segment 8 is brought in to sort the activities into charge number sequence. At the last pass of the sort, segment 9 is moved into its core location. It will pull in the sorted information but will not create a physical SORTED TIME TAPE. At the same time that segment 9 is brought in, segment 10 is moved into core. After completion of the update and report selection routine, segment 11 is brought in to sort the output data. For the WORK PACKAGE/ACTIVITY REPORTS it will be the final sort; for all other reports it will be an intermediate sort. At the last pass of the sort, segment 12 is brought in to manipulate the data and to set

them out for the final sort. After completion of this manipulation, segment 13 is brought in to sort the output data in the required sequence. At the last pass of the sort, segment 14 is moved into its core location to pull in the sorted information and create the reports to be placed on the OUTPUT REPORT TAPE.

f. Option E Program Segment Usage

The Option E program segment usage will read in segment 1, bypass 2 and 3, and move segment 4 into its core location. It will use a SORTED DATA TAPE created in an earlier run. Option E will then follow the exact program segment usage as indicated in Option C.

g. Option F Program Segment Usage

The Option F program segment usage will read in segment 1, bypass 2 and 3, and move segment 4 into its core location. It will use a SORTED DATA TAPE created in an earlier run. Option F will then follow the exact program segment usage as indicated in Option D.

h. Option G Program Segment Usage

The Option B program segment usage will also hold true for this option. After creation of the SORTED DATA TAPE, segment 4 is brought in. The only reason that this segment is used is to duplicate the OLD SECONDARY MASTER TAPE onto the NEW SECONDARY MASTER TAPE. After the duplication effort, segments 5, 6, 7, 8, and 9 are bypassed, and segment 10 is brought into core. This option will use SORTED TIME TAPE created in an earlier run. After segment 10 is brought in, Option G will operate exactly as does Option D.

Control Card Setup

The control cards used with any one run will be set on the INPUT DATA TAPE as the first records following the unsorted data label. Following the control cards will be the raw or edited input data. During the edit phase the control cards will be set onto the EDITED DATA TAPE. If more than one input tape is used the first tape read in will be the one that contains the control cards.

Executive On-Line Messages

At the start of the program, certain information-type messages are set out on the on-line printer. These messages indicate the option selected as well as the reports requested. These messages will take the following forms:

a. Beginning Message

THE PERT - COST PROCESSING RUN OF DDMMYY
FOR - (Program Name)

The date in the beginning message is the NEW MASTER FILE DATE from the control card, and the program name is determined from the name in the "A" control card.

b. Option Selected Message

This message will vary, depending on the option selected by the user.

Option A

THE FOLLOWING PHASE WILL BE OPERATED UPON:

INPUT EDIT

Option B

THE FOLLOWING PHASES WILL BE OPERATED UPON:

INPUT EDIT

INPUT EDIT SORT

Option C

THE FOLLOWING PHASES WILL BE OPERATED UPON:

INPUT EDIT

INPUT EDIT SORT

TIME MERGE AND SORT

13 - ORGANIZATIONAL STATUS REPORT - RESP, CHGE, PERF, RESC	LEVEL NO. XX
20 - ORGANIZATIONAL STATUS REPORT - NETW, PERF, CHGE, RESP, RESC	LEVEL NO. XX
21 - ORGANIZATIONAL STATUS REPORT - NETW, RESC, CHGE, RESP, PERF	LEVEL NO. XX
22 - ORGANIZATIONAL STATUS REPORT - NETW, CHGE, RESP, PERF, RESC	LEVEL NO. XX
23 - ORGANIZATIONAL STATUS REPORT - NETW, RESP, CHGE, PERF, RESC	LEVEL NO. XX
30 - MANAGEMENT SUMMARY REPORT	LEVEL NO. XX
35 - PROGRAM/PROJECT STATUS REPORT	LEVEL NO. XX
40 - FINANCIAL PLAN/STATUS REPORT - MNTH, CHGE	LEVEL NO. XX
41 - FINANCIAL PLAN/STATUS REPORT - MNTH	LEVEL NO. XX
50 - MANPOWER LOADING REPORT - RESC, MNTH, PERF, CHGE	LEVEL NO. XX
51 - MANPOWER LOADING REPORT - RESC, MNTH	LEVEL NO. XX
52 - MANPOWER LOADING REPORT - PERF, MNTH, RESC	LEVEL NO. XX
55 - RAINBOW CATEGORY REPORT	LEVEL NO. XX
60 - COST CATEGORY STATUS REPORT	LEVEL NO. XX
70 - SUMMARY FINANCIAL FORECAST - SUMMARY ITEM - YEAR	LEVEL NO. XX
71 - SUMMARY FINANCIAL FORECAST - COST CATEGORY - YEAR	LEVEL NO. XX
75 - SUMMARY FINANCIAL FORECAST - SUMMARY ITEM - MNTH	LEVEL NO. XX
76 - SUMMARY FINANCIAL FORECAST - COST CATEGORY - MNTH	LEVEL NO. XX
80 - BUDGET AUTHORIZATION AND UPDATING FORM	LEVEL NO. XX
85 - ESTIMATING AND UPDATING FORM	LEVEL NO. XX

For the above messages, the first two lines will come out on all on-line listings. For Options C and E, the program will automatically set out report type 01 and its accompanying message. On Options D, F, and G, one or more of the messages will be set out, dependent on what reports have been selected.

The XX following the LEVEL NO. will indicate the level that has been requested for a particular report. Each level will be another line with the level number indicated in the message. If the level number is above 16, the following message will be put out on the on-line printer:

LEVEL OVER 16 INDICATED WILL BE SET TO 16

If the report number requested is not a legal number, the following message will be put out on the on-line printer, with the XX indicating the illegal number:

UNAUTHORIZED REPORT NO. XX

d. End-of-Phase Messages

At the end of each major phase, a message will be forthcoming indicating the completion of one phase and the entrance into the next phase. These messages will take the following forms, depending on the phase being completed:

1. END OF PERT EDIT PHASE
2. END OF PERT COST EDIT SORT PHASE
3. END OF PERT COST TIME MERGE PHASE
4. END OF PERT COST UPDATE PHASE
5. END OF PERT COST PROCESSING RUN

If at the completion of a particular phase, the program is to finish without entering another phase, the message, END OF PERT COST PROCESSING RUN, will supersede the normal end-of-phase message.

Executive Control Card Error Messages

The executive routine will accomplish the editing of the program control cards. Any error that is determined during this edit operation will have an accompanying message indicating the problem set out on the on-line printer. If any errors are determined, the system will stop at completion of the control card edit. These error messages will take the following form:

- a. THE-A-CARD IS NOT THE FIRST CONTROL CARD IN THE SYSTEM

The first control card read by the executive program is not an "A" card.

b. **A DATE ON THE CONTROL CARD HAS NON-NUMERIC CHARACTERS IN THE DD OR YY**

One of the "A" control card dates has a non-numeric day or year in the field.

c. **CANNOT LOCATE A MONTH INDICATED ON CONTROL CARD DATE**

One of the "A" control card dates has an illegitimate month in its field.

d. **THE DAYS DO NOT FALL IN THE RANGE SPECIFIED BY THE MONTH**

The number of days associated with a particular month does not fall in the range specified for that month.

e. **THERE IS NO OPTION CODE IN CONTROL CARD A**

The column to indicate option code is blank or zero in control card "A"

f. **THE OPTION CODE IS INCORRECT**

The option code in control card "A" is not in the range of A to G

g. **THERE IS NO AS OF DATE IN CONTROL CARD A**

The new master file date in control card "A" columns 12 through 18 is blank or zero.

h. **ONE OF THE DATES REQUIRED FOR OPERATION IS NOT INCLUDED IN CONTROL CARD A**

Dependent upon the option requested, certain dates have to be present in the "A" control card. These options and dates are:

1. Option A - New Master File Date
2. Option B - New Master File Date
3. Option C - New Master File Date
Report Issue Date
PERT Time Tape Date
Secondary Master Date

- 4. Option D - New Master File Date
Report Issue Date
PERT Time Tape Date
Secondary Master Date
PERT Cost Master Date
 - 5. Option E - Same as Option C
 - 6. Option F - Same as Option D
 - 7. Option G - New Master File Date
Report Issue Date
PERT Time Tape Date
PERT Cost Master Date
- i. **DUPLICATE A CARDS FOR THIS RUN**
More than one "A" card is present in the control card deck.
 - j. **INPUT TAPE COUNT INCORRECT**
The column indicating input tape count in control card "A" is not in the range of 1 to 9.
 - k. **NO INPUT TAPES INDICATED ON OPTIONS REQUIRED**
For options A, B, C, D, and G the input tape count in control card "A" is zero or blank.
 - l. **ALPHABETIC CHARACTERS IN MAN-MONTH CONVERSION FIELD**
The value in the man-month conversion field is non-numeric.
 - m. **THE CONTROL CARD CODE IS INCORRECT**
The control card code in column 1 is not in the range of A to F.
 - n. **THERE IS NO CONTROL CARD CODE**
The control card code in column 1 is a blank or zero.
 - o. **MORE THAN 5 OUTPUT REPORT CONTROL CARDS INSERTED**
The limit of 5 cards with a code of B has been surpassed.

p. **NO REPORTS INDICATED ON OPTIONS REQUIRING REPORTS**

There is no "B" control card on options D, F, or G which are required to produce at least one output report other than the error listing.

q. **MORE THAN 50 PROJECT CONTROL CARDS INSERTED**

The limit of 50 network or project cards with a code of "C" has been surpassed.

r. **DUPLICATE D CARDS FOR THIS RUN**

More than one "D" card is present in the control card deck.

s. **TAPE CHANNEL NOT A-B-C**

On the "D" control card, one of the tape reassignments is using a channel other than A-B-C.

t. **DUPLICATE E CARDS FOR THIS RUN**

More than one "E" card is present in the control card deck.

u. **DUPLICATE F CARDS FOR THIS RUN**

More than one "F" card is present in the control card deck.

v. **SECURITY NO. INCREMENTER NOT IN RANGE**

The field that indicates the character of the security number to increment is not in the range of 0-24.

Executive Program Operations

The following are some of the conventions used in the executive phase:

a. **Executive Flag Indications**

During the executive phase, many flags are set which are used during future phase processing. These flags are:

EX81 - If option C or E is in effect, this flag is set on

- EX84 - If file establishment on PERT COST MASTER TAPE is indicated, this flag is set on
- EX85 - If file establishment on SECONDARY MASTER TAPE is indicated, this flag is set on
- EX86 - If the time tape is in SE-PE sequence, this flag is set on
- EX87 - If an "F" control card is present, this flag is set on
- EX88 - If an "E" control card is present, this flag is set on
- EX89 - This flag will carry the count of the input tapes involved in this run
- EX90 - If a "D" control card is present, this flag is set on
- EX91 - If a "B" control card is present, this flag is set on
- EX92 - This flag will carry the count of the "B" control cards present in this run
- EX93 - This flag will carry the count of the "C" control cards present in this run
- EX94 - If there is no secondary master date, this flag is set on
- EX95 - If there is no PERT Cost master date, this flag is set on
- EX96 - If there is no user's time tape date, this flag is set on
- EX97 - The option being requested is carried in this flag as a value of 1 through 7, representing A thru G, respectively
- EX98 - If there is no report issue date, this flag is set on

EX99 - If an "A" control card is present, this flag is set on

EX99A - If this run is to be made without any time input, this flag is set on

When a flag is considered "on," it means a nonzero value is placed in that flag.

b. Tape Table

A special tape table has been constructed for this program to give it a greater flexibility with a minimum control card manipulation. This table will be preset to the following conditions:

1. USER'S TIME TAPE	B4
2. SORTED DATA TAPE	B5
3. OLD PERT COST MASTER	B6
4. SORT - MERGE TAPE	B2
5. SORT - MERGE TAPE	B1
6. SYSTEM ERROR AND OUTPUT TAPE	A2
7. INPUT AND NEW PERT COST MASTER	A6
8. INPUT AND SORT-MERGE TAPE	A7
9. SORT - MERGE TAPE	A4

If this arrangement differs from the tape setup at a particular installation, it can be changed with the use of the "D" control card. Both the tape setup and density can be set with this card. All the above tapes are set to high density in the tape table.

Channel A, B, or C with any unit number from 0 to 9 can be used in this table.

Executive Region Descriptions

The region descriptions on the following pages will describe the major subroutines used in the executive region as well as the executive routine itself. Behind each region description will be one or more flow charts describing that region. Figure III-C-1 is the control card layout.

PERT COST
CONTROL CARD INPUT FORM

Prepared by _____ Page _____ of _____
 Date _____

MAIN CONTROL CARD

CARD NO.	REPORT FILE DATE		NEW MASTER FILE DATE		NEW PROGRAM NAME REPLACES CURRENT NAME	PERT TIME TAPES		PERT COST MASTER	SECONDARY MASTER	PROGRAM FROM	SPIN UP	PERIOD		ALERT SEC							
	DAY	MONTH	YEAR	DAY		MONTH	YEAR	DAY	MONTH			YEAR	DAY		MONTH	YEAR	DAY	MONTH	YEAR		
1	2	13	4	5			42	43	45	50		55	54	55	65	73	74	75	78	79	80

REPORT SELECTION CARD

CARD NO.	ARIABLE REPORT SELECTION FIELD
1	
2	
3	
4	
5	
6	
7	

PROJECT SELECTION CARD

OMIT THIS CARD TO PROCESS ALL PROJECTS

CARD NO.	PROJECT NUMBER
1	7 12

TAPE REASSIGNMENT CARD

CARD NO.	NEW MASTER TAPES	NEW MASTER TAPES	NEW MASTER TAPES	PROGRAM OUTPUT TAPES	REPORT CHANGE TAPES	OLD MASTER TAPES	NEW MASTER TAPES	NEW MASTER TAPES	NEW MASTER TAPES									
1	11	13	17	30	23	25	29	31	35	37	41	43	47	49	53	55	59	61

SECURITY NUMBER CONTROL CARD

CARD NO.	SECURITY NUMBER
1	5 6 7

PROGRAM NAME CHANGE CONTROL CARD

CARD NO.	OLD PROGRAM NAME
1	19

Fig. III-C-1 Control Card

Region EXEC

EXPLANATION OF REGION:

This routine will edit and decipher the control cards. It will control the phasing of the program segments, as well as set up all of the option conditions. All tapes to be used will be initially rewound in this region.

CALLING SEQUENCE:

Program will initially transfer to the EXEC portion of the system. All links to the other phases will be made in this section.

INPUT:

Control cards

OUTPUT:

Not applicable

STORAGE USED:

SCHLD - 4 words - Security number hold
PNHLD - 4 words - Program name hold (new or current)
PNHD2 - 4 words - Program, name hold (old)
TRMSP - 3 words - Term (span)
ORHLD - 70 words - Output report selections hold
PJHLD - 50 words - Project number hold

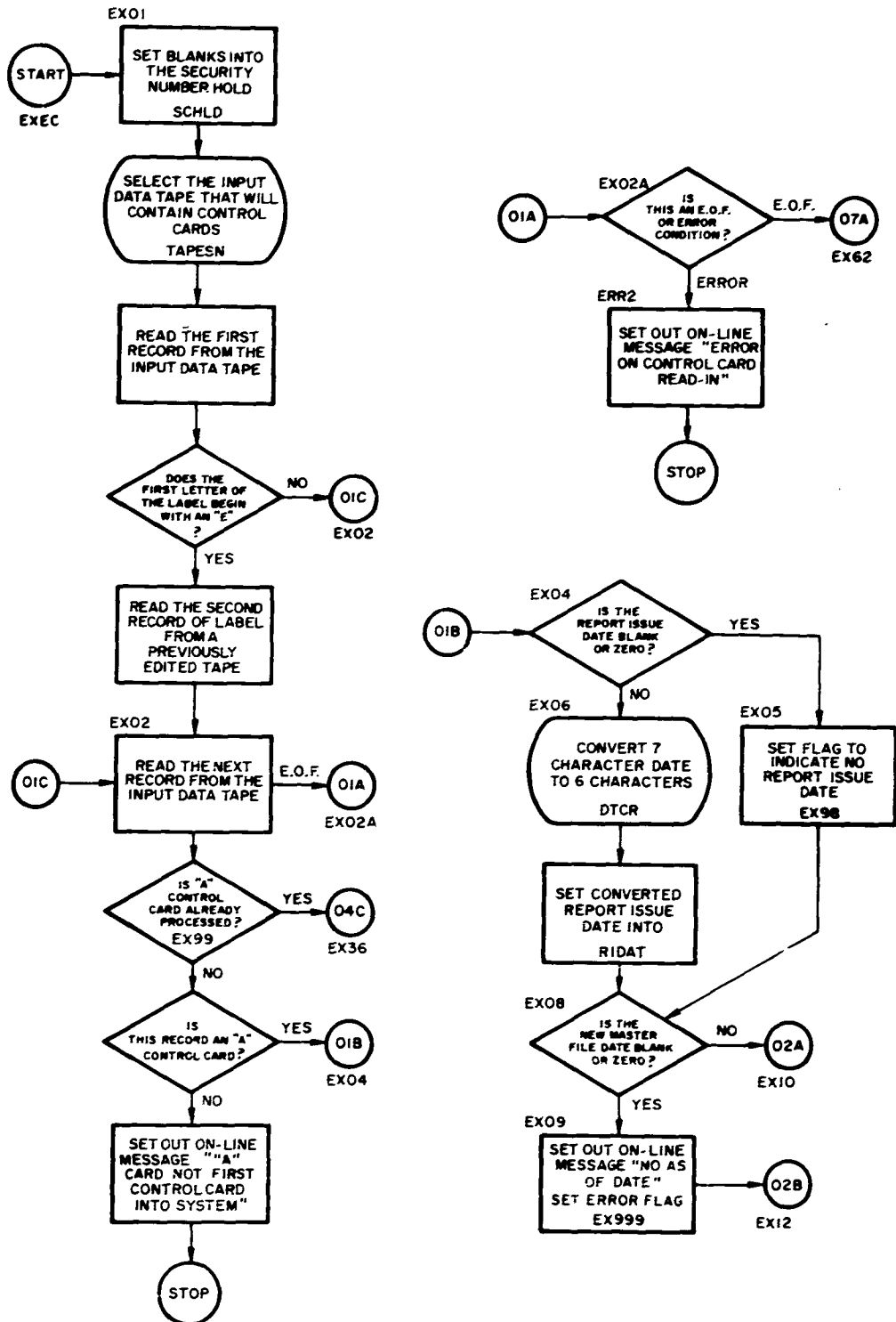
SUBREGIONS AND SUBROUTINES USED:

DTCR	PMAS
FIXPT	PUAOT
TUASN	MSRT
EDIT	JAOO
EDSO	

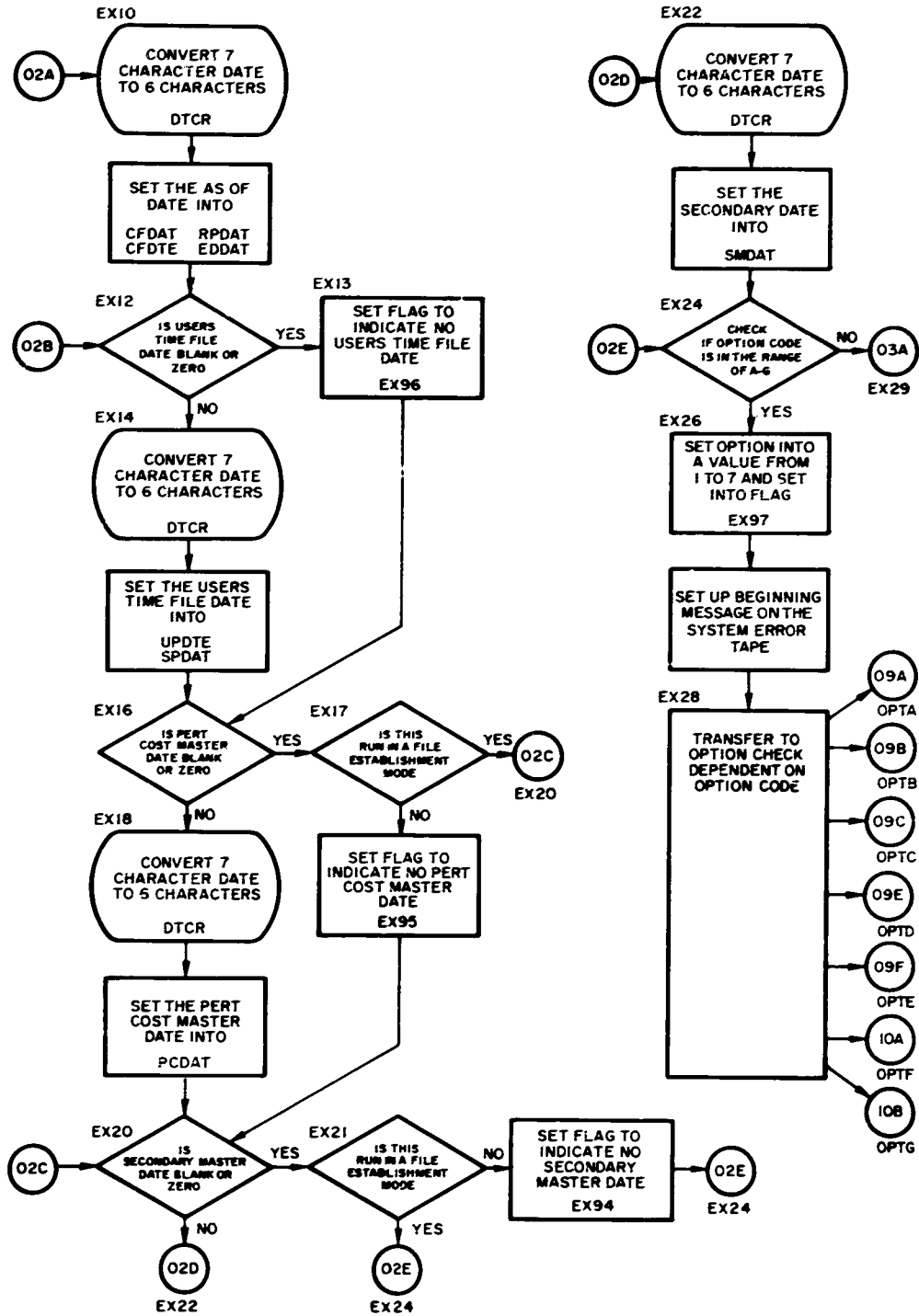
EXPLANATION OF CALLING SEQUENCE:

Not applicable

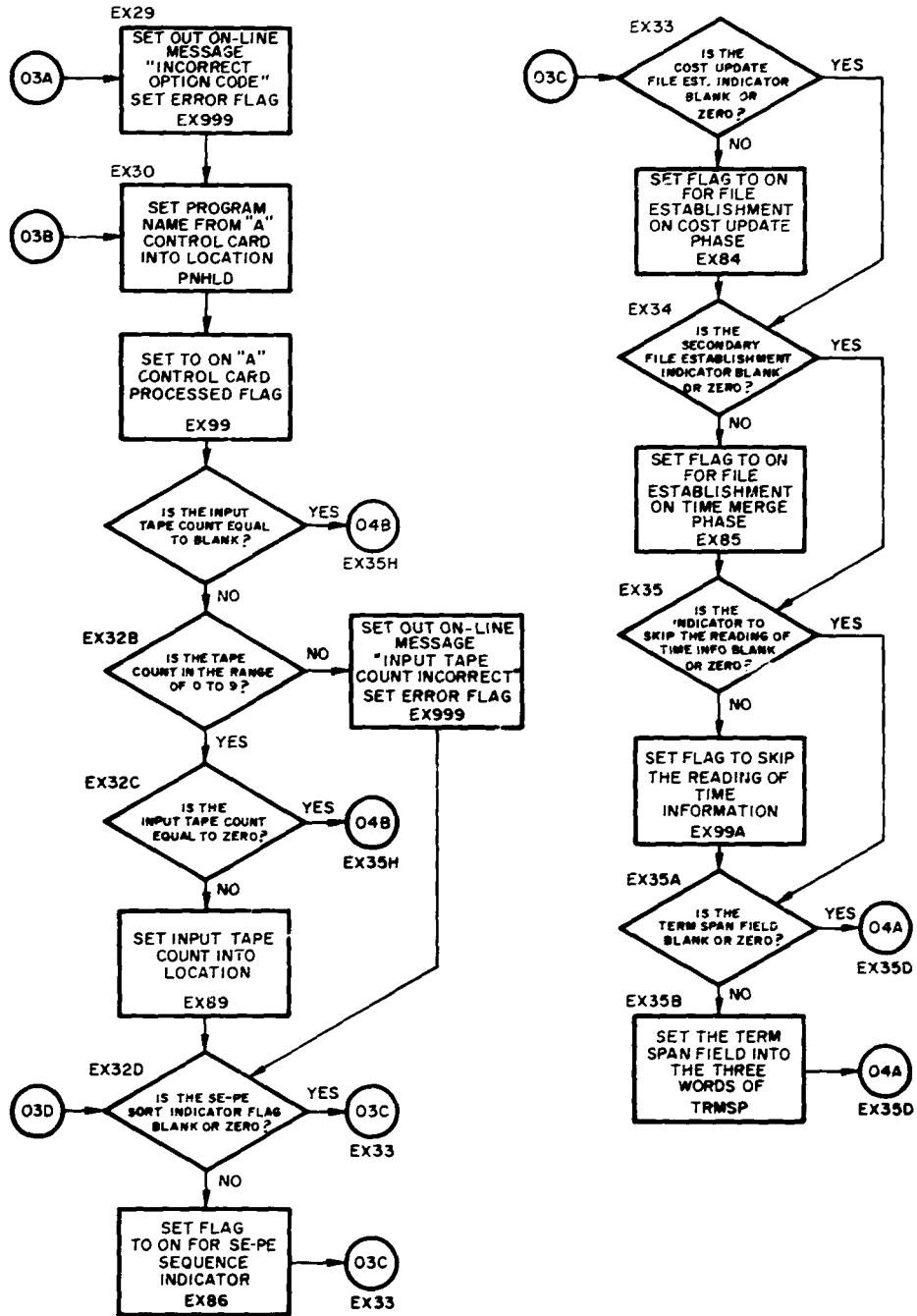
REGION EXECUTIVE



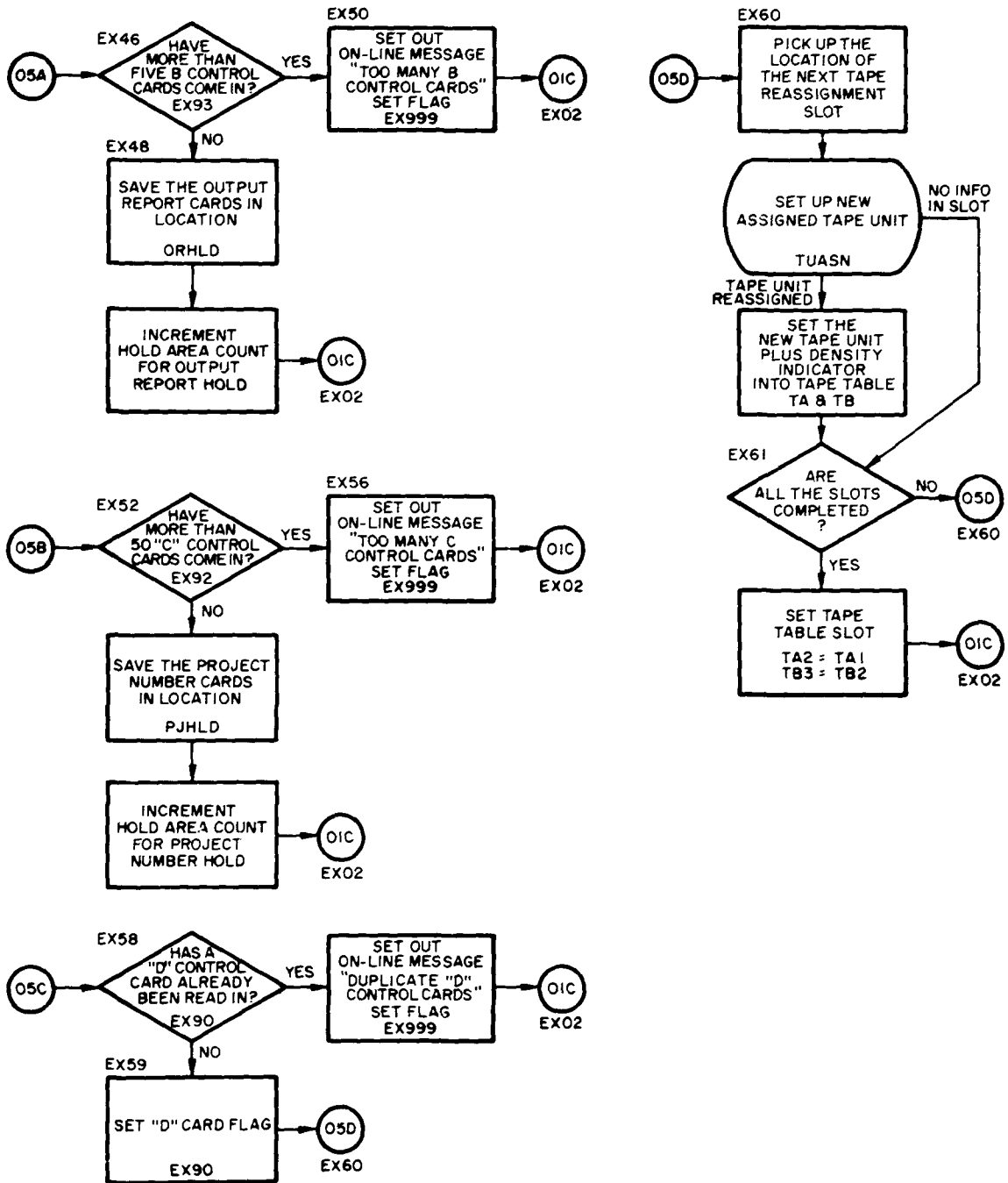
REGION EXECUTIVE



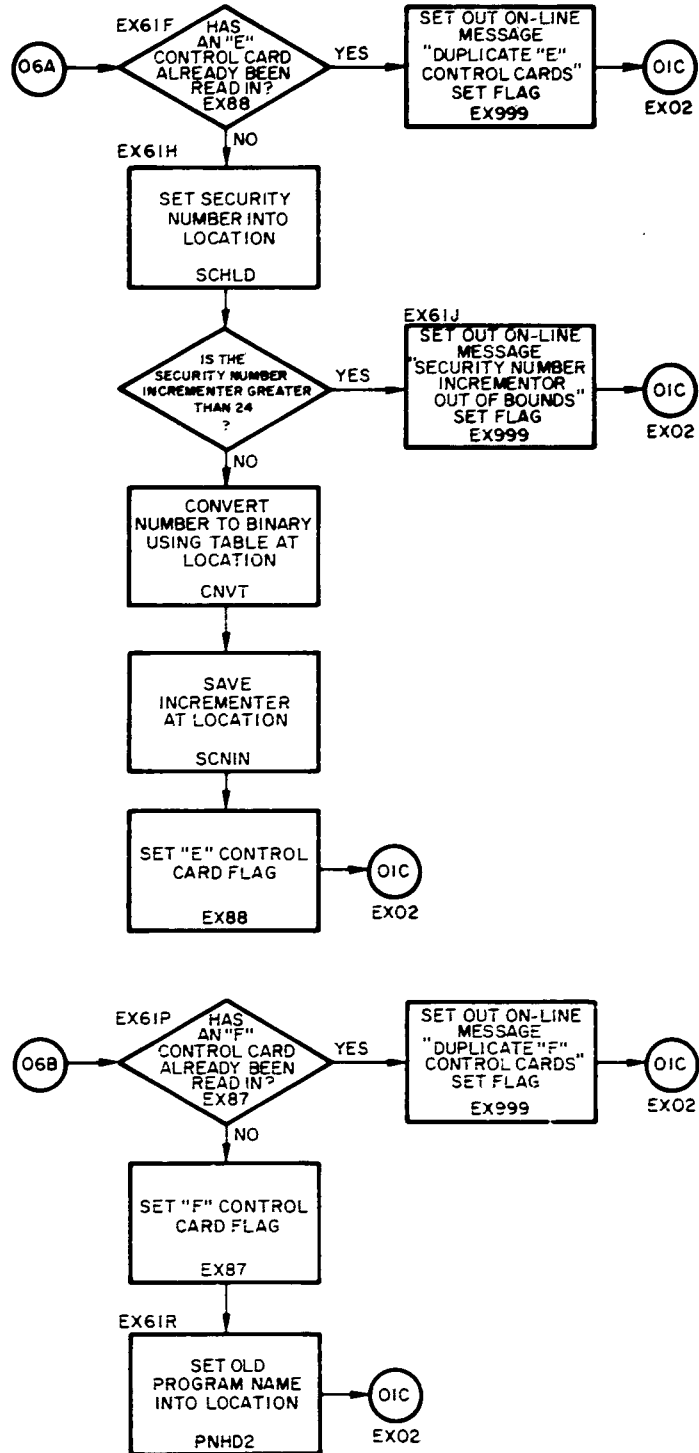
REGION EXECUTIVE



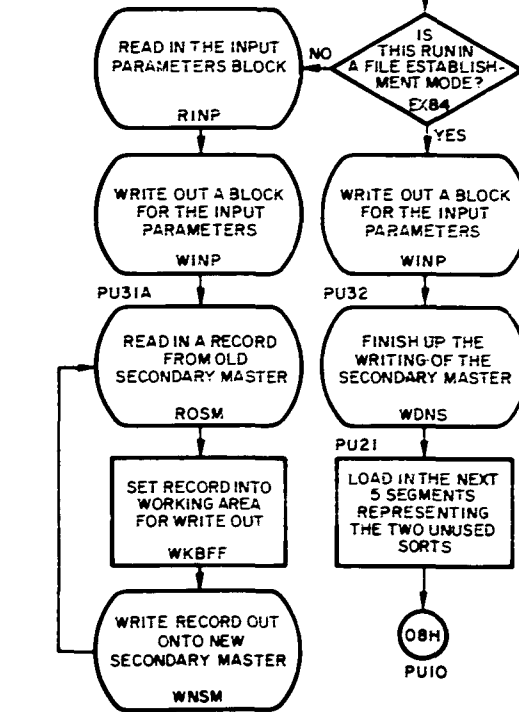
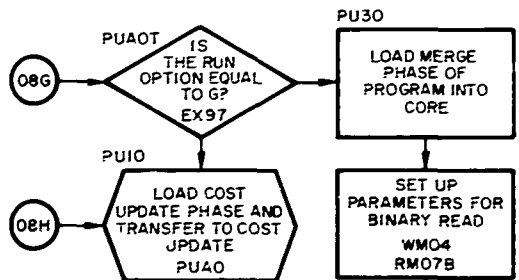
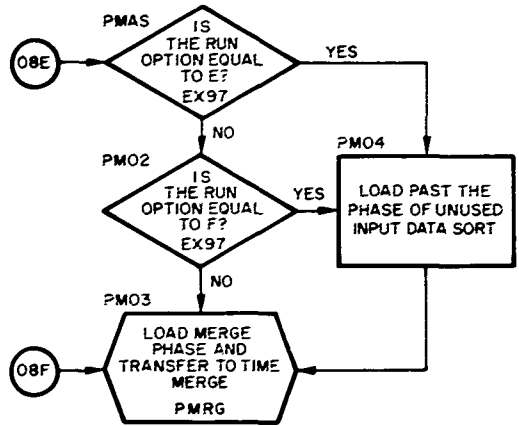
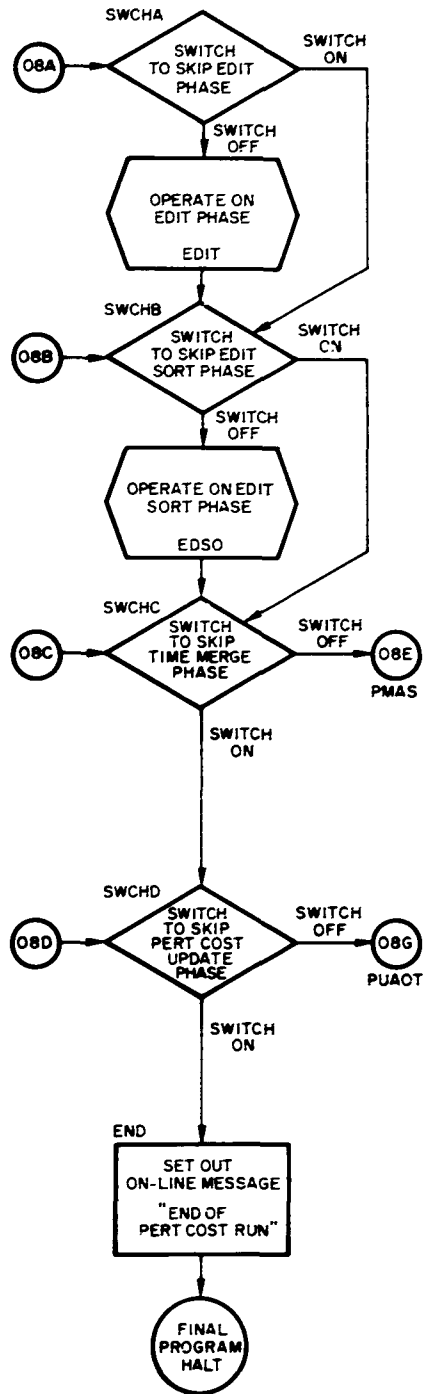
REGION EXECUTIVE



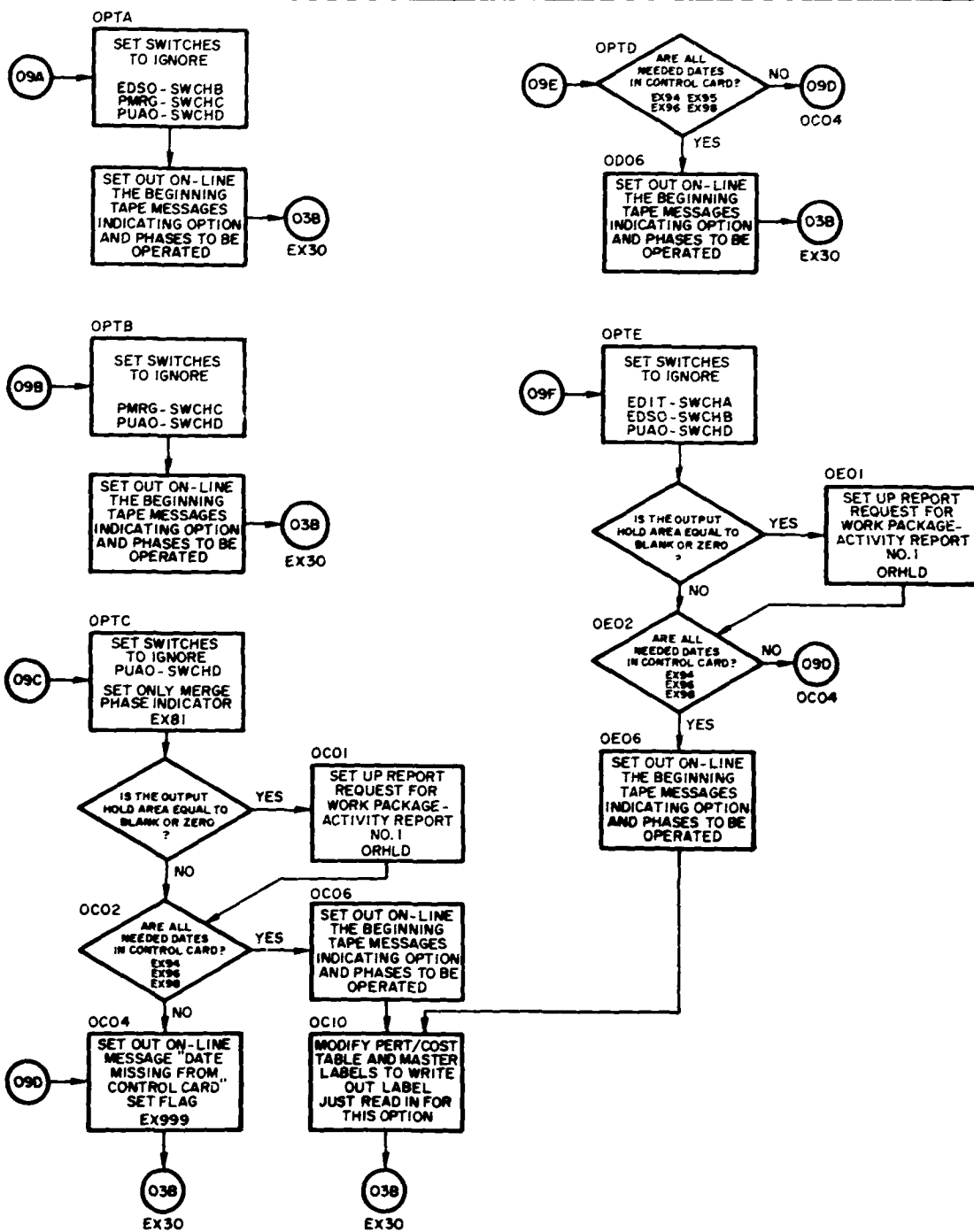
REGION EXECUTIVE



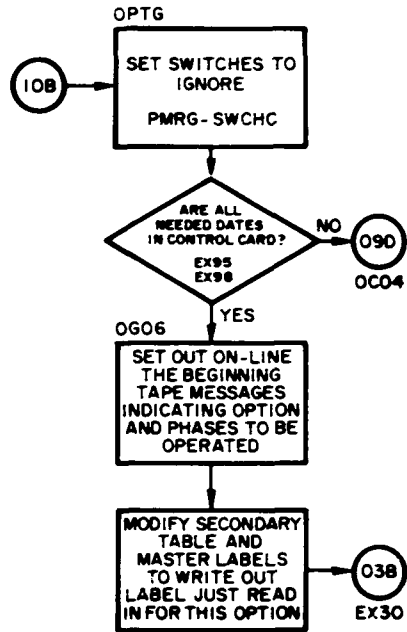
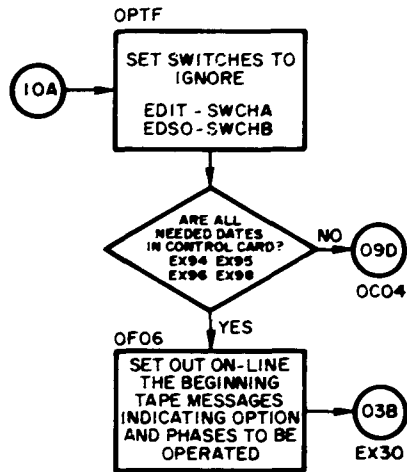
REGION EXECUTIVE



REGION EXECUTIVE



REGION EXECUTIVE



Region DTCR

EXPLANATION OF REGION:

This routine will take a seven-character date and convert it into DD-MM-YY and verify the figures.

CALLING SEQUENCE:

L TSX DTCR, 4
L + 1 Normal return

INPUT:

The date will come in as XXXXDD in the accumulator and MMMYYX in the MQ.

OUTPUT:

The date in the form of DD-MM-YY will come out in the accumulator.

STORAGE USED:

DTTB - 12 words - Hold range of days tied to month
DTTB2 - 12 words - Hold legitimate months

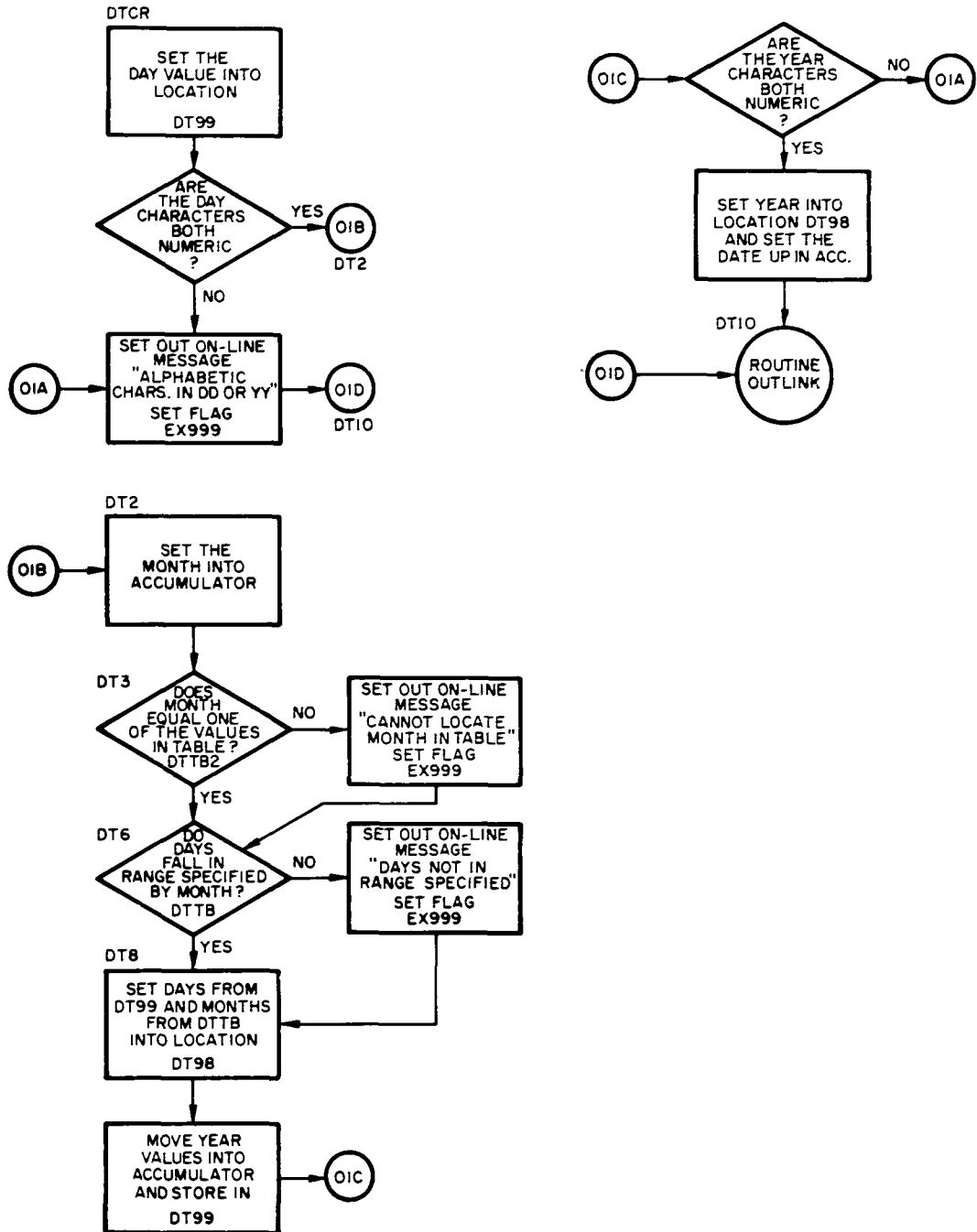
SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found, a message is put out on the on-line printer, and the program is stopped.

REGION DTCR



Region TUASN

EXPLANATION OF REGION:

This routine will set up the new tape unit to be reassigned from the "D" control card.

CALLING SEQUENCE:

L TSX TUASN, 4
L + 1 Zero or blank return
L + 2 Normal return

INPUT:

The "D" control card

OUTPUT:

The tape channel and number in the address of the accumulator.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found, a message is put out on the on-line printer, and the program is stopped.

Region PMAS

EXPLANATION OF REGION:

This routine will set up the segments of the program to operate upon for the PERT merge phase.

CALLING SEQUENCE:

L TSX PMAS, 4
L + 1 Normal return

INPUT:

Not applicable

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

The outlink from this routine will take the system into PMRG

Region PUAOT

EXPLANATION OF REGION:

This region will set up the segments of the program to operate upon for the PERT cost update phase.

CALLING SEQUENCE:

L TRA PUAOT

INPUT:

Not applicable

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

The outlink from this region will take the system in.o PUAO from which it will go into the output routine leaving the executive control section.

Region JA00

EXPLANATION OF REGION:

This routine will unpack the output report selections so that they can be deciphered by the output section.

CALLING SEQUENCE:

L TSX JA00, 4
L + 1 Normal return

INPUT:

ORHLD table set up with the "B" control cards.

OUTPUT:

On-line printing indicating the reports selected.
The ORPT table containing the deciphered output report selections.

STORAGE USED:

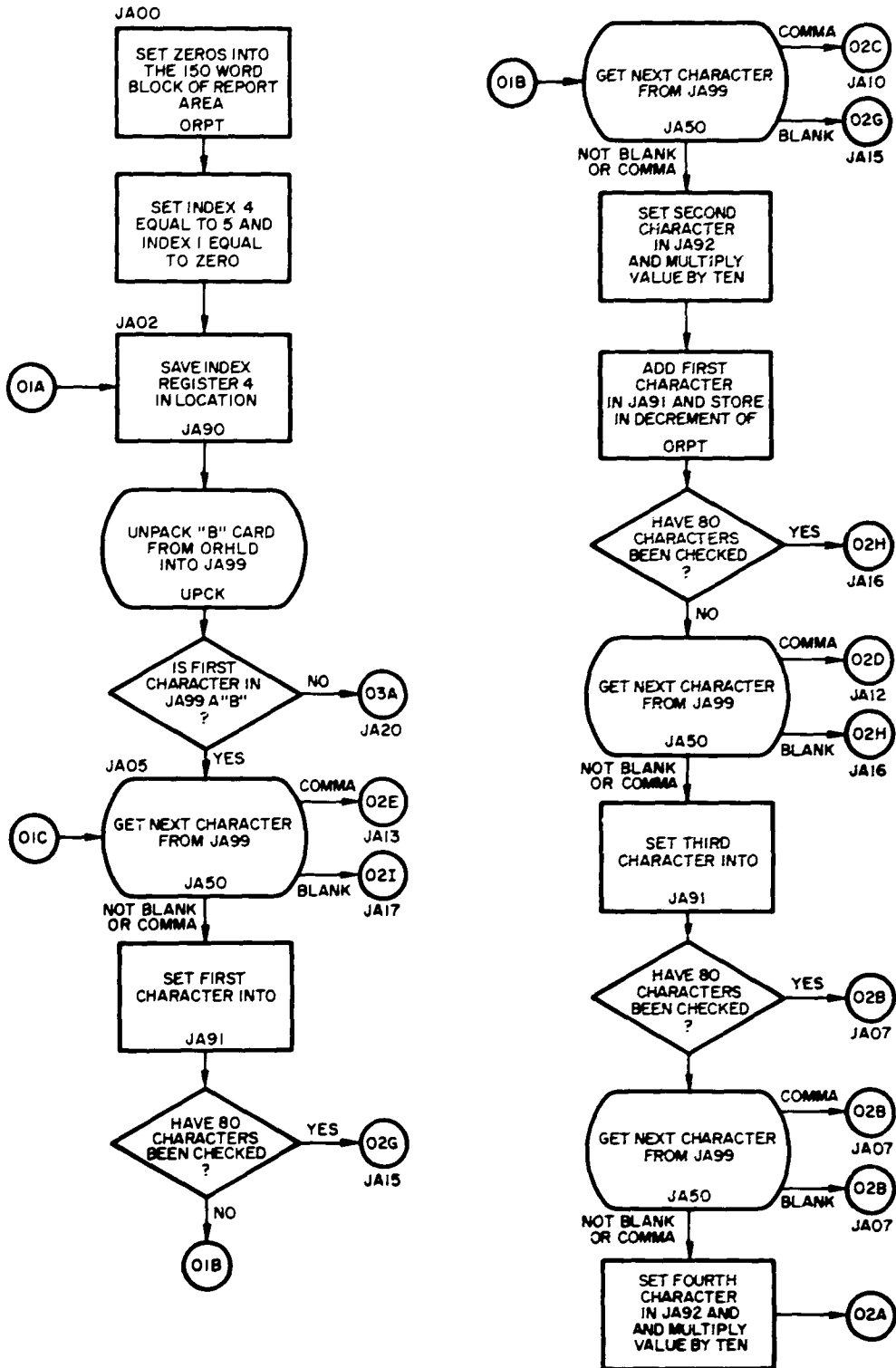
ORPT - 150 words - Hold deciphered output report
 selections

SUBREGIONS AND SUBROUTINES USED:

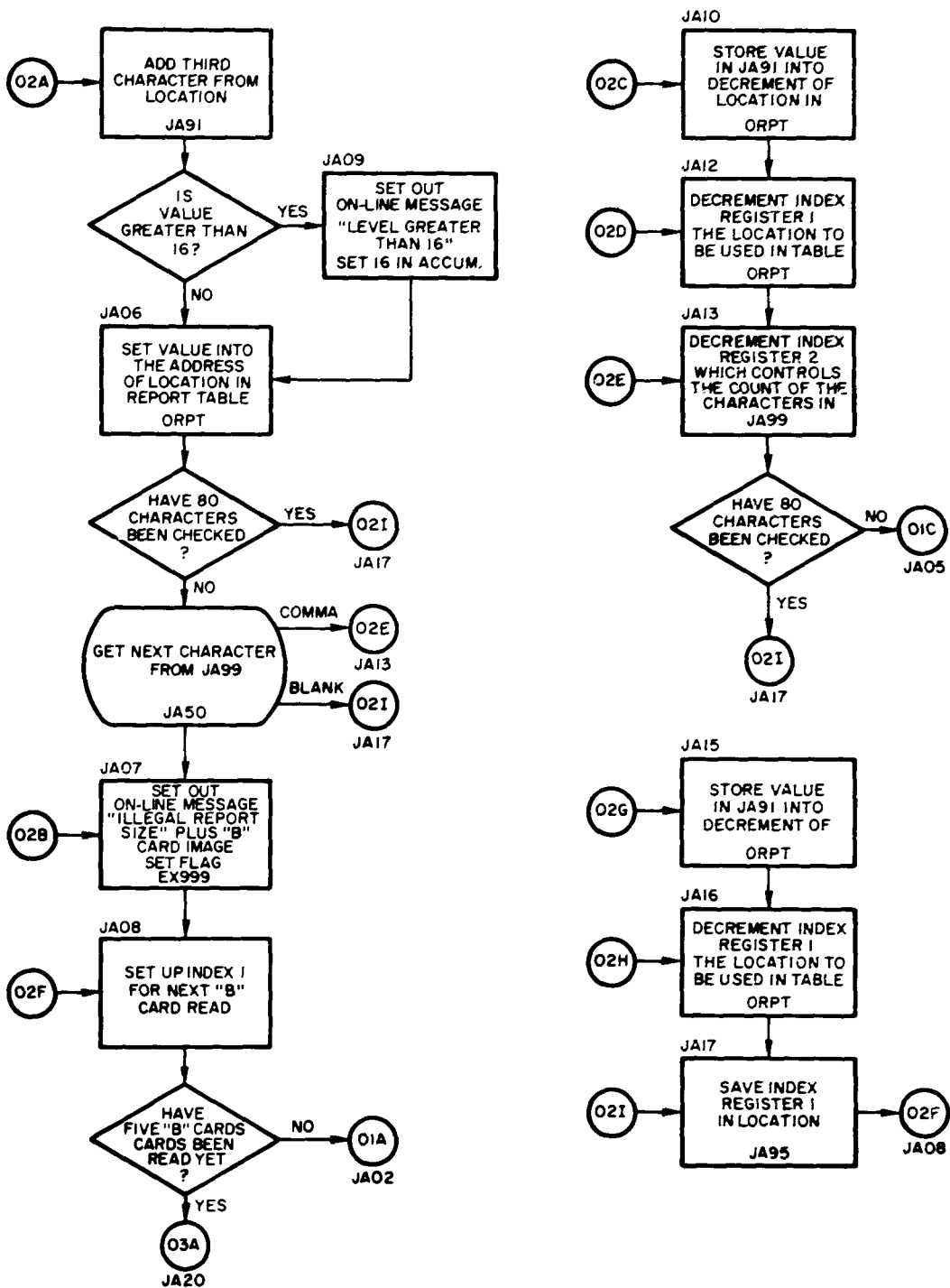
Not applicable

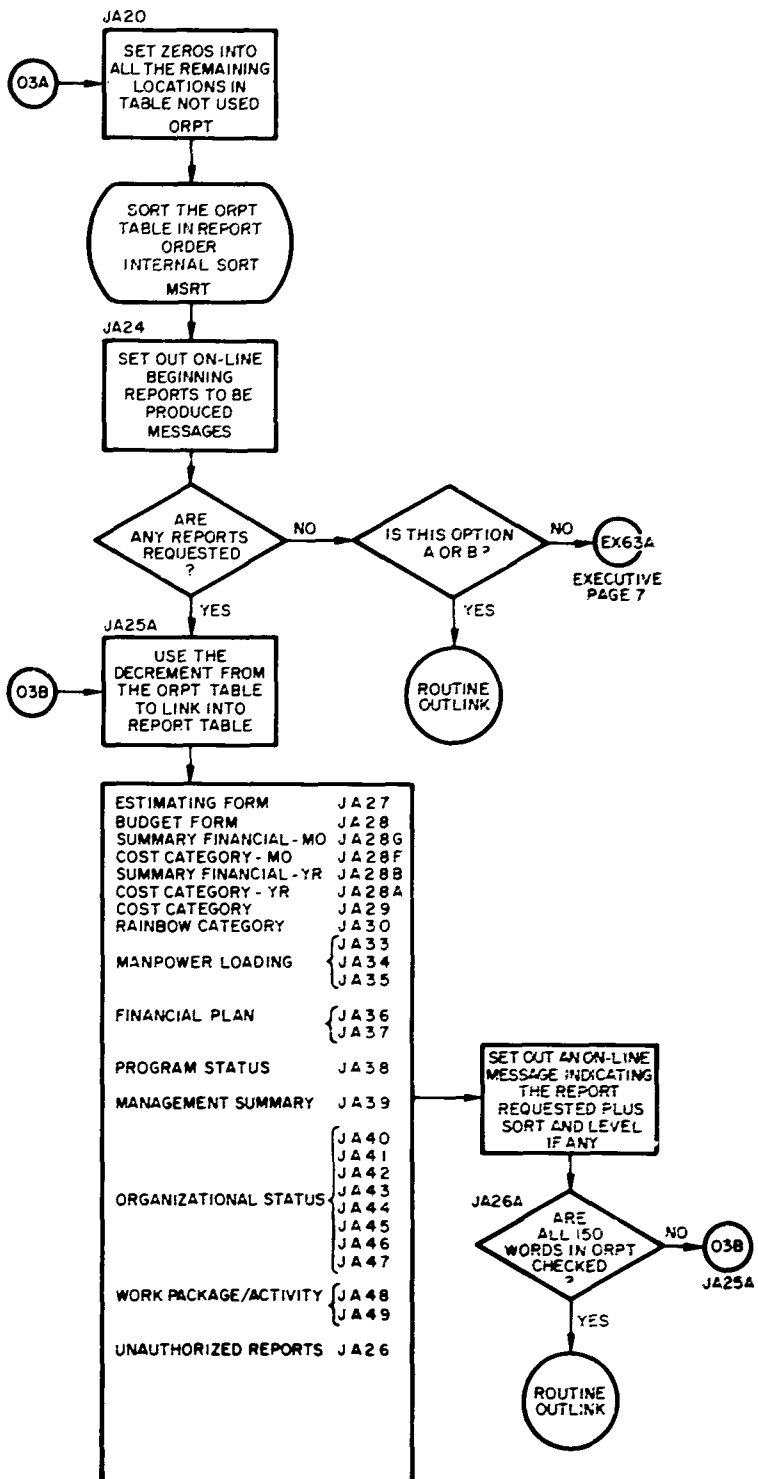
EXPLANATION OF CALLING SEQUENCE:

Not applicable



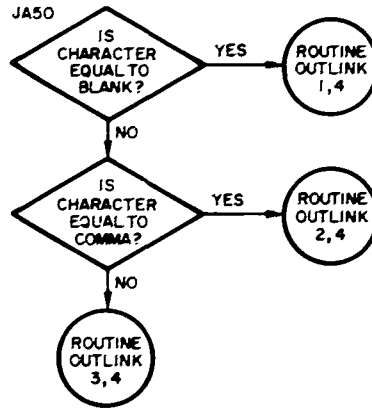
REGION JA00



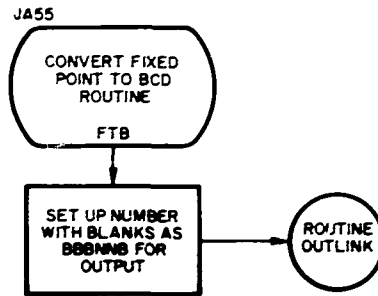


REGION JACO

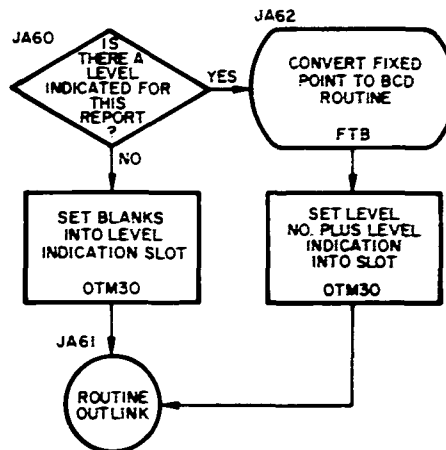
JASO - CHARACTER TYPE DETERMINATION



JA55 - CONVERT BINARY NUMBER TO BCD



JA60 - SET UP LEVEL INDICATION



III-D PERT COST EDIT PHASE

This phase will accomplish the input data editing. It will select the acceptable data, write the data out on the EDITED DATA TAPE, and write the errors on the SYSTEM ERROR TAPE. At the end of the edit phase, a message will indicate the number of errors encountered during the processing which will be displayed on the on-line printer. This message will take one of the following forms:

1. XXXX ERRORS DETERMINED
IF RUN IS TO BE CONTINUED EVEN THOUGH ERRORS
INDICATED HIT START

2. NO ERRORS DETERMINED

If the option indicated is only the edit phase, the program will come to its normal conclusion with or without input errors, and only the first line of message (1) or message (2) will be printed out. When the option indicated exceeds the edit phase, a halt will occur, and message (1) will indicate the number of input errors encountered. If these errors are to be ignored, the start button at the console is hit, and these input errors are bypassed. The program will then go into the edit sort phase. For the case where there are no errors indicated and the option code exceeds the edit phase, the program will go into the edit sort automatically after message (2) is printed.

Input Editing Data Tape Labels

The input data information can be entered into the system with any one of the three following labels as the first record on tape:

Column →

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
U	N	S	O	R	T	E	D		R	A	W		D	A	T	A		T	A	P	E
A	C	T	U	A	L			R	A	W		D	A	T	A		T	A	P	E	
E	D	I	T	E	D			R	A	W		D	A	T	A		T	A	P	E	

The "UNSORTED RAW DATA TAPE" label is set in front of all input that is in the form of cards and will have to go through a card-to-tape procedure.

The "ACTUAL RAW DATA TAPE" label will be placed onto any input tape that is generated from another computer program and will eventually be fed into the PERT Cost system.

The "EDITED RAW DATA TAPE" label will be set onto the front of all correct data that has previously passed through the edit phase. The label on this tape will indicate that no editing is necessary for this information because it has already been done. For INPUT DATA TAPE label checking, only the first four words are verified for acceptability. When this tape is used as the EDITED DATA TAPE in the edit sort phase, the entire label is checked as is discussed on Page III-E-12. This entire label takes the form on tape of two records, the first record of six words and the second of four.

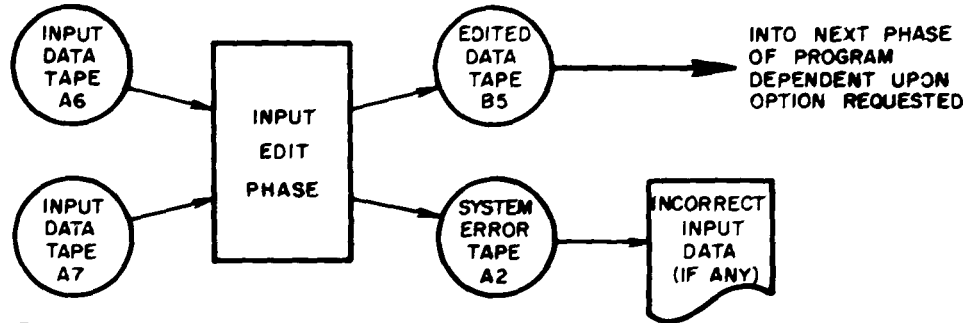
Each tape (if more than one is required) will contain one of the above three labels as the first record on that tape. All records on the INPUT DATA TAPE will be unblocked, and no prior sort will be required, because the edit sort phase will accomplish this. Any combination of input tapes (to a maximum of nine) containing the above three labels can be read in during any cyclic or file establishment run.

Input Editing Tape Operations

The edit phase allows for alternating input tapes A6 and A7. If only one input tape is required for this run, it will be placed on tape unit A6, with a blank tape set on A7 if the option requires it. A maximum of nine alternating input tapes can be used. The output from these alternating input tapes, which has been acceptable to the edit program, is set out on tape unit B5. A maximum of nine reels of B5 can be created during any run.

The tape flow during the input editing phase will take the following form:

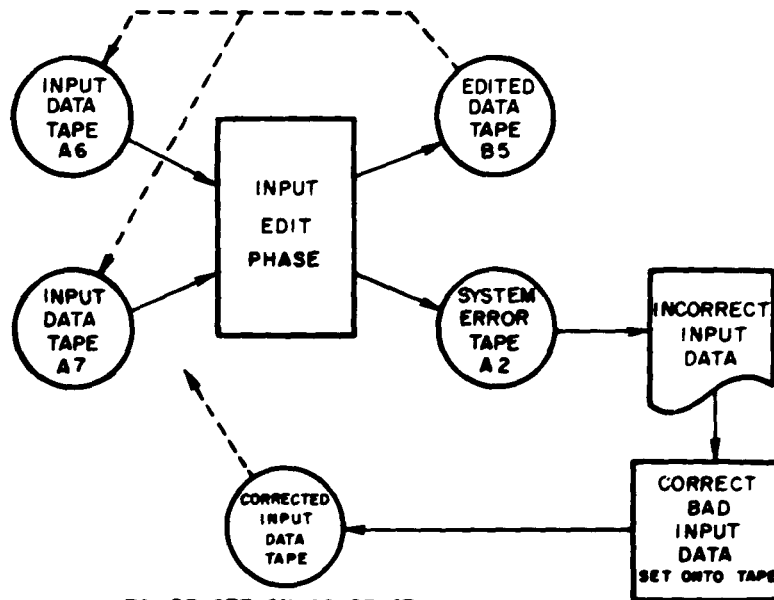
- a. If all input data are correct or if the bad data are to be ignored:



ALTERNATING INPUT TAPES
(MAXIMUM OF NINE)

The printout of the SYSTEM ERROR TAPE will take place after the completion of this run.

- b. If a portion or all of the input data is incorrect and it is to be corrected:



TO BE SET ON A6 OR A7.
WILL CONTAIN "UNSORTED
RAW DATA TAPE" LABEL

The printout of the SYSTEM ERROR TAPE will take place after the completion of the edit phase. The errors indicated on this tape will be corrected and new input cards punched reflecting these corrections. These cards, along with the new control cards, will then go card-to-tape with a label of "UNSORTED RAW DATA TAPE" preceding the input. This tape and the tape containing the acceptable data (EDITED DATA TAPE) will be mounted on units A6 and A7. The tape containing the current control cards must be mounted on A6. The program will then be restarted from the beginning.

Input Editing Tape Messages On-Line

The messages forthcoming on the on-line printer regarding the alternating input and edited tapes will be as follows, depending on the number of tapes used and the governing option:

- a) Only one input tape and Option A

```
TAPE A6 HAS BEEN SELECTED FOR READING
TAPE B5 HAS BEEN SELECTED FOR WRITING
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT EDIT PHASE
```

The above set of messages will be followed by the error-indication messages described on Page III-D-1. Error messages will likewise follow all of the tape messages described in the examples below.

- b) Two input tapes and Option A

```
TAPE A6 HAS BEEN SELECTED FOR READING
TAPE B5 HAS BEEN SELECTED FOR WRITING
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
TAPE A7 HAS BEEN SELECTED FOR READING
TAPE A7 IS NOW REWINDING AND SHOULD UNLOAD
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT EDIT PHASE
```

While A6 is rewinding, Tape A7 is being read to speed up computer processing. This is true for all the alternating reads.

- c) Three or more input tapes, Option A, and multiple edited tapes

TAPE A6 HAS BEEN SELECTED FOR READING
TAPE B5 HAS BEEN SELECTED FOR WRITING
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
SET NEXT REEL OF THIS SERIES ON TAPE A6
TAPE A7 HAS BEEN SELECTED FOR READING
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
SET NEXT REEL OF THIS SERIES ON TAPE B5
TAPE A7 IS NOW REWINDING AND SHOULD UNLOAD
TAPE A6 HAS BEEN SELECTED FOR READING
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT EDIT PHASE

The above process can continue until nine input tapes have been read from A6 and A7. A maximum of nine B5 tapes can be created during any one run. The EDITED DATA TAPE is not alternating, and therefore the program must wait until the tape is rewound, unloaded, and a new tape loaded prior to proceeding.

- d) Only one input tape and Option B

The on-line messages will take the same form as shown in (a) except for message line 4, which will appear as follows:

TAPE B5 IS NOW REWINDING

Tape B5 is not unloaded in this option because it is to be used in the edit sort phase of the program.

- e) Two input tapes and Option B

The on-line messages will take the same form as shown in (b) except for message lines 5 and 6, which will appear as follows:

TAPE A7 IS NOW REWINDING
TAPE B5 IS NOW REWINDING

Tape A7 is not unloaded for this option because it will become one of the sort and merge tapes.

- f) Three or more input tapes, Option B, and multiple-edited tapes

The on-line messages will take the same form as shown in c) except for message line 8, which will appear as follows:

TAPE A7 IS NOW REWINDING

The above message applies to the final reference made to tape A7. All previous messages referring to A7 will involve a rewind and unload of the tape. Tape B5 is re-wound and unloaded if multiple EDITED DATA TAPES are created. The reason for this operation is to reload the first B5 created onto the unit so that in the edit sort the data are reread in the order they were created.

- g) Only one input tape and Options C to G

The on-line messages will take the same form as shown in a) except for message lines 3 and 4, which will appear as follows:

TAPE A6 IS NOW REWINDING

TAPE B5 IS NOW REWINDING

Tape A6 is not unloaded in these options because it will be used for the new PERT COST MASTER TAPE. Tape B5 is not unloaded because it will be input to the edit sort phase.

- h) Two input tapes and Options C to G

The on-line messages will take the same form as shown in b) except for message lines 3, 5 and 6, which will appear as follows:

TAPE A6 IS NOW REWINDING

TAPE A7 IS NOW REWINDING

TAPE B5 IS NOW REWINDING

Tape A7 is not unloaded for these options because it will become one of the sort and merge tapes.

- i) Three or more input tapes, Options C to G, and multiple-edited tapes

The on-line messages will take the same form as described in f) except that line 10 of c) will be changed as follows:

TAPE A6 IS NOW REWINDING

The above message applies to the final reference made to tape A6. All previous messages referring to A6 will involve a rewind and unload of the tape.

Input Editing Off-Line Error Messages

The errors determined during the edit phase are set out on the SYSTEM ERROR TAPE. There are no on-line indications regarding this tape. The SYSTEM ERROR TAPE is never rewound or unloaded unless it has reached end-of-tape. The removal of this tape at program end is a manual operation.

During the edit phase operation, the program will edit input cards until the first error is located. This error will be set out on the SYSTEM ERROR TAPE, whereupon the program will proceed to edit the next input card.

During the edit phase, the following errors and accompanying messages can be forthcoming:

- a. ERROR IN CARD CODE

XX - 80 characters of input card - XX

If the input card code is not in the range of 1 to 7, or is a 3, this message will be set out. (Note: the second line of this and all other messages in this section will be a reproduction of the input card to which this message applies.)

- b. NOT A LEGITIMATE CHANGE CODE

The change code does not correspond to R, T, and D for 7-3 card inputs or A, C, and D for the others.

c. JUSTIFICATION ON A FIELD OF THIS INPUT IN ERROR

If a field contains data that is not properly justified, this message is set out. The one exception to this rule is where an asterisk is used to clear out a field and this asterisk is always left-justified.

d. ERROR ON INPUT PARAMETER CARD CODE

The 1-type input card is not in the range of A to C. If the A to C range is verified, the following card number ranges are checked:

1. A - Range 1 to 9
2. B - Range 1 to 75
3. C - Range 1 to 19

e. NO PREDECESSOR NUMBER FOR ACTIVITY

If the predecessor is blank or zero on a 2-type input, this message is put out.

f. NO SUCCESSOR NUMBER FOR ACTIVITY

The successor is blank or zero on a 2-type input.

g. NO CHARGE NO. TIED TO AN ACTIVITY

The charge number is blank or zero on a 2-type input and it is not a delete code.

h. NO RESOURCE CODE TIED TO RATE INPUT

The resource code is blank or zero on a 4-type input.

i. RATE INPUT YEAR OUT OF RANGE

The year is alphabetic or not in the range of 6X or 7X.

j. RATE INFORMATION MISSING ON RATE INPUT

If both the unit rate and overhead rate are absent from a field that has a year related to it and the change code is not a delete.

- k. **ALPHABETIC CHARACTERS IN RATE INPUT**
The rate fields contain a character other than blank, decimal point, or 1 to 9 on a 4-type card input.
- l. **YEAR QUARTER ON RATE CHANGE NOT IN RANGE**
The quarter if indicated is not in the range of 1 to 4 on one of the fields on a 4 card input.
- m. **NO RAINBOW CATEGORY TIED TO INPUT CARD**
The rainbow category field on a 5 card is zero or blank.
- n. **SKILL CODE INFO MISSING ON SKILL INPUT**
The first resource or skill code field on a 5 or 6 card input is blank or zero and card code is not a delete.
- o. **NO COST ELEMENT CODE TIED TO INPUT CARD 6**
The cost element code field on a 6 card is zero or blank.
- p. **ERROR IN SECONDARY CODE**
The secondary code (column 78) on 7 card input is not in the range of 0 to 5.
- q. **NO CHARGE NO. TIED TO COST INPUT**
The charge number is blank or zero on 7 card input.
- r. **CHARGE NO. START DATE IN ERROR**
The start date uses a bad month, alphabetic days or years, or the days do not fall in the range specified by its month.
- s. **CHARGE NO. COMPLETE DATE IN ERROR**
The complete date uses a bad month, alphabetic days or years, or the days do not fall in the range specified by its month.
- t. **LEVEL CODE OUT OF BOUNDS**
The work breakdown level code is not in the bounds of 1 to 16.

- u. **NO PERFORMING UNIT TIED TO COST INPUT**
The performing unit is blank or zero on 7-3, 7-4, or 7-5 card inputs.
- v. **NO RESOURCE CODE TIED TO COST INPUT**
The resource code is blank or zero on 7-3, 7-4, or 7-5 card input.
- w. **NOT A LEGITIMATE INPUT CATEGORY TYPE**
The UDC code is not a legitimate code of H, D, M, T, and U for 7-3, 7-4, and 7-5 inputs.
- x. **NON-NUMERIC CHARACTERS IN COST FIELDS**
The values in the numeric fields of the 7-3, 7-4, and 7-5 input cards contain a character other than blank or 0-9. The 7-3 actual input may contain an alphabetic character in the first position of the field due to the possibility of having a minus sign overpunch.
- y. **NO MONTH OR YEAR IN ACTUAL INPUTS**
On a 7-3 input which is not a delete, there is no month or year shown for a field with a UDC code.
- z. **MONTH AND YEAR OF ACTUAL INPUTS AFTER TIME NOW**
The date on a field of the 7-3 actual input card is after the time-now date.
- aa. **NON-NUMERIC CHARACTERS IN DATE FIELD**
The 7-3 input card date uses a non-numeric month and year, other than blank.
- bb. **THIRD CODE INCORRECT**
The code (column 79) on a 7-4 or 7-5 input card is not in the range of 0-9.

cc. A FIELD ON THIS INPUT SHOULD CONTAIN A VALUE

All value fields on the 7-4 or 7-5 input cards are blank, and the change code is not delete

dd. NO DATA ON INPUT CARD

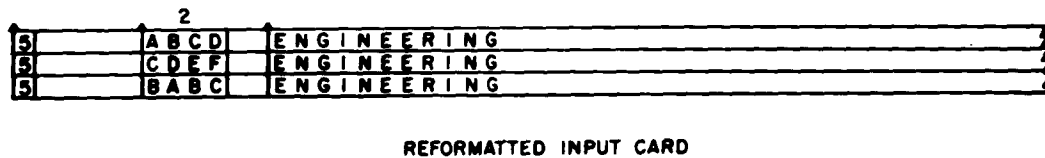
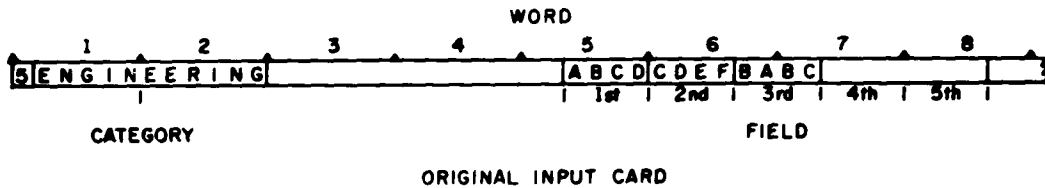
The input card should contain some information in the body data, but these data are all blank or zero.

Input Editing Program Operations

The following are some of the programming approaches that have been followed in the edit phase:

a. 5 and 6 Card Reformatting

Both the 5 and 6 input cards can have one or many resource codes tied to a category. Since the program logic uses the resource code as the indicative information on the card, except for category deletes, the fields are switched during the edit phase. For every resource code, a card is developed as shown:



The above holds true for both 5 and 6 cards. The change code remains in the same location, column 80, even after reformatting.

b. ZERO EDITING

To set up the fields that are involved in sorts, a zero editing approach is used. All leading blanks are transformed to zero. If a blank falls between two valid characters, it is left as a blank. The fields that are zero-edited include:

1. predecessor number
2. successor number
3. charge number
4. network code
5. performing unit
6. resource code
7. responsible organization
8. charge number next higher relation (father).

c. DELETE CHANGE CODE CONVERSION

In developing the sort for the input cards that contain a change code, the following order was used for all but the 7-3 cards:

1. adds or change code A
2. delete or change code D
3. changes or change code C

To make the processing easier, and to get the right order in the change code automatically, all codes having a D were change to B on the EDITED DATA TAPE.

d. CLEAR-OUT OF A FIELD

To set a field other than a value field to a blank, an asterisk is placed in the leftmost column of the field. Justification is disregarded for this case.

Input Editing Region Descriptions

The following region descriptions will describe the major subroutines used in the edit phase as well as the edit phase itself. Behind each region description will be one or more flow charts describing that region.

Region EDIT

EXPLANATION OF REGION:

This routine will accomplish the input data editing. It will select the acceptable data, write it out on the EDITED DATA TAPE, as well as writing the errors on the SYSTEM ERROR TAPE.

CALLING SEQUENCE:

L TSX EDIT, 4
L + 1 Normal return

INPUT:

Up to nine INPUT DATA TAPES

OUTPUT:

Up to nine EDITED DATA TAPES for the acceptable data
The SYSTEM ERROR TAPE for all unacceptable data

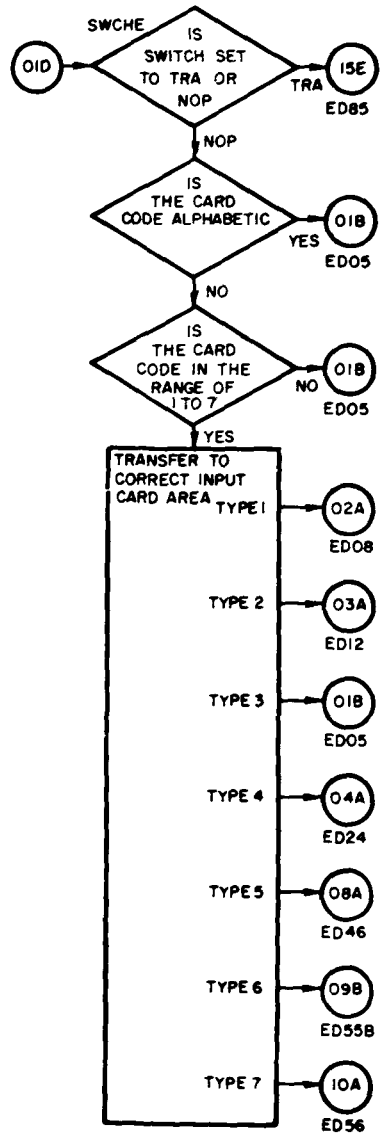
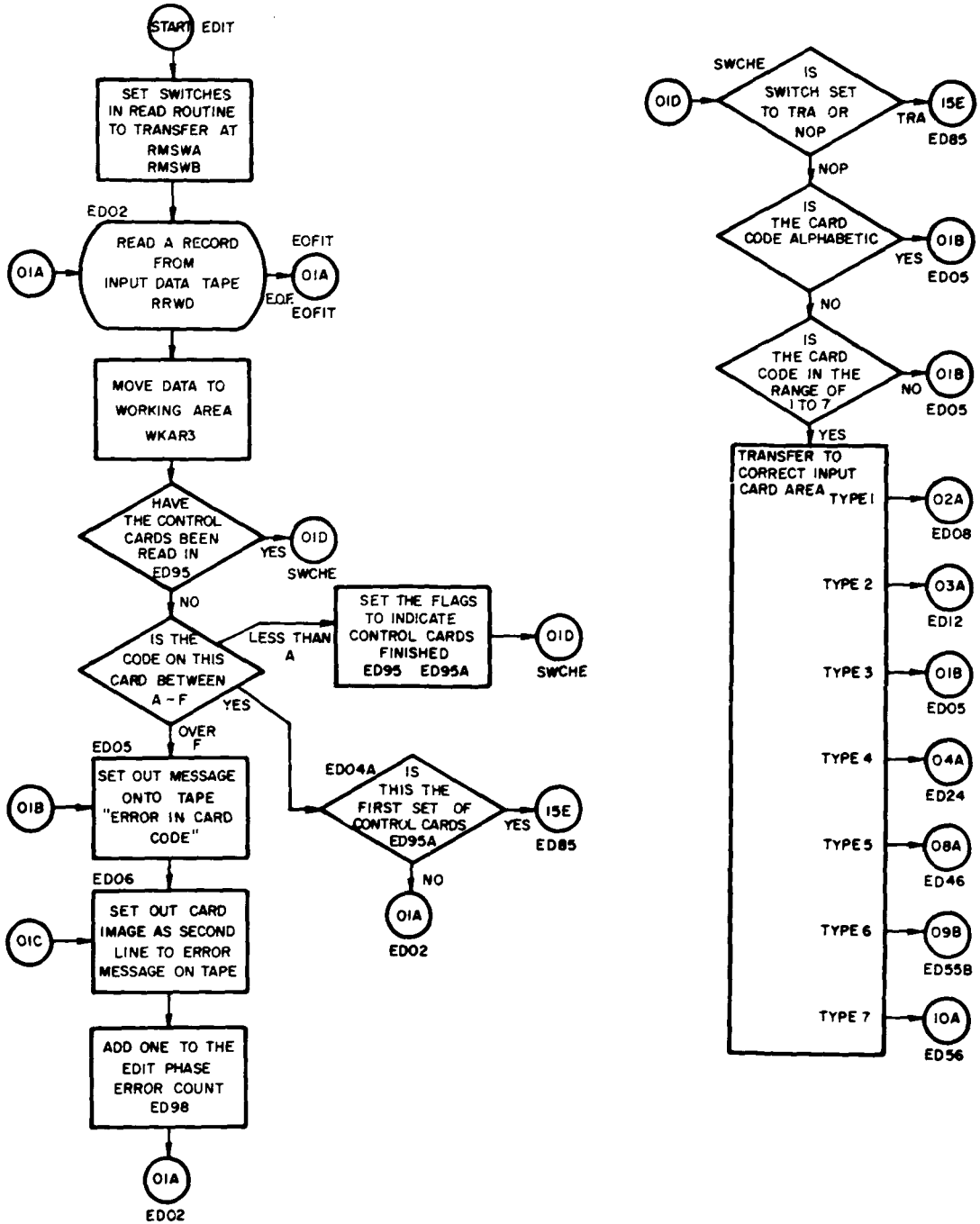
STORAGE USED:

ED 96 - Flag to indicate if there is any information on input card.
 0 will indicate no information.
ED98 - Count of errors found in edit phase.
ED99 - Flag to indicate if there is any rate input data.
 0 will indicate no data on rate input.

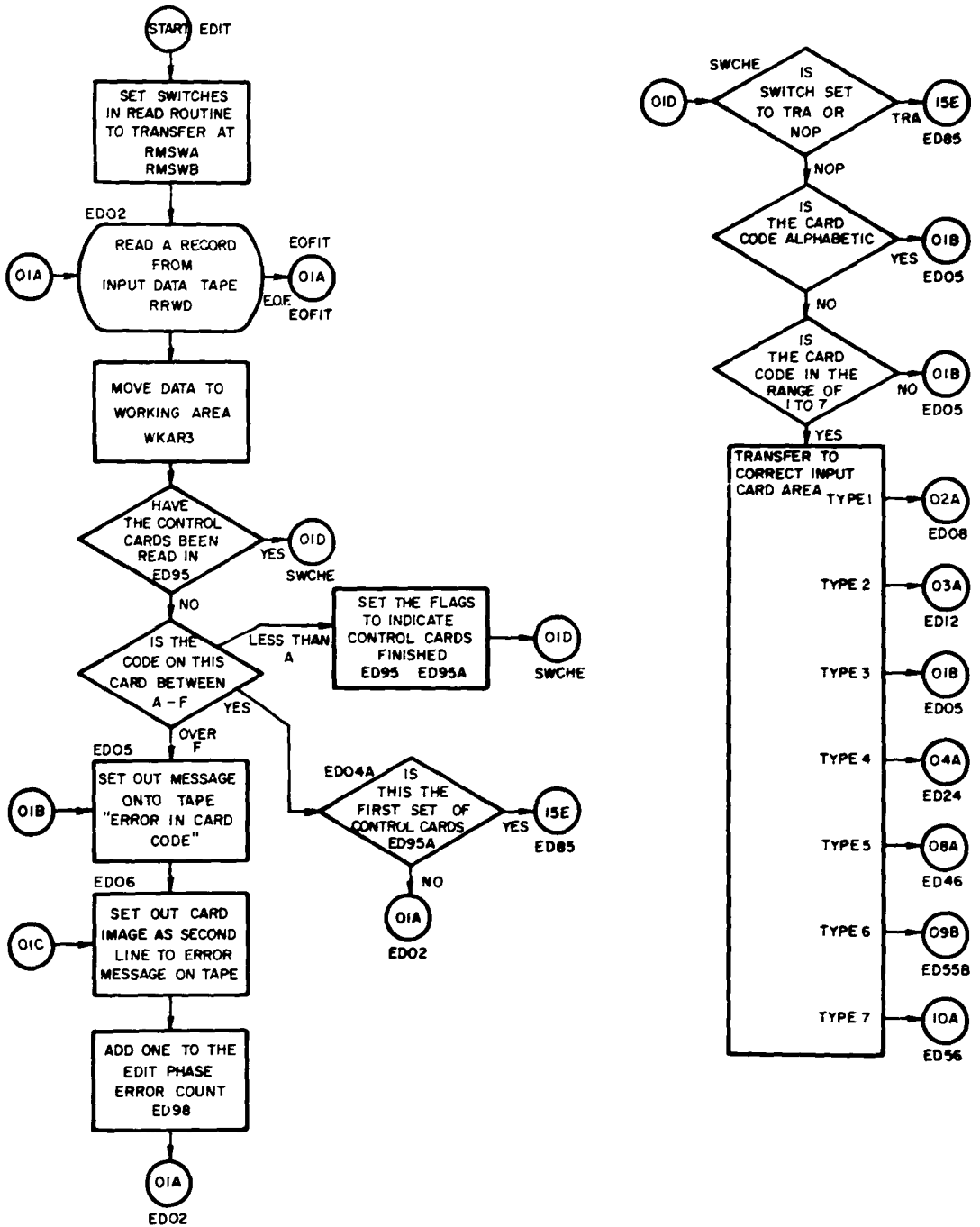
SUBREGIONS AND SUBROUTINES USED:

CNCK	CHCD2
DTED	EOFIT
PURC	CHGCD
INFT	EDTOR
MYCK	RRWD
FDCK	WRWD
FDCK2	

REGION EDIT

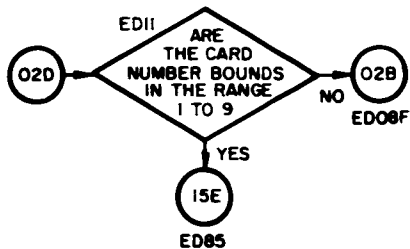
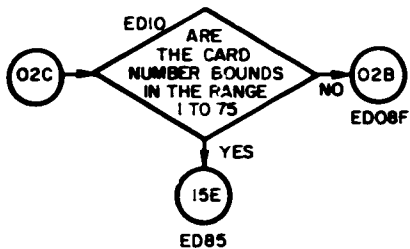
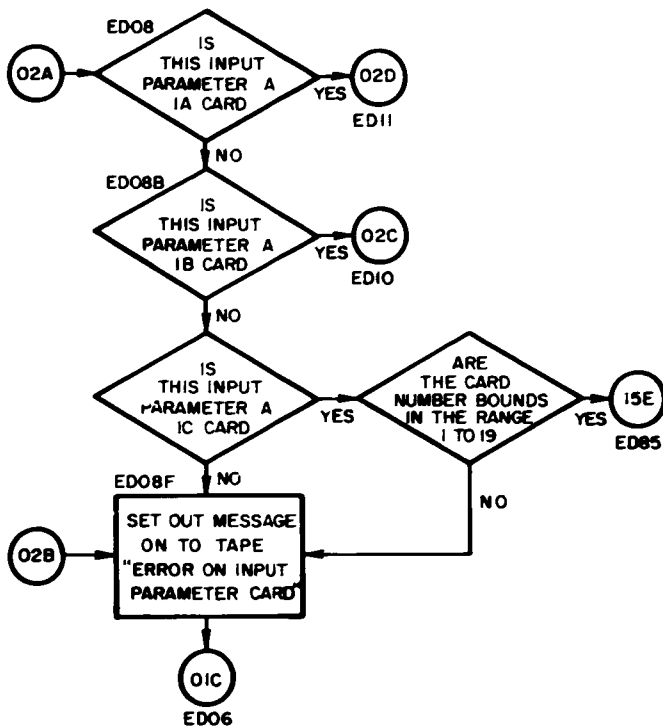


REGION EDIT



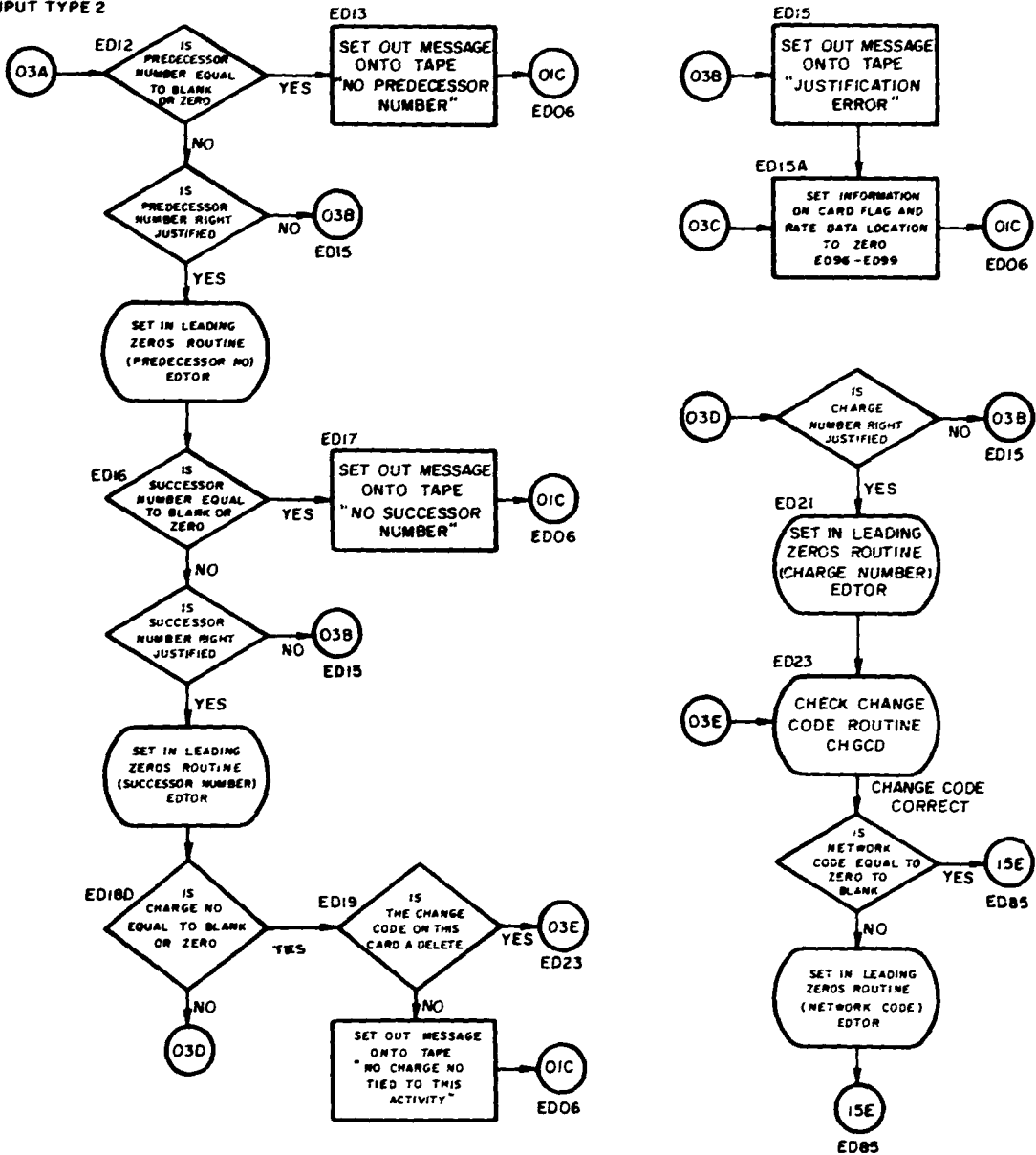
REGION EDIT

INPUT TYPE I



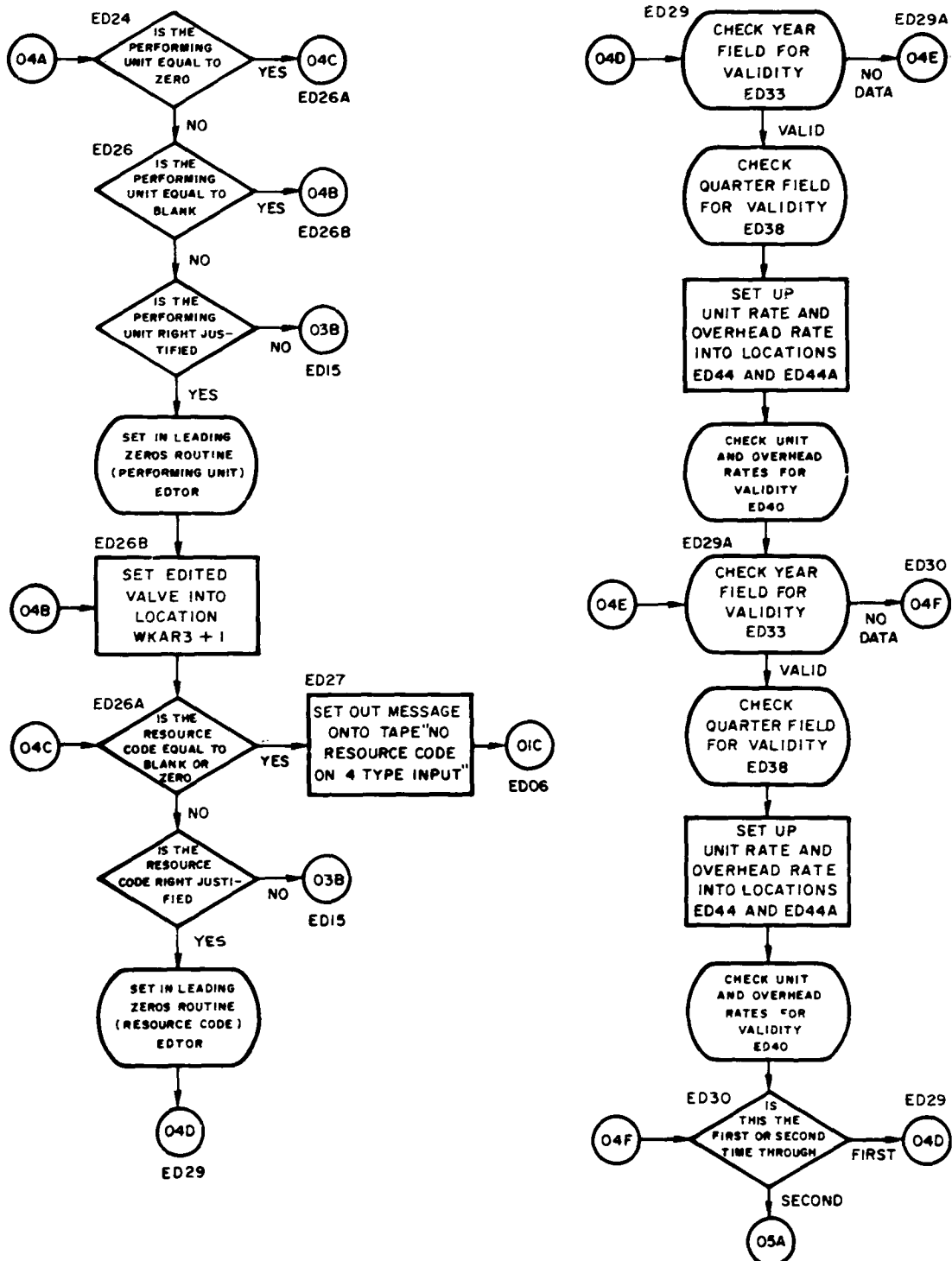
REGION EDIT

INPUT TYPE 2



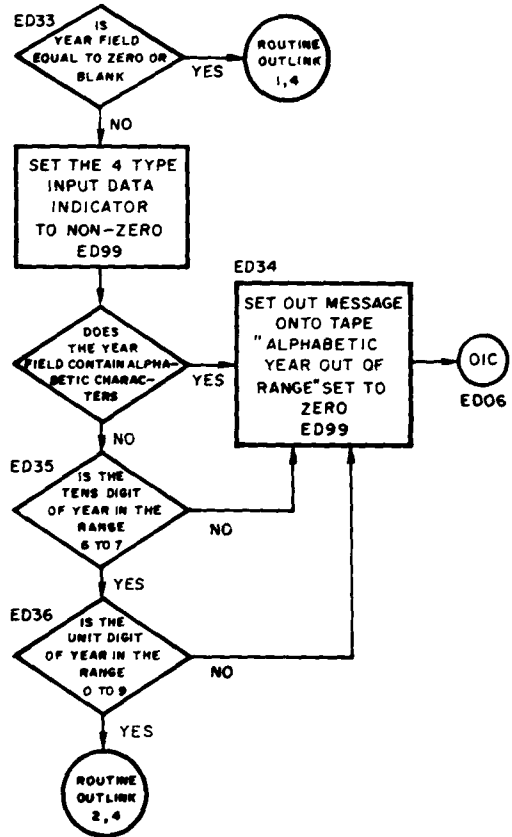
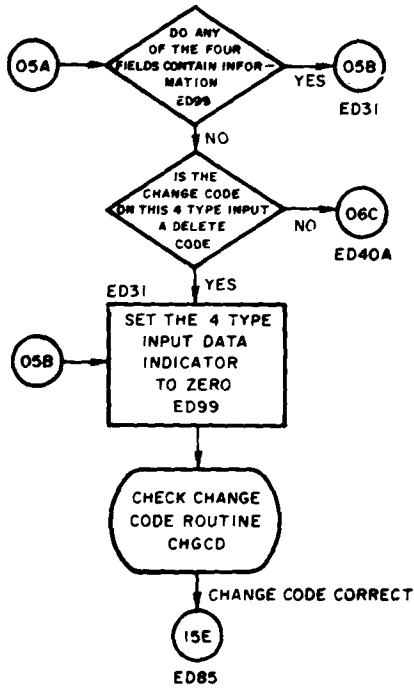
REGION EDIT

INPUT TYPE 4

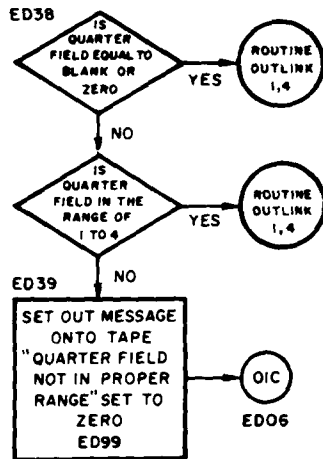


REGION EDIT

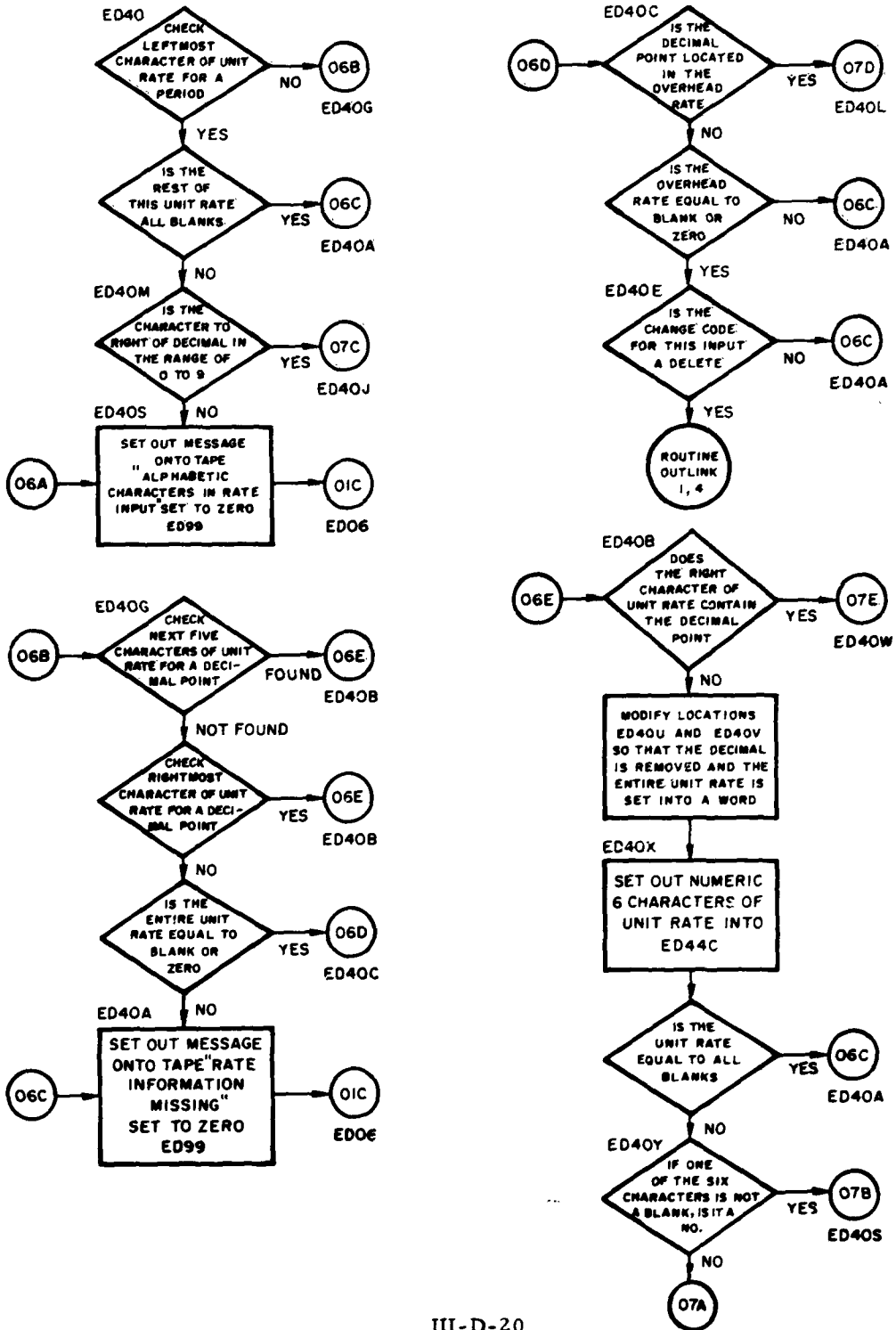
ED33 CHECK YEAR FIELD FOR VALIDITY



ED38 CHECK QUARTER FIELD FOR VALIDITY

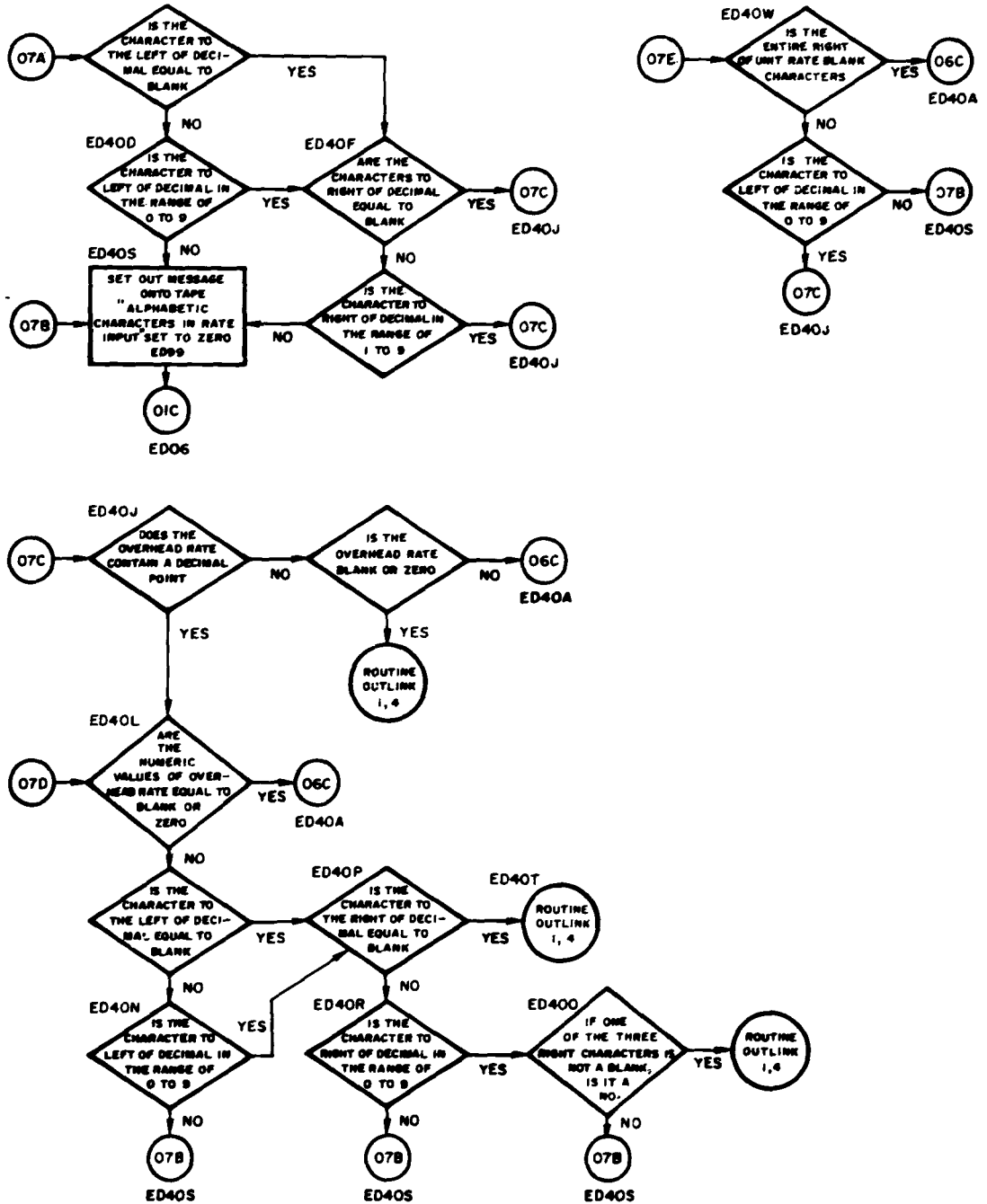


ED40 CHECK UNIT AND OVERHEAD RATES FOR VALIDITY



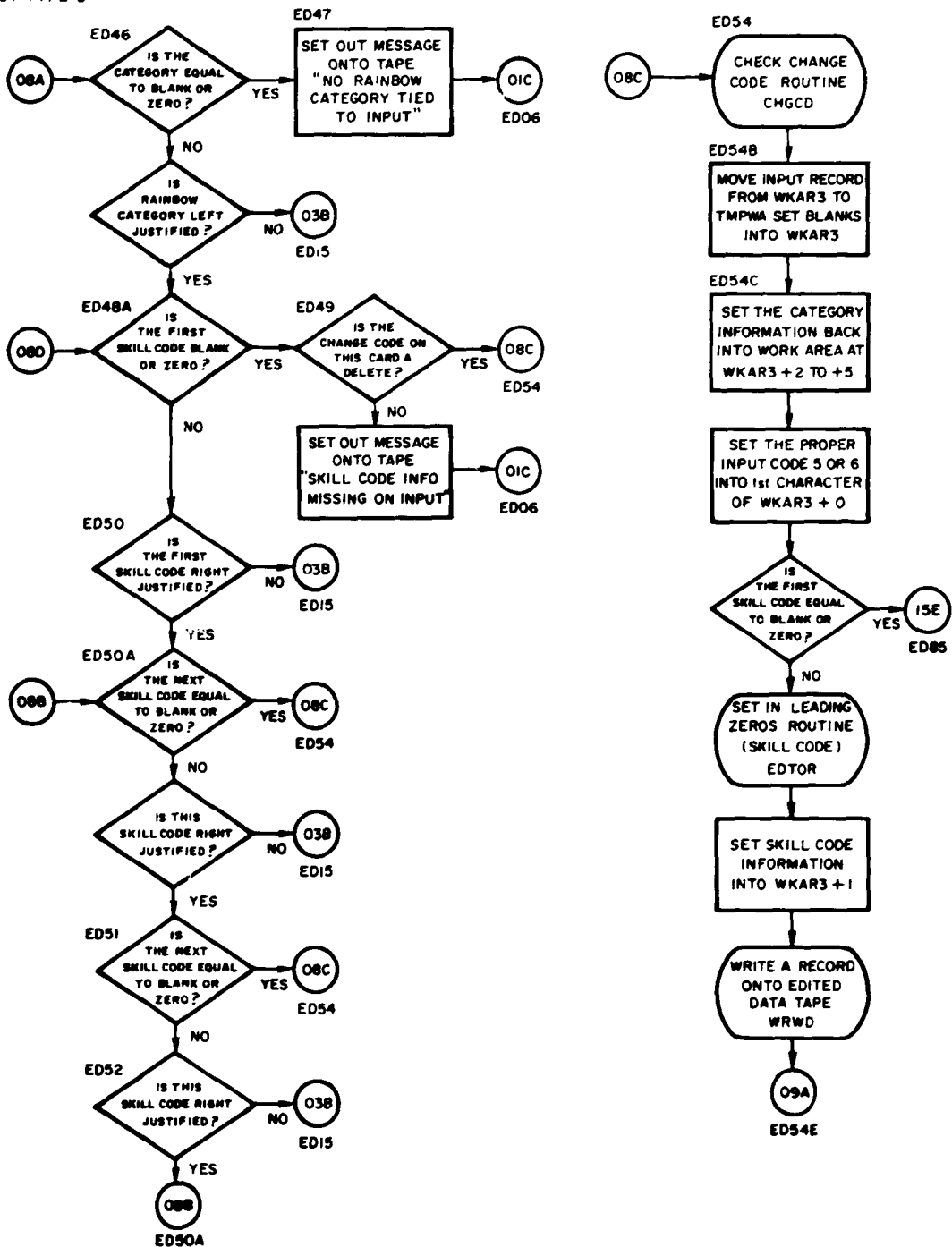
REGION EDIT

ED 40 (CONT)

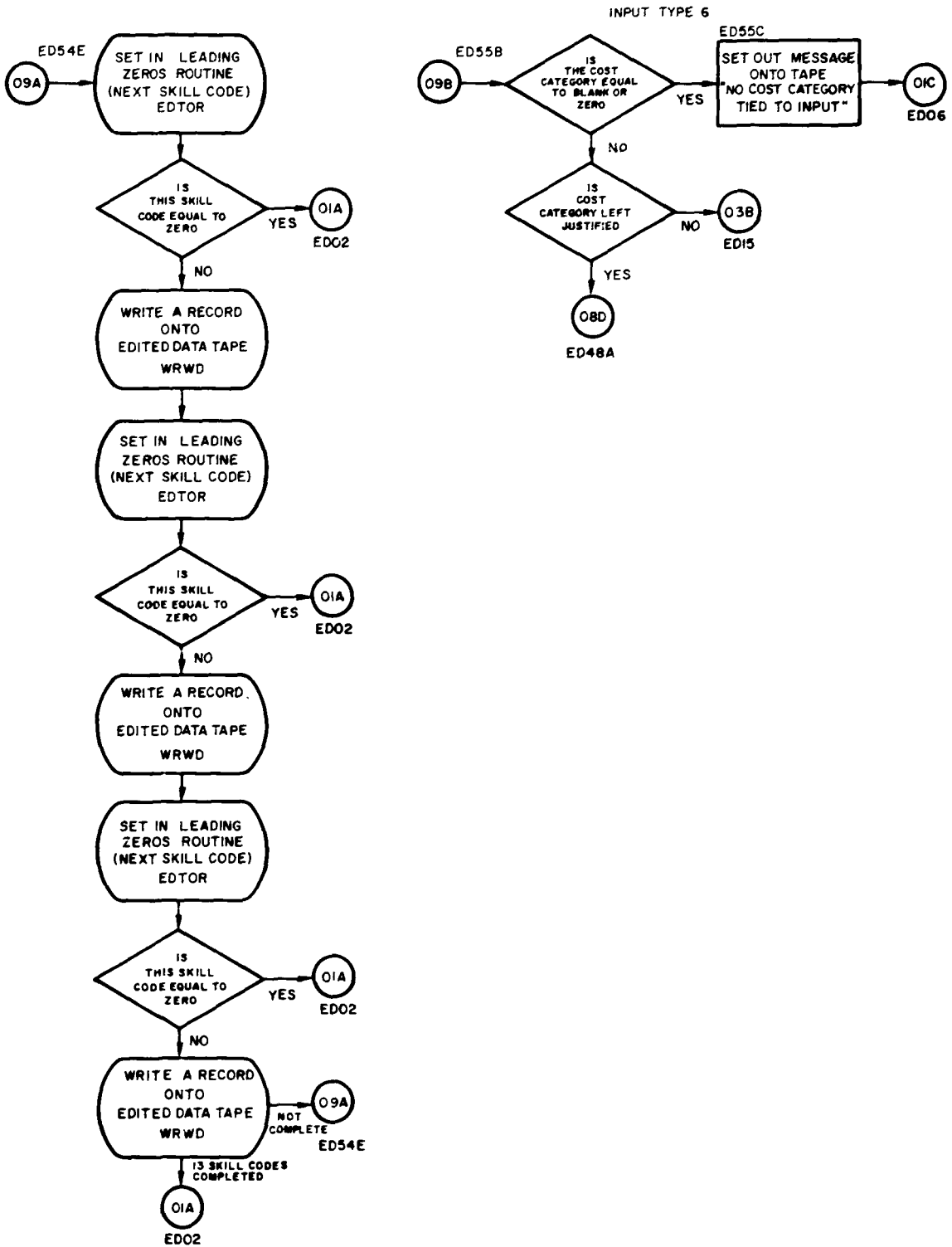


REGION EDIT

INPUT TYPE 5

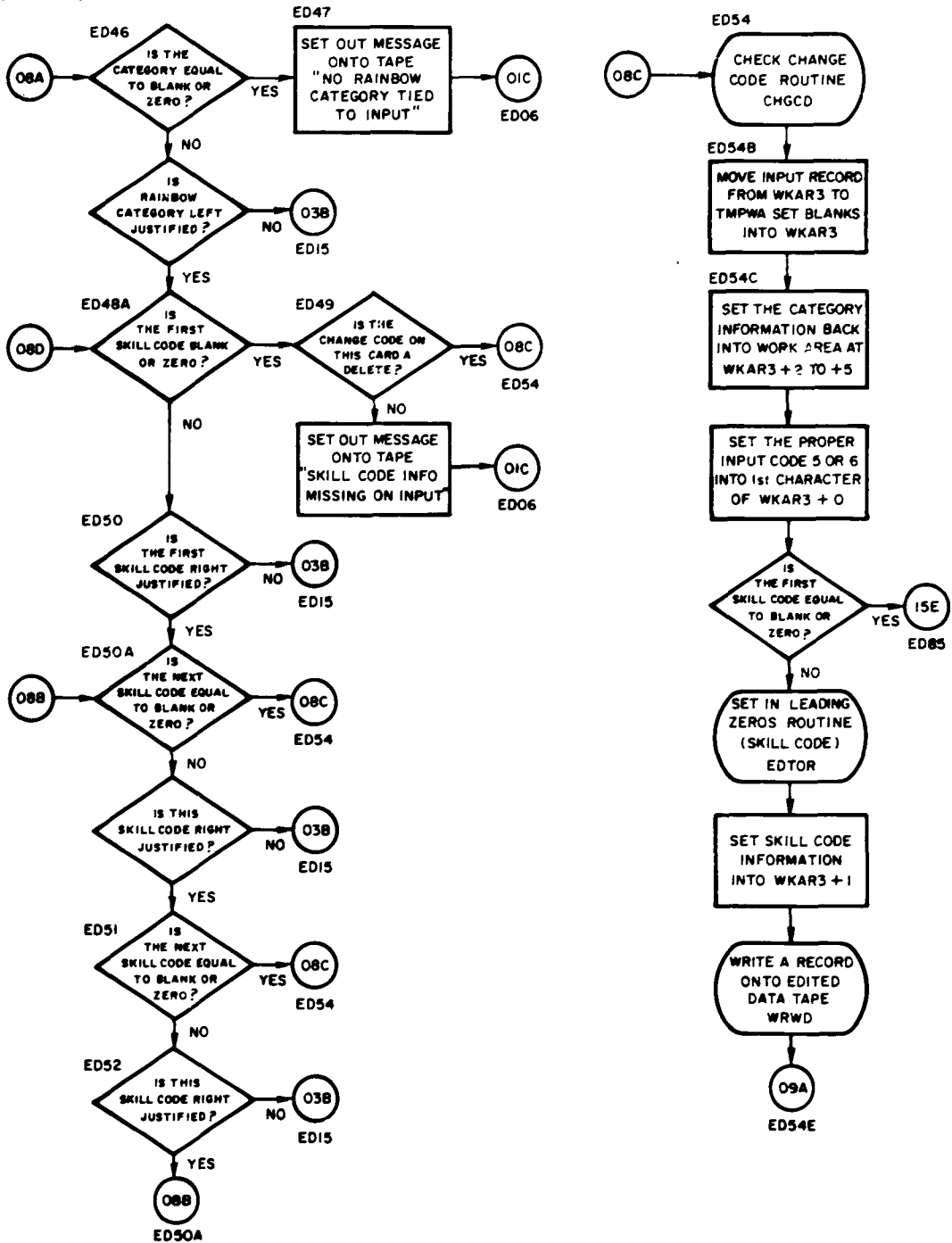


REGION EDIT

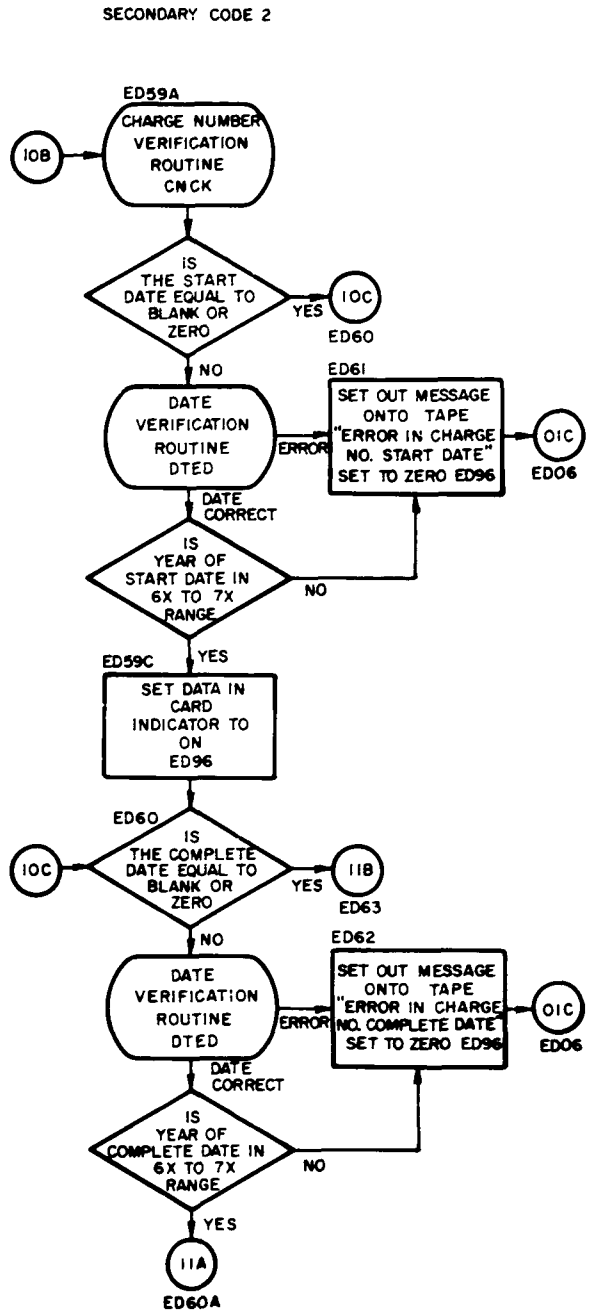
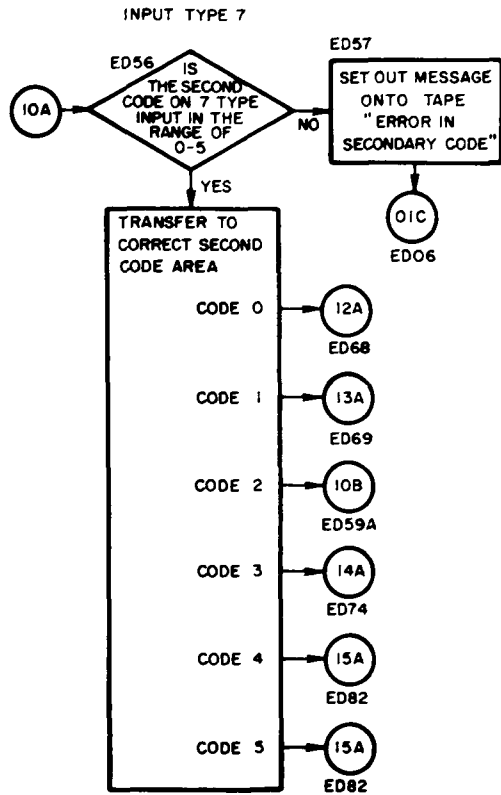


REGION EDIT

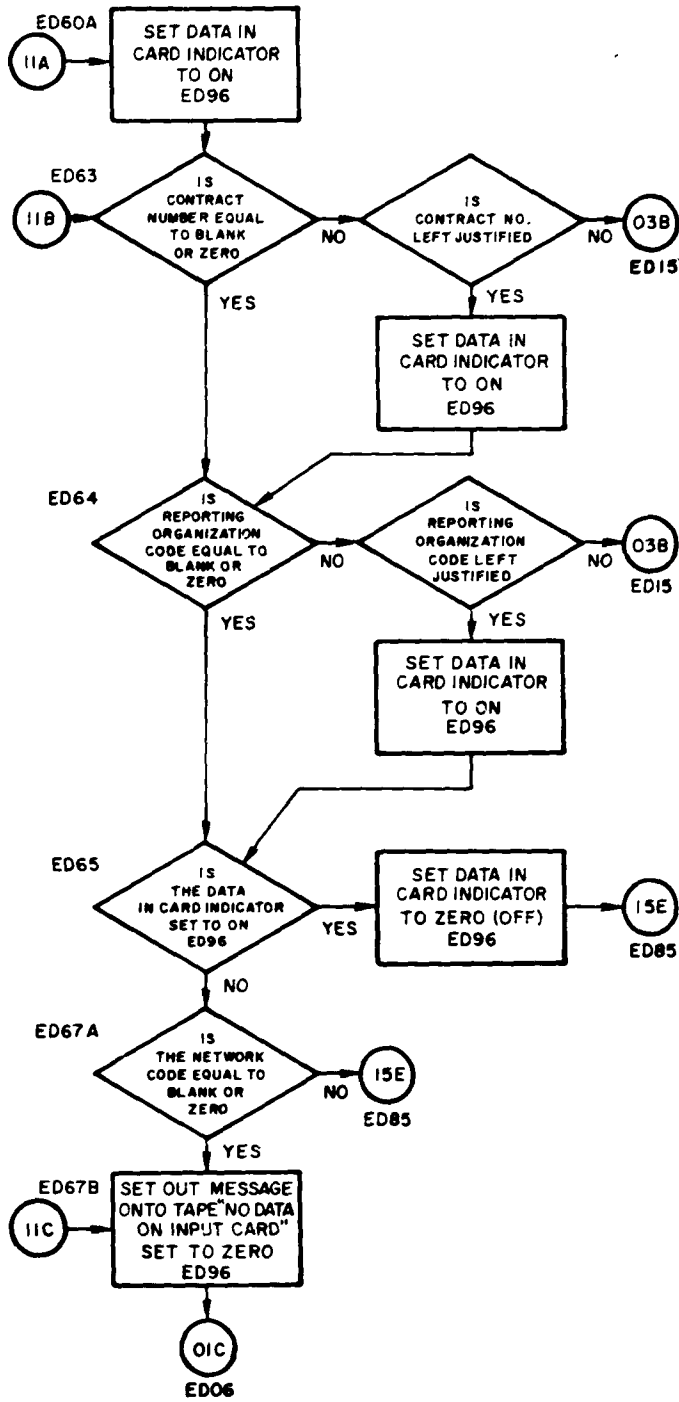
INPUT TYPE 5



REGION EDIT

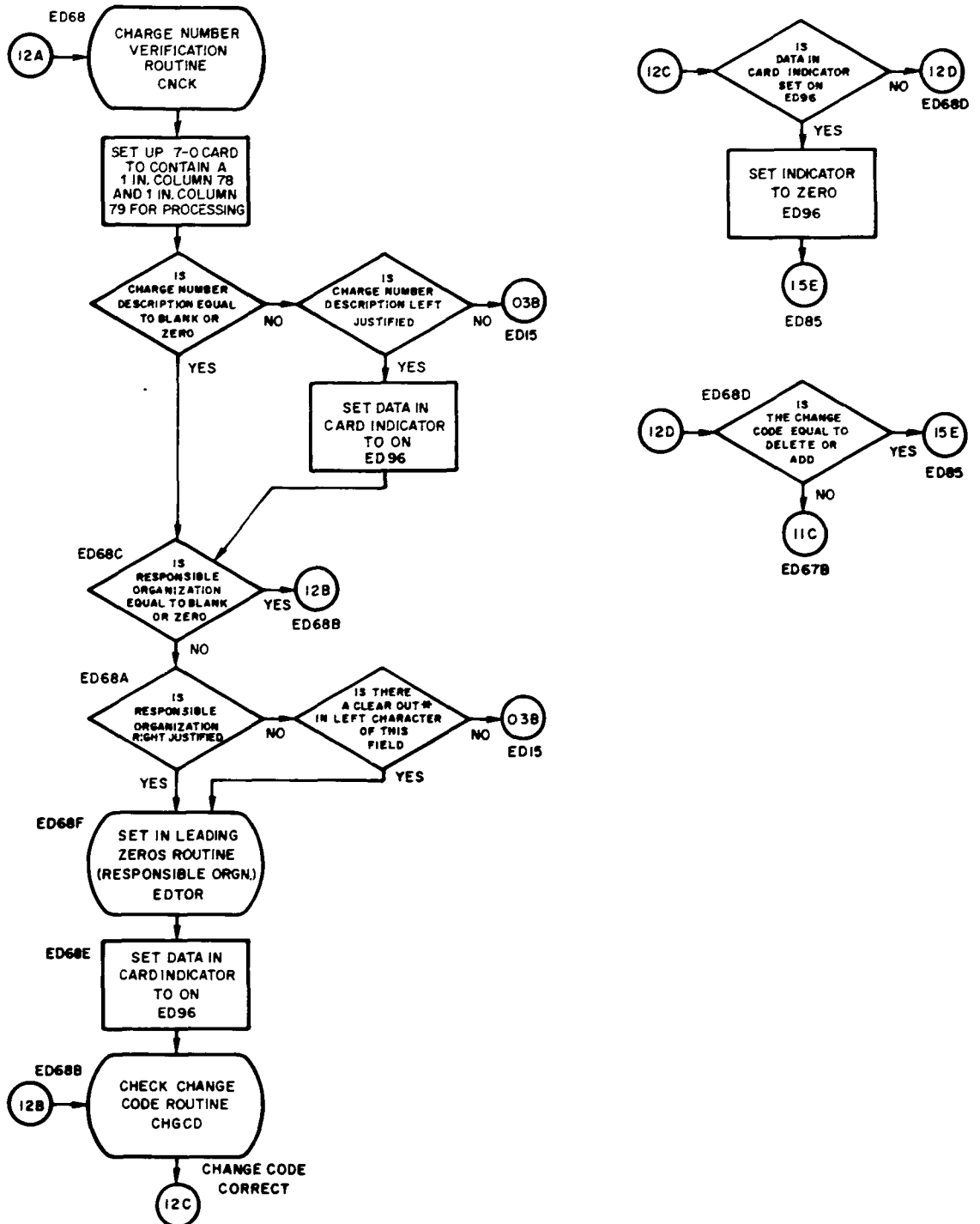


REGION EDIT



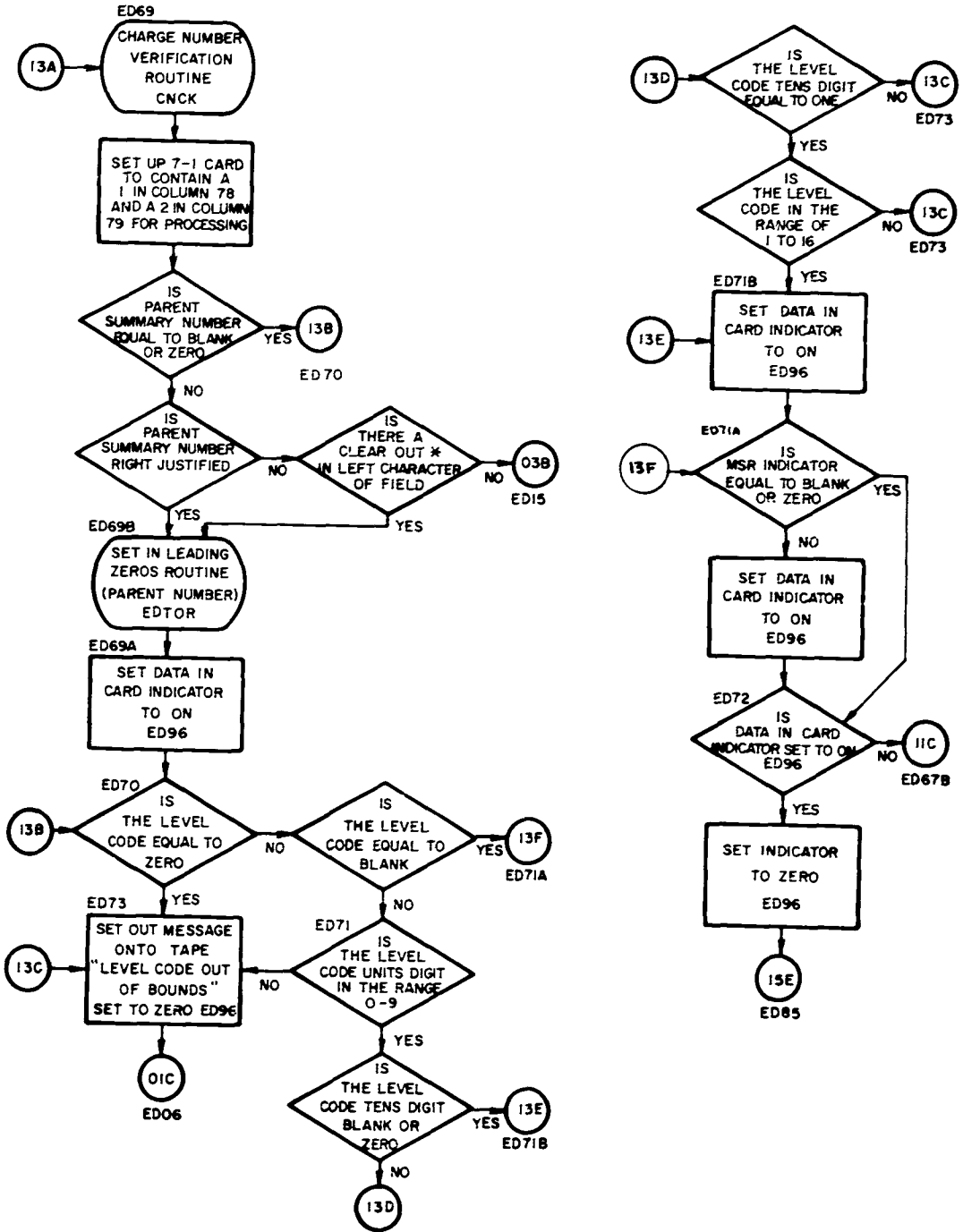
REGION EDIT

SECONDARY CODE 0



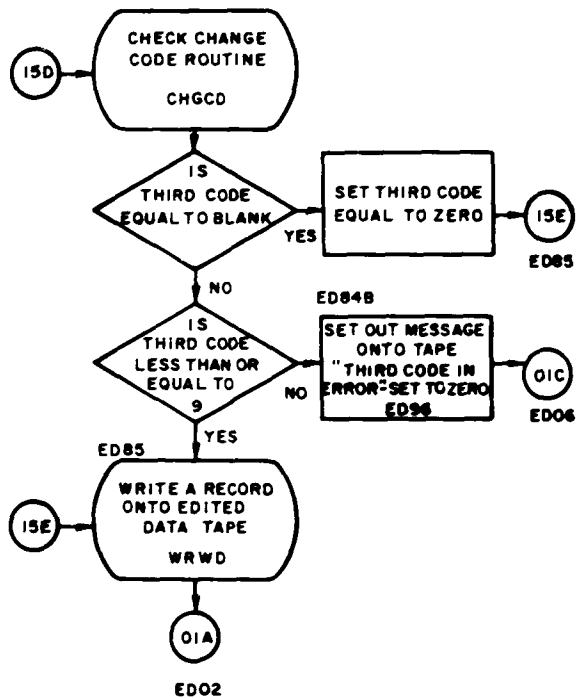
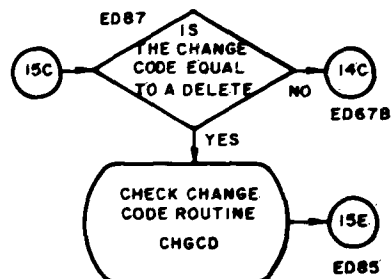
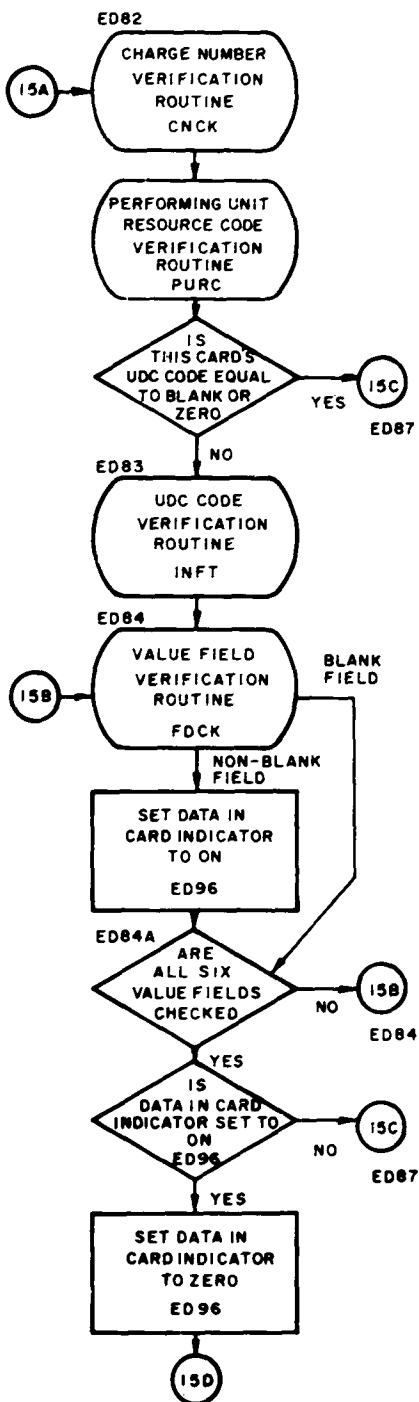
REGION EDIT

SECONDARY CODE I



REGION EDIT

SECONDARY CODE 4 AND 5



Region CNCK

EXPLANATION OF REGION:

This routine will edit and verify the charge number on the input data cards.

CALLING SEQUENCE:

L TSX CNCK, 4
L + 1 Normal return

INPUT:

Charge number starting in the 2nd character of WKAR3 and running for 18 characters

OUTPUT:

An edited charge number in WKAR3

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

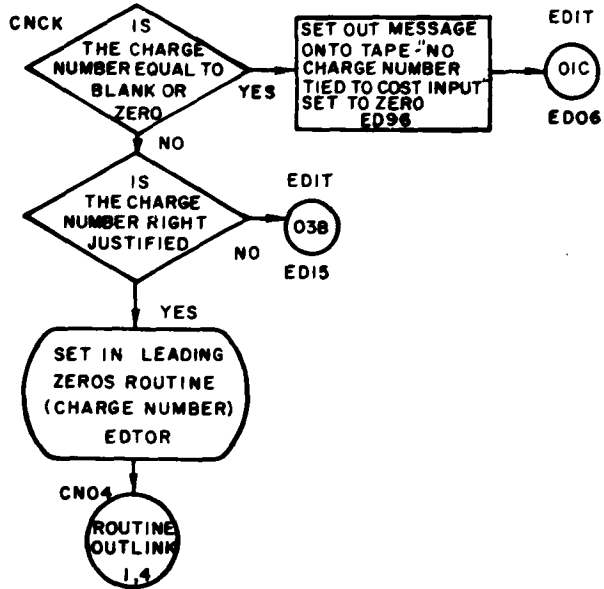
EDITOR

EXPLANATION OF CALLING SEQUENCE:

If an error is found the input is set out on the SYSTEM ERROR TAPE with an accompanying message

REGION CNCK

CHARGE NUMBER CHECK
ROUTINE



Region DTED

EXPLANATION OF REGION:

This routine will check the dates (DDMMYY) in the input cards verifying months, days in range specified by months, and alphabetic characters in year or days.

CALLING SEQUENCE:

L TSX DTED, 4
L + 1 Error return
L + 2 Normal return

INPUT:

The date will come into this routine as XXXXDD in the accumulator and MMYYYX in the MQ.

OUTPUT:

Not applicable

STORAGE USED:

The DTTB and DTTB2 tables which are part of the DTCR subroutine explained in section III-C.

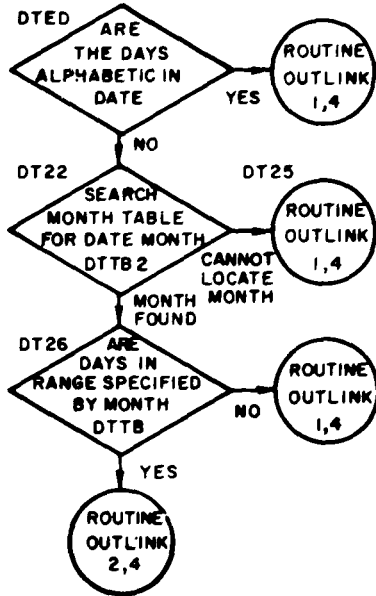
SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

Not applicable

DATE EDIT
ROUTINE



Region PURC

EXPLANATION OF REGION:

This routine will edit the performing unit and resource code for the 7 card inputs where required.

CALLING SEQUENCE:

L TSX PURC, 4
L + 1 Normal return

INPUT:

Performing unit starting in the 20th character of WKAR3 and running for 6 characters. Resource code starting in the 26th character of WKAR3 and running for 4 characters.

OUTPUT:

An edited performing unit and resource code in WKAR3.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

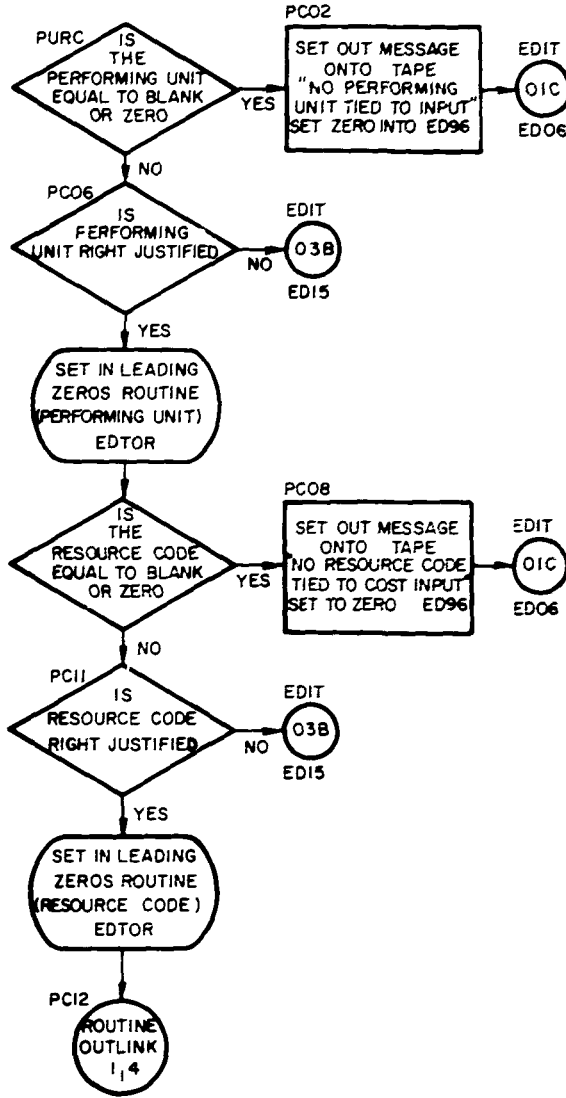
EDITOR

EXPLANATION OF CALLING SEQUENCE:

If an error is found the input is set out on the SYSTEM ERROR TAPE with an accompanying message.

REGION PURC

PERFORMING UNIT
RESOURCE CODE
CHECK ROUTINE



Region INFT

EXPLANATION OF REGION:

This routine will verify the UDC code for the following codes:
H, D, M, T, and U.

CALLING SEQUENCE:

L TSX INFT, 4
L + 1 Normal return

INPUT:

The UDC code right-justified in the accumulator.

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

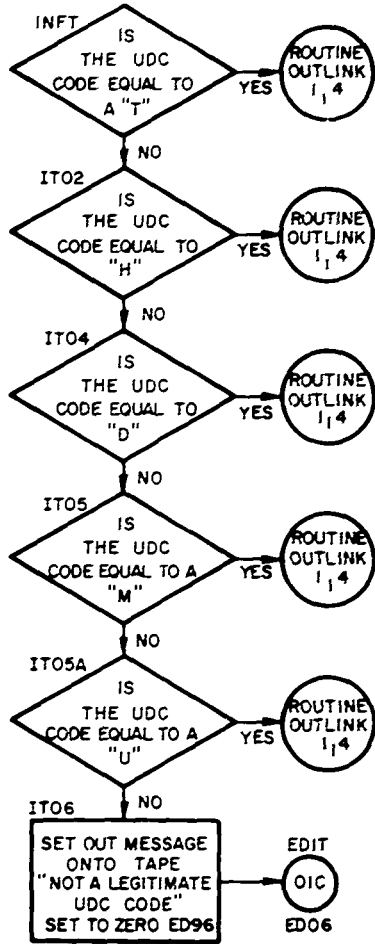
Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found, the input is set out on the SYSTEM ERROR TAPE
with an accompanying message.

REGION INFT

UDC CODE
VERIFICATION
ROUTINE



Region MYCK

EXPLANATION OF REGION:

This routine will check the month and year for cost inputs (7-3 cards).

CALLING SEQUENCE:

L TSX MYCK, 4

L + 1 Normal return

INPUT:

The month and year will come into this routine, right-justified, in the accumulator as XXMMYY.

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

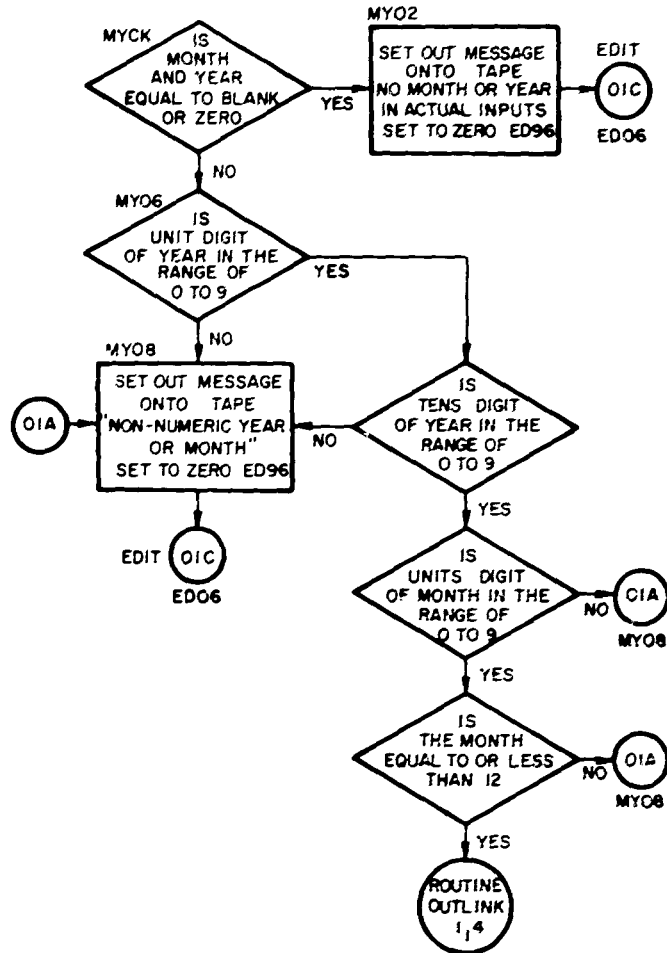
Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found the input is set out on the SYSTEM ERROR TAPE with an accompanying message.

REGION MYCK

MONTH AND YEAR
CHECK ROUTINE



Region FDCK

EXPLANATION OF REGION:

This routine will check the value fields for the 7-4 and 7-5 card inputs.

CALLING SEQUENCE:

L TSX FDCK, 4
L + 1 Return if field is blank
L + 2 Normal return

INPUT:

The value field will be 6 characters, and is set up in the accumulator.

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

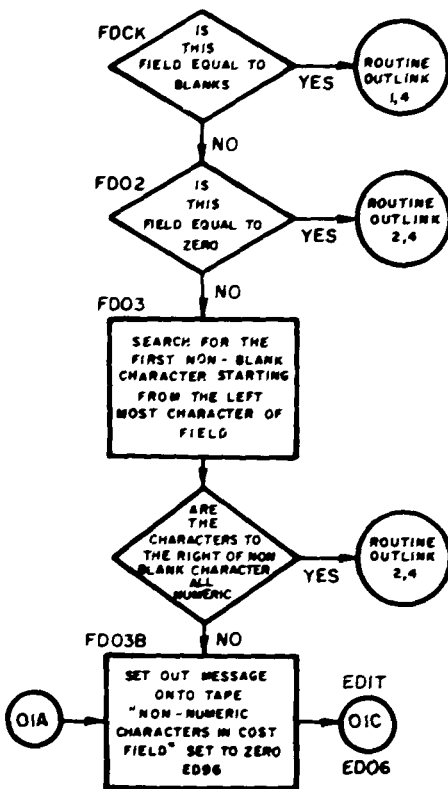
Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found, the input is set out on the SYSTEM ERROR TAPE with an accompanying message.

REGION FOCK

VALUE FIELD CHECK
ROUTINE FOR 7-4
AND 7-5 INPUTS



Region FDCK2

EXPLANATION OF REGION:

This routine will check the value fields for the 7-3 card inputs allowing for (-) signs in the leftmost character of field.

CALLING SEQUENCE:

L TSX FDCK2, 4
L + 1 Return if field is blank
L + 2 Normal return

INPUT:

The value field will be 6 characters, and is set up in the accumulator.

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

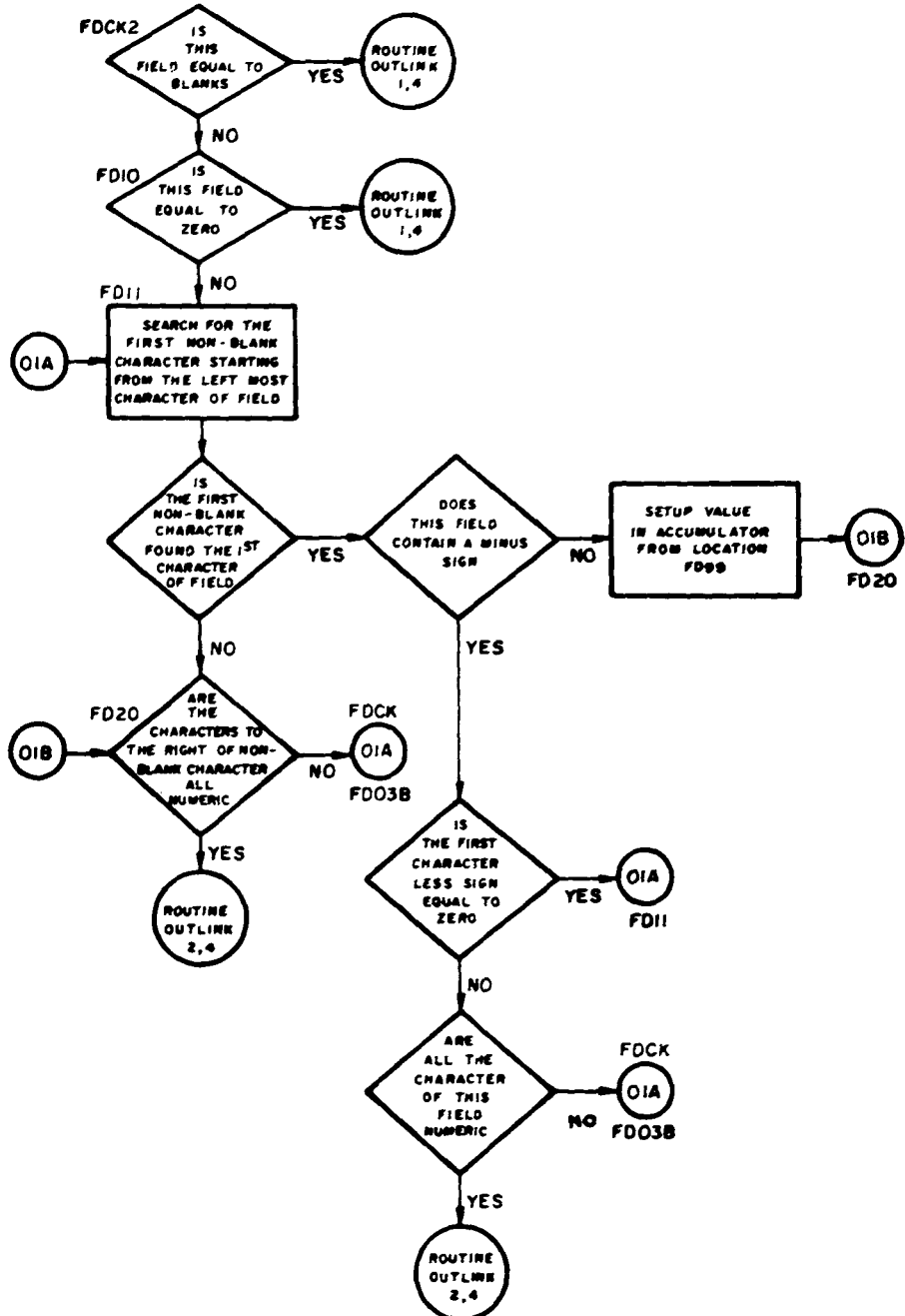
Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found, the input is set out on the SYSTEM ERROR TAPE with an accompanying message.

REGION FDCK2

VALUE FIELD CHECK
ROUTINE FOR 7-3
INPUTS



Region CHCD2

EXPLANATION OF REGION:

This routine will check the second class of change code associated with 7-3 type input. These codes are R, T, and D.

CALLING SEQUENCE:

L TSX CHCD2, 4
L + 1 Normal return

INPUT:

Not applicable--tied to 7-3 input card.

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

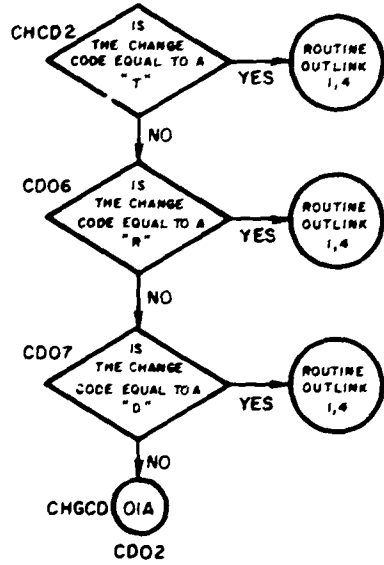
Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found, the input is set out on the SYSTEM ERROR TAPE with an accompanying message.

REGION CHCD2

ACTUAL INPUT
CHANGE CODE
VERIFICATION
ROUTINE



Region EOFIT

EXPLANATION OF REGION:

END-OF-FILE EXIT for wrapping up the PERT COST EDIT portion of program. The writing of the E.O.F.'s, the rewinding and unloading of tapes, as indicated by the option, as well as setting up the messages for the end of the edit phase are accomplished in this routine.

CALLING SEQUENCE:

L TRA EOFIT

Outlink TRA to EDIT ROUTINE EXIT

INPUT:

Not applicable

OUTPUT:

Number of errors message set out on on-line printer plus accompanying information as described on Page III-D-1.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

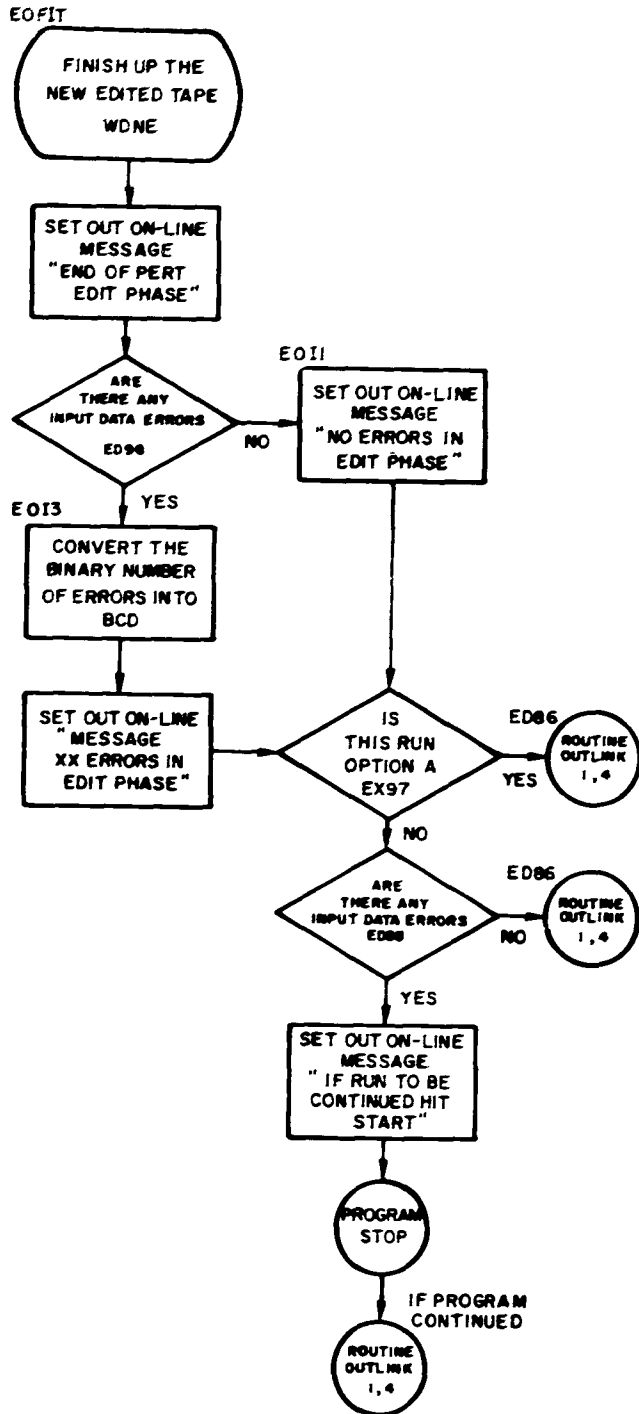
WDNE (See Section III-B) to finish up EDITED DATA TAPE

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION EOFIT

END OF FILE ON
INPUT TAPE



Region CHGCD

EXPLANATION OF REGION:

This routine will check the major type of change code associated with the input cards. These codes are A, C, and D.

CALLING SEQUENCE:

L TSX CHGCD, 4
L + 1 Normal return

INPUT:

Code will always be set in column 80 of card and for this routine will be the 80th character in WKAR3.

OUTPUT:

Any D code located will be set to a B in the 80th character of WKAR3 for sorting convenience.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

If an error is found, the input is set out on the SYSTEM ERROR TAPE with an accompanying message.

Region EDTOR

EXPLANATION OF REGION:

This routine will set up leading zeros for all fields described on Page III-D-12.

CALLING SEQUENCE:

L TSX EDTOR, 4
L + 1 This word of field is all blank
L + 2 Normal return--field does not contain all blank

INPUT:

The leftmost word of the field to be edited, followed by the word at its right, until a non-blank is found. For each word the routine will have to be entered again. If the first word is less than 6 characters, blanks should be set into the leftmost characters, which are not contained in the field to be checked.

OUTPUT:

For each word of the field entered, the leftmost blanks will be converted to zeros.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

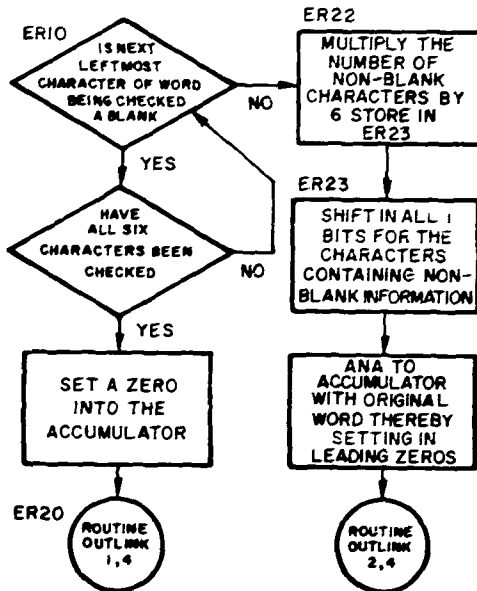
Not applicable

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION EDITOR

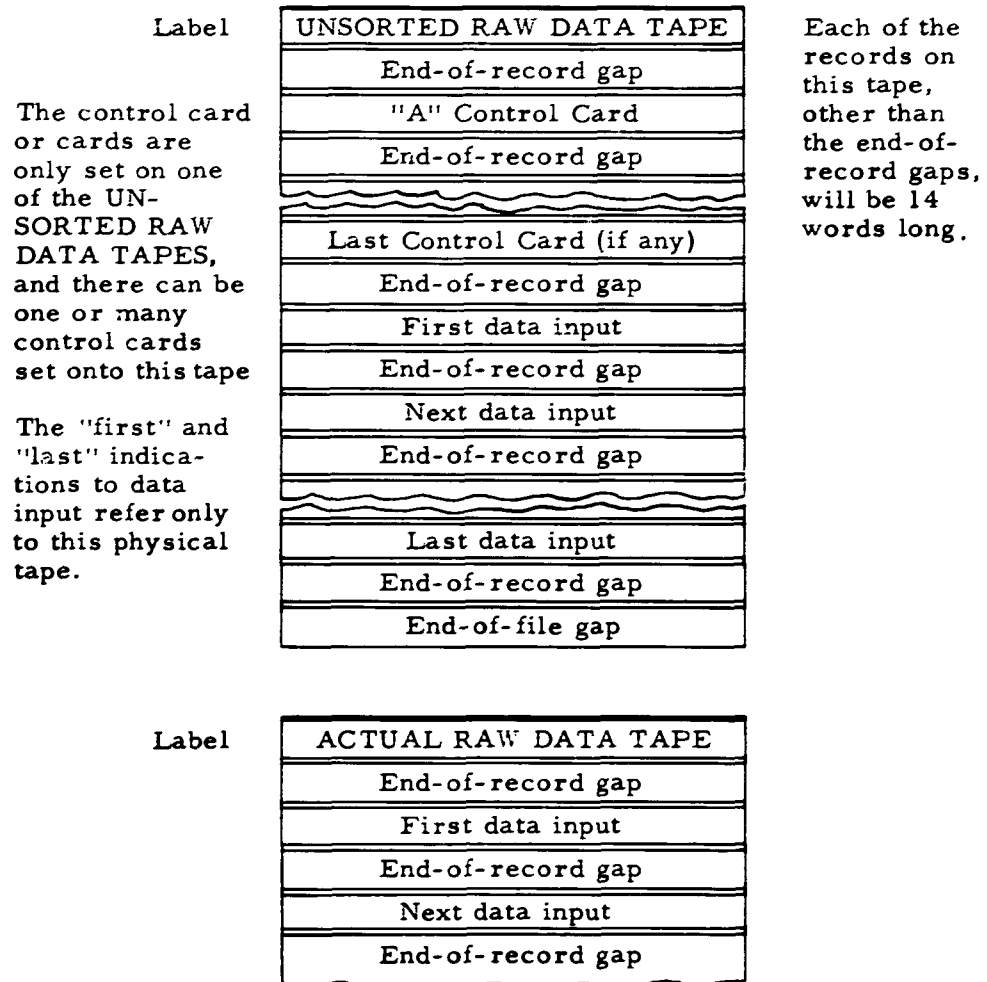
TO SET IN LEADING
ZEROS ROUTINE

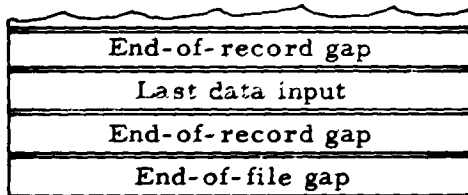


Input Edit Tape and Card Layouts

The following section will show pictorially the various tape layouts involved in the edit phase as well as the layout for the input data cards (except for the input parameter cards which will be explained in Section III-F).

All input cards can be set onto the INPUT DATA TAPE in a random order except for the label, which must be first. The edit sort phase will set the cards in the proper order. The layout on the INPUT DATA TAPE will take the following form:



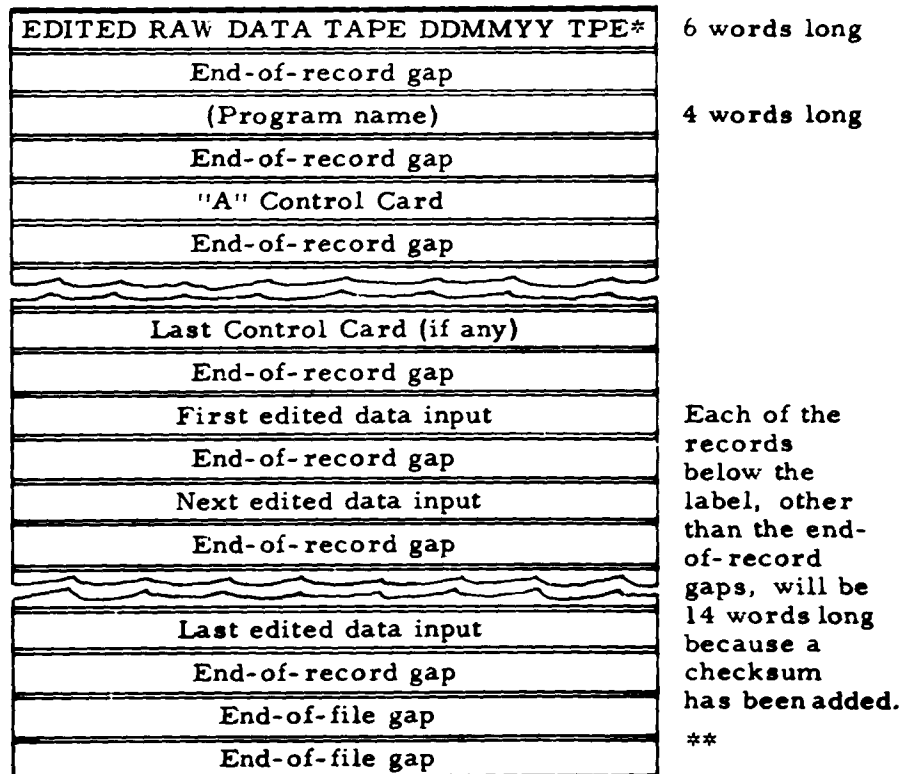


These tapes will be created as a result of a card-to-tape or tape-to-tape operation.

The EDITED DATA TAPE will be developed by passing the INPUT DATA TAPES through the edit phase. This EDITED DATA TAPE may be longer than its corresponding INPUT DATA TAPE due to the breakdown of the 5 and 6 card inputs as explained on Page III-D-11. The EDITED DATA TAPE can be used as an INPUT DATA TAPE in the case where a previous edit pass has been corrected and the program is started again. The layout on the EDITED DATA TAPE will take the following form:

These control cards will be set only on the first EDITED DATA TAPE and will consist of the latest control card set. There can be one or many control cards set on this tape.

The first and last indications to edited data input refer only to this physical tape



*The EDITED DATA TAPE will have a 1 indicating it was the first tape

created of this series. All the following tapes created, if any, will be numbered consecutively from 2 to 9.

**The configuration shown represents the last tape of a series. If it is not the last tape of a series, an additional record of one word is inserted between the two end-of-file gaps as explained on Page III-B-10.

Figure III-D-1 is the input data card layouts. Table III-D-1 shows the input coding assignments.

Input Type	Column					Remarks
	1	2	78	79	80	
	Card Main	code Sub	Second code	Third code	Change code	
1. Control cards Main control card Output report selection Project selection Tape reassignment Security number Program name change	A B C D E F					Read in off of input tape
2. Parameter cards Read USERS TIME TAPE	1	A B C				Read in off of input tape Carried on Secondary Master
3. Charge no. associated with activities	2				A-add D-delete C-change	Carried on Secondary Master
4. Rate conversion changes	4				A-add D-delete C-change	Carried on PERT/ Cost Master
5. Rainbow Category associated with resource code	5				A-add D-delete C-change	Carried on PERT/ Cost
6. Cost Category with resource code	6				A-add D-delete C-change	Carried on PERT/ Cost Master
7. Description and responsible unit input	7		0		A-add D-delete C-change	PERT/Cost Master
8. Program breakdown input	7		1			
9. Charge no. changes	7		2			
10. Actual inputs	7		3		R-replace I-add to D-delete	
11. Estimated inputs	7		4	0 to 9	A-add D-delete C-change	
12. Budgeted inputs	7		5	0 to 9	A-add D-delete C-change	

Table III-D-1 Input Coding Assignments

III-E PERT COST EDIT SORT PHASE

This phase will read the EDITED DATA TAPE, format the input cards for sorting, and set the information out on the sort tape. After sorting is completed, this data is set out on the SORTED DATA TAPE and the phase is completed. The sort used for this phase is the 4-tape sort described in section IV-C. If the "B" option is indicated, the program will finish up at this point and print out the program ending messages. If the option is C, D, or G the program will print out the edit sort ending message and will automatically go into the next phase. On options E or F the edit sort phase is bypassed.

Edit Sort Tape Operations

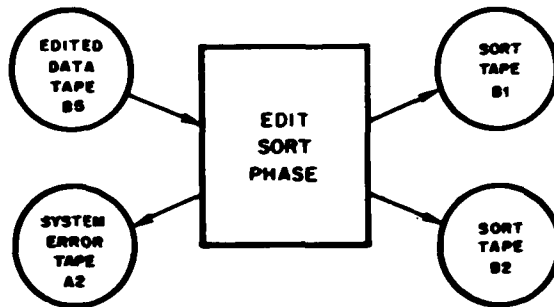
The edit sort phase allows for up to nine SORTED DATA TAPES. The edit sort phase will first read the EDITED DATA TAPES, ignoring the control cards. These tapes contain single unblocked records in BCD. This phase will then take each record, re-format it with the proper sort key, and set it out on the 4-tape sort. The above operation will continue until all the EDITED DATA TAPES have been completed. At this point the program will go into the merge phase of the sort. At the completion of this phase, the program will begin setting up records from the sort into binary blocks of 200 words to be placed on the SORTED DATA TAPE. The SORTED DATA TAPE will be a second file following the EDITED DATA TAPE and may consist of a maximum of nine tapes.

The purpose in setting the SORTED DATA TAPE as a second file is to avoid changing tape during the program operation. As discussed earlier, the last two INPUT DATA TAPES are used for other purposes and the information on these tapes is destroyed. To avoid going back to a card-to-tape operation, the acceptable data for all the INPUT DATA TAPES plus control cards are kept on the EDITED DATA TAPE. Thus, in case of a redundancy on the SORTED DATA TAPE, the input and control cards can be recovered without putting a different tape on the computer, since they are contained in

the file preceding the sorted data on the same physical tape. The program can simply be restarted, and the EDITED DATA TAPES then become the INPUT DATA TAPES.

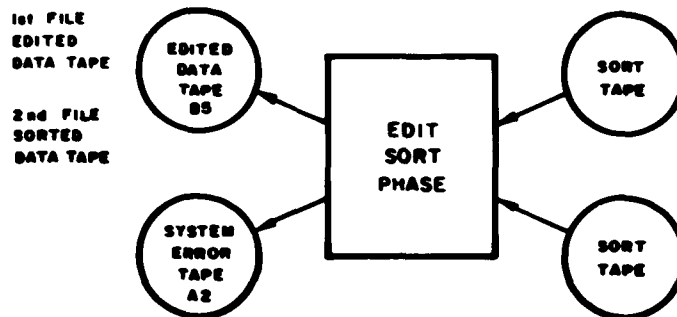
The tape flow for the edit sort phase will take the following form:

During data read-in, formatting and sorting the configuration is



When all of the EDITED DATA TAPES have been completed the last tape is not rewound. At this point the sort will take over and arrange the edited data in proper sequence using tapes B1, B2, A7 and A4 as the merge tapes.

During the last merge pass the sort will pass control to the edit sort phase and the SORTED DATA TAPE will be developed as a second file on B5. The configuration is



The final merge tapes to be used are dependent upon the number of merge passes made by the sort. At the completion of this phase the sorted data tape is rewound and unloaded according to the option that is selected. For option B the tape is both rewound and unloaded; for all other options it is only rewound.

Edit Sort Tape Messages On-Line

The messages forthcoming on the on-line printer regarding the edit sort tapes will be as follows, depending on the number of tapes used and the governing option:

- a) One edited tape with the sorted information to be set onto the same tape.

```
TAPE B5 HAS BEEN SELECTED FOR READING
COMPLETED READING OF EDITED TAPE B5
* * * DO NOT REWIND * * *
TAPE B5 HAS BEEN SELECTED FOR WRITING
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT COST EDIT SORT PHASE
```

For Option B, the above messages will be followed by the program ending message and the system will stop. For Options C, D, and G, line 5 will be changed to read

```
TAPE B5 IS NOW REWINDING
```

and the system will automatically go into the time-merge or cost-update phase after the above messages. Options E and F do not pass through the edit sort phase.

- b) More than one edited tape with the sorted information to be set onto more than one tape.

To get to the start of the EDITED DATA TAPES the following messages will be set out:

```
SET FIRST EDITED TPE OF SERIES ON B5
IF PROPER REEL IS PLACED ON UNIT HIT - START
```

At this point the regular I/O messages will be set out as follows:

TAPE B5 HAS BEEN SELECTED FOR READING
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
SET NEXT REEL OF THIS SERIES ON TAPE B5
TAPE B5 HAS BEEN SELECTED FOR READING

(the above set of messages can
continue for up to 9 tapes)

COMPLETED READING OF EDITED TAPE B5
* * * DO NOT REWIND * * *
TAPE B5 HAS BEEN SELECTED FOR WRITING
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
SET NEXT REEL OF THIS SERIES ON TAPE B5
TAPE B5 HAS BEEN SELECTED FOR WRITING

(the above 3 messages can
continue for up to 9 tapes)

TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT COST EDIT SORT PHASE

For Option B, the above messages will be followed by the program ending message and the system will stop. The SORTED DATA TAPE inputs into Option E or F will be the first tape that contains sorted information. Those tapes that contain only edited data should not be set back on the computer, but should be saved in case an error occurs on the sorted data. Prior to printing the phase ending message of the above series, the following information will be set out on the printer for Options C, D, or G

SET FIRST SORTED TAPE OF SERIES ON B5
IF PROPER REEL IS PLACED ON UNIT HIT - START

and under these options the system will automatically go into the next phase.

All of the above messages refer to non-alternating tapes. Anytime a new tape is set onto the computer, the system will stop until the tape is in a ready position.

When the message "SET NEXT REEL OF THIS SERIES ON TAPE B5" is set out for the reading of the EDITED DATA TAPES it means that these tapes should be read in the order that they were created. When it is set out for the writing of the SORTED DATA TAPES it means that a blank or utility tape should be set on that unit to write the next tape of the series.

Edit Sort Error Message

There is only one error message that can be produced during the edit sort phase. This message will stop the system and be set out on the on-line printer.

ERROR IN CARD CODE AFTER EDIT PASS
XX - 80 Characters of Input Code - XX

If the card code is not in the range of 1 to 7 the above message will be printed. (The second line of this message is a reproduction of the input card to which the message applies.) This problem is probably due to a computer error, since the card code had been checked and found correct in the edit phase.

Edit Sort Sequencing Parameters

The following parameters are used to develop the sorting sequence for the input cards. Each individual card type will have its own sort key but all cards will be sorted together. The sort key used for this card type will be 5 words and this information will precede the regular 14-word record. The data in the sort key will, in most cases, duplicate information in the original record. The matrix given in Fig. III-E-1 will show the sort key for each of the individual input cards. EX86 is a location in core that is set up from the successor-predecessor indicator in Column 4 of the "A" control card. If Column 4 is blank or zero, EX86 = 0; otherwise, EX86 ≠ 0.

Edit Sort Region Description

The following region description will describe the major subroutine used in the edit sort phase.

Region EDSO

EXPLANATION OF REGION:

This routine will perform the formatting and sorting for the edited input data.

CALLING SEQUENCE:

L TSX EDSO, 4
L+1 Normal return

INPUT:

Up to nine EDITED DATA TAPES.

OUTPUT:

Up to nine SORTED DATA TAPES.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

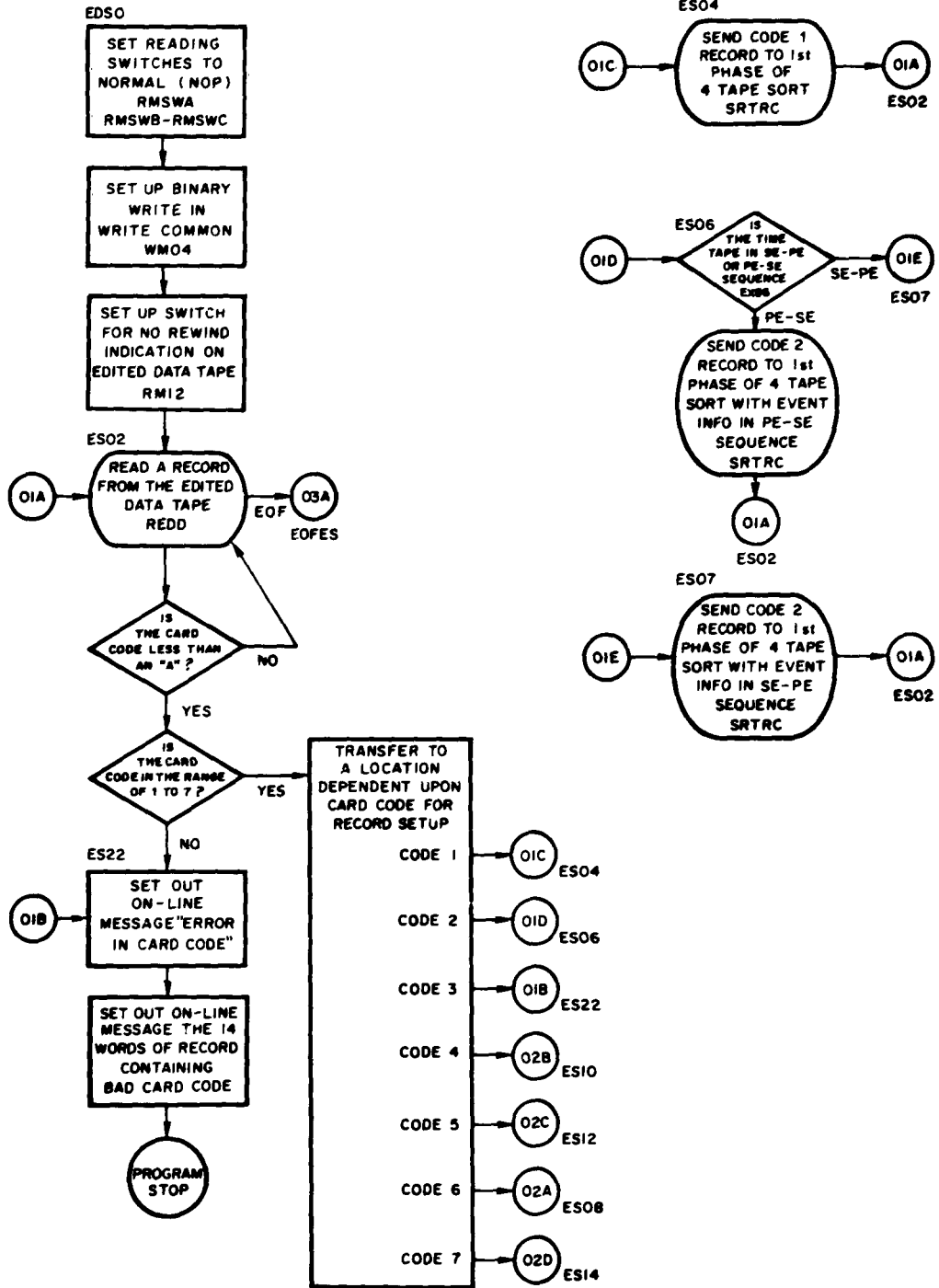
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

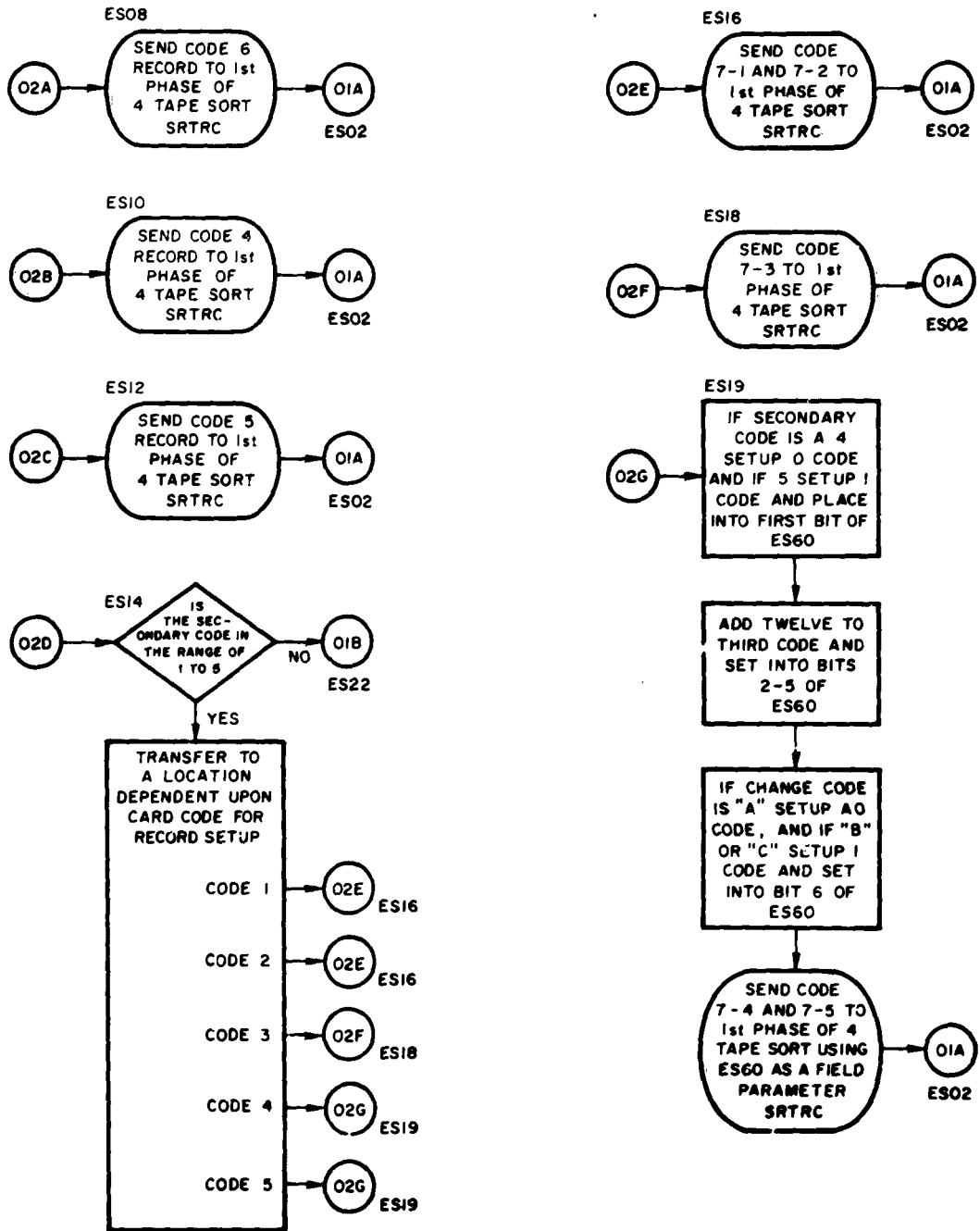
If an error is found, the input and error message will be set out on the on-line printer and the program will halt.

REGION EDSO

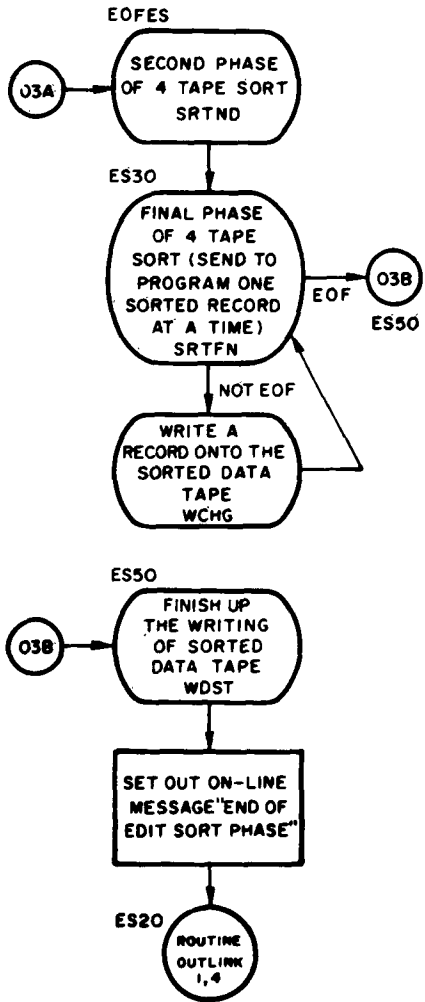
EDIT SORT PHASE



REGION EDSO



REGION EDSO

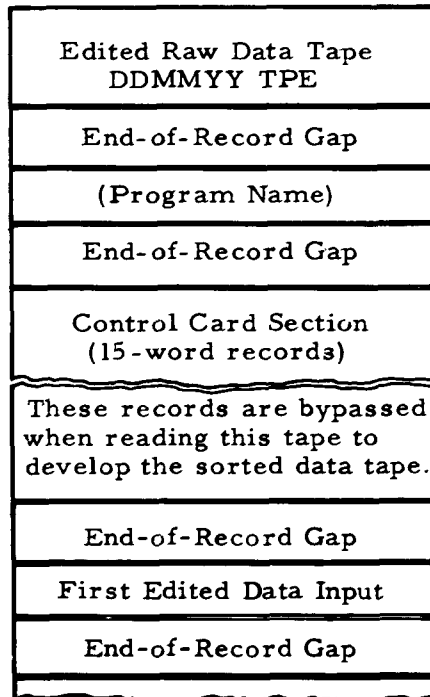


Edit Sort Tape Layouts

This subsection shows pictorially the tape layouts involved in the Edit Sort phase. The layout of the EDITED DATA TAPE was described on Page III-D-53.

Edited Tape Label
(BCD Mode)

This section only
set onto the first
tape of the edited
data tape series.

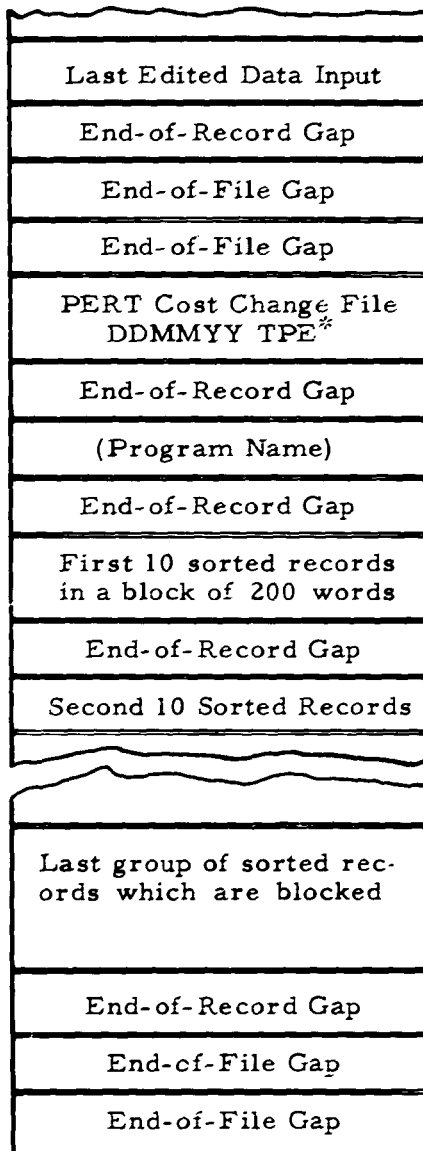


6 words long

4 words long

Each of the records
below the label,
other than the end
of record gaps,
will be 15 words
long and written
in the BCD mode.

Sorted Tape Label
(BIN Mode)



6 words long

4 words long

Each of the records below the label, other than the end of record gaps, will be 200 words long and written in the BIN mode.

This record if relating to the last tape of the series may contain from 1 to 10 records in its block.

**

The "first" and "last" reference to sorted records refers only to this physical tape.

* The first sorted data tape will have a "1," indicating it was the first tape created of this series. If any additional sorted data tapes are created they will be numbered consecutively from 2 to 9.

** The configuration shown represents the last tape of a series. If it is not the last tape of a series an additional record of one word is inserted between the two end-of-file gaps as explained on Page III-B-10.

Each individual block of sorted data will be made up of 10 records, except for the last block, and each logical record will take the following form:

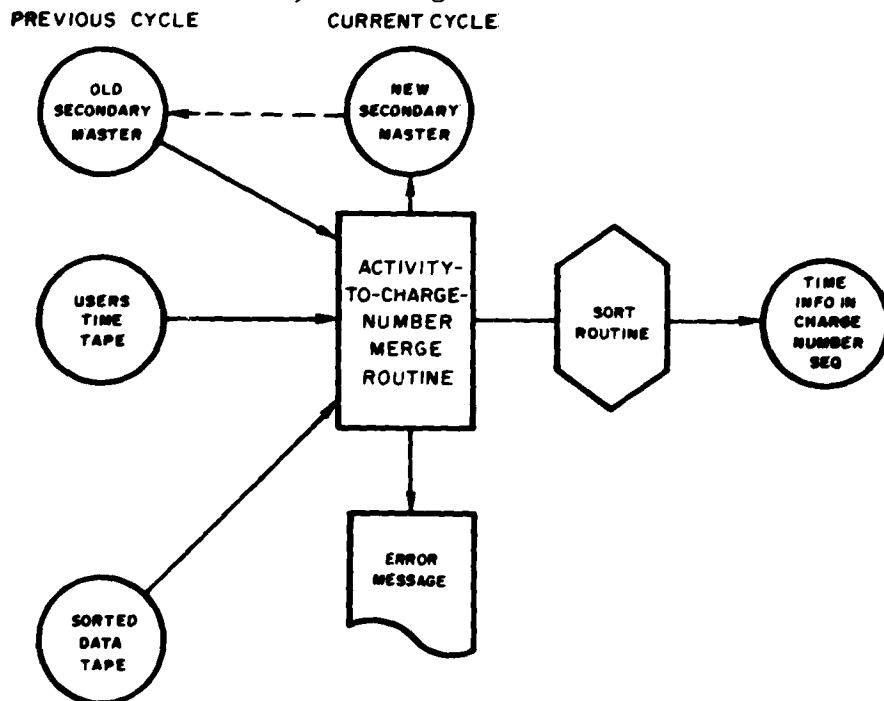
Words	1	Sort key as described in Figure III-E-1
	2	
	3	
	4	
	5	
	6	14-word layout of input data card with little or no alteration from the original input
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	
	16	
	17	
	18	
	19	
	20	Check sum

Developed by
writer routine

III-F PERT COST TIME MERGE PHASE

Time Merge General Description

In the time merge phase, the charge or summary numbers are merged with activity information from a PERT Time tape or cards to generate a time information tape for use during the PERT Cost Update phase. This selected time information for the Cost Update will be sequenced into charge number order by means of a 4-tape sort. Only activities related to a charge or summary number will be included on this output tape. The time merge phase is accomplished by two routines--the activity-to-charge-number merge routine and the activity-to-charge-number sort, as illustrated below.



In the preceding diagram, the PERT Time tapes are referred to as the USERS TIME TAPE, which will contain the activity information to be merged. The inputs that tie the activities to charge or summary numbers were verified in the preceding Edit and Edit Sort phase and come into the system from the SORTED DATA TAPE. The system will read and interpret the USERS TIME

TAPE by means of a set of parameter cards which were read in during the file establishment and which likewise come into the system from the SORTED DATA TAPE. The activity/charge number information is retained on the SECONDARY MASTER TAPE in blocks of 600 words and can be modified by adds, deletes, or changes in the existing file. The input parameters are developed by the system into an INPAR table of 350 words, as described in the following subsections, and is set out onto the NEW SECONDARY MASTER TAPE for use in the next cyclic run.

The output tape from the activity-to-charge-number merge will be in PE-SE or SE-PE sequence and its data will be sorted by charge number in the follow-up routine. The sorted information will be then used during the PERT Cost Update phase.

At the end of the time merge phase, a message indicating the number of errors encountered during the processing will be displayed on the on-line printer. This message will take one of the following forms:

- (a) XXXX ERRORS DETERMINED
IF RUN IS TO BE CONTINUED EVEN THOUGH ERRORS
INDICATED HIT START
- (b) NO ERRORS DETERMINED

If message (a) is printed out the program will stop. If these errors are to be ignored, the start button at the console is hit and they are bypassed. The program will then go into the activity-to-charge-number sort and continue on into its next phase. Where there are no errors indicated (Message (b)), the program will automatically go on to the activity-to-charge-number sort.

Time Merge Input Parameters

The input parameter system for the PERT time merge phase was developed in order to maintain a capability to read most PERT Time system tapes without having to modify the existing PERT Cost program. In the development of this parameter system the following three distinct types of cards

were produced: general description cards, file description cards, and field description cards.

General Description Cards (Type 1A)

These cards contain the code of "1A" in columns 1 and 2. They contain information that relates to the general characteristics of the PERT Time tape that is to be used. Some of the characteristics that are defined in these cards are: (1) the PERT Time network base date, (2) whether the PERT Time calculations are based on the start or the base date, and (3) whether T_S and T_A use the same location in the PERT Time file.

The complete set of characteristics contained in type 1A cards is coded as follows: (See Subsec. 3.5.6 for table layouts):

1. Sort Required Indicator - Column 12
If the USERS TIME TAPE is in some sequence other than PE-SE or SE-PE sequence, Column 12 is set to a character other than blank or zero. This indicator is located at INPAR + 0: 1 = sort required, 0 or blank = sort not required.
2. Network Base Date - Columns 5 to 11
If a network start date is in elapsed time relevant to a network base date, or if the activity data are related to a network base date, this date must be present. It will be set up in a DDMMYY format with the month being represented in an alphabetic configuration containing the first three characters of the month.
3. Base or Start Date Indicator - Column 13
If the dates in the USERS TIME TAPE are carried as a number, this indicator is set to relate the time dates to the start or the base date of the network. Whichever of the two dates is used it will become the value to which the elapsed time values are added in order to arrive at a calendar date. The indicator is located at Inpar + 3: 1 = calculations made using base date, 2 = calculations made using start date. These same indicator values will appear in the "1A" control card in Column 13.

4. Actual Code Indicator - Column 14

If T_S/T_A are located in the same physical word of the USERS TIME TAPE a scheduled or actual flag (INPAR + 340) is used. This flag will indicate whether the actual or scheduled dates are located in the T_S/T_A field. Once this flag has been isolated the value is compared with the actual code indicator (INPAR + 4). If it agrees, the T_S/T_A field is an actual date, but if it does not, it is a scheduled date.

5. T_S/T_A Set-up Code - Column 15

If T_S/T_A are located in the same physical word of the USERS TIME TAPE this column can be blank or zero. If they are in separate words this indicator is set to a character other than zero or blank. When the T_S/T_A dates are in two separate fields, the actual code indicator and the scheduled or actual flag do not have to be set. The scheduled date field will then be found in the T_S/T_A field (INPAR + 330) and the actual date location will then be found in the T_A field (INPAR + 344).

File Description Cards (Type 1B)

These cards contain the code "1B" in Columns 1 and 2. The information carried in these cards relates to the file characteristics of the PERT Time tape that is to be used. These cards indicate the type of records in the file, as well as the number of files. They give the PERT Cost program the capability to read the tape and to be aware of the kind of record it has read. The elements used, their codes, and the purpose of each field are described below:

1. Card Order Number - Columns 3-4

This code allows a maximum of 75 cards, which must be in the same order as the USERS TIME TAPE. This code is part of the sort sequence for the card. As these cards come in to the system from the SORTED DATA TAPE they are translated into 4-word configuration groups starting at INPAR + 10 and ending at INPAR + 309. If the maximum number of "1B" cards is not used, the remaining blocks will be filled with zeros.

2. File Order Number - Columns 5-6

This code designates a file and represents a family of record types. Each different, sequential file represented on the USERS TIME TAPE gets an order number larger by 1 than the previous file. This number is carried as a binary value in bits 3-17 of the first word of the file description set.

3. Record Type Number - Column 7

This code links the individual fields, by record type, to a particular record in the file. A maximum of seven record types can be used. These types may be present in more than one file. The record type number used for a particular field will have a corresponding code number for that field in the "1C" cards, no matter which file of the USERS TIME TAPE relates to it. This value is carried in bits 18-20 of the first word of the file description set. If the record type number is zero it will indicate to the program that this is the only card for this file and that this file is to be skipped in processing the USERS TIME TAPE.

4. One-or-Many Indicator - Column 8

This indicator will show whether only one of this type of record or many records of this type are in a particular file of the USERS TIME TAPE. This code is carried in bit 5 of the fourth word of the file description set. The code used for this indicator is: 0 or Blank = many of this record type in file; 1 = only one of this record type in file.

5. Length of Logical Record - Columns 9-11

If the record being described by this particular "1B" card is a blocked record of a fixed length, the number of words in the logical record are indicated. If this record is not blocked or is made up of variable sized logical records, this field is left blank. If it contains a value, it is converted to binary and is carried in bits 21-35 of the first word of the file description set.

6. Read Mode - Columns 12-14

This field will contain either "BCD" or "BIN" according to the mode used in developing this particular record on the USERS TIME TAPE. The above mnemonics are converted to 1 and 0, respectively, and are set into the S-bit of the second word of the file description set.

7. End-of-Block Code - Columns 15-17

This code will be either "EOL" to indicate that this record is part of a block, or "EOR" to indicate that this record is terminated by an end-of-record mark. The "EOR" condition will convert to a 1 and the "EOL" to a 2 and these codes will be set into bits 1 and 2 of the first word of the file description set.

8. Record ID Code - Columns 18-23
This code will be used in identifying individual records of the USERS TIME TAPE. It will be set into the third word of the file description set, and compared to the file ID code of the USERS TIME TAPE as determined by the information in Columns 24-30. This code will always be right-justified, since the ID code from the USERS TIME TAPE will be forced to the right by the program. If the code is less than 6 characters or a full word, leading zeros should be set into the record ID code field. If the code is greater than 6 characters, the six most meaningful should be selected and set into this field, as well as into the retrieval fields in Columns 24-30. If there is no record ID code, this field is left blank, as is Columns 24-30, and the record being checked from the USERS TIME TAPE is assumed to be the record wanted.
9. Word Position in Record for ID - Columns 24-25
This field will indicate the location in the record that the ID field can be found. This location is converted to binary and set into bits 21-35 in the second word of the file description set. The first word of the record is considered as 1 instead of zero for all references to this record.
10. Retrieval Mode for ID - Column 26
This field will indicate the mode in which this record ID is carried in the USERS TIME TAPE. There are three possible modes that can be used:
C = characters and is converted to a 1
W = words and is converted to a 2
B = binary and is converted to a 3
This converted value is set into bits 18-20 of the second word of the file description set.
11. Field Start Position for ID - Column 27-28
This start position will indicate the location in the word that this field begins. It will vary with the retrieval mode used. If words are used, this field is left blank. If characters are used, this field will contain a value in the range of 1 to 6 indicating the character start position. If it is a binary mode, this field will contain a value in the range of 1 to 36 indicating the bit start position. This number is converted to binary and set into bits 3-11 in the second word of the file description set.

12. Number of Units for ID - Columns 29-30

This field will contain the number of units that are tied to the retrieval code for the record ID. If the retrieval code indicates the ID is carried as words, this field has to be 1, since the program cannot handle an ID of more than one word. If the code denotes characters, this field will have to be in the range of 1 to 6; if the ID is binary, the field must be in the range of 1 to 36. This number is converted to binary and set into bits 12-17 in the second word of the file description set.

13. Variable Record Indicator - Column 31

This code will indicate that the logical record involved is of variable word length and that the information in columns 32-38 will state where the count of the words is located in this record. The letter V in this column will indicate a variable record, and it will cause a 1 to be set into the sign bit of the first word of the file description set.

14. Retrieval Information for Variable Record Count - Columns 32-38

The information regarding these fields are the same as discussed in items 9-12 above, except that this data is set into the fourth word of the file description set instead of the second. The count developed from this data is used as the length of logical record to determine the size of the record in the block.

In the processing of the input parameter file-description cards, a "found" indicator is located in bit 1 of the fourth word of the file description set. This indicator is set when a particular record is located. If this file has been completed and one of the records has not been located, the system will stop and an error message will be forthcoming. (Page III-F-14).

Field Description Cards (1-C)

These cards are coded "1C" in Columns 1 and 2. They contain the data that relate to the individual fields of the PERT Time tape that is to be used. These cards indicate where in the record the requested data can be found as well as how large a field is involved. The card indicates on fields that use dates or binary representations of time the type of information used. The information recorded and the codes used are described below.

1. Field Code Number - Columns 3-4

This code is preset and will relate the field description code to a particular field. This code will be in the range of 01 to 18 and is part of the sort sequence for this card. As these cards come into the system from the SORTED DATA TAPE they are translated into a 2-word configuration starting at INPAR + 310 and ending at INPAR + 344. If there is no card for a particular field, the 2-word configuration will remain at zero.

2. Record Type - Column 5

This code ties a particular field to a record in the file. A number from 1 to 7 should appear for every field that is to be used. This code should correspond to the record type in the file description card if this field is a part of that record. In assigning the record type code, the lower number of a set should be given to the first records read in, and then the higher numbers to the following, in their respective order. The reason is that in developing the pseudo-time record from the USERS TIME TAPE, all the fields with a record type number equal to or larger than the one being currently worked upon will be cleared out. This capability allows the program to use multi-record types to develop a pseudo-time record, and to keep certain fields while clearing out others. This code is set into bits S-2 in the first word of the field description set.

3. Word Position in Record - Columns 6-8

This field indicates the location in the record where this item can be found. This location is converted to binary and set into bits 21-35 in the first word of the field description set. The first word of the record is set up as a 1 instead of 0 for all references to this record.

4. Retrieval Mode - Column 9

This field indicates the mode used for this item in the USERS TIME TAPE:

C = characters, and is converted to a 1

W = words, and is converted to a 2

B = binary, and is converted to a 3

This converted value is set into bits 18-20 of the first word of the field description set.

5. Sign Position - Columns 10-11

This field indicates the location of the sign position connected to one of the parameter input fields. It will apply only to those fields that can be either plus or minus, such as slack, T_L , or S_L . This field is expected to be located in one of the binary bits of the word containing the numeric value. If this bit is a zero the sign is made plus, if it is a one the sign is set to minus. The location of the sign position is set into bits 3-17 of the second word of the field description set.

6. Field Start Position - Column 12-13

This start position indicates the location in the word where this field begins. It will vary according to the retrieval mode used. If words are used this field is left blank. If characters are used this field will contain a value in the range of 1 to 6 indicating the character start position. If it is a binary mode, this field will contain a value in the range of 1 to 36 indicating the bit start position. This number is converted to binary and set into bits 3-11 in the first word of the field description set.

7. Number of Units - Columns 14-15

This field contains the number of units that are tied to the retrieval code for this input. If the retrieval code indicates words, this field will state the number of full words that make up this item. If it is characters, this field will indicate the number of characters, which may extend over many words, that will make up this item. If the retrieval mode is in binary the value will be in the range of 1 to 36. The number of units value is converted to a binary number and is set into bits 12-17 in the first word of the field description set.

8. Format Mode - Column 16

The format mode relates to all data that will take the form of a date or elapsed time value. It indicates the manner in which these values are carried in the USERS TIME TAPE. The codes and converted values that are used, and the way the information is carried by the USERS TIME TAPE, are as follows:

B = binary; converted to a 1. The number of work days from a base date is carried in binary.

D = calendar date; converted to a 2. The actual calendar date that relates to this item is carried in BCD.

W = weeks \times 10; converted to a 3. The number of weeks times ten from a base date is carried in binary.

T = weeks and decimal tenths; converted to a 4. The number of weeks and tenths as a decimal value from a base date is carried in binary.

F = floating point; converted to a 5. The weeks and decimal tenths value is carried in a floating-point configuration to be added to a base date.

C = BCD days; converted to a 6. The number of work days from a base date is carried in BCD.

K = BCD weeks and decimal tenths; converted to a 7. The number of weeks and tenths is carried as a BCD value from a base date. A decimal point or any other character may be used to separate the fraction from the whole number.

This format mode value, from 1 to 7, is set into bits 18-20 of the second word of the field description set.

9. Sub-format Mode - Column 17

This code will relate to the format mode that is discussed in 8 above. Three of these format mode categories will be split into a more detailed breakdown of the information in the USERS TIME TAPE. The following are these breakdowns:

If the D code is used in the format mode category, the following codes will indicate the date configuration used.

Code 1 = DDMMYY

Code 2 = MMDDYY

Code 3 = DDMMMYY

Code 4 = MMMDDYY

} Alphabetic Month

Code 5 = DD-MM-YY

Code 6 = MM-DD-YY

If the T code is used in the format mode category, the number of bits from 0-7 that comprise the decimal value is set into this column.

If the K code is used in the format mode category, the following codes will indicate the presence of a decimal indicator or the lack of it, and the number of decimal characters.

Code 0 = no decimal portion to item

Code 1 = no decimal point and 1 decimal character

Code 2 = no decimal point and 2 decimal characters

Code 3 = no decimal point and 3 decimal characters

Code 4 = decimal point and no decimal characters

Code 5 = decimal point and 1 decimal character

Code 6 = decimal point and 2 decimal characters

Code 7 = decimal point and 3 decimal characters

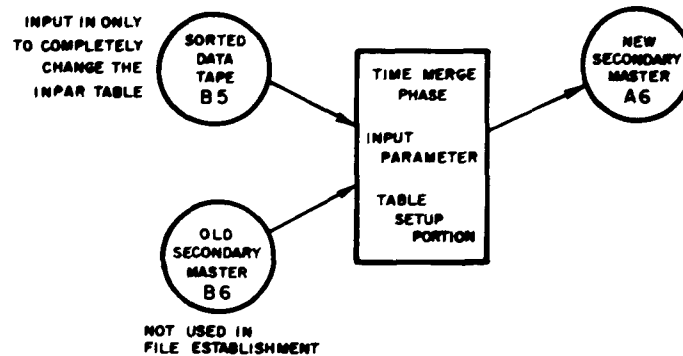
These values, in the range of 0 to 7, are set into bits S-2 of the second word of the field description set.

Time Merge Input Parameter Table Operations

The input parameter cards are initially read in during file establishment and a table of 350 words at location "INPAR" is developed. These cards, if present, will be the first cards read from the SORTED DATA TAPE; therefore, this table development is the first operation completed in the PERT Cost time merge phase. After this table has been developed it is set out on the NEW SECONDARY MASTER TAPE for usage on the next cyclic run. If during the next cyclic run there are no input parameter cards, the table from the OLD SECONDARY MASTER TAPE is used and this table will again be set out on the NEW SECONDARY MASTER. There is no provision for updating this table. Any time a "1" card is found on the SORTED DATA TAPE it will indicate to the program that a new INPAR table will be developed. Therefore, if a change is to be made to the INPAR table the entire set of "1" type parameter cards will have to be reentered into the system.

After the completion of the edit and edit sort phase, the tape on A6 containing the raw data is rewound but not unloaded. This tape will become the NEW SECONDARY MASTER TAPE, and the first item set onto this tape will be the input parameters. If the system is in a file establishment mode the input parameters are developed into the INPAR table and set out onto the NEW SECONDARY MASTER TAPE. If this system is to be run without time data, a pseudo INPAR table is set out containing 350 words of zero. The following

diagram shows the tapes that can be used during this portion on the time merge phase.

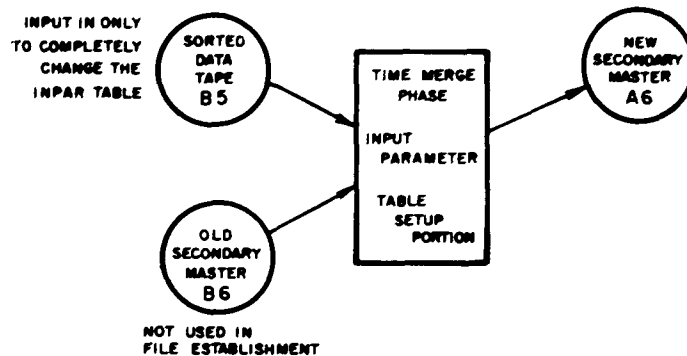


After this table has been developed it will be used during the merging of time data with charge numbers to read the USERS TIME TAPE. Each activity of the USERS TIME TAPE is developed with certain selected time information, as determined by the input parameter cards. This activity is then compared with the activity to charge number information and if they match this record is set out on the sort tapes. If they do not match the time information is ignored and the next time record is developed. It is possible, in the parameter card system, to pick up the charge number from the USERS TIME TAPE. In this case, no merge takes place and those activities that contain a charge number are sent out onto the sort tape. If the USERS TIME TAPE contains a sequence other than PE-SE or SE-PE the program will develop a PSEUDO USERS TIME TAPE. This tape will then be sorted into PE-SE sequence, after which it will be merged with the activity-to-charge-number information.

Time-Merge Input Parameter Error Messages

In developing the INPAR table from the input parameters, the following error or exception messages can be produced, depending on the type of error. The program will first pass through the entire set of parameter cards, indicating the error as it occurs but continuing on to the next card. When the input parameter cards are completed and there have been no

diagram shows the tapes that can be used during this portion on the time merge phase.



After this table has been developed it will be used during the merging of time data with charge numbers to read the USERS TIME TAPE. Each activity of the USERS TIME TAPE is developed with certain selected time information, as determined by the input parameter cards. This activity is then compared with the activity to charge number information and if they match this record is set out on the sort tapes. If they do not match the time information is ignored and the next time record is developed. It is possible, in the parameter card system, to pick up the charge number from the USERS TIME TAPE. In this case, no merge takes place and those activities that contain a charge number are sent out onto the sort tape. If the USERS TIME TAPE contains a sequence other than PE-SE or SE-PE the program will develop a PSEUDO USERS TIME TAPE. This tape will then be sorted into PE-SE sequence, after which it will be merged with the activity-to-charge-number information.

Time-Merge Input Parameter Error Messages

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- i. ERROR 1B CODE MODE INDIC. COL. 26
The retrieval mode is not indicated as B, C, W, or blank.
- j. ERROR 1B CODE FLD. ST. POS. COLS. 27-28
There is information in the record ID and the retrieval code is B or C but Columns 27 and 28 are zero or blank.
- k. ERROR 1B CODE NO. OF UNITS COLS. 29-30
There is information in the record ID and the retrieval code is a B or C but Columns 29 and 30 are zero or blank.
- l. ERROR 1B TOO MANY DATA UNITS COLS. 27-30
For the field start position, Columns 27-28, if the retrieval code is C this value should be in the range of 1 to 6. If the code is B, it should be in the range of 1 to 36. For the number of units, Columns 29-30, if the retrieval code is C this value should be in the range of 1 to 6. If the code is B this value added to the field start position should be a number equal to or less than 37.
- m. ERROR 1B VAR. REC. INDIC. COL. 31
This column does not contain a V indication or a blank.
- n. ERROR 1B VAR. REC. WORD NO. COLS. 32-33
There is a "V" in Column 31 and these columns are blank or zero.
- o. ERROR 1B VAR. REC. MODE COL. 34
The retrieval mode is not indicated as a B, C, W or blank.
- p. ERROR 1B VAR. FLD. START POS. COLS. 35-36
When there is a "V" in Column 31 and the retrieval code is B or C but these columns are zero or blank.
- q. ERROR 1B VAR. NO. OF UNITS COLS. 37-38
There is a "V" in Column 31 and the retrieval code is B or C but these columns are zero or blank.

- r. ERROR 1B TOO MANY DATA UNITS COLS. 35-38
- For the field start position, Columns 35-36, if the retrieval code is C this value should be in the range of 1 to 6. If the code is B it should be in the range of 1 to 36. For the number of units, Columns 37-38, if the retrieval code is C this value should be in the range of 1 to 6. If the code is B this value added to the field start position should be a number equal to or less than 37.
- s. ERROR 1C FIELD CODE COLS. 3-4
- An error exists on the field code of the 1C type of card if these columns are blank, zero, duplicated, or out of sequence.
- t. ERROR 1C RECORD TYPE COL. 5
- The record type is not in the range of 1 to 7.
- u. ERROR 1C WORD POS. IN REC. COLS. 6-8
- The word position value is either blank or zero.
- v. ERROR 1C RETRIEVAL MODE COL. 9
- The retrieval mode is not indicated as B, C, or W.
- w. ERROR 1C FIELD START POS. COLS. 12-13
- The retrieval code is B or C and these columns contain either a blank or a zero.
- x. ERROR 1C NO. OF UNITS COLS. 14-15
- The retrieval code is B, C, or W and these columns contain either a blank or a zero.
- y. ERROR 1C TOO MANY DATA UNITS COLS. 12-15
- For the field start position, Columns 12-13, if the retrieval code is C this value should be in the range of 1 to 6. If the code is B it should be in the range of 1 to 36. For the number of units, Columns 14-15, if the retrieval code is B this value added to the field start position should be a number equal to or less than 37.

z. ERROR 1C FORMAT MODE COL. 16

This mode is not indicated by a B, D, W, T, F, C, K, or a blank.

aa. ERROR 1C DATE SUB-MODE COL. 17

If the format mode, Column 16, is a D this field should be in the range of 1 to 6. If it contains a T or K this field should be in the range of 0 to 7.

ab. FILE BEING ESTABLISHED WITH NO. 1 CARD INPUT

There is No. 1 card input for a file establishment that uses time data.

The above messages will all be followed with an 80-character reproduction of the input card creating the error.

Time Merge Input Parameter Restrictions

Although this system is flexible with respect to the format of the USERS TIME TAPE, there are certain minimum requirements that must be met.

These requirements are:

1. The tape must be compatible with IBM 7090 data processing equipment.
2. The tape must contain, as a minimum, those elements of PERT Time data which are considered to be both necessary and sufficient for a successful computer run. These elements are:
 - a) Start or base date
 - b) Predecessor and successor number
 - c) S_E or T_E
 - d) S_L or T_L
 - e) T_S
 - f) T_A
 - g) t_s or t_e
3. The tape must contain activity-oriented PERT Time data. Explicitly, the computed values (T_E , T_L , S_E , S_L , and slack) must be related to an activity or to the succeeding event of an activity.

4. All of the PERT Time data must be contained on a single tape. The system does not have the capability of reading multiple PERT time tapes.
5. If any of the fields contain information carried in the binary mode, this information must be carried within (or up to) a full computer word. It is not acceptable to have binary information split between two computer words.

Time Merge Input Parameter Table Layouts

The following table layouts will illustrate the manner in which the INPAR table has been constructed in core and is carried on tape. (Fig. III-F-1) indicates the fields that were described on Page III-F-4. This figure is the actual input form used, and will allow for up to 15 "1B" cards on this form. The information from this form is translated card by card into the INPAR table area. This table area is located from INPAR + 10 to INPAR + 309 and each card is set into a 4-word block (Fig. III-F-2). Each of these 4-word blocks will follow the previous block until all of the "1B" cards have been completed. The balance of the file description portion of the INPAR table will be zeros. Up to 75 "1B" cards can be set into the INPAR table.

Figure III-F-3 also will indicate fields that were described on Page III-F-7. This figure is the actual input form used, and allows for the input of "1A" and "1C" cards from this form. For the "1A" cards the input is translated field by field and set into its proper location in INPAR + 0 to INPAR + 9. All unused locations in INPAR, or blank fields on the input card, will result in zeros being set into the table. (Figure III-F-5) will show the placement of the "1A" data into the INPAR table.) The information from the "1C" card is translated field by field and card by card into the INPAR table. This table area is located at INPAR + 310 to INPAR + 349 and each card is set into a 2-word block (Figure III-F-4). Each of these 2-word blocks will be set into its respective location according to the card number related to the input. Only those fields that are described by "1C" cards will have information in the INPAR table. All other fields that have not been described will have zeros in their respective locations in this table. INPAR + 346 to +349 will always contain zeros.

Figure 3.5.6-5 shows the entire INPAR table layout and the information contained within. The first of a set of file description blocks is shown in detail at INPAR + 10 to INPAR + 13. All following 4-word blocks will duplicate the first, in form, up to a maximum of 75. The same is true for the field description blocks, in that it is detailed at INPAR + 310 to INPAR + 311 and this form is duplicated by all field descriptions that follow it. Each of the fields is shown opposite the first word of its respective 2-word block.

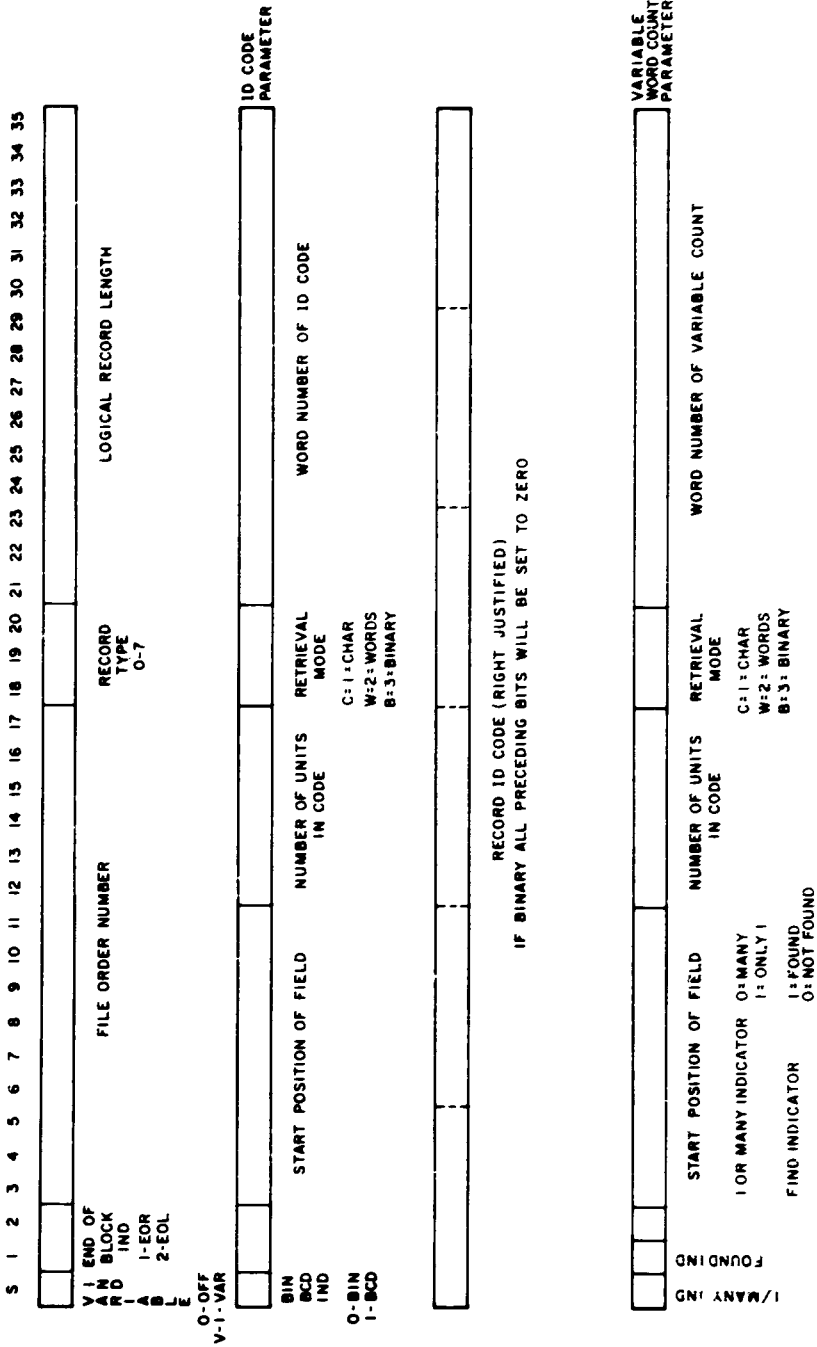


Fig. III-F-2 Breakdown of Input Parameter File Description Blocks

CARD CODE	CARD NUMBER	BASE DATE			BASE/START DATE IND.	ACTUAL CODE-T _s /T _A	T _s /T _A SET CODE		
		DAY	MONTH	YEAR					
1	23	45			11	12	13	14	15
1	A	0	1						

CARD CODE	CARD NUMBER	RECORD TYPE	WORD POSITION IN RECORD	RETRIEVAL MODE	SIGN POSITION	FIELD START POSITION	NUMBER OF UNITS	FORMAT MODE	SUB FORMAT MODE	NETWORK CODE	NETWORK DESCRIPTION	START DATE	REPORT DATE	PREDECESSOR NUMBER	SUCCESSOR NUMBER	S _E	T _E	S _L	T _L	T _S OR T _S /T _A	I _S	I _B	SLACK	ACTIVITY DESCRIPTION	SCHEDULED/ACTUAL FLAG	CHARGE NUMBER	T _A	
																												1
1	C	0	1																									
1	C	0	2																									
1	C	0	3																									
1	C	0	4																									
1	C	0	5																									
1	C	0	6																									
1	C	0	7																									
1	C	0	8																									
1	C	0	9																									
1	C	1	0																									
1	C	1	1																									
1	C	1	2																									
1	C	1	3																									
1	C	1	4																									
1	C	1	5																									
1	C	1	6																									
1	C	1	7																									
1	C	1	8																									

Fig. III-F-3 Data Description Block

S 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35



RECORD TYPE 0-7 START POSITION OF FIELD NUMBER OF UNITS IN CODE RETRIEVAL MODE WORD POSITION IN RECORD

C-1-CHAR
W-2-WORDS
B-3-BINARY



SUB-MODE SIGN POSITION FORMAT MODE

1- DDMMYY
2- MMDDYY
3- DDDMMYY
4- MMMDDYY
5- DD-MM-YY
6- MM-DD-YY

B-1-BINARY
D-2-DATE
W-3-WKS x 10
T-4-WKS AND TENTHS IN DECIMAL
F-5-FLOATING POINT -WKS x 10
C-6-BCD DAYS
K-7-BCD WKS AND TENTHS

FOR T
NUMBER OF
BITS FROM 0-7
OF DECIMAL VALUE

FOR K
BIT S
1 : DECIMAL POINT
0 : NO DECIMAL POINT
BITS 1-2
INDICATES NO. OF
DECIMAL CHARACTERS

III-F-22

Fig. III-F-4 Breakdown of Input Parameter Field Description Blocks

		BITS													
		5	2	3	6	9	12	15	18	21	24	27	30	33-35	
S _L	+ 326	RECORD TYPE	START POSITION OF FIELD				NO. OF UNITS		WORD POSITION		IN RECORD				
	+ 327	DATE AND MODE	SIGN POSITION						NUMBER		WORD				
T _L	+ 328														
	+ 329														
T ₅ OR T ₅ / T ₆	+ 330														
	+ 331														
t ₁	+ 332														
	+ 333														
t ₂	+ 334														
	+ 335														
SLACK	+ 336														
	+ 337														
ACTIVITY DESCRIPTION	+ 338														
	+ 339														
SCHEDULED/ACTUAL FLAG	+ 340														
	+ 341														
CHARGE NUMBER	+ 342														
	+ 343														
T ₈	+ 344														
	+ 345														
	+ 346														
	+ 347														
	+ 348														
	+ 349														

CONTINUATION
OF INPUT
PARAMETER
FIELD
DESCRIPTION

Fig III-F-5 Input Parameter Block (Continued)

Time Merge Input Parameter Region Descriptions

The following region description describes the input parameter subroutine used in the time merge phase of the program.

Region PMSU

EXPLANATION OF REGION:

This region will translate the input parameters into a table called INPAR and write it out on the NEW SECONDARY MASTER TAPE.

CALLING SEQUENCE:

L TSX PMSU, 4

L + 1 Normal return

INPUT:

SORTED DATA TAPE (Input Type Number 1)

OLD SECONDARY MASTER TAPE

OUTPUT:

The INPAR table developed in core and set out on the NEW SECONDARY MASTER TAPE

STORAGE USED:

INPAR - 350 words - table location

HUNPK - 81 words - input card storage locations

HMKUP - 4 words - block makeup area (for both file and field blocks)

SUBREGIONS AND SUBROUTINES USED:

PACK

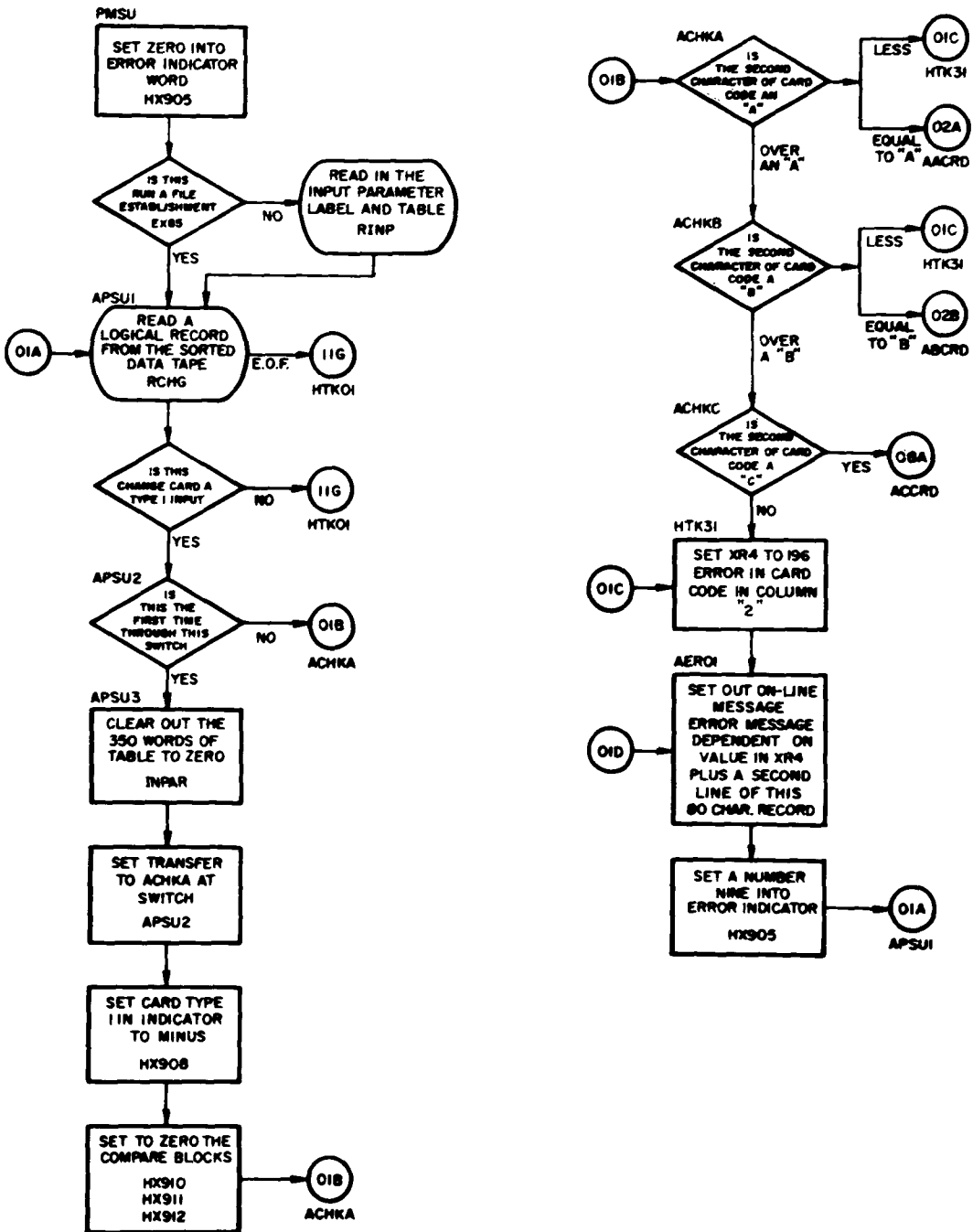
RCHG

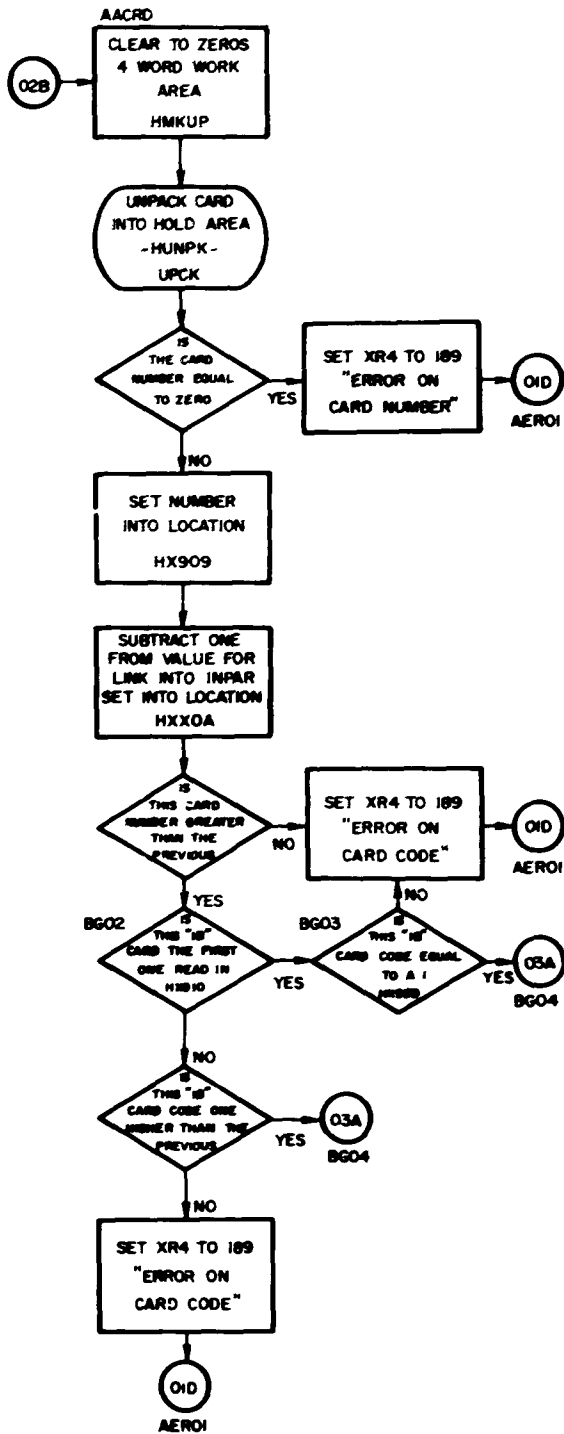
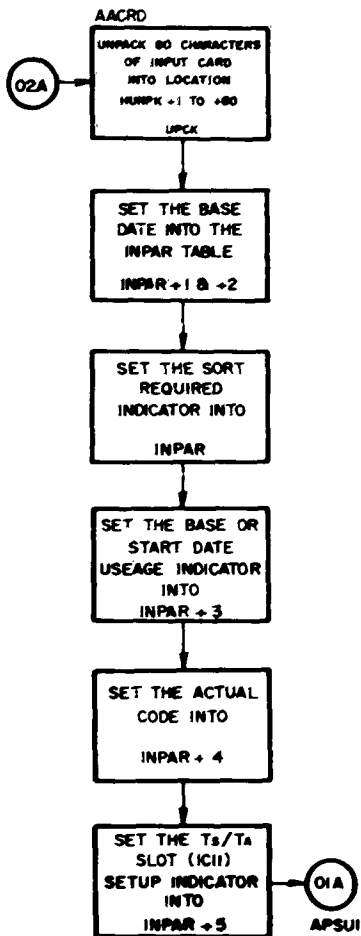
UPCK

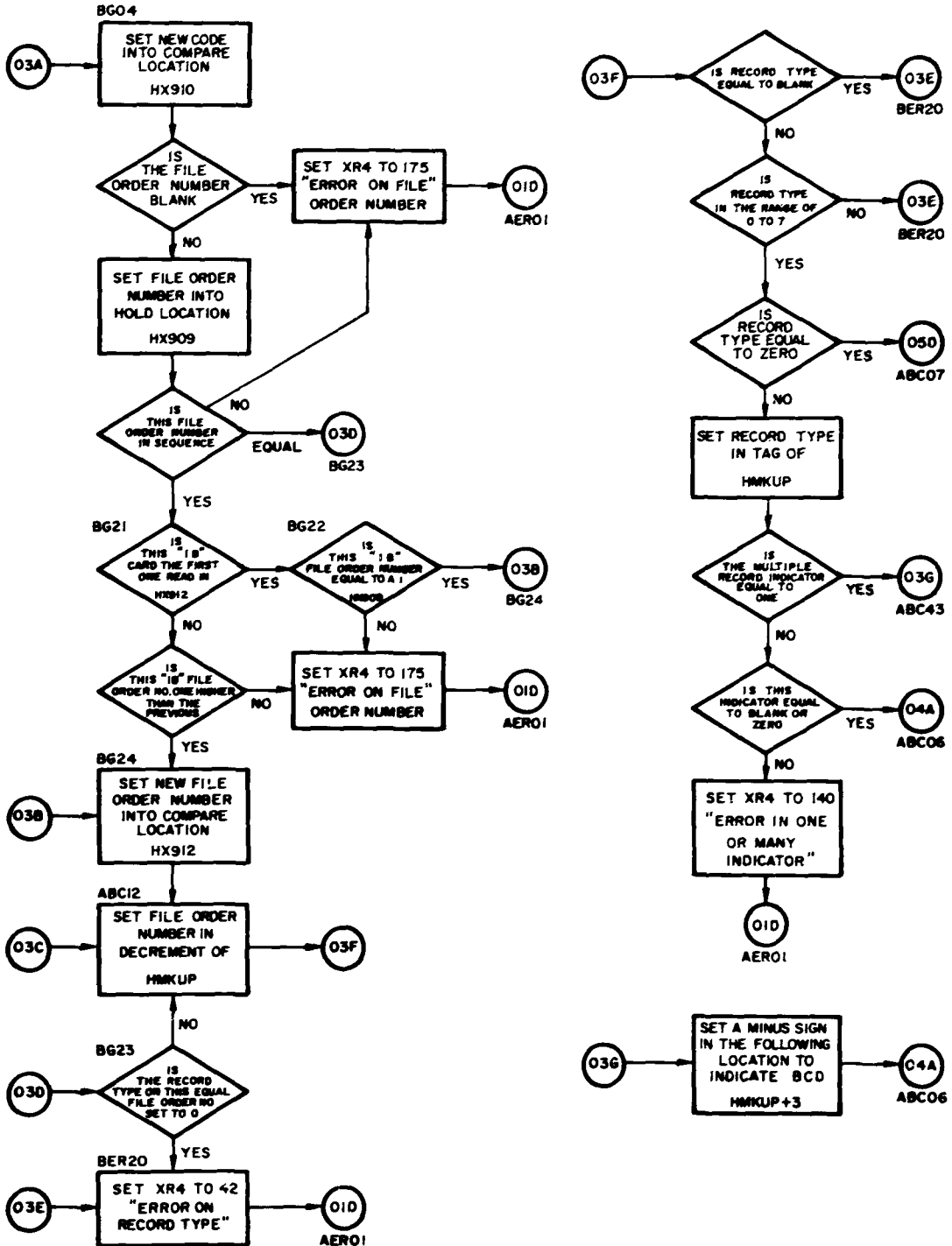
EXPLANATION OF CALLING SEQUENCE:

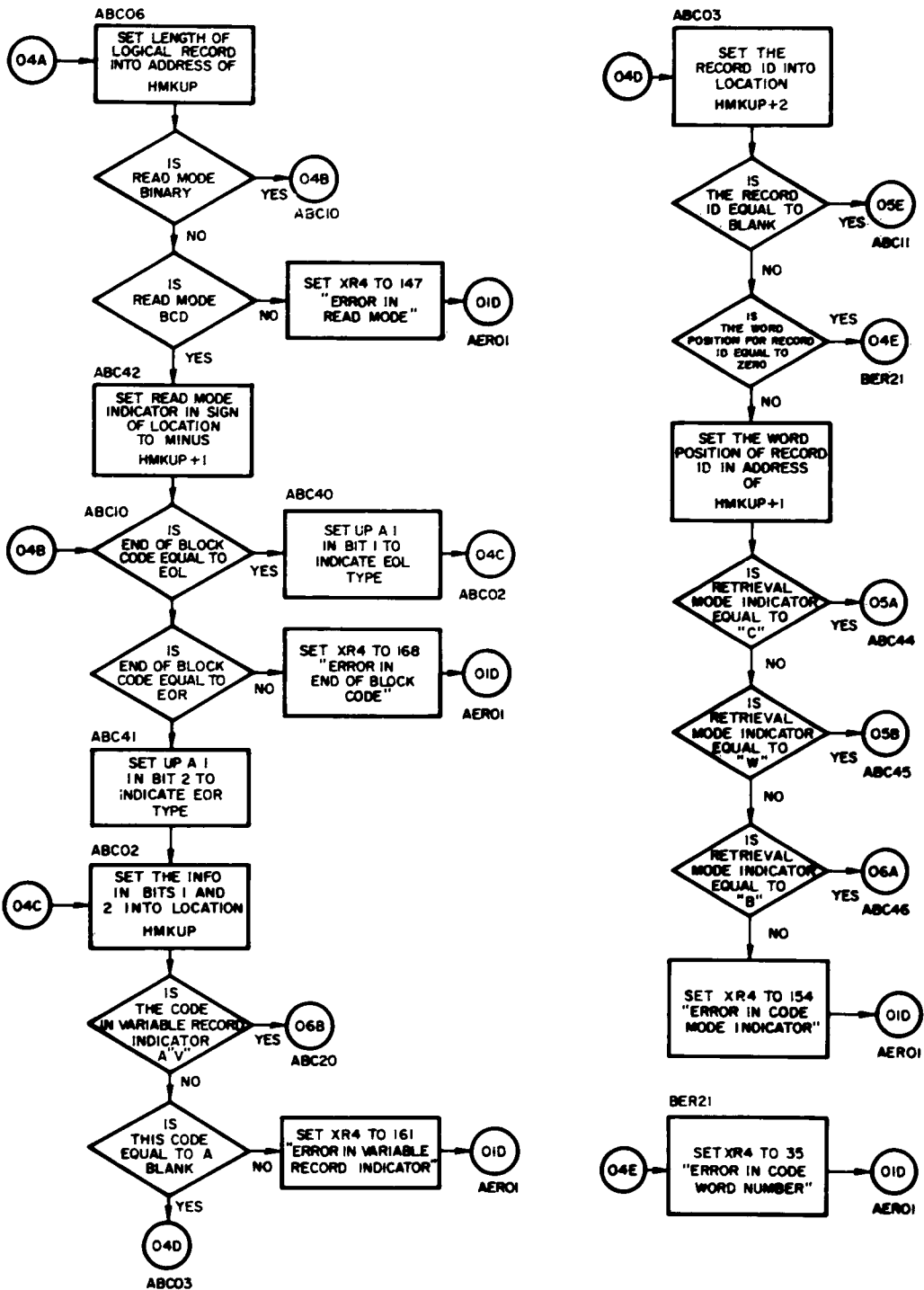
If an error is determined in developing this table, a message is set out on the on-line printer and the program will bring in the next card to translate. When all type 1 cards are completed and one or more errors have been found, the program will stop. If no errors are determined, the program will go to its normal return.

INPUT PARAMETER
TABLE SETUP ROUTINE

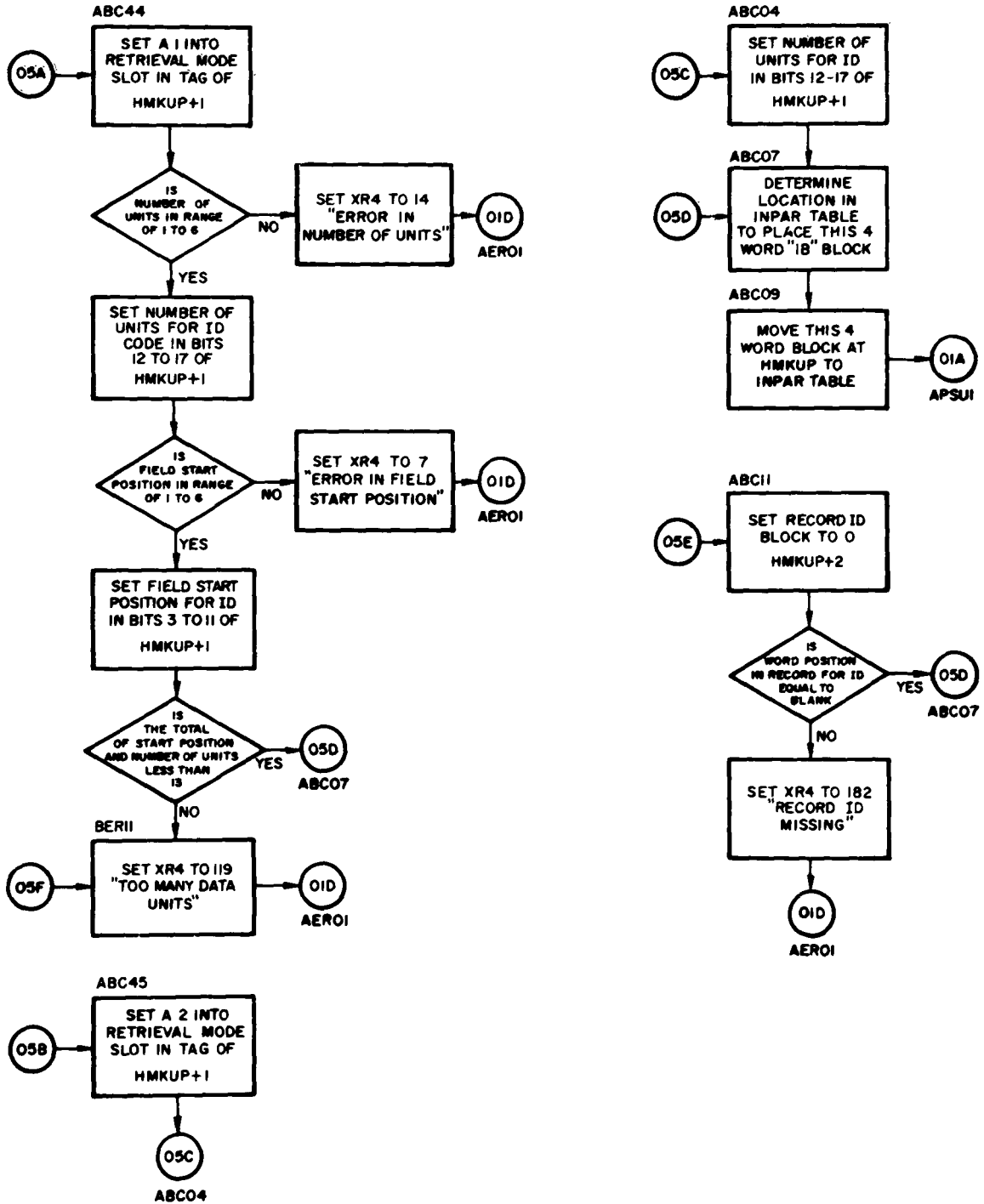




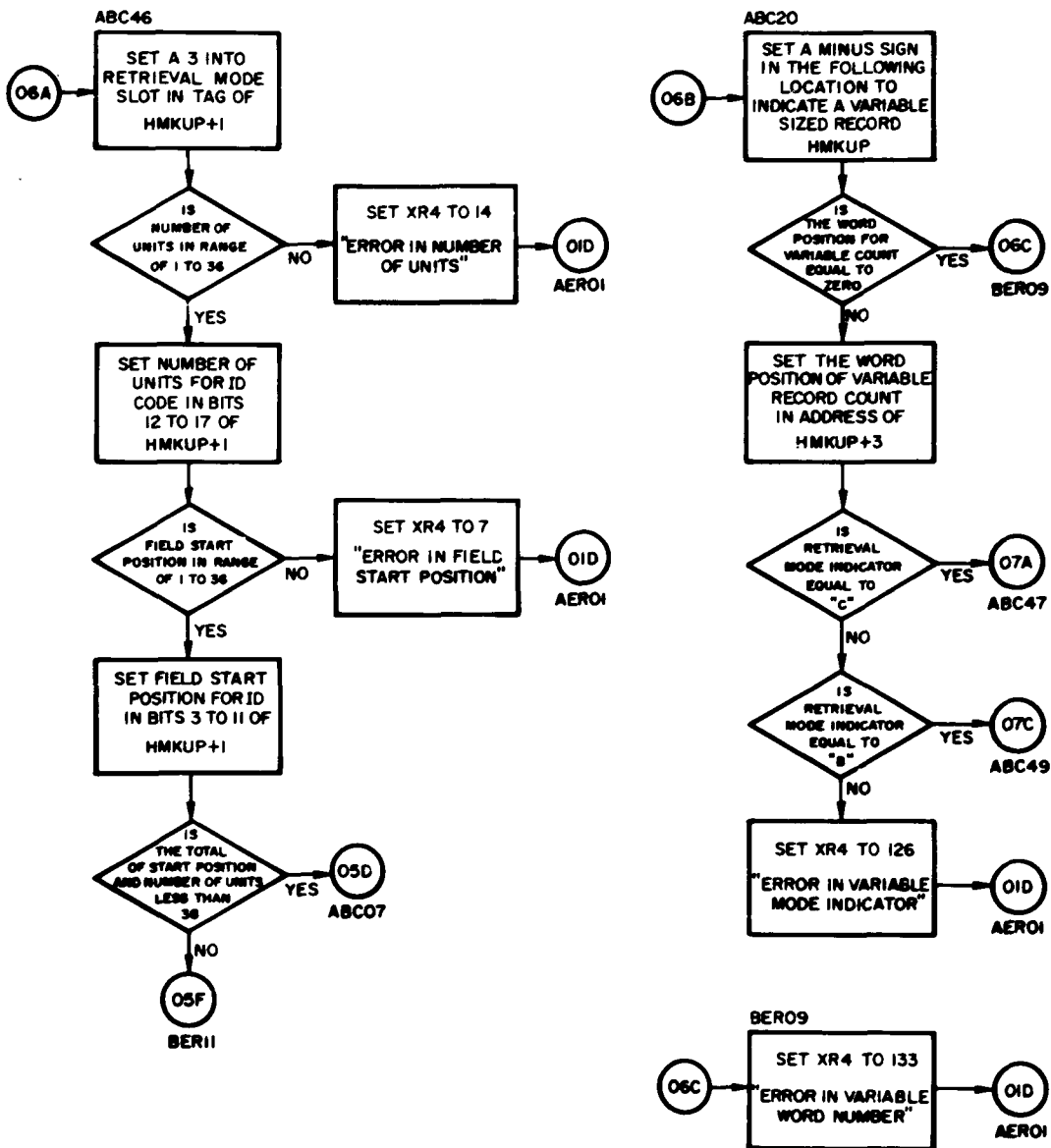




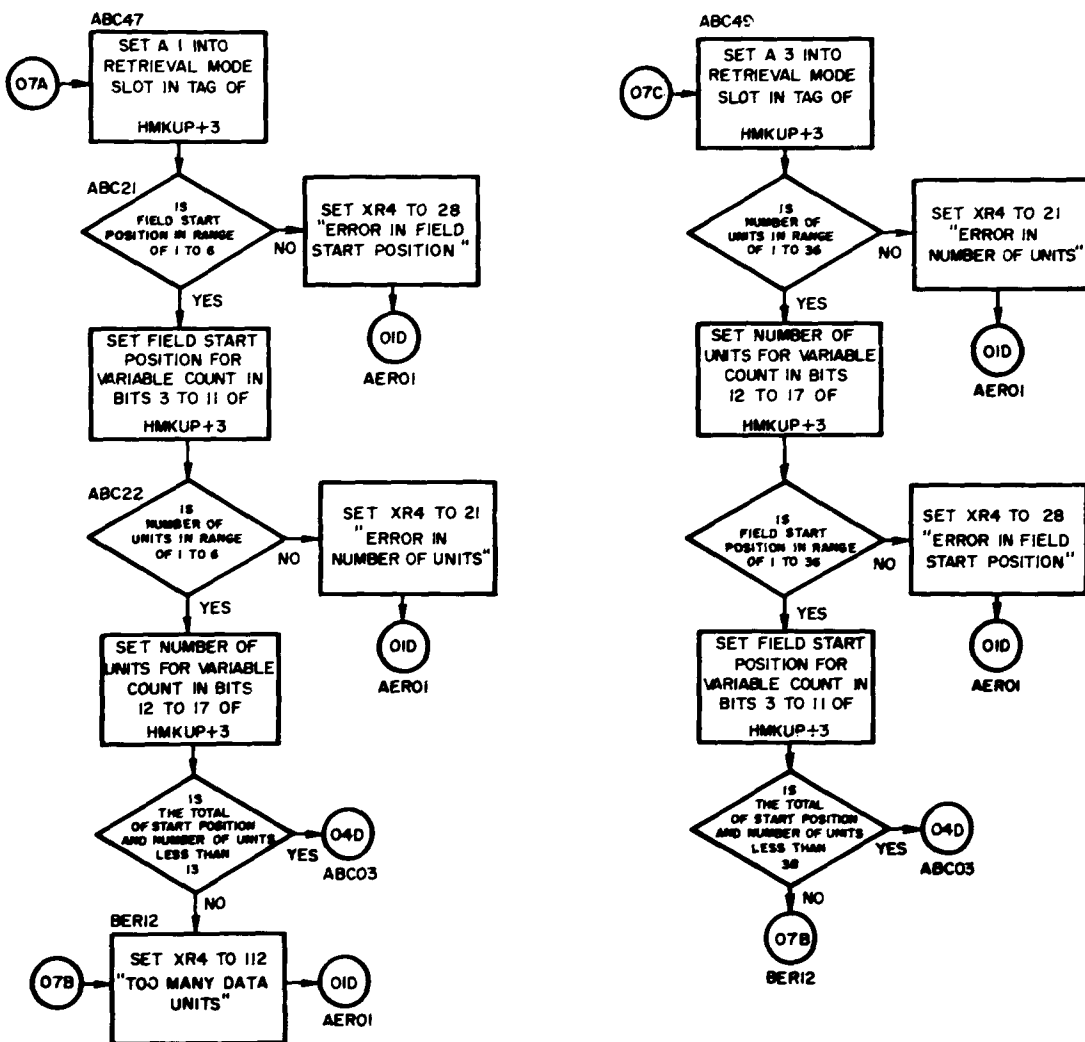
REGION PMSU

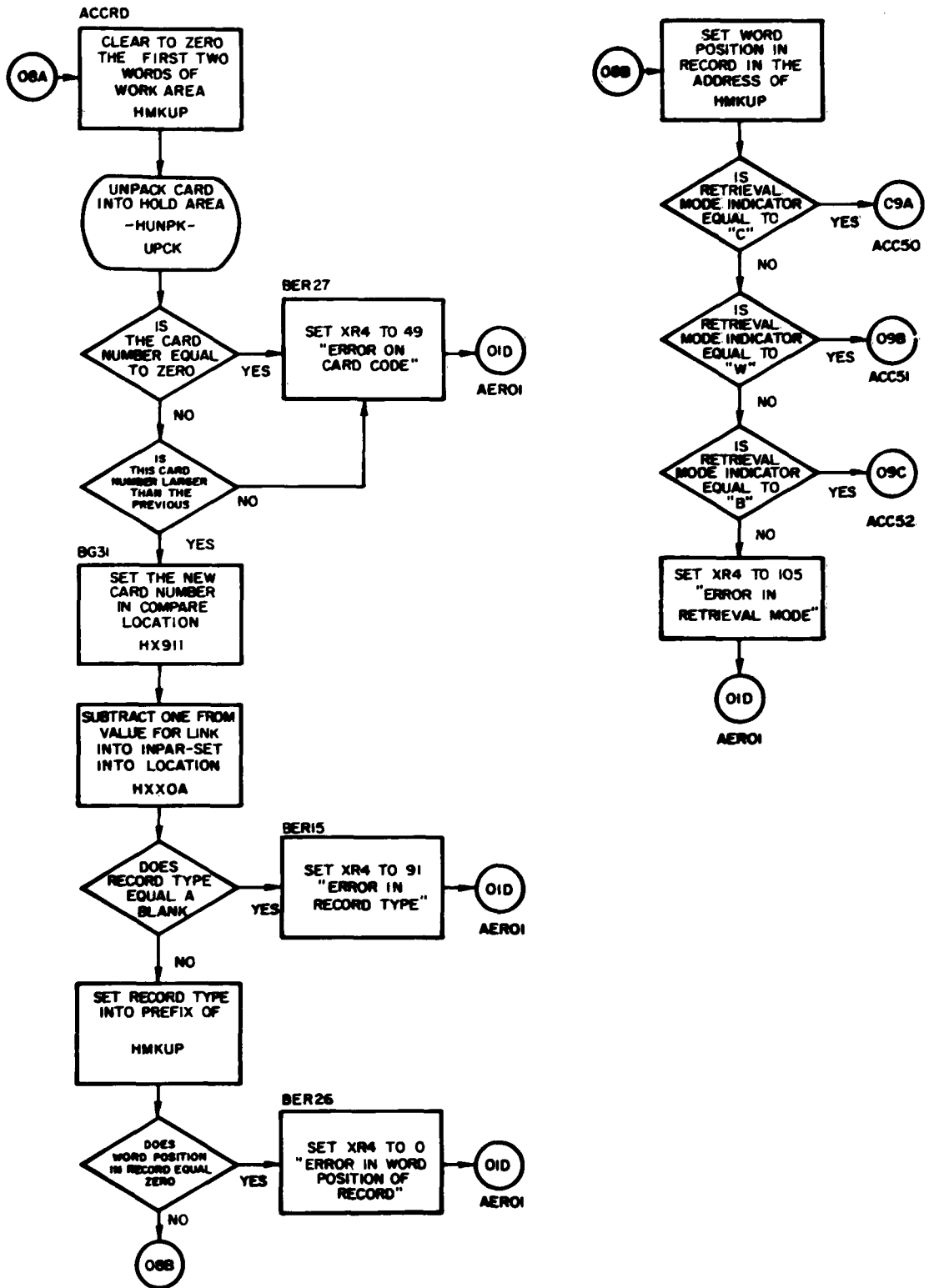


REGION PMSU

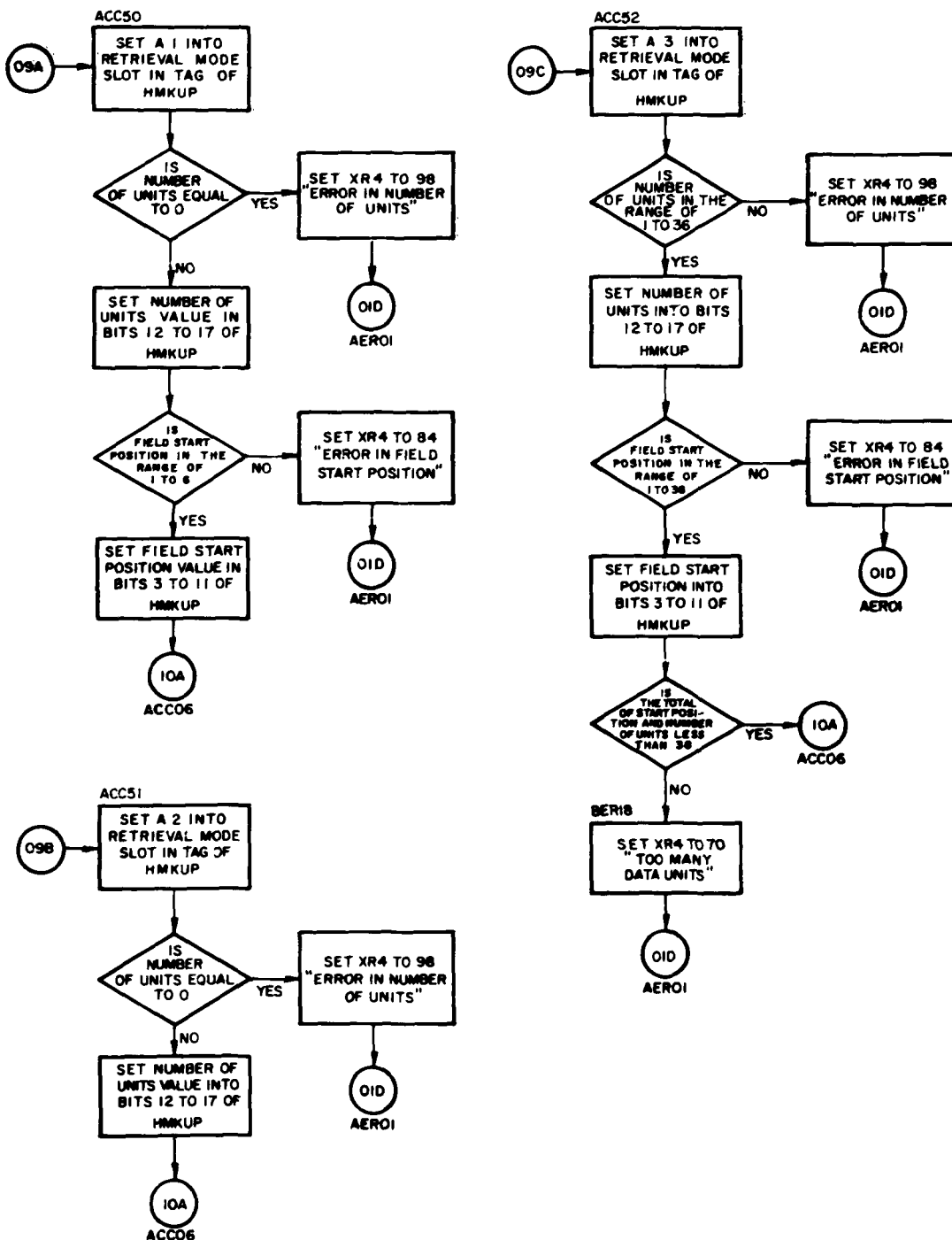


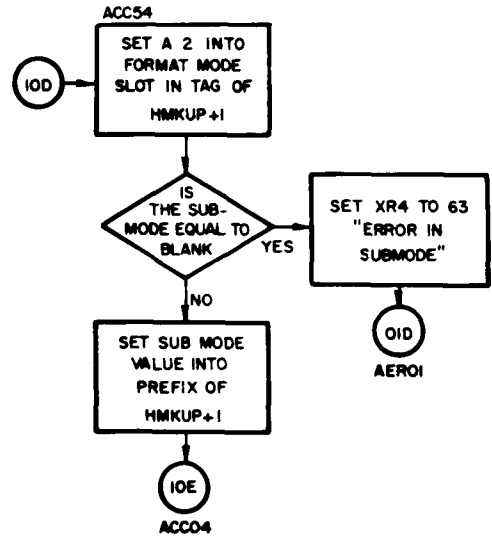
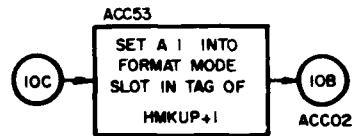
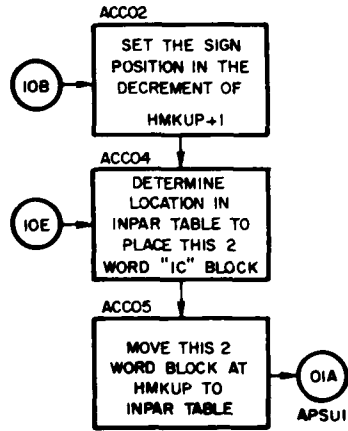
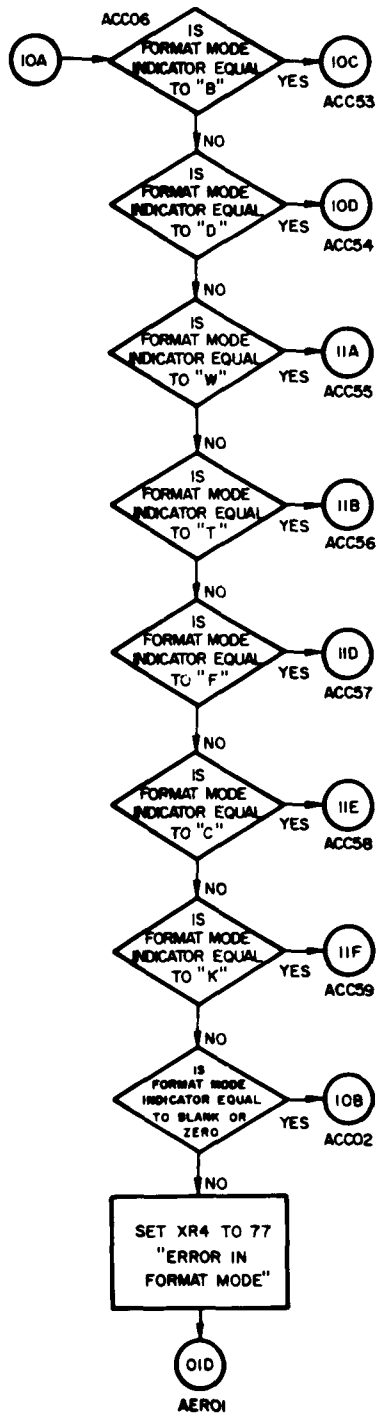
REGION PMSU



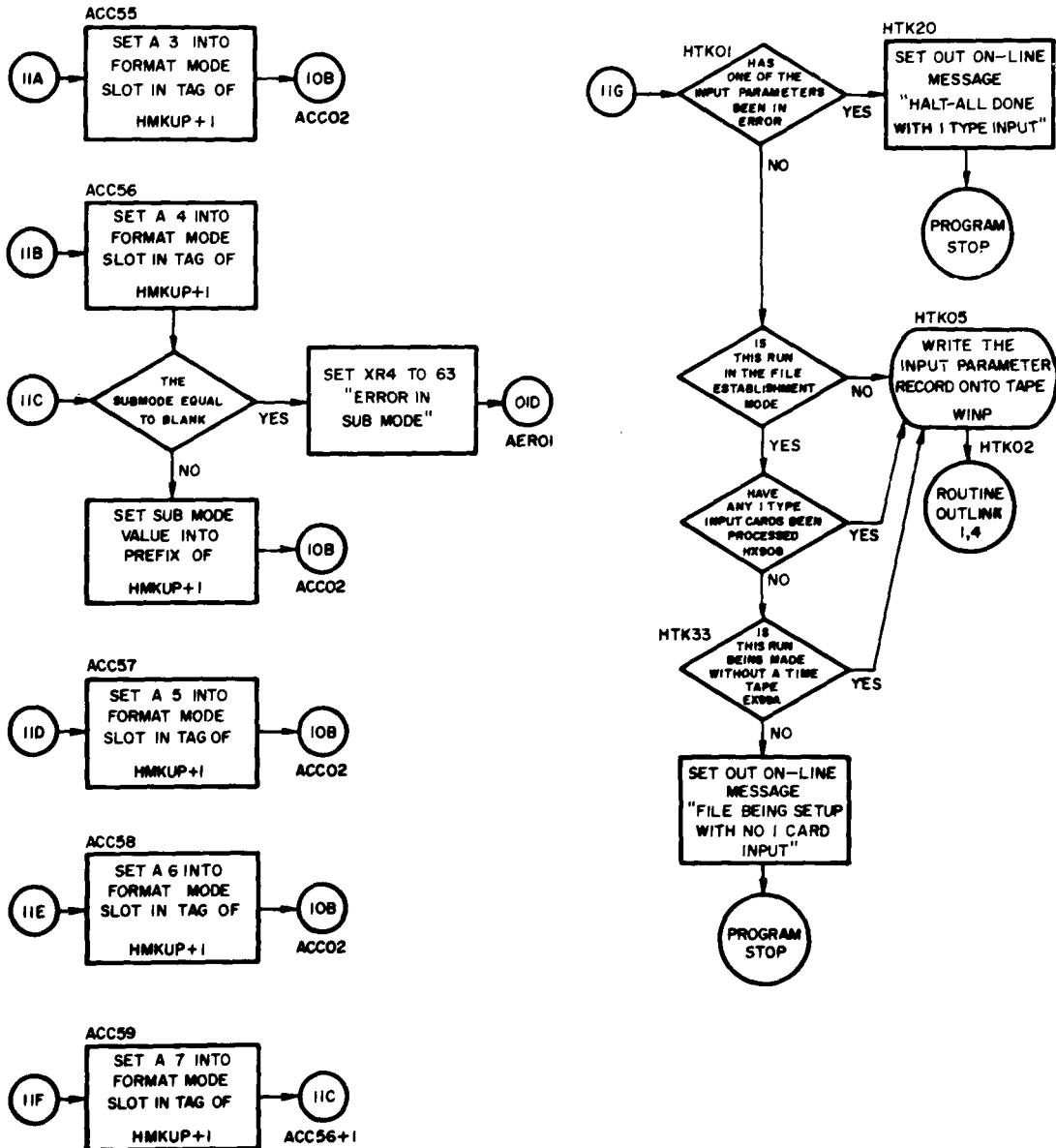


REGION PMSU





REGION PMSU



Time Merge Phase Tape Operations

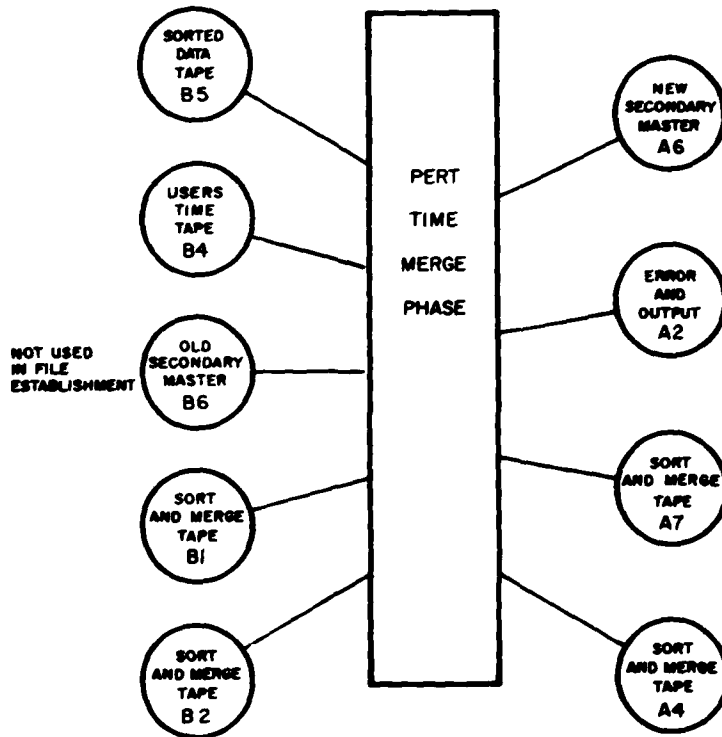
After the creation or bringing in of the input parameter table the Type 2 input cards are read in off the sorted input tape. If this is a file establishment run, the activity-to-charge-number information is developed from this data. This information is then stored on the NEW SECONDARY MASTER TAPE. If this is not a file establishment run, the Type 2 input cards will update the data on the OLD SECONDARY MASTER TAPE and then set the new data on the NEW SECONDARY MASTER TAPE. It is possible that there would be no Type 2 cards on an update run, and the data from the old tape would be set directly onto the new tape.

If one of the elements of data on the USERS TIME TAPE is the charge number, this could preclude any Type 2 input. In this case the merge function of this phase would be basically bypassed and the time record, after development by means of the input parameters, would be set out onto the sort tapes if the time record contained a charge number. For this situation the secondary master tape would not contain any activity-to-charge-number information but would have a pseudo record. This record would contain only a label and an end-of-file in order to use the normal program reads and writes. It is possible to have activity-to-charge-number inputs on the Secondary Master for the above situation. In this case the input data would then override any conflict of charge numbers for an activity.

A maximum of nine reels of the OLD SECONDARY MASTER TAPE can be read and up to nine reels of the NEW SECONDARY MASTER TAPE can be written. If any errors occur during the time merge processing, they will be set out on the SYSTEM ERROR TAPE. At the end of the merge phase and just prior to entering the activity-to-charge-number sort, the messages described on Page III-F-2 would be set out. If it is judged that the program

cannot continue because of the volume or type of errors, the SYSTEM ERROR TAPE is printed out. After correcting the problem the program is then re-started from the beginning.

The tape flow during the time merge phase will take the following form, which is the normal tape configuration used during the time merge phase. The tape operations are described below.



Tape Operation When Users Time Tape is to be Sorted

The USERS TIME TAPE is read into the system by means of the INPAR table and as each record is formed it is set out onto the sort and merge tapes A4 and A7. At the completion of the USERS TIME TAPE the 4-tape sort (see Subsec. 4.2) is operated, using tapes A4, A7, B1, and B2. When the last pass is to be completed in the merge phase, the control is returned to the program and the PERT time data is read into the system from the A or the B bank, depending on the number of passes. This data is now in

PE-SE sequence and can be merged with the charge numbers, which are also in PE-SE sequence and are stored on the OLD SECONDARY MASTER TAPE B6. The charge numbers in PE-SE sequence can be updated during this processing from data stored on the SORTED DATA TAPE B5. After which the merged activity/charge number data are set onto the NEW SECONDARY MASTER TAPE A6. During this processing of the data, the time records that are tied to a charge number are set out onto the 4-tape sort on the side opposite from which the PERT Time data is read. At the completion of the time merge phase the 4-tape sort is operated again, using tapes A4, A7, B1, and B2. This sort will set the time information into charge number sequence. The last phase of this sort is tied to the update phase (see Subsec III-G).

Tape Operation when USERS TIME TAPE is in PE-SE or SE-PE Sequence

The USERS TIME TAPE is read into the system by means of the INPAR table, and as each record is formed it is merged with the charge numbers which also are in PE-SE or SE-PE sequence. The charge numbers in activity sequence will be read in from the OLD SECONDARY MASTER TAPE B6, updated by input from the SORTED DATA TAPE B5, and set out on the NEW SECONDARY MASTER TAPE A6. During the processing of this data, the time records that are tied to a charge number are set out onto the 4-tape sort on tapes A7 and A4. At the completion of the time merge phase, the sort is operated using A4, A7, B1, and B2 as merge tapes. This sort will set the time information into charge number sequence for the update phase.

Tape Operation During Option G

During Option G the time merge phase is virtually bypassed, in that there is no Type 1 or Type 2 input data and no USERS TIME TAPE. The only operation performed during this phase under this option is a tape duplication operation for the SECONDARY MASTER. The input parameter records and labels and the SECONDARY MASTER data and its labels are duplicated from the OLD SECONDARY MASTER TAPE to the NEW SECONDARY

MASTER TAPE. The only exception to the duplication of this data is the program name, if it has been changed during this run. After this duplication is completed the program will go into the update phase.

Time Merge Phase On-Line Messages

The messages forthcoming on the on-line printer regarding the tapes used in the time merge phase will be:

- (a) For File Establishment in Option D or F

TAPE B5 HAS BEEN SELECTED FOR READING
TAPE B4 HAS BEEN SELECTED FOR READING
TAPE A6 HAS BEEN SELECTED FOR WRITING
TAPE B4 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT COST TIME MERGE PHASE

The above set of messages will be followed by the error indication messages described in Subsec. 3.5.1. This will hold true for all of the examples below. After the error indication messages, the following two lines will also be set out on the on-line printer for examples (b), (c), and (d) below.

COMPLETED WRITING OF NEW SECONDARY TAPE A6
DO NOT REWIND

- (b) For Regular Cyclic Runs in Option D or F

TAPE B5 HAS BEEN SELECTED FOR READING
TAPE B4 HAS BEEN SELECTED FOR READING
TAPE B6 HAS BEEN SELECTED FOR READING
TAPE A6 HAS BEEN SELECTED FOR WRITING
TAPE B4 IS NOW REWINDING AND SHOULD UNLOAD
COMPLETED READING OF OLD SECONDARY TAPE B6
DO NOT REWIND
END OF PERT COST TIME MERGE PHASE

If more than one OLD SECONDARY MASTER TAPE or NEW SECONDARY MASTER TAPE is used, the following messages will be inserted at the point the tape hits end-of-file or end-of-tape.

TAPE XX IS NOW REWINDING AND SHOULD UNLOAD
SET NEXT REEL OF THIS SERIES ON TAPE XX

If this tape is the old master, the next reel will indicate the next tape that was created subsequent to the one that is now rewinding. If this tape is the new master, the next reel will indicate a blank or scratch tape. The program will hold up at this point until the tapes are rewound and unloaded, and a new tape is set on for processing.

(c) For Regular Cyclic Runs in Option G

```
TAPE B6 HAS BEEN SELECTED FOR READING  
TAPE A6 HAS BEEN SELECTED FOR WRITING  
COMPLETED READING OF OLD SECONDARY TAPE B6  
***DO NOT REWIND***  
COMPLETED WRITING OF NEW SECONDARY TAPE B6  
***DO NOT REWIND***
```

During this option the only operation accomplished in the time merge phase is the duplication of the OLD SECONDARY MASTER TAPE onto the new. These messages refer to this operation.

(d) For Regular Cyclic Runs in Option C and E

The tape messages for Option C and E will follow the same pattern set up for D and F in (b) above except that the following tape message will take place during this phase.

```
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
```

In Option C and E the only input in should apply to the time data relationship and therefore the SORTED DATA TAPE should finish up in this phase.

Time Merge Phase Error Messages

The errors determined during the time merge phase are set out on the SYSTEM ERROR TAPE or the on-line printer. Any messages on the SYSTEM ERROR TAPE will not stop the processing during the time merge phase but the errors will be totaled and set out in the message described in Subsec. 3.5.1. Some of the on-line messages will stop the system, while others will contain an option to continue. A group of the on-line messages will cause no stop at all.

The errors messages that will be set out on the SYSTEM ERROR TAPE are explained below.

(a) ACTIVITY INDICATED ON SEC MASTER NOT ON USERS TAPE

An activity is located on the SECONDARY MASTER that cannot be found on the users tape. There will be one of two messages following this line, according to whether there is any Type 2 input for this activity. If there is not, the information from the SECONDARY MASTER is set out as follows in 42 characters:

Network no. -predecessor-successor-charge number

If there is Type 2 input, it will be set out as follows:

XX - 80 characters of input cards - XX

This 80-character line will also follow the messages (b), (c), and (d).

(b) CHANGE IS REQUESTED ON NON-EXISTENT ITEM IN SEC MASTER

A Type 2 input is attempting to change an activity-to-charge-number relationship on a non-existent item.

(c) ATTEMPTING TO ADD AN ACTIVITY ALREADY IN SEC MASTER

A Type 2 input is attempting to add a new activity-to-charge-number relationship on an existing item.

(d) MORE THAN ONE CHANGE INPUT FOR THIS ACTIVITY

Two input cards relating to the same activity are found during this run. The first is handled normally but the second is not operated upon at all and is set out on the SYSTEM ERROR TAPE.

(e) DUPLICATE ACTIVITIES ON SECONDARY MASTER

Two records relating to the same activity are found on the SECONDARY MASTER. The second record is removed from the NEW SECONDARY MASTER TAPE and this message plus a 42-character predecessor, successor, and charge-number message is set out.

- (f) SAME ACTIVITY APPEARS MORE THAN ONCE ON USERS TAPE

Duplicate activities are found during the time merge phase reading of the USERS TIME TAPE. A second line of 24 characters indicating network code, predecessor, and successor numbers is also set out. The system will process the first activity and ignore its duplicate.

- (g) CANNOT LOCATE MONTH XXX LN NN

When a field in the USERS TIME TAPE contains an alphabetic 3-character month which is not legitimate, this message is set out with the bad month located at the XXX positions. The LN number in this message will refer to the field involved and relates to the input parameter "1C" card numbers. A second line of 24 characters indicating network code, predecessor, and successor numbers is also set out.

The following error messages will be set out on the on-line printer, and will stop the system.

- (h) A TYPE 1 CARD FOUND AFTER PARAMETER SETUP

During the reading of the Type 2 cards a Type 1 input parameter card was found. The SORTED DATA TAPE is out of sequence.

- (i) FIRST RECORD ON SEC MASTER NOT NETWORK CODE

The first record found on the SECONDARY MASTER was not a network code record.

- (j) CHANGE INPUT OUT OF SEQUENCE

CURRENT (network no. -predecessor-successor)
NEW (XX - 80 characters of input card - XX)

When the input from the SORTED DATA TAPE is not in sequence the above messages are set out, indicating the two sequence checking fields.

- (k) SECONDARY MASTER OUT OF SEQUENCE

CURRENT (network no. -predecessor-successor)
NEW (network no. -predecessor-successor-charge no.)

When the input from the OLD SECONDARY MASTER is not in sequence the above messages are set out, indicating the two sequence checking fields.

- (l) USERS PERT TIME TAPE OUT OF SEQUENCE
CURRENT (network no. -predecessor-successor)
NEW (network no. -predecessor-successor)

When the information from the USERS TIME TAPE is not in sequence the above messages are set out, indicating the two sequence checking fields.

- (m) NETWORK CODE SET UP TWICE ON SEC MASTER -
XXXXXX

The same network code is found in two consecutive network code records of the OLD SECONDARY MASTER. The network code is set into the field indicated by XXXXXX.

- (n) TWO EOF MARKS FOUND WITH NO PARAMETER
INDICATION

There is no "1B" card in the input parameters to indicate that a non-operative file is present.

- (o) FIRST WORD ON INPUT PARAMETERS BLANK

The "1B" portion of the INPAR table indicates that the USERS TIME TAPE read is finished and nothing has yet been read.

- (p) NO FIELDS TIED TO THIS RECORD TYPE X

One of the "1B" file cards describing a particular record type was not found in this file. The "X" will indicate the record type.

- (q) BAD MONTH ON BASE DATE

The month field on the base date is an illegitimate value for a month.

- (r) NO START DATE TO TIME NETWORK

The start date carried in the USERS TIME TAPE has a value of zero.

- (s) START DATE OF NETWORK PRIOR TO 1945

The network start date is prior to the calendar used, which has a January 1, 1945 base.

The following error messages are set out on the on-line printer with an option to continue after stopping.

(t) NO ACTIVITIES TIED TO NETWORK CODE XXXXXX

When two network codes in a row are located on the SECONDARY MASTER the above message is set out with the first network code being set into the field indicated by XXXXXX. This error will not stop the system but will set this message out on-line.

(u) DATE DOES NOT AGREE ON USERS TAPE DDMMYY
IF LABEL IS TO BE IGNORED HIT START BUTTON
TO CONTINUE

The report date on the USERS TIME TAPE does not match with the users date on the "A" control card. If the program is to be continued the start button is hit. The DDMMYY configuration in the first line will indicate the day, month and year of the report date in the USERS TIME TAPE.

Time Merge Phase Region Descriptions

The following region descriptions and flow charts will describe the major subroutines used in the time merge phase as well as the time merge phase itself.

Region PMRG

EXPLANATION OF REGION:

This routine will accomplish the tying together of activities and charge numbers. It will read the USERS TIME TAPE, OLD SECONDARY MASTER and SORTED DATA TAPE to perform this merging process and will produce a NEW SECONDARY MASTER. This routine will also develop the input parameter table, "INPAR."

CALLING SEQUENCE:

L TRA PMRG

INPUT:

Type 1 and type 2 input data from the SORTED DATA TAPE.

An input parameter table or the development of one.

An OLD SECONDARY MASTER TAPE.

A USERS TIME TAPE

OUTPUT:

A new input parameter table to go on NEW SECONDARY MASTER

A NEW SECONDARY MASTER

A selected set of time input linked to charge numbers to be sorted in charge number sequence for the update phase.

STORAGE USED:

INPAR - input parameter table
WKCH1 - network code on changes
WKCH2 - event no. on changes
WKSM1 - network code on SEC MASTER
WKSM2 - event no. on SEC MASTER
NNHLD - network name
WKBFF - input to be set on SEC MASTER
PTWKA - selected time info from USERS TAPE
PTWK7 - start date & number
PTWK8 - USERS TAPE network name
PTWK9 - USERS TAPE network-pred-succ
PUBFF > users read-in buffer
PUBF1 <

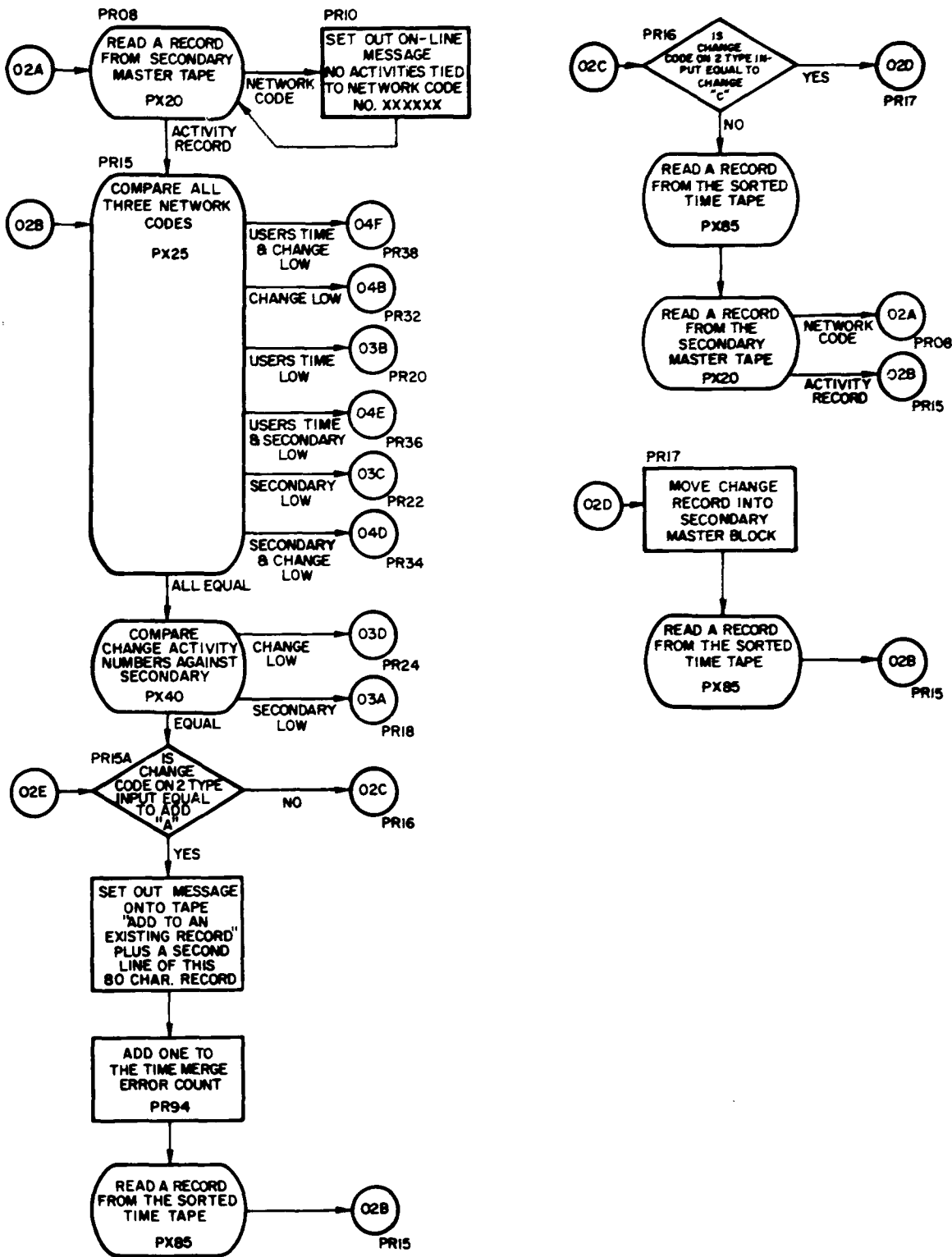
Region PMRG (continued)

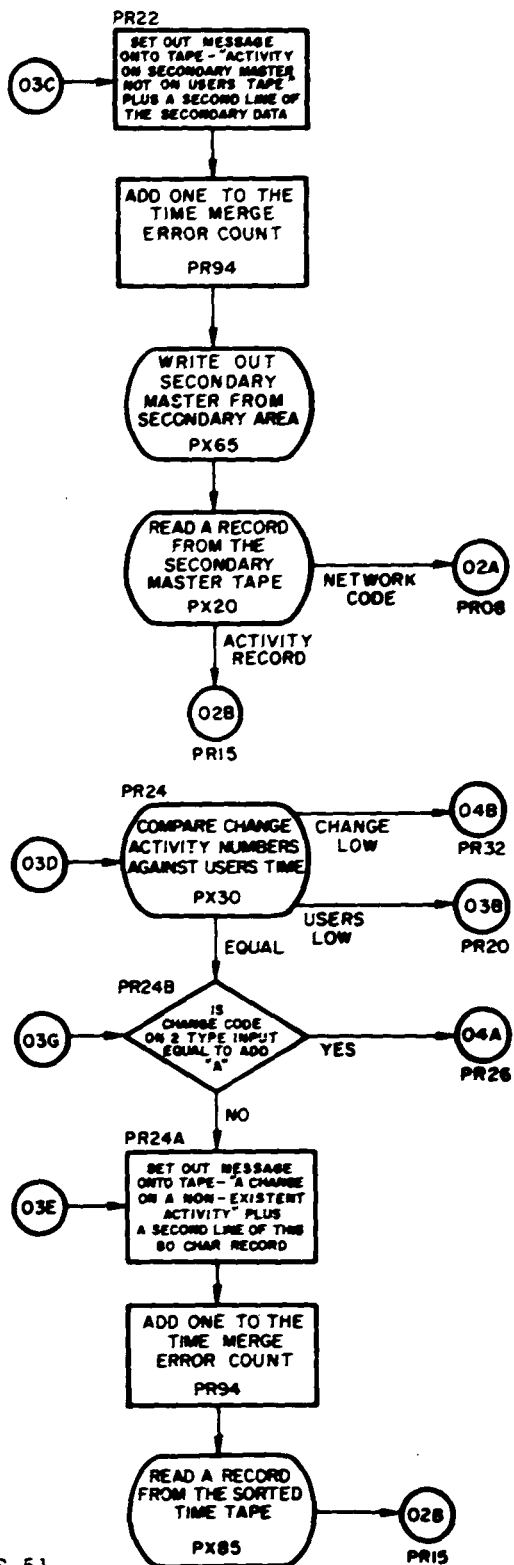
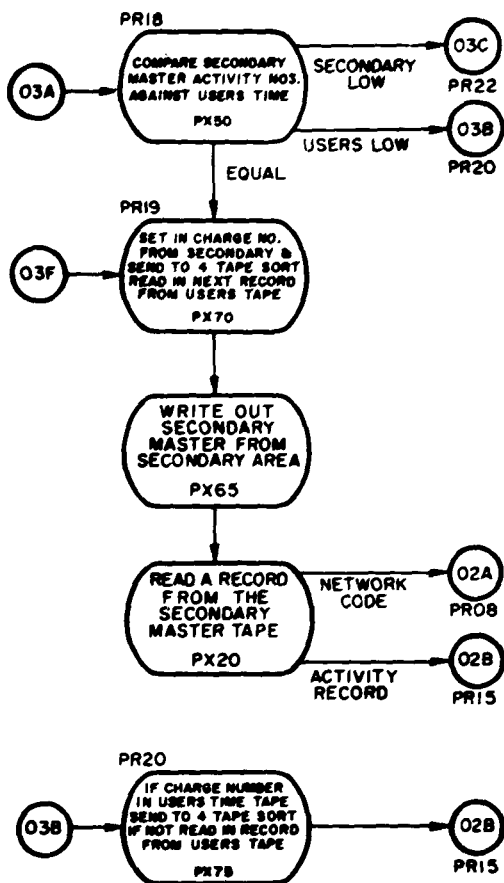
SUBREGIONS AND SUBROUTINES USED:

PMSU	PX20	PX60	PX85	PD60	PD70
PX01	PX25	PX65	ENDPM	PD65	PD75
PX05	PX30	PX70	PMRD	PD66	PD80
PX10	PX40	PX75	PD50	PD67	
PX15	PX50	PX80	PD55	PD68	

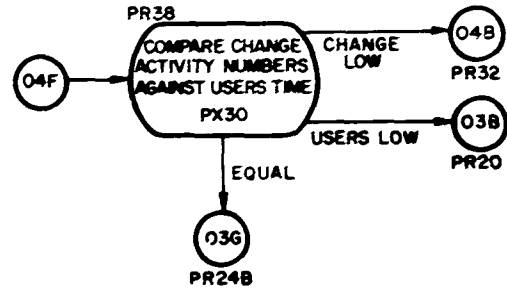
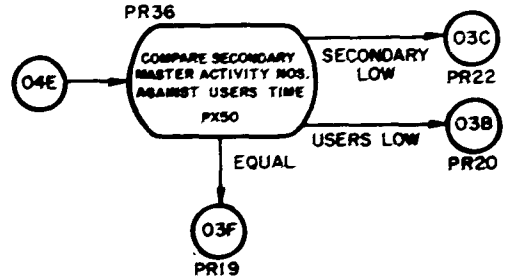
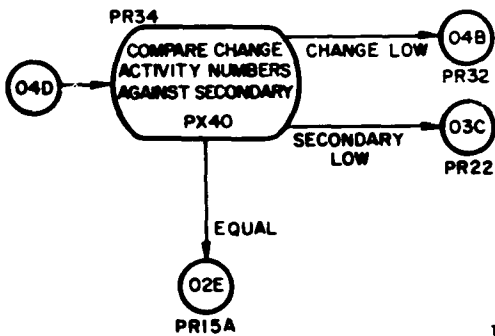
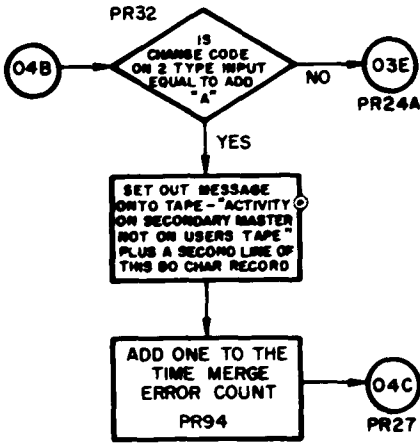
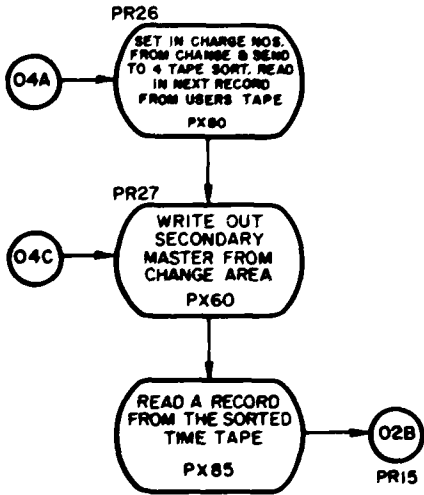
EXPLANATION OF CALLING SEQUENCE:

When the time merge phase is finished the outlink is a transfer to PUAOT, which will take the system into the update phase.





REGION PMRG



Region PX01

EXPLANATION OF REGION:

To set a pseudo number of all 1-bits into the change record blocks WKCH1 and WKCH2

CALLING SEQUENCE:

L TSX PX01, 4
L + 1 Normal return

INPUT:

Not applicable.

OUTPUT:

E. O. F. on change tape indicator PR99. It is set to a value other than zero and WKCH1 and WKCH2 contain all 1-bits.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

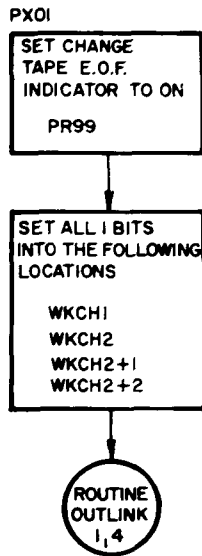
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PXOI

SET PSEUDO NUMBER INTO CHANGE AREA



Region PX05

EXPLANATION OF REGION:

To test the input code on the data contained in the SORTED DATA TAPE for a type 2 code.

CALLING SEQUENCE:

L TSX PX05, 4
L + 1 Normal return if code over 2
L + 2 Normal return if code equal to 2

INPUT:

The input data code.

OUTPUT:

Not applicable.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

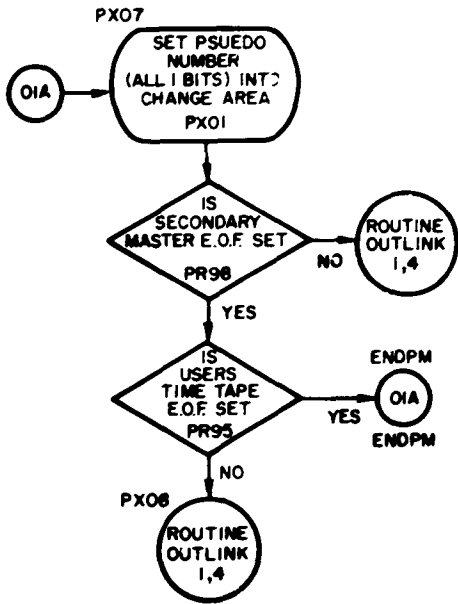
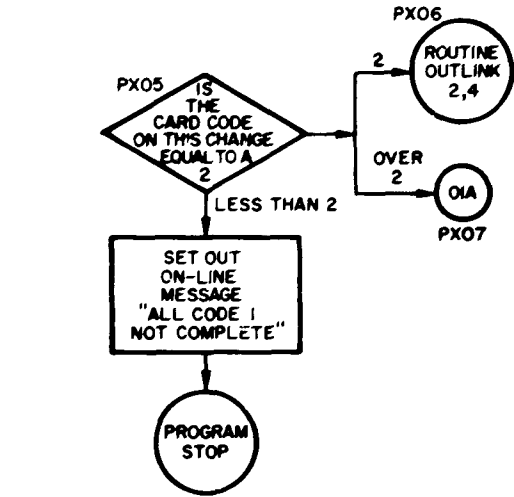
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

If the code is a 1 an exception message is set out on the on-line printer and the system is stopped.

REGION PX05

CHECK CARD CODE ON
SORTED DATA TAPE



Region PX10

EXPLANATION OF REGION:

This routine will move the input data record into its check area WKCH1 and WKCH2

CALLING SEQUENCE:

L TSX PX10, 4

L + 1 Normal return

INPUT:

Network code, predecessor, and successor from input data card.

OUTPUT:

The above input set into WKCH1 and WKCH2.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PX10

MOVE CHANGE RECORD
INTO WORK AREA

PX10

MOVE THE
CHANGE RECORD
INTO THE
FOLLOWING
LOCATIONS

WKCH 1
WKCH 2
WKCH 2+1
WKCH 2+2

ROUTINE
OUTLINK
1,4

Region PX15

EXPLANATION OF REGION:

To set a pseudo number of all 1-bits into the secondary master blocks WKSM1 and WKSM2

CALLING SEQUENCE:

L TSX PX15, 4

L + 1 Normal return

INPUT:

Not applicable.

OUTPUT:

E. O. F. on SECONDARY MASTER indicator PR98. It is set to a value other than zero and WKSM1 and WKSM2 contain all 1-bits.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

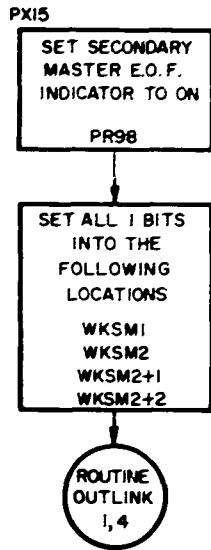
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PX15

SET PSEUDO NUMBERS
INTO SECONDARY
MASTER AREA



Region PX20

EXPLANATION OF REGION:

This routine will read the OLD SECONDARY MASTER, check sequence, and set the information into WKSM1 or WKSM2, according to the type of record.

CALLING SEQUENCE:

L TSX PX20, 4
L + 1 Normal return for network record
L + 2 Normal return for data record

INPUT:

OLD SECONDARY MASTER TAPE

OUTPUT:

The SECONDARY MASTER DATA set into WKSM1 and WKSM2.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

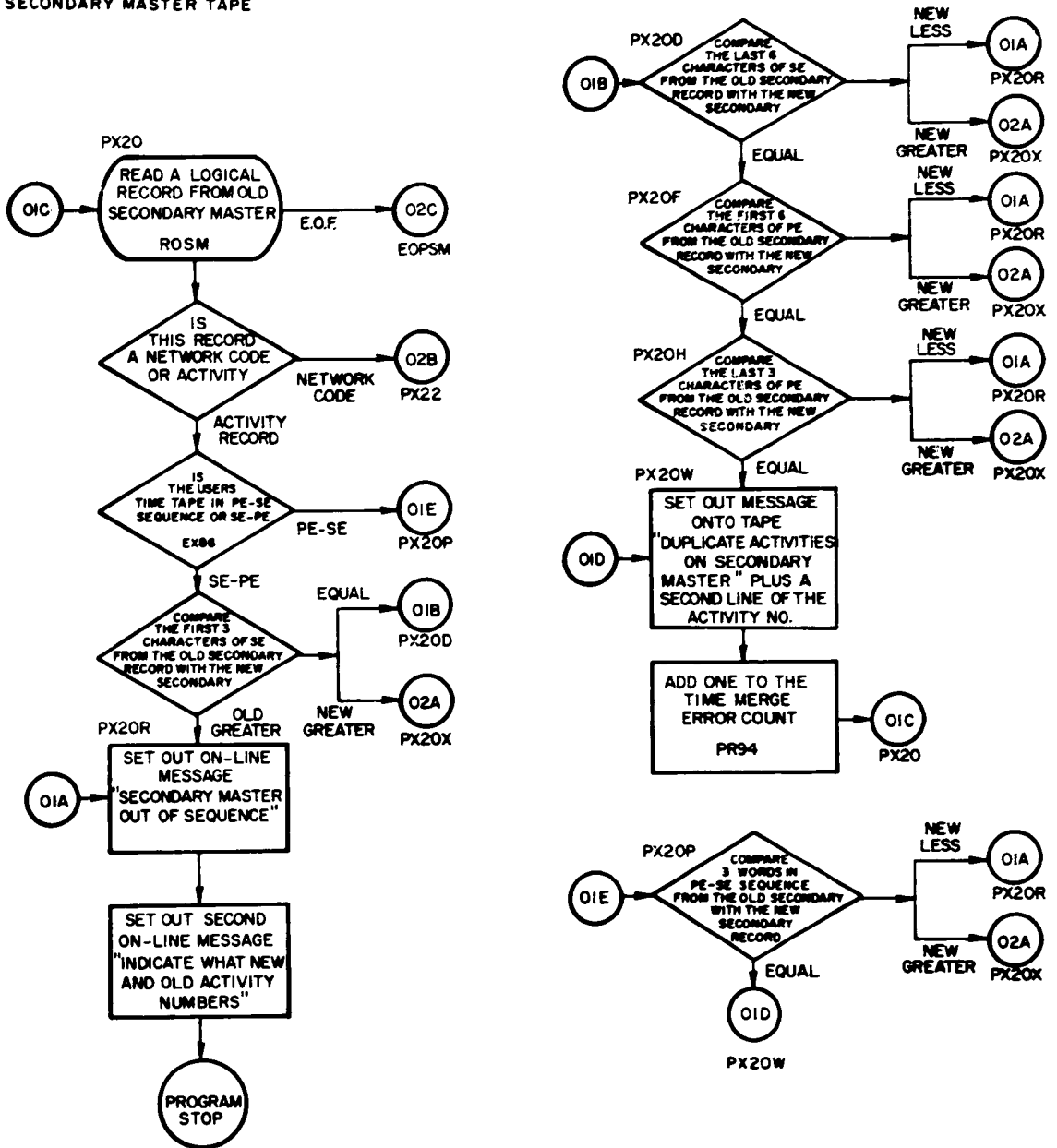
ROSM

EXPLANATION OF CALLING SEQUENCE:

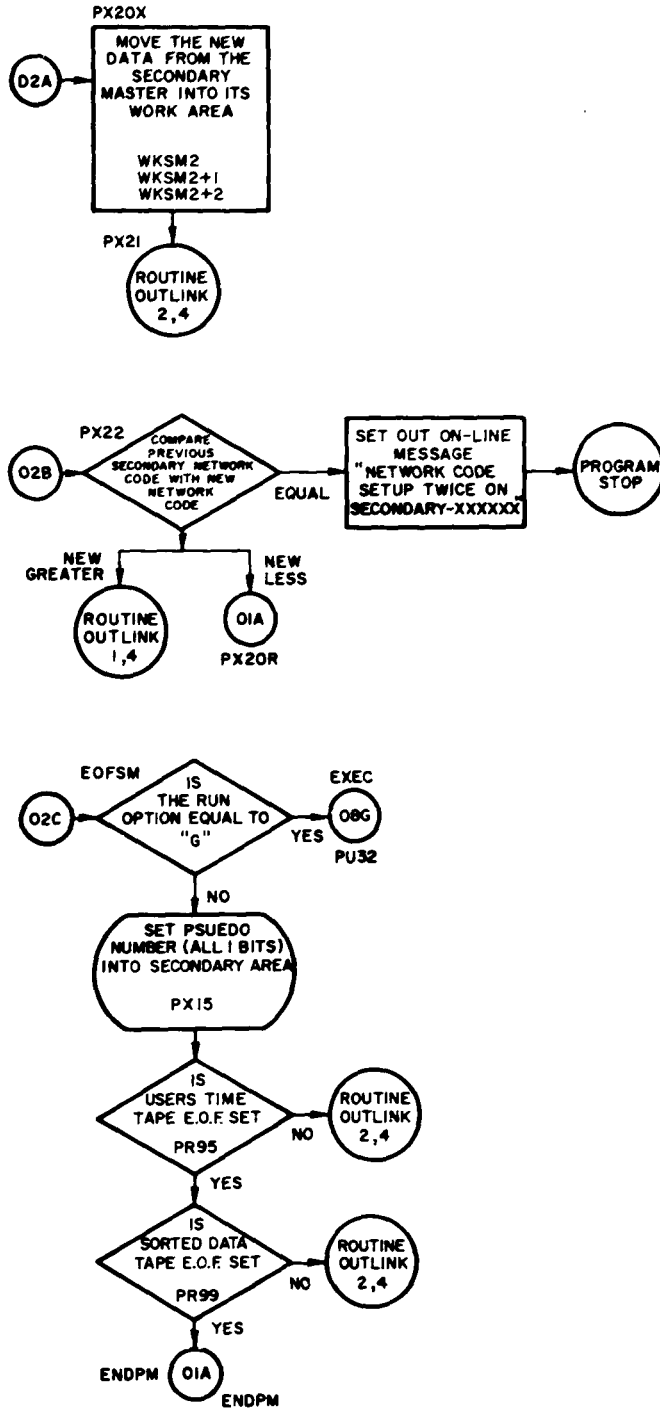
If an error occurs the reason for the error is printed out on-line and the system will stop.

REGION PX20

READ A RECORD FROM
SECONDARY MASTER TAPE



REGION PX20



Region PX25

EXPLANATION OF REGION:

This routine will compare all three files into the time merge (USERS TIME TAPE, SORTED DATA TAPE, and OLD SECONDARY MASTER) for the lowest network code value.

CALLING SEQUENCE:

L TSX PX25, 4
L + 1 Userstime and input low return
L + 2 Onlyinput low return
L + 3 Only users time low return
L + 4 Users time and SECONDARY MASTER low return
L + 5 Only SECONDARY MASTER low return
L + 6 SECONDARY MASTER and input low return
L + 7 All three are equal return

INPUT:

The network codes for all three files.

OUTPUT:

Not applicable.

STORAGE USED:

Not applicable.

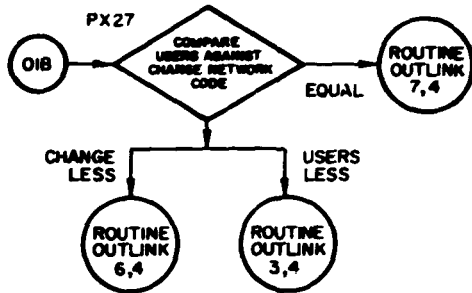
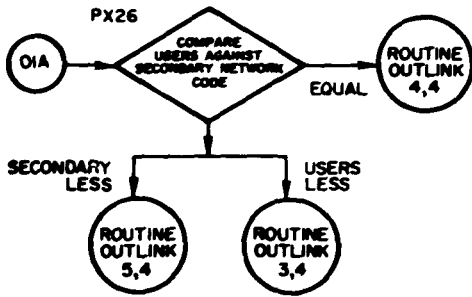
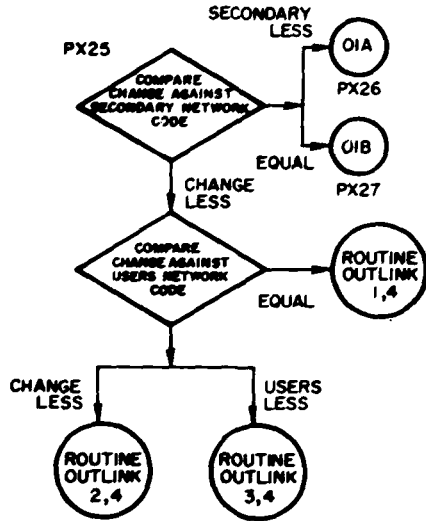
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

NETWORK NUMBER
COMPARE ROUTINE



Region PX30

EXPLANATION OF REGION:

Check the **USERS TIME TAPE** activities against the **SORTED DATA TAPE** activities for the lower of the two.

CALLING SEQUENCE:

L TSX PX30, 4
L + 1 Data input lower return
L + 2 Users information lower return
L + 3 Both of the above equal return

INPUT:

The data in **WKCH2** and **PTWKA** for comparisons.

OUTPUT:

Not applicable.

STORAGE USED:

No applicable.

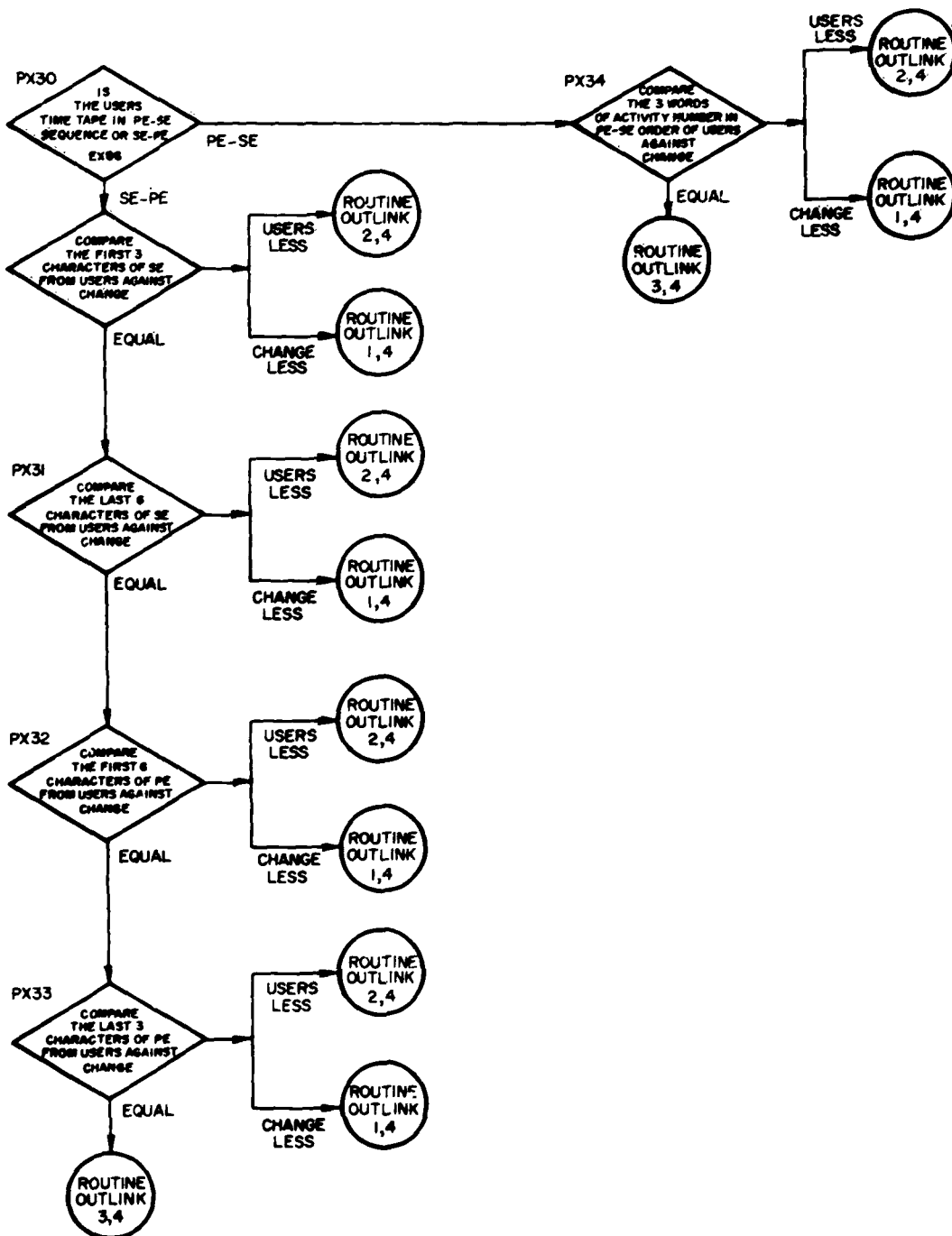
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

CHECK USERS ACTIVITY
NUMBERS AGAINST CHANGES



Region PX40

EXPLANATION OF REGION:

Check the SORTED DATA TAPE activities against the OLD SECONDARY MASTER TAPE activities for the lower of the two.

CALLING SEQUENCE:

L TSX PX40, 4
L + 1 Data input lower return
L + 2 Secondary master input lower return
L + 3 Both of the above equal return

INPUT:

The data in WKCH2 and WKSM2 for comparisons.

OUTPUT:

Not applicable.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

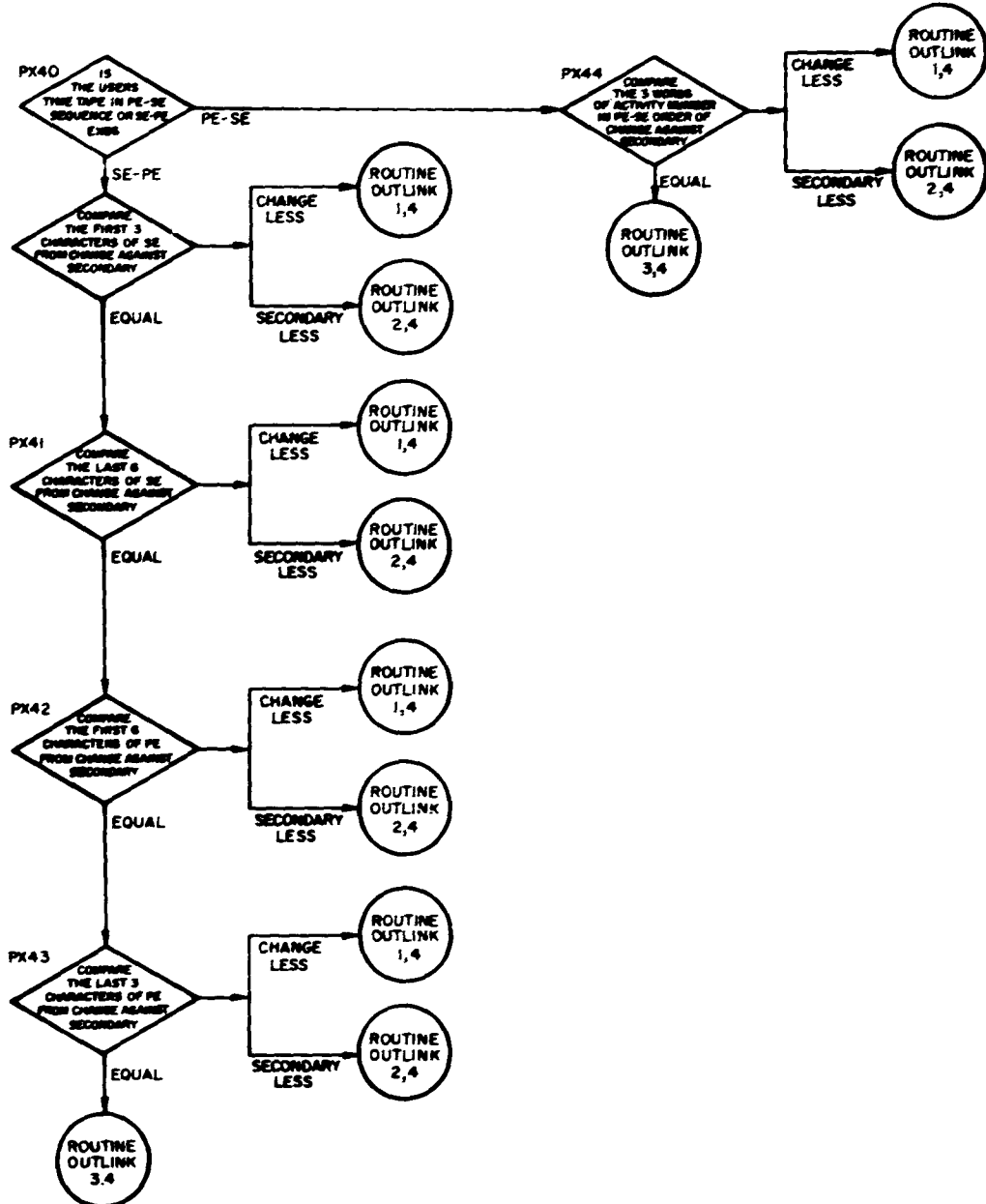
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PX40

CHECK CHANGE ACTIVITY NUMBERS
AGAINST SECONDARY MASTER



Region PX50

EXPLANATION OF REGION:

Check the OLD SECONDARY MASTER TAPE activities against the
USERS TIME TAPE activities for the lower of the two.

CALLING SEQUENCE:

L TSX PX50, 4
L + 1 Secondary master lower return
L + 2 Users tape lower return
L + 3 Both of the above equal return

INPUT:

The data in WKSM2 and PTWKA for comparisons.

OUTPUT:

Not applicable.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

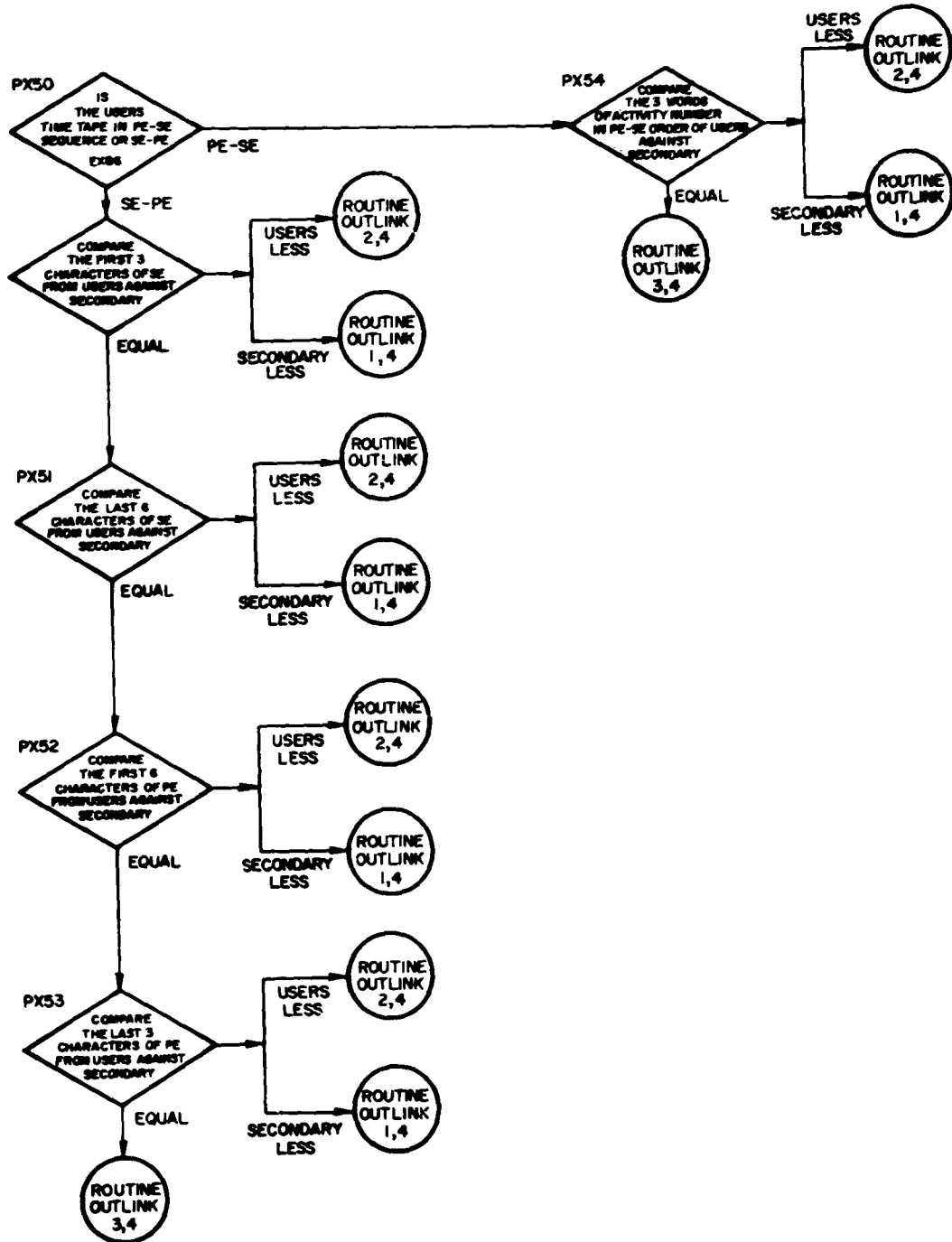
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PX60

CHECK USERS ACTIVITY NUMBERS
AGAINST SECONDARY MASTER



Region PX60

EXPLANATION OF REGION:

This routine will write the NEW SECONDARY MASTER from data that has been set up from the SORTED DATA TAPE.

CALLING SEQUENCE:

L TSX PX60, 4

L + 1 Normal return

INPUT:

SORTED DATA TAPE information in core.

OUTPUT:

A network code and data record or just a data record (depending on PR97) onto the NEW SECONDARY MASTER TAPE.

STORAGE USED:

PR97 - flag to indicate whether a network code has been already set onto the SECONDARY MASTER.

SUBREGIONS AND SUBROUTINES USED:

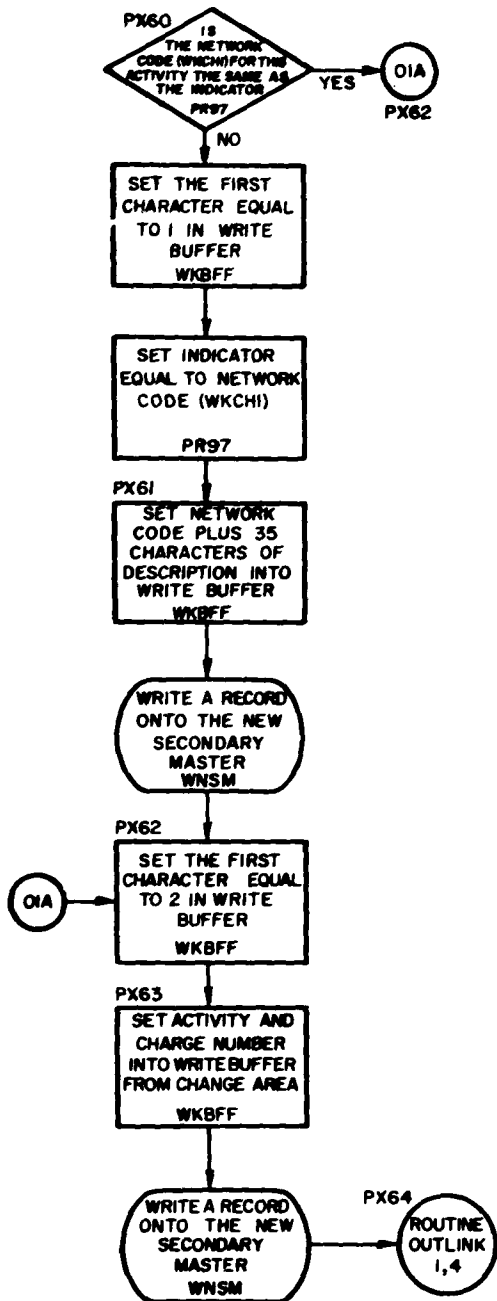
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PX60

WRITE OUT SECONDARY MASTER
FROM NEW ADDS



Region PX65

EXPLANATION OF REGION:

This routine will write the **NEW SECONDARY MASTER** from data that has been set up from the **OLD SECONDARY MASTER**.

CALLING SEQUENCE:

L **TSX PX65, 4**

L + 1 **Normal return**

INPUT:

OLD SECONDARY MASTER information in core.

OUTPUT:

A network code and data record or just a data record onto the **NEW SECONDARY MASTER TAPE**, depending on PR97.

STORAGE USED:

PR97 - flag to indicate whether a network code has been already set onto the **SECONDARY MASTER**.

SUBREGIONS AND SUBROUTINES USED:

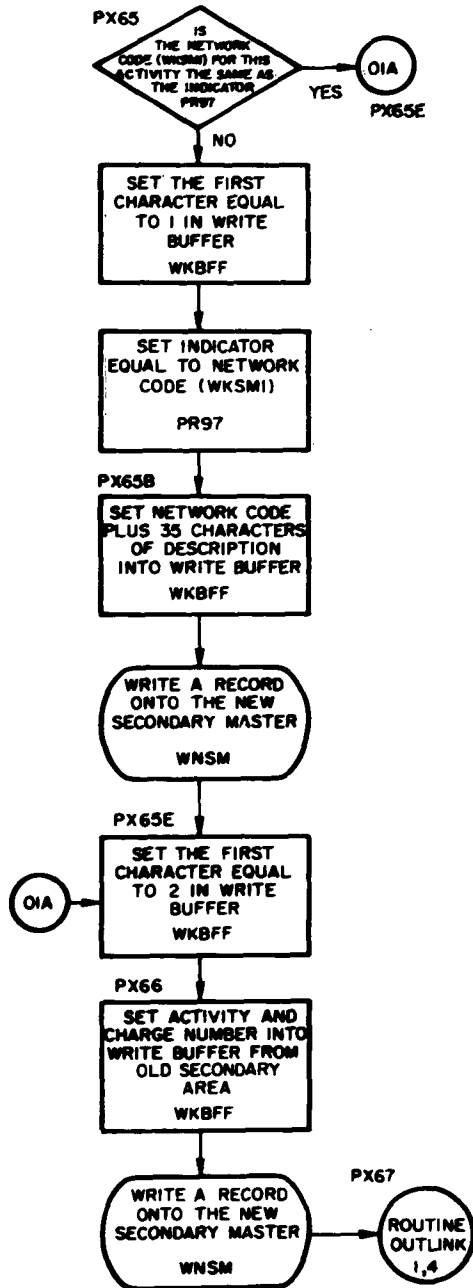
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

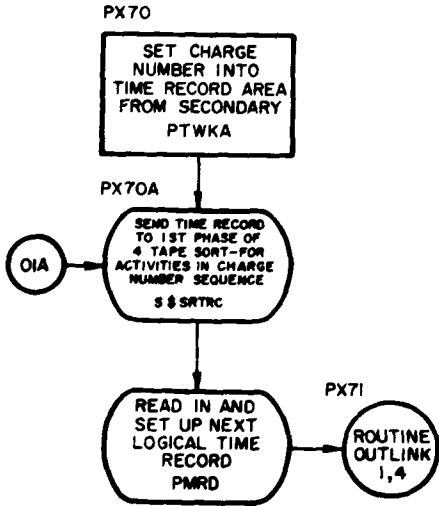
REGION PX65

WRITE OUT SECONDARY MASTER
FROM OLD SECONDARY AREA



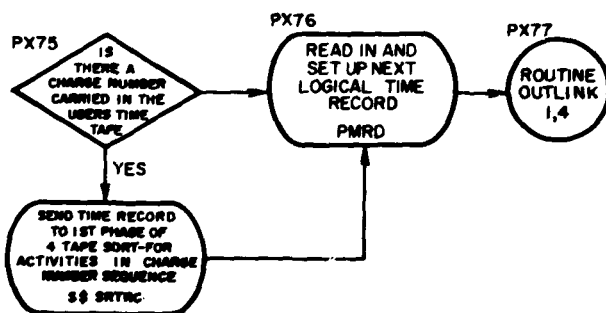
REGION PX70

SET CHARGE NUMBER FROM
SECONDARY INTO TIME
RECORD AND SORT



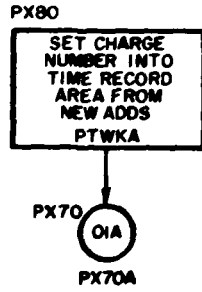
REGION PX75

CHECK FOR USERS CHARGE
NUMBER IN TIME RECORD
AND SORT



REGION PX80

SET CHARGE NUMBER FROM
NEW ADDS INTO TIME RECORD
AND SORT



Region PX85

EXPLANATION OF REGION:

This routine will read the SORTED DATA TAPE, check sequence, and set the information into WKCH1 and WKCH2.

CALLING SEQUENCE:

L TSX PX85, 4

L + 1 Normal return

INPUT:

SORTED DATA TAPE

OUTPUT:

The type 2 input data set into WKCH1 and/or WKCH2.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

RCHG

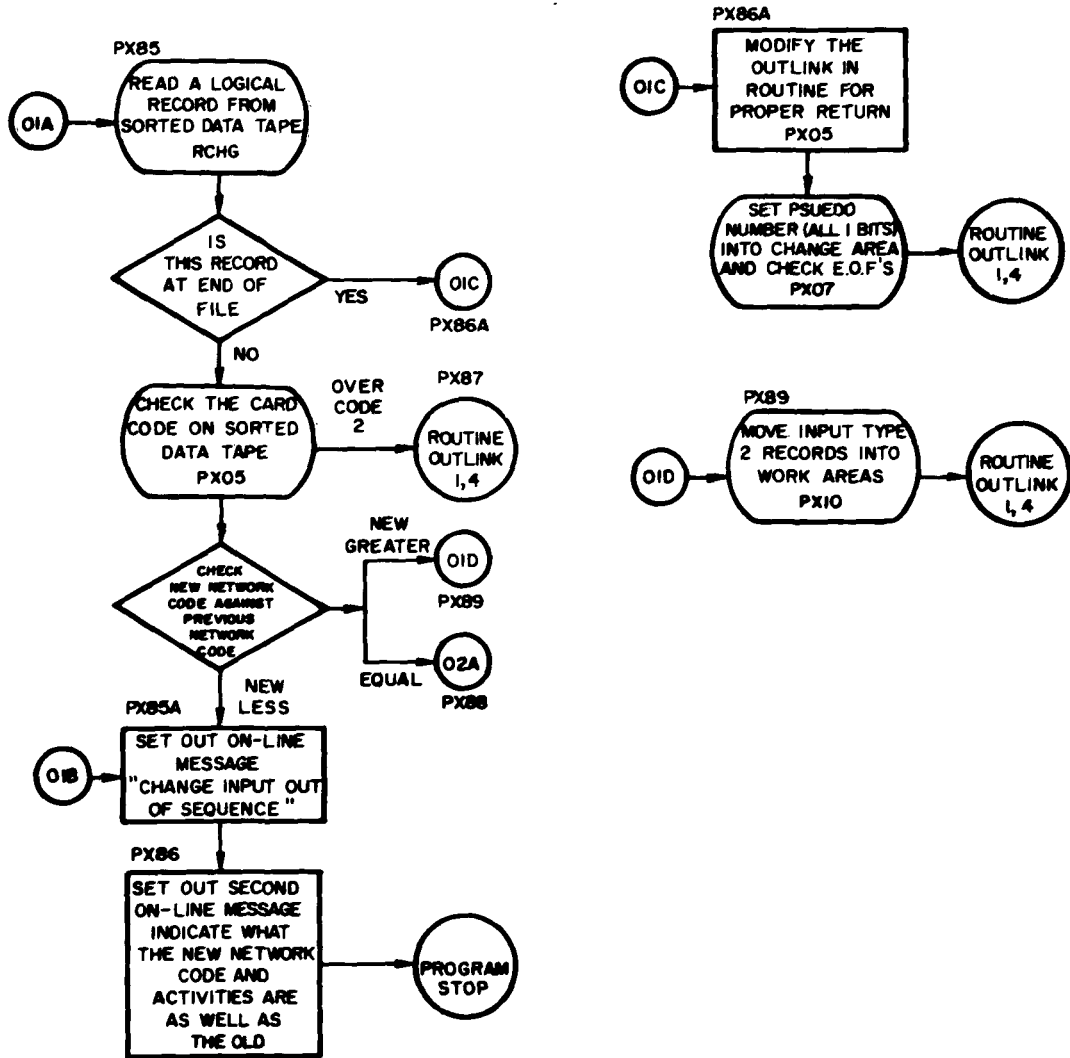
PX10

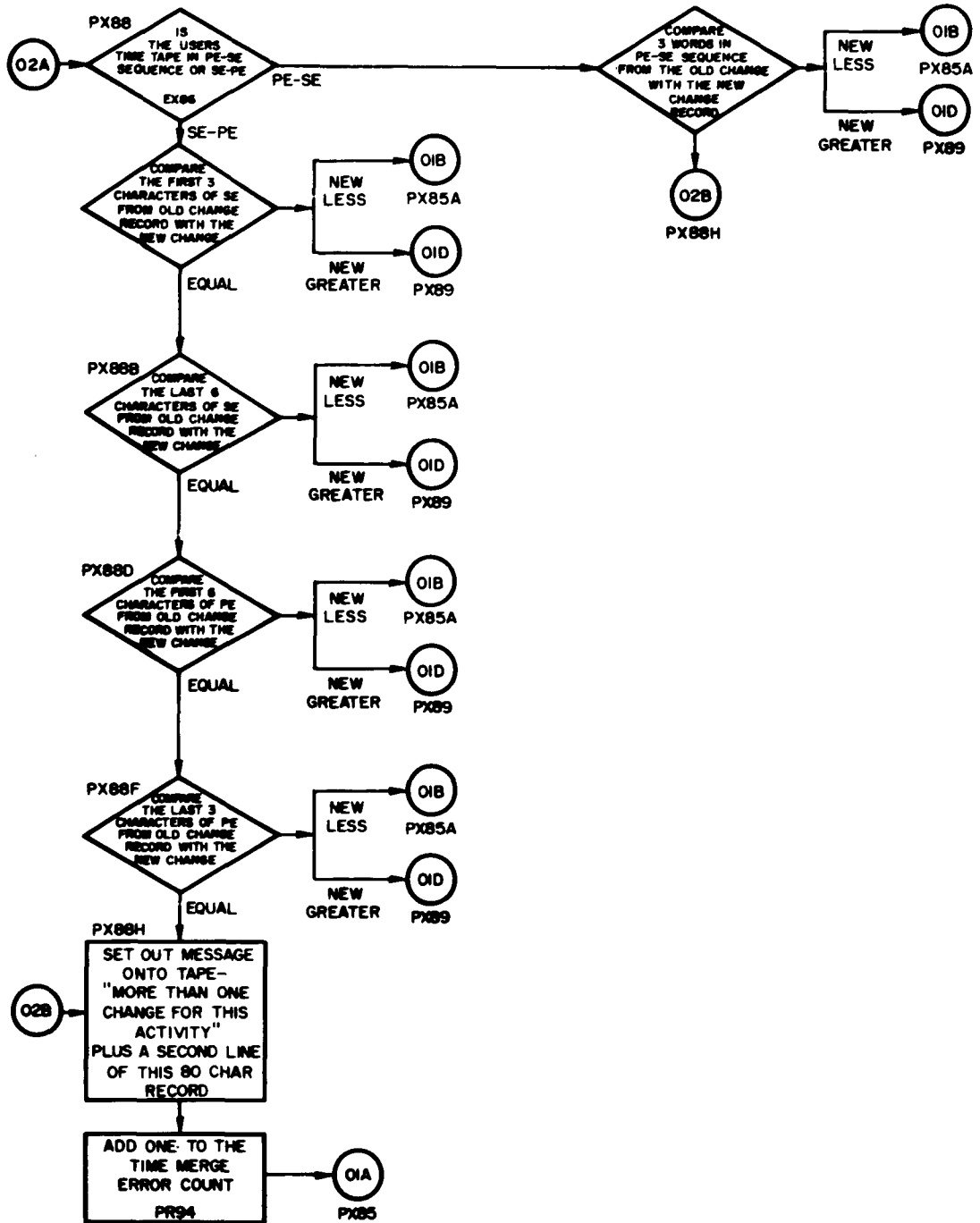
PX05

EXPLANATION OF CALLING SEQUENCE:

If an error occurs, the reason for the error is printed out on-line and the system will stop.

READ A RECORD FROM
SORTED DATA TAPE





Region ENDPM

EXPLANATION OF REGION:

This routine will set out the ending messages for the time merge phase and contain the link into the PERT Cost update phase.

CALLING SEQUENCE:

L TRA ENDPM

INPUT:

Number of errors indicated in location PR94.

OUTPUT:

The on-line messages ending the PERT merge phase as shown on Page III-F-2.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

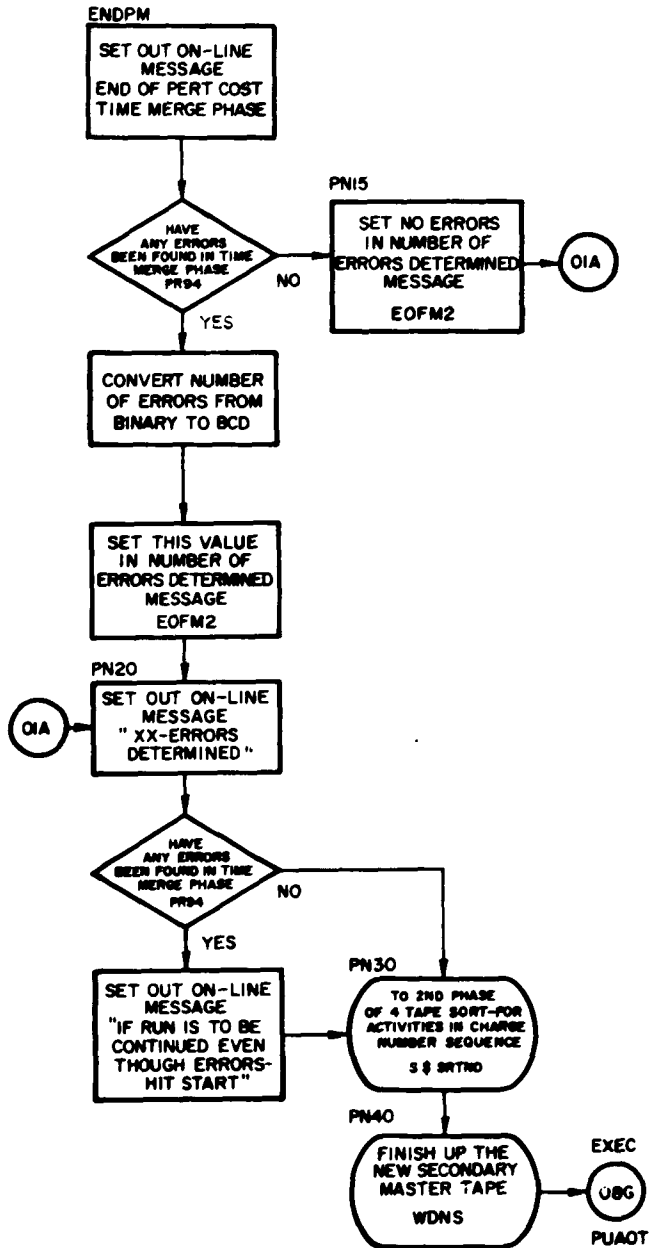
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

When the time merge phase is in this routine it is finished and the outlink is a transfer to PUAOT, which will take the system into the update phase.

REGION ENDFM

FINISH UP PERT TIME
MERGE PHASE



Region PMRD

EXPLANATION OF REGION:

This routine will read the USERS TIME TAPE from the input parameter table and set up one record in the PTWKA block. If a sort is necessary to get the information in PE-SE order this routine will accomplish it. The sequence of the USERS TIME TAPE is also verified in this area.

CALLING SEQUENCE:

L TSX PMRD, 4
L + 1 Normal return

INPUT:

INPAR parameter table
USERS TIME TAPE

OUTPUT:

A selected time information record in the PTWKA block.

STORAGE USED:

Not applicable.

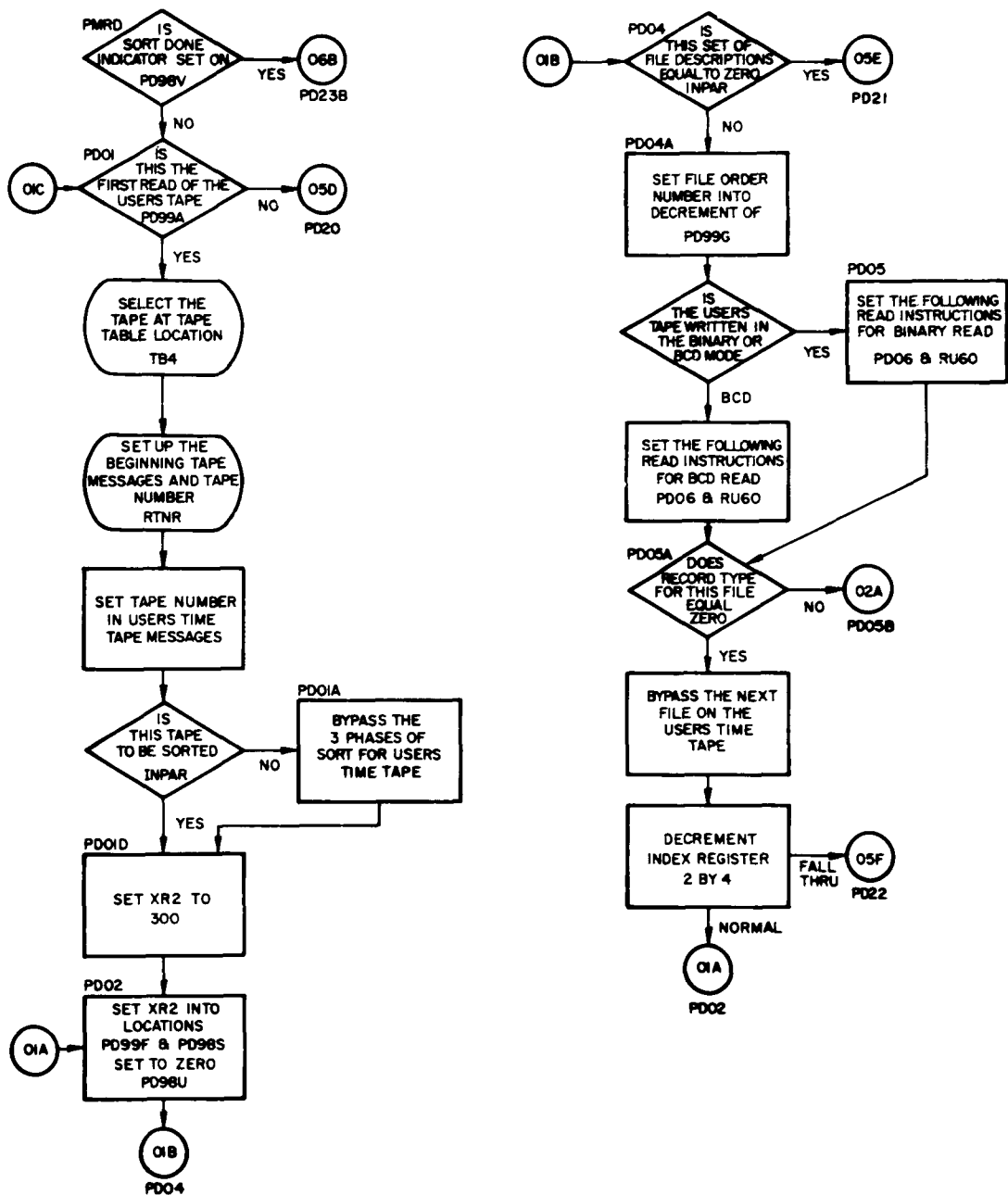
SUBREGIONS AND SUBROUTINES USED:

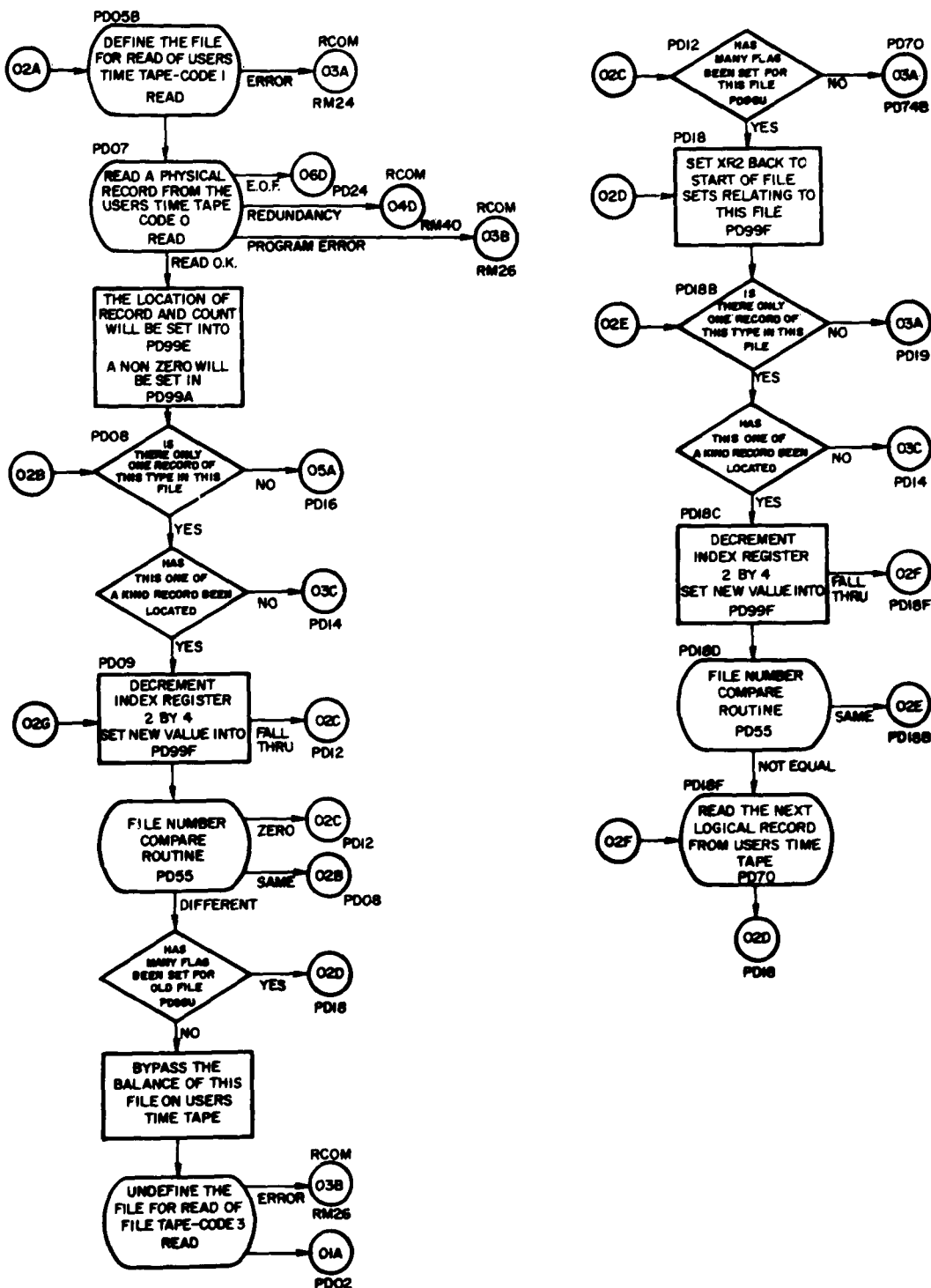
PD50	PD65	PD68	PD80
PD55	PD66	PD70	
PD60	PD67	PD75	

EXPLANATION OF CALLING SEQUENCE:

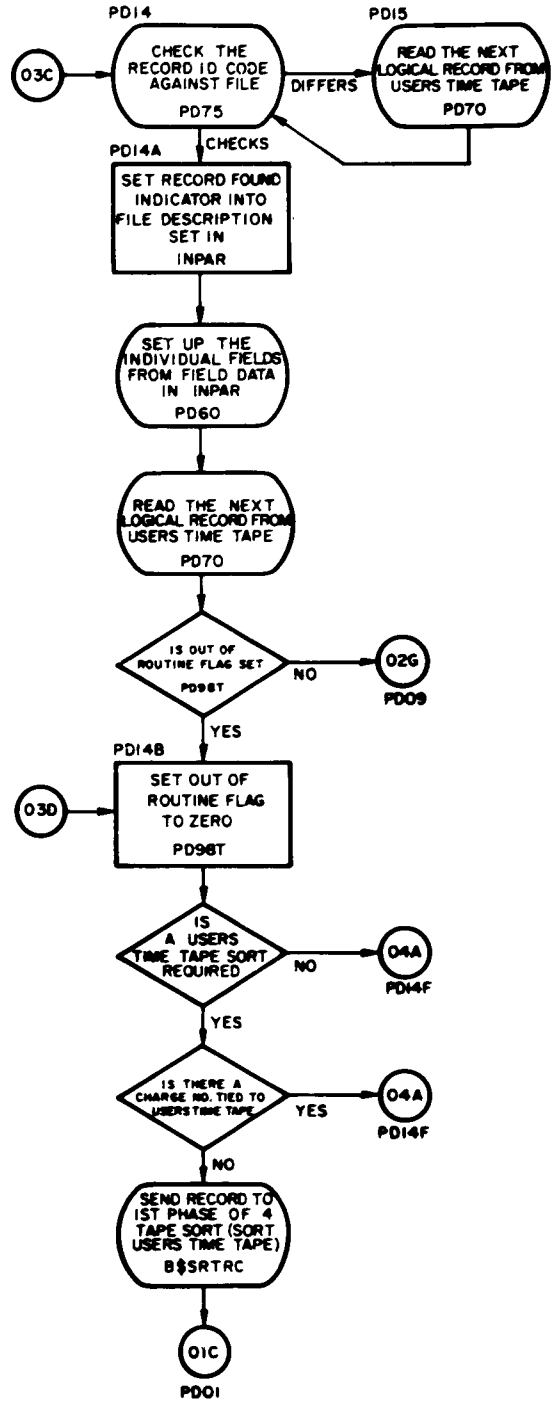
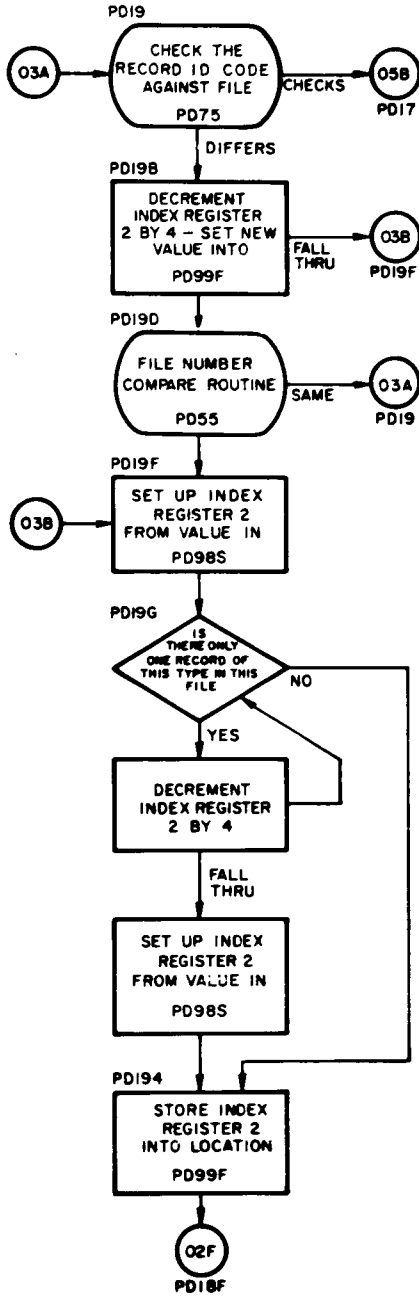
If an error occurs the reason for the error is set out either on the on-line printer or the SYSTEM ERROR TAPE. The system may then stop if the problem warrants it.

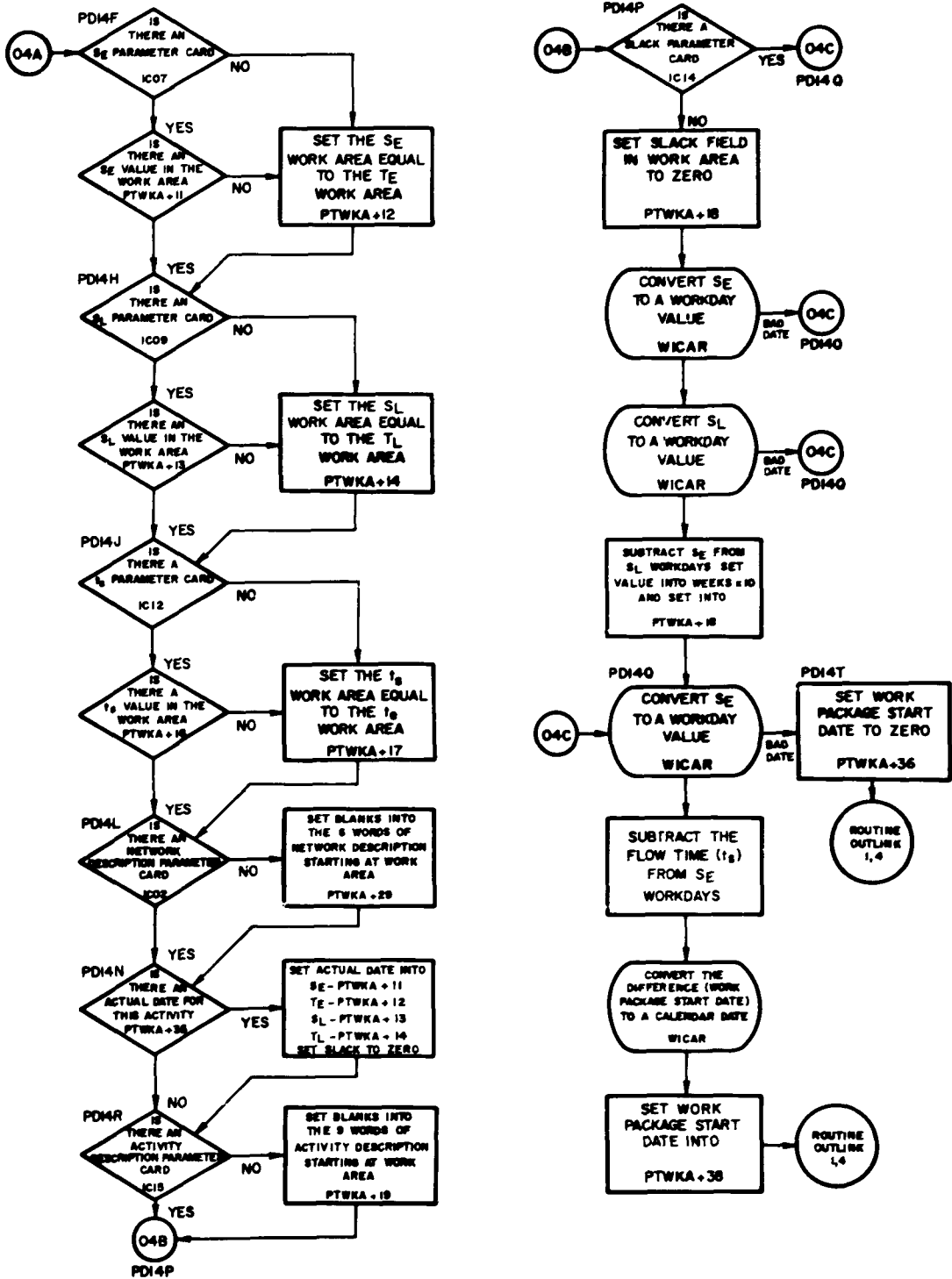
REGION PMRD



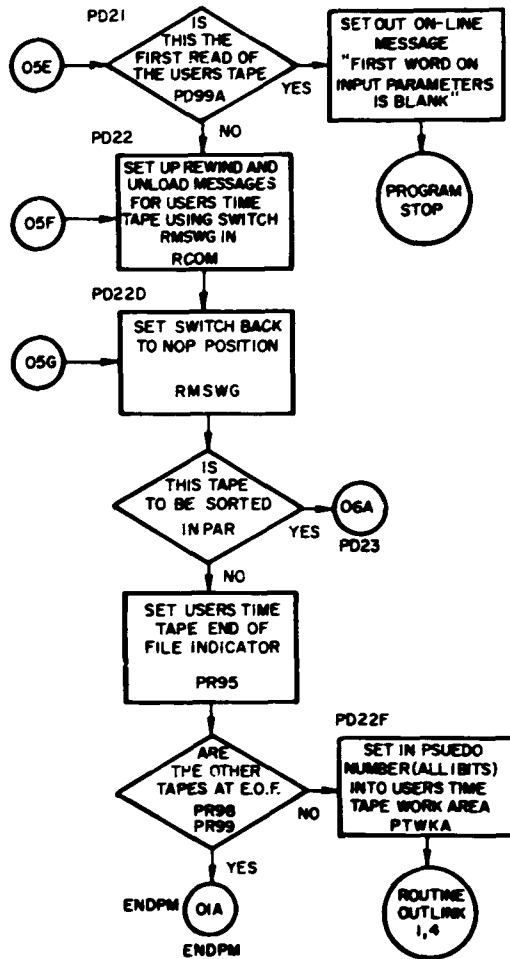
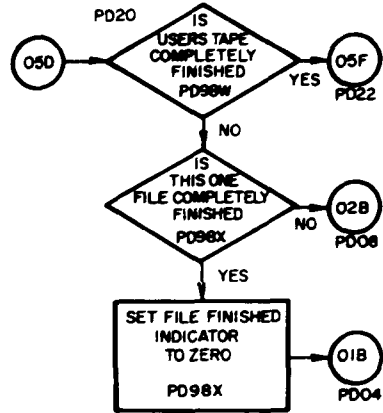
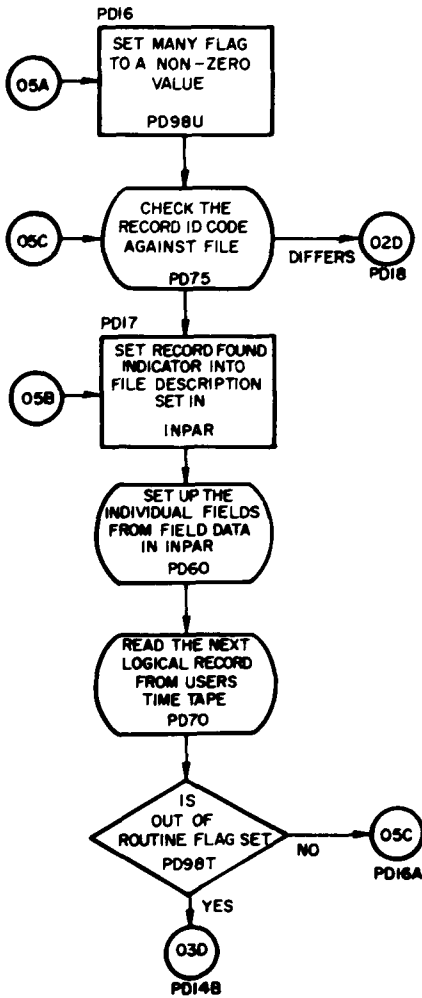


REGION PMRD

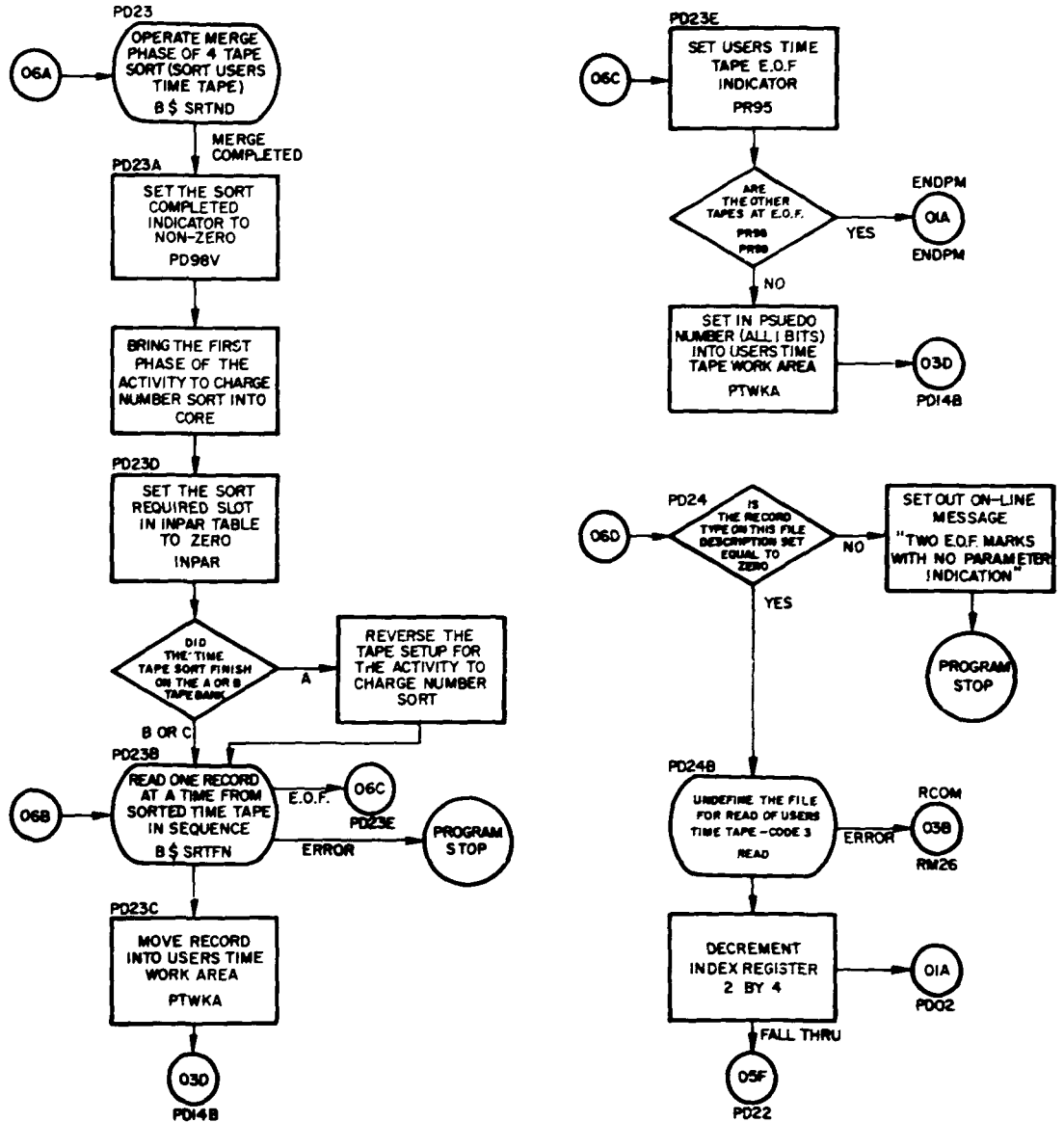




REGION PMRD



REGION PMRD



Region PD50

EXPLANATION OF REGION:

This region will convert a binary predecessor or successor number to a BCD configuration.

CALLING SEQUENCE:

L TRA PD50

INPUT:

The binary value in the location PD69G.

OUTPUT:

The BCD configuration of the binary value in PTWKA.

STORAGE USED:

PD69W and PD69X contain the BCD value after the FTB subroutine.

SUBREGIONS AND SUBROUTINES USED:

FTB

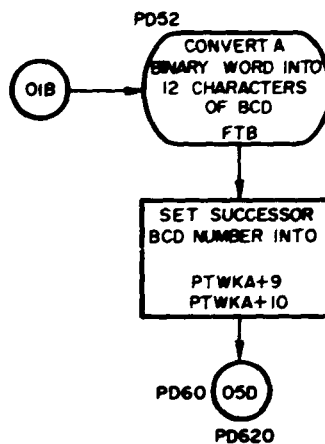
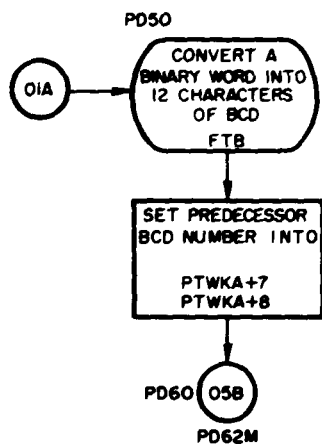
EXPLANATION OF CALLING SEQUENCE:

At the end of this routine, control is transferred back to the predecessor or successor area.

REGION PD50

CONVERT BINARY PE
NUMBER TO BCD

CONVERT BINARY SE
NUMBER TO BCD



Region PD55

EXPLANATION OF REGION:

This routine will check the file number between two blocks in the file description area.

CALLING SEQUENCE:

L TSX PD55, 4
L + 1 File number is zero return
L + 2 File numbers are equal return
L + 3 File numbers are different return

INPUT:

Old file number in PD99G.

OUTPUT:

Not applicable.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

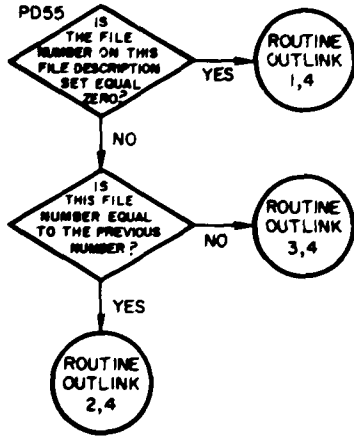
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PD55

COMPARE FILE NUMBERS
FROM INPAR FILE
DESCRIPTION SETS



Region PD60

EXPLANATION OF REGION:

This routine will set up the individual fields from the field description block translation of the USERS TIME TAPE. It will also check sequence on the USERS TIME TAPE.

CALLING SEQUENCE:

L TSX PD60, 4
L + 1 Normal return

INPUT:

USERS TIME TAPE
INPAR parameter table

OUTPUT:

A selected time information record in the PTWKA block.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

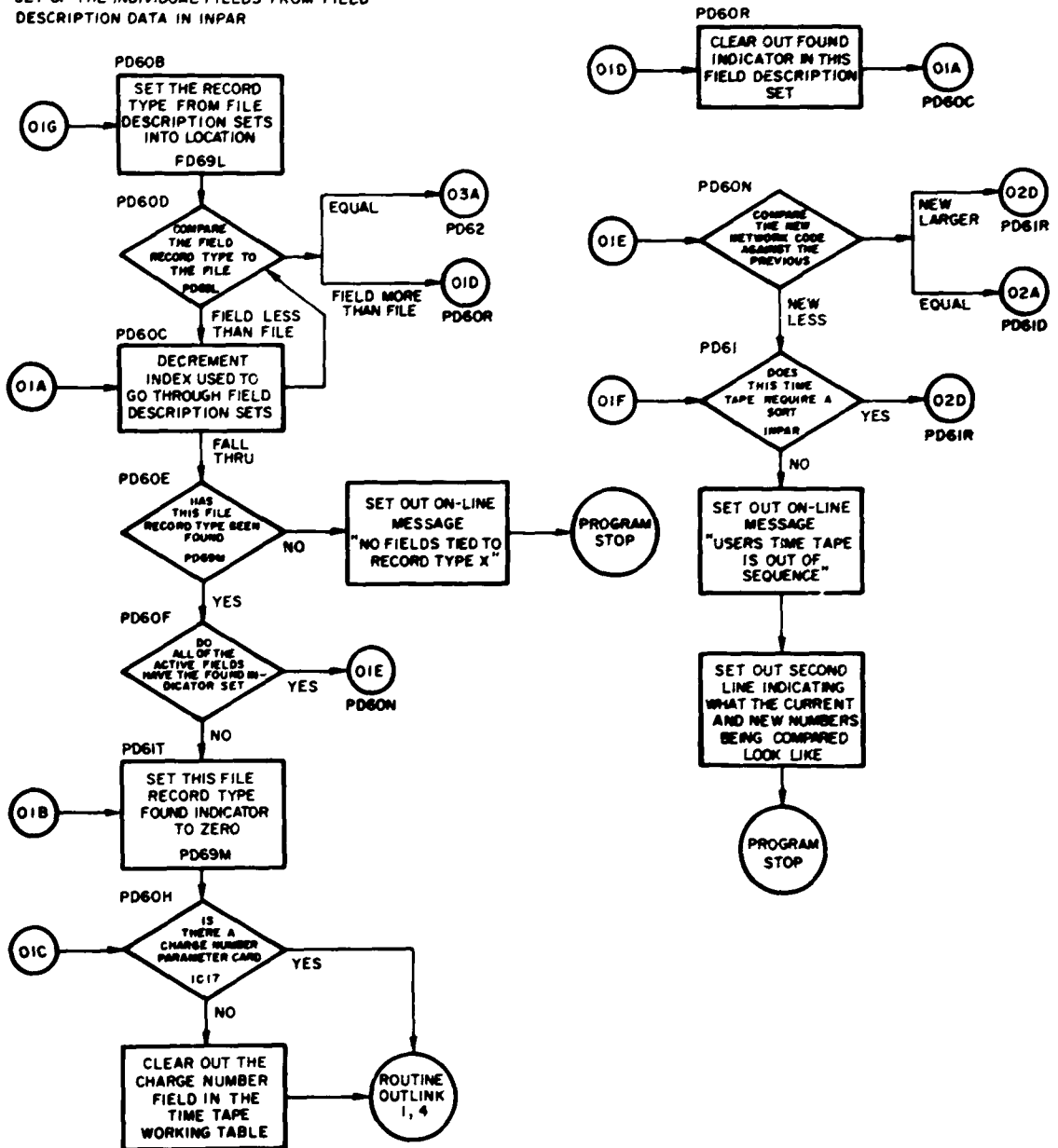
PD68	WICAR	PD66
PD67	PD65	

EXPLANATION OF CALLING SEQUENCE:

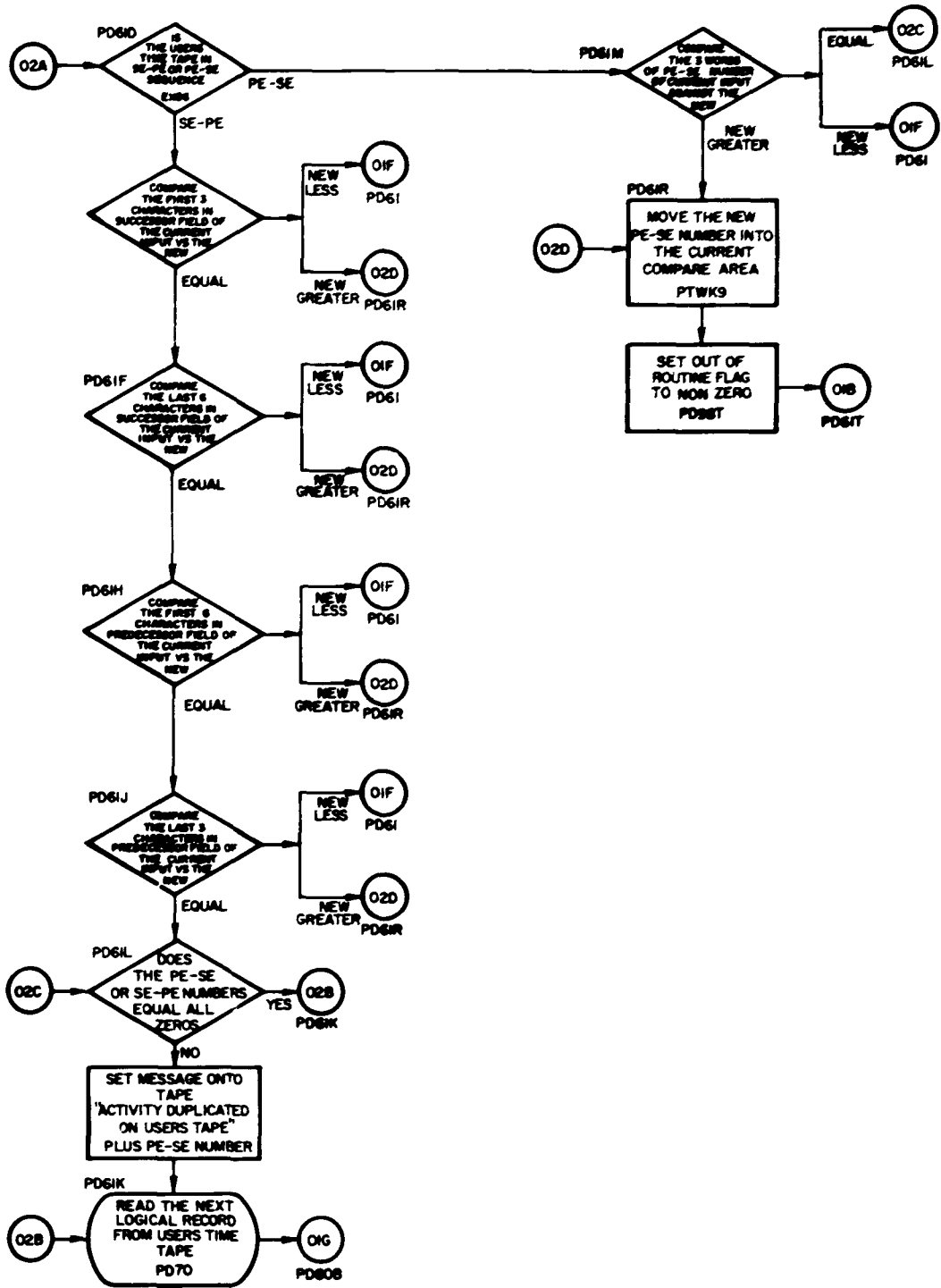
If an error occurs, the reason for the error is set out either on the on-line printer or the SYSTEM ERROR TAPE. The system may then stop if the problem warrants it.

REGION PD60

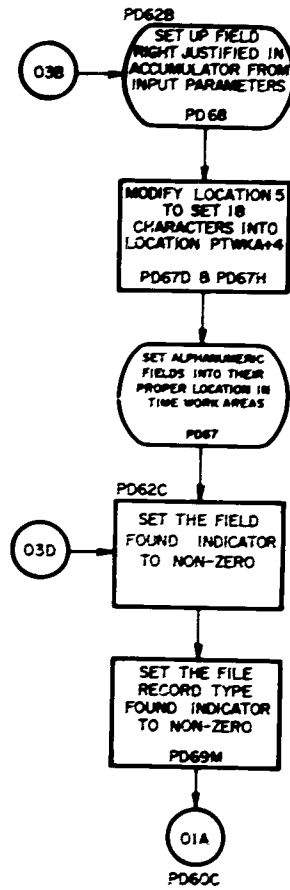
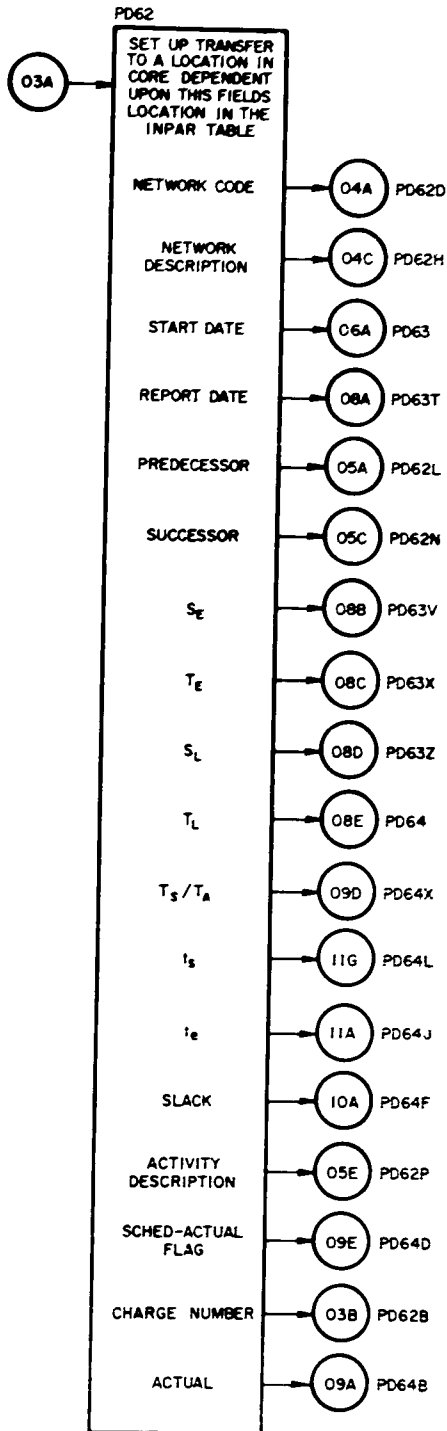
SET UP THE INDIVIDUAL FIELDS FROM FIELD DESCRIPTION DATA IN INPAR



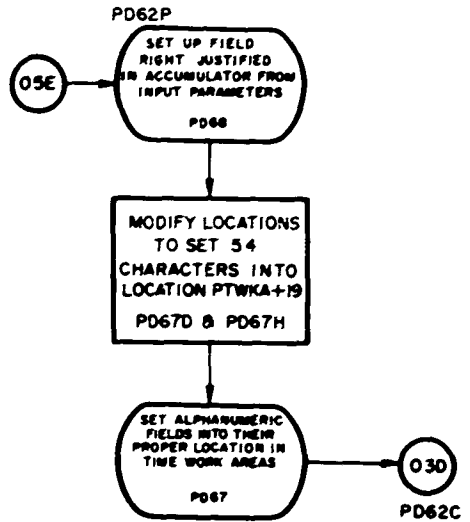
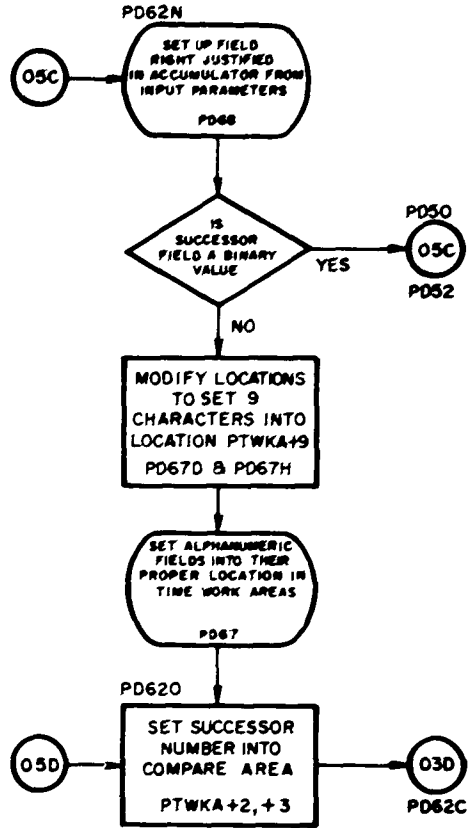
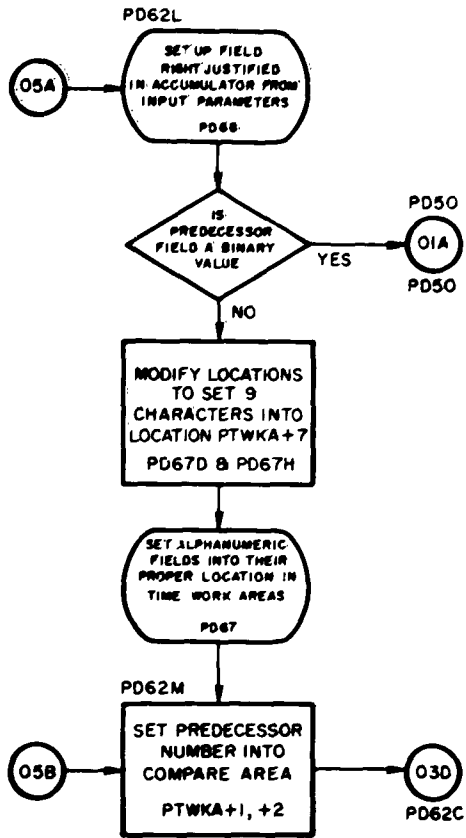
REGION PD60

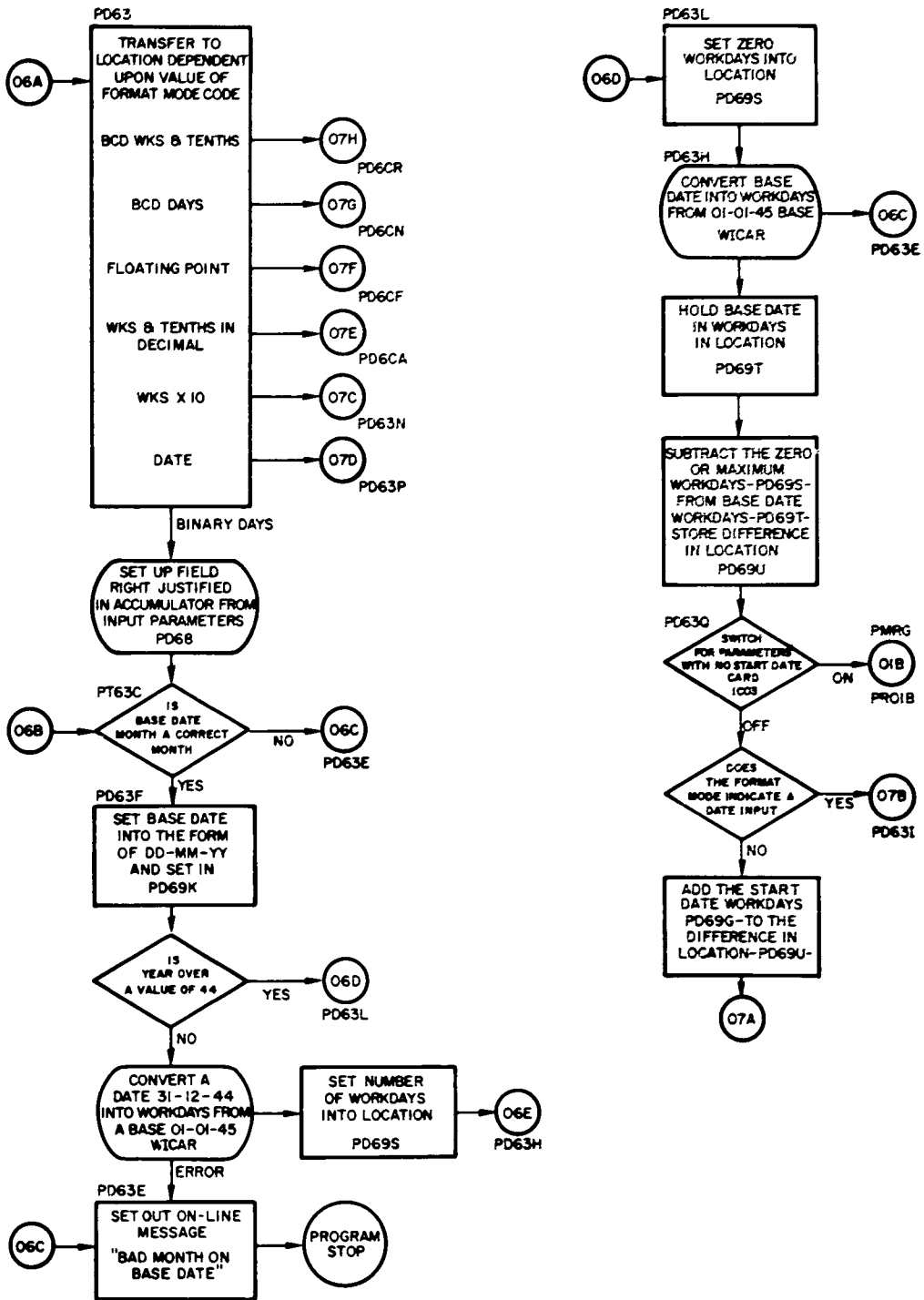


REGION PD60

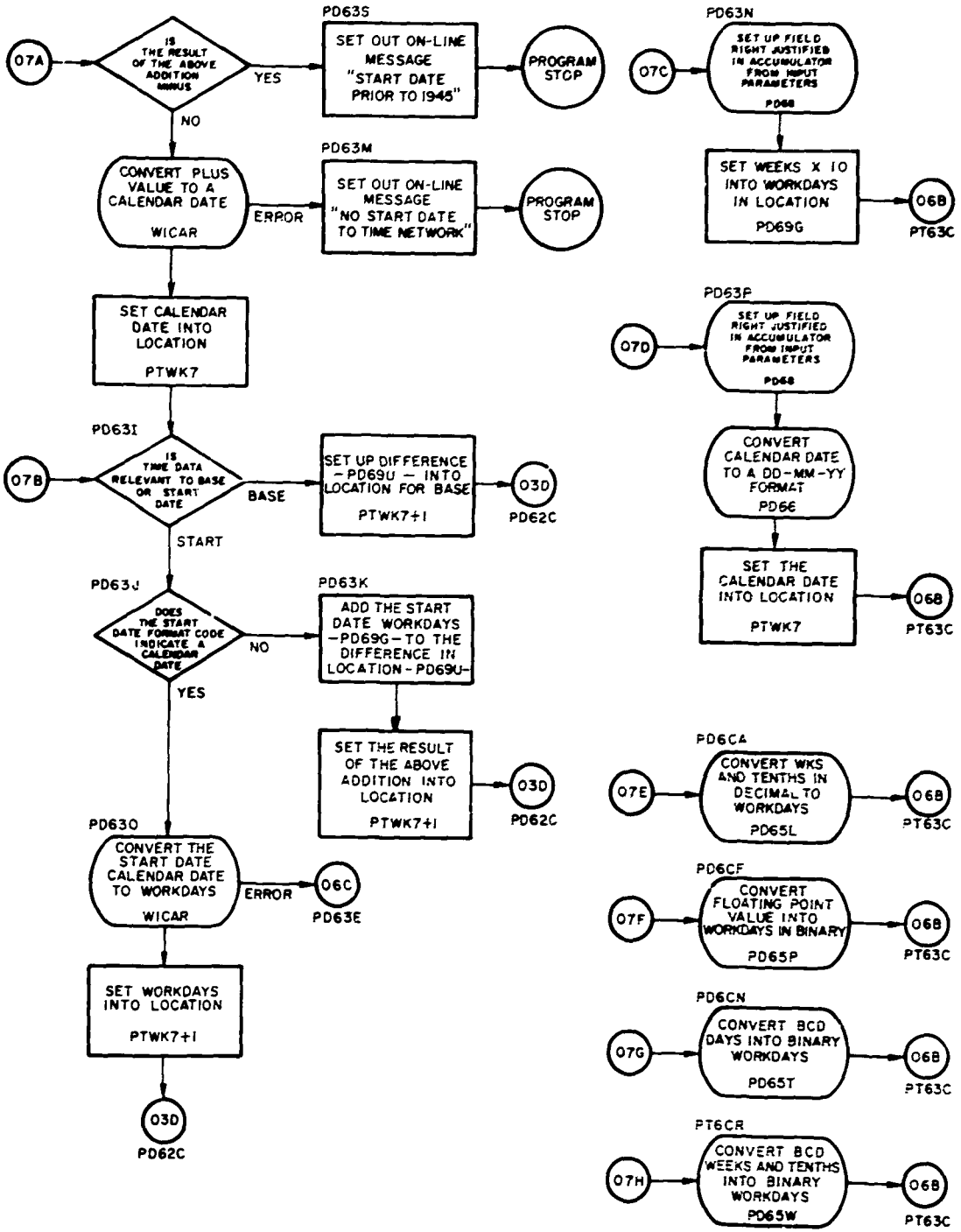


REGION PD60

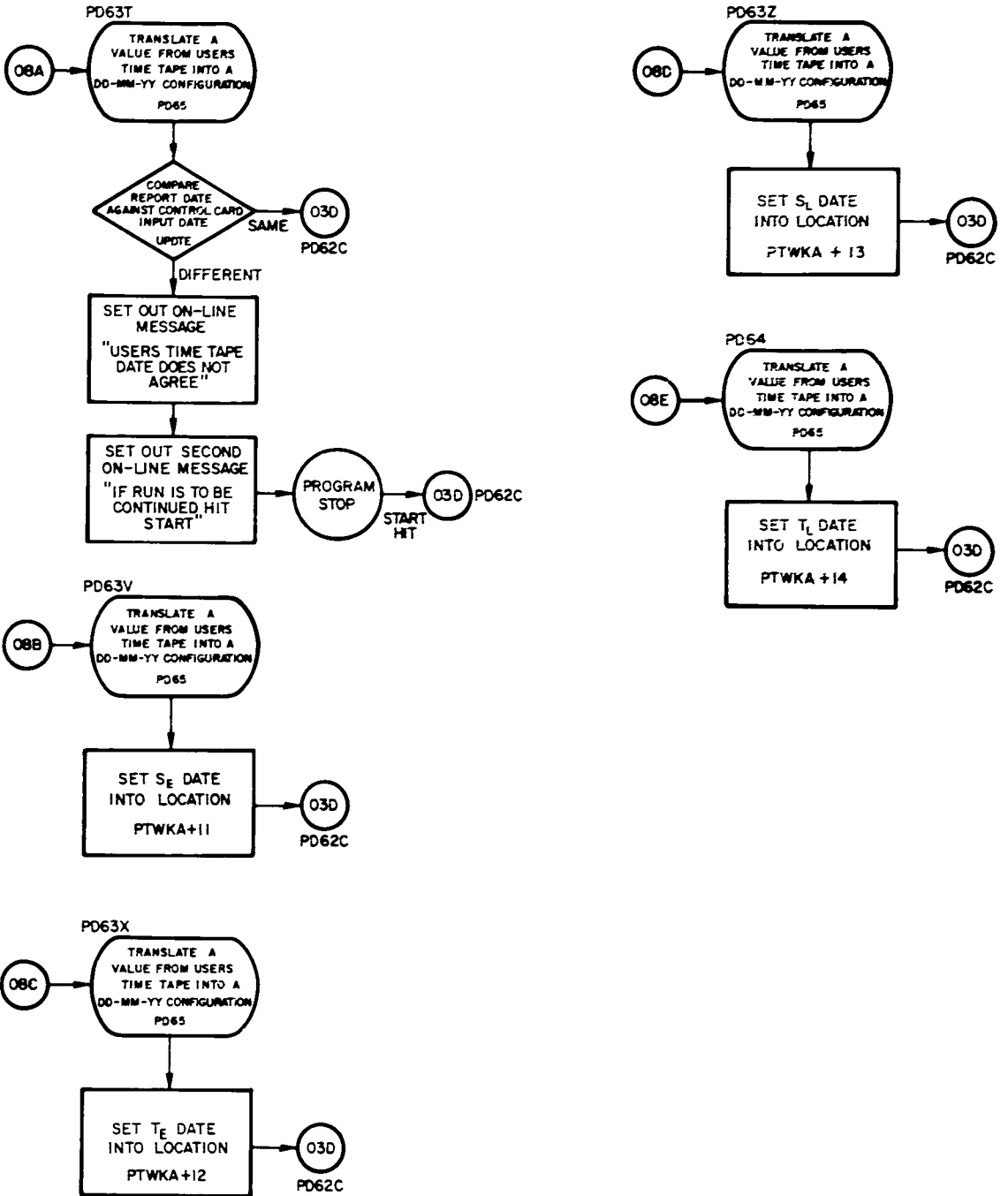


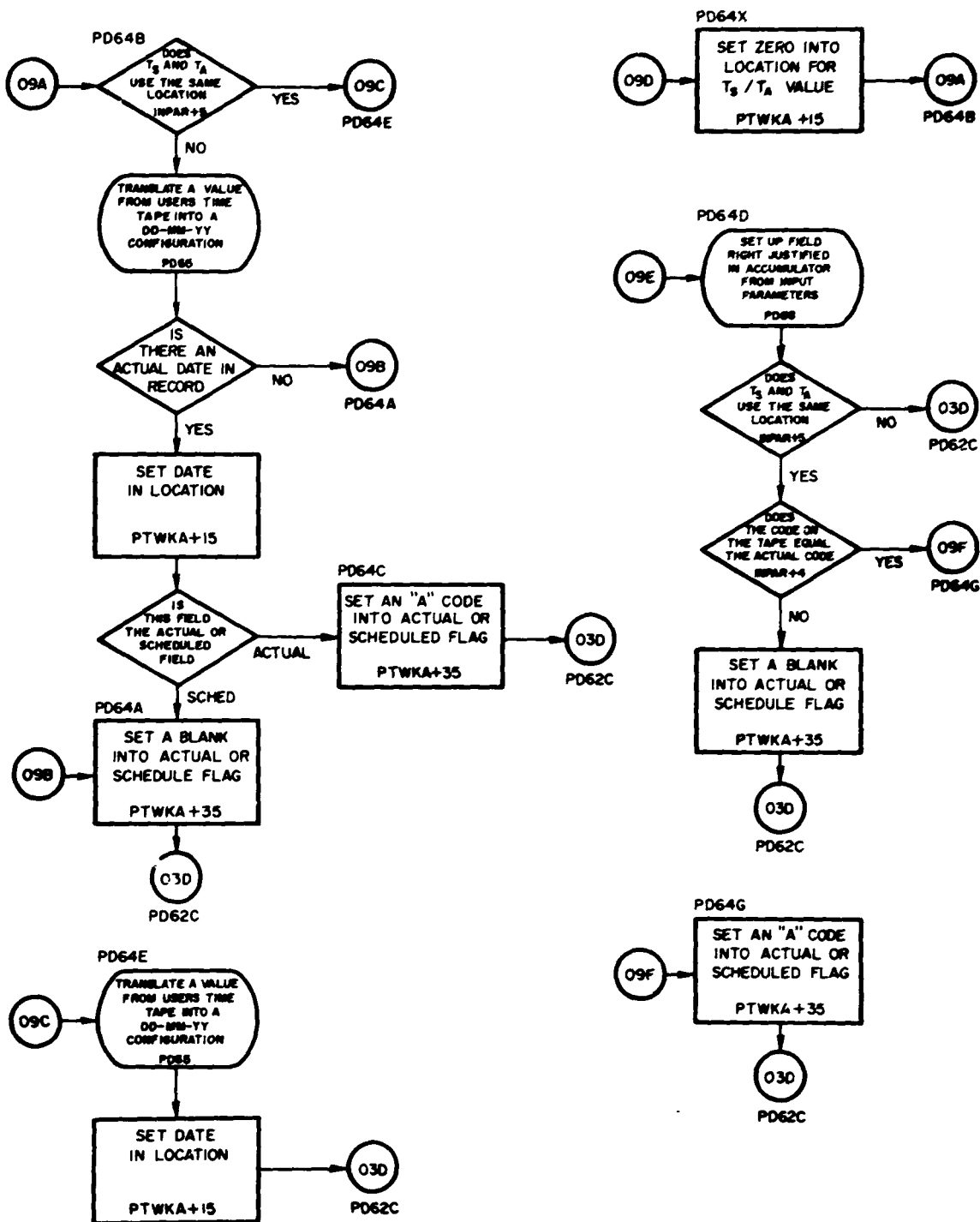


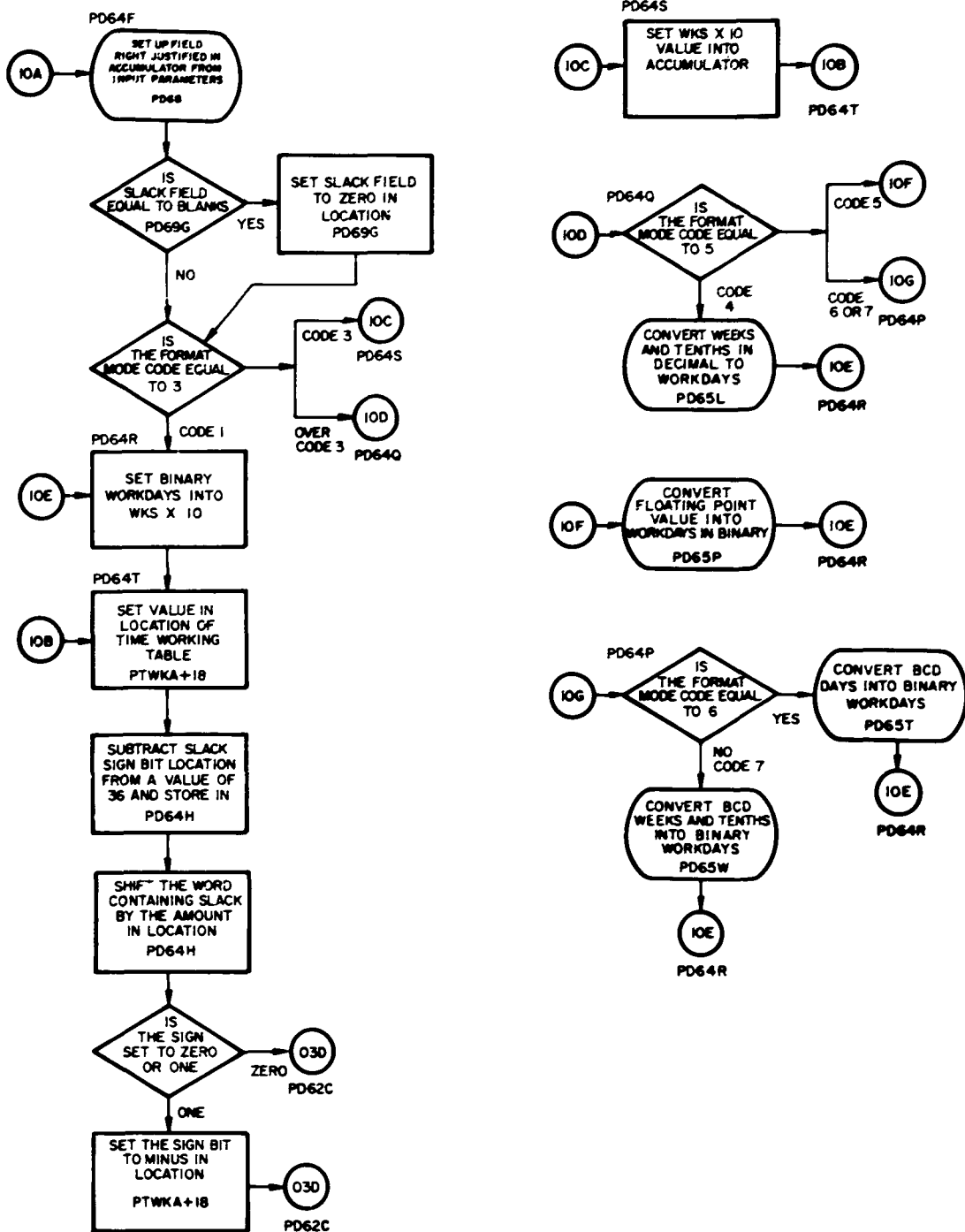
REGION PD60

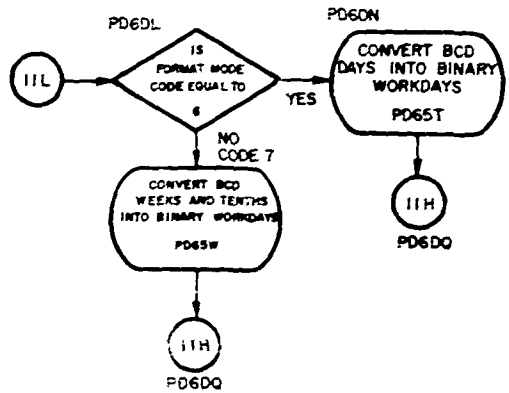
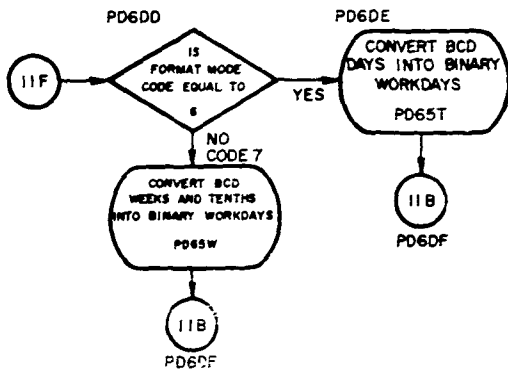
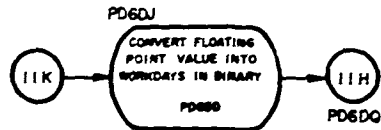
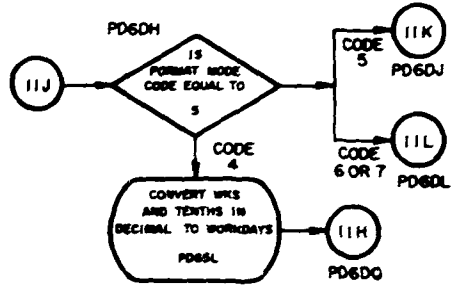
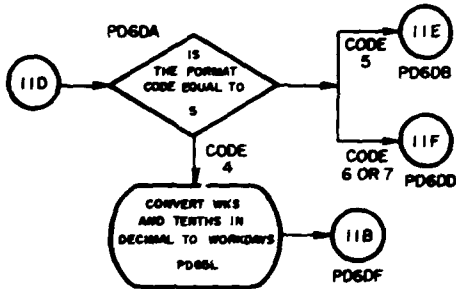
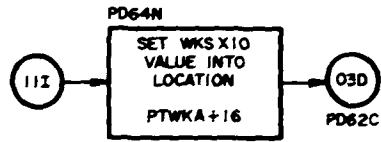
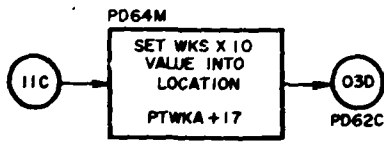
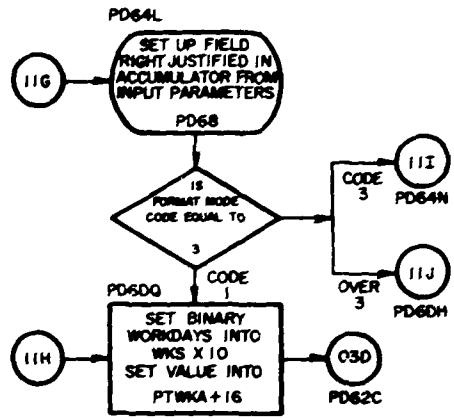
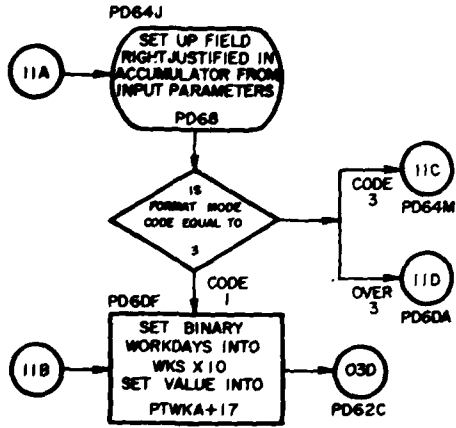


REGION PD60









Region PD65

EXPLANATION OF REGION:

This routine will translate the date fields from the **USERS TIME TAPE** such as S_E , S_L , T_E , T_L , T_A , and T_S into a **DD-MM-YY** configuration for the **PTWKA** block.

CALLING SEQUENCE:

L **TSX PD65, 4**

L + 1 **Normal return**

INPUT:

USERS TIME TAPE

INPAR parameter table

OUTPUT:

In the accumulator will be the date in a **DD-MM-YY** configuration to be set into **PTWKA**.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

PD68

PD66

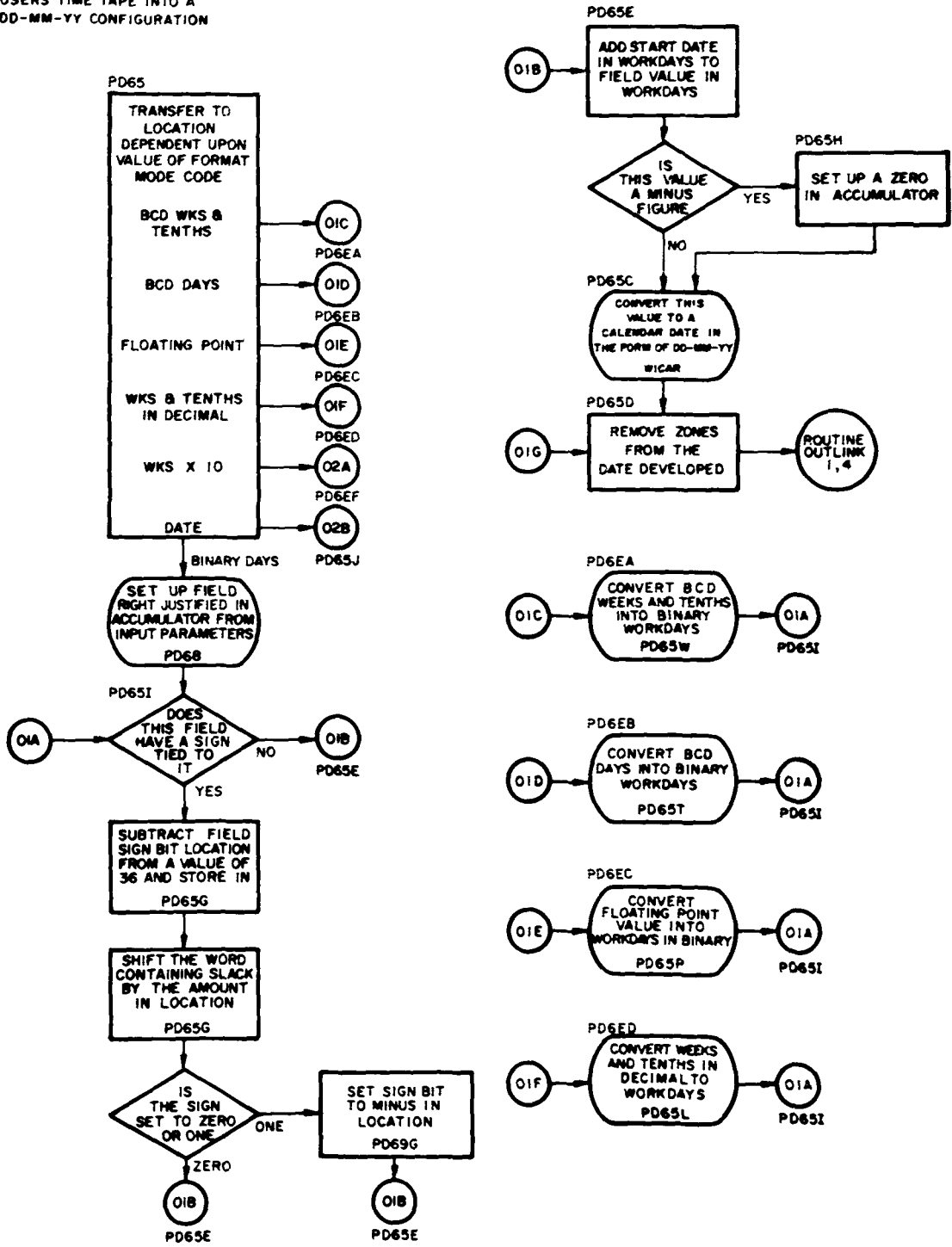
WICAR

EXPLANATION OF CALLING SEQUENCE:

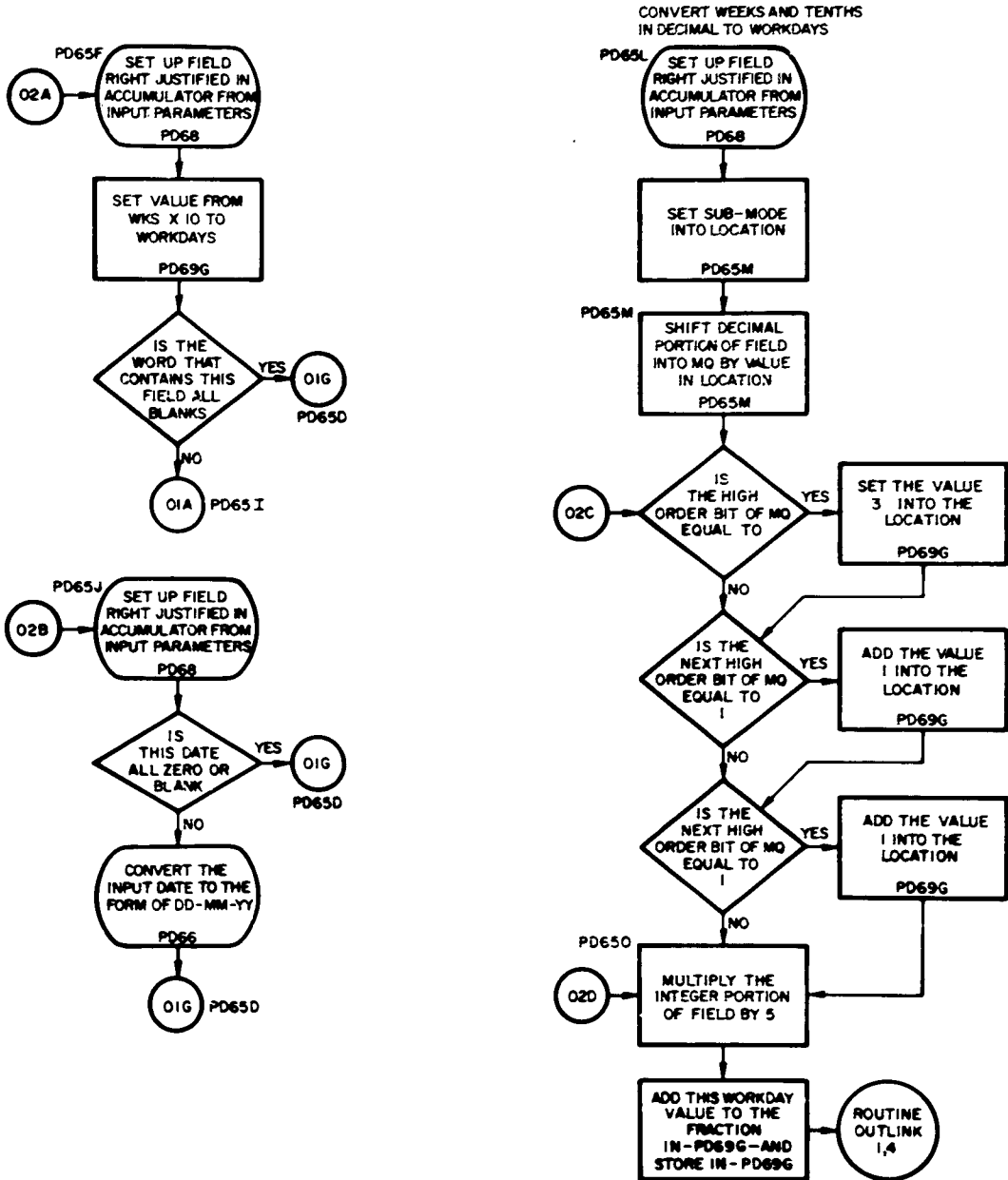
Not applicable.

REGION PD65

TRANSLATE A VALUE FROM
USERS TIME TAPE INTO A
DD-MM-YY CONFIGURATION

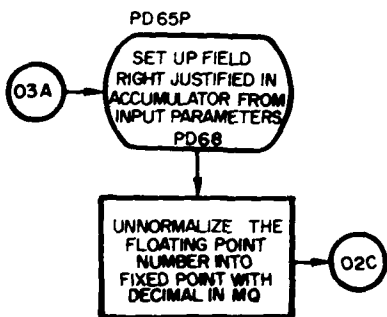


REGION-PD68

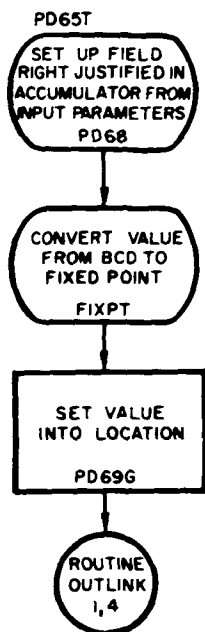


REGION PD66

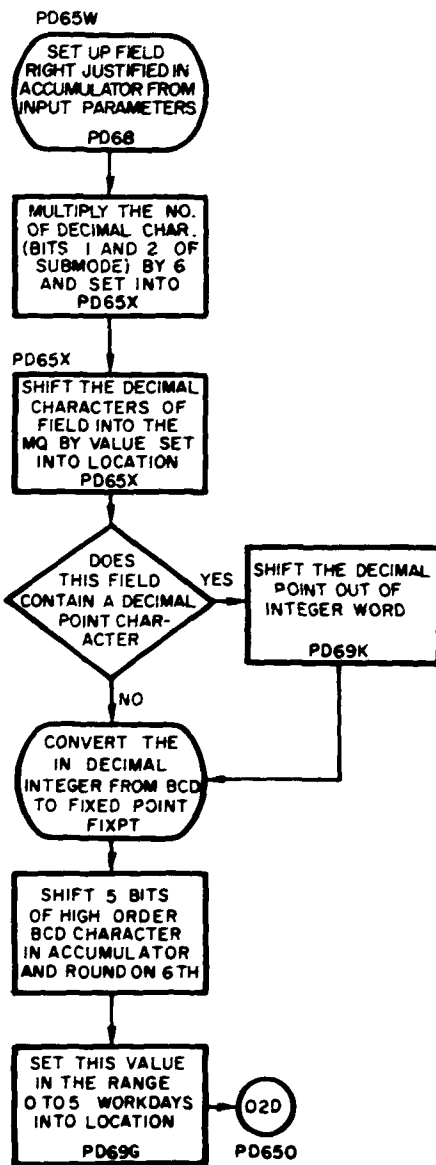
CONVERT FLOATING POINT
IN WEEKS AND DECIMAL
TENTHS TO WORKDAYS



CONVERT BCD DAYS
INTO BINARY WORKDAYS



CONVERT BCD WEEKS
AND TENTHS INTO
BINARY WORKDAYS



Region PD66

EXPLANATION OF REGION:

This routine will convert a date to a DD-MM-YY mode if the date is a calendar date, but is set up in a different configuration.

CALLING SEQUENCE:

L TSX PD66, 4

L + 1 Normal return

INPUT:

Calendar date in location PD69G.

OUTPUT:

In the accumulator will be the date in a DD-MM-YY configuration to be set into PTWKA.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

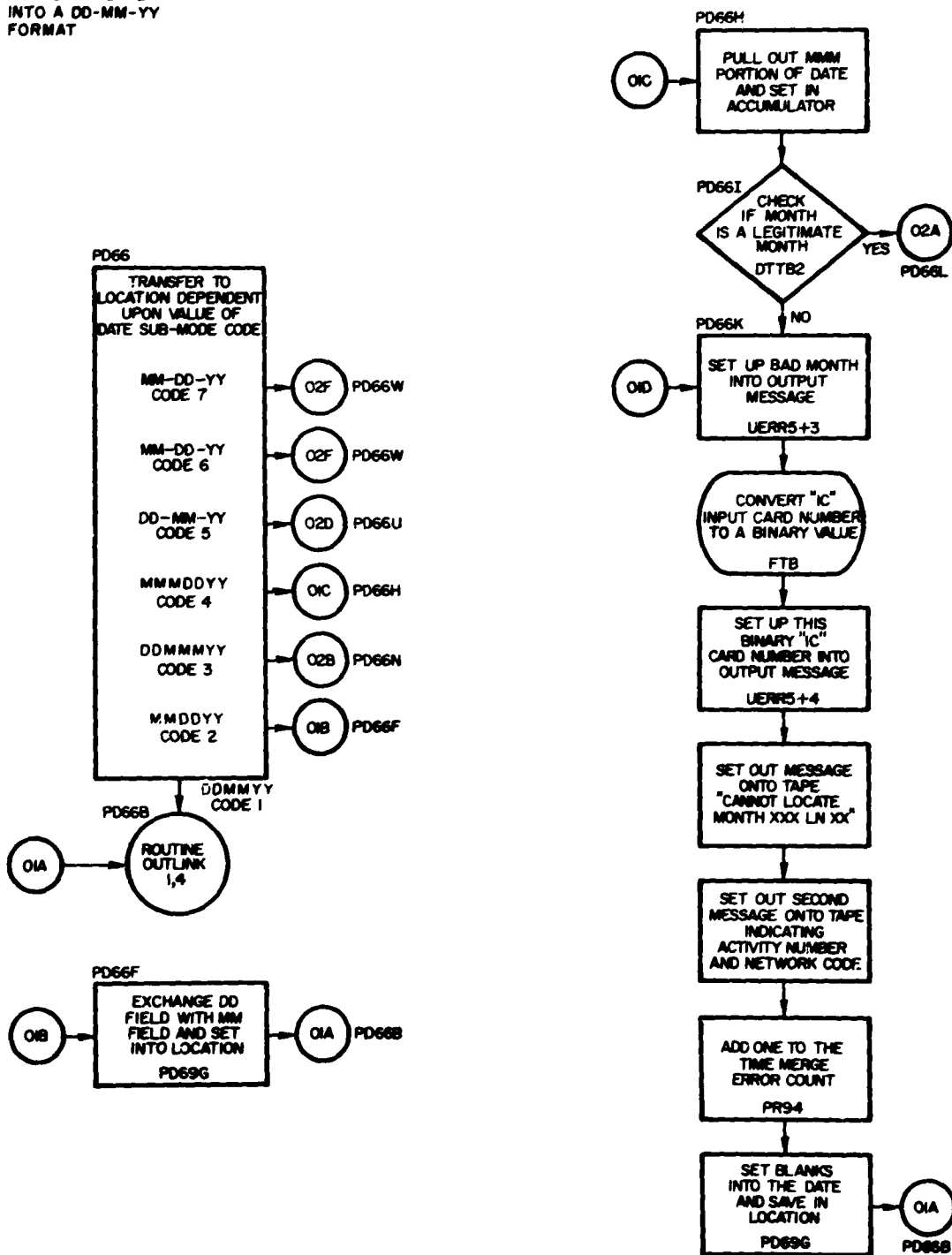
PD68

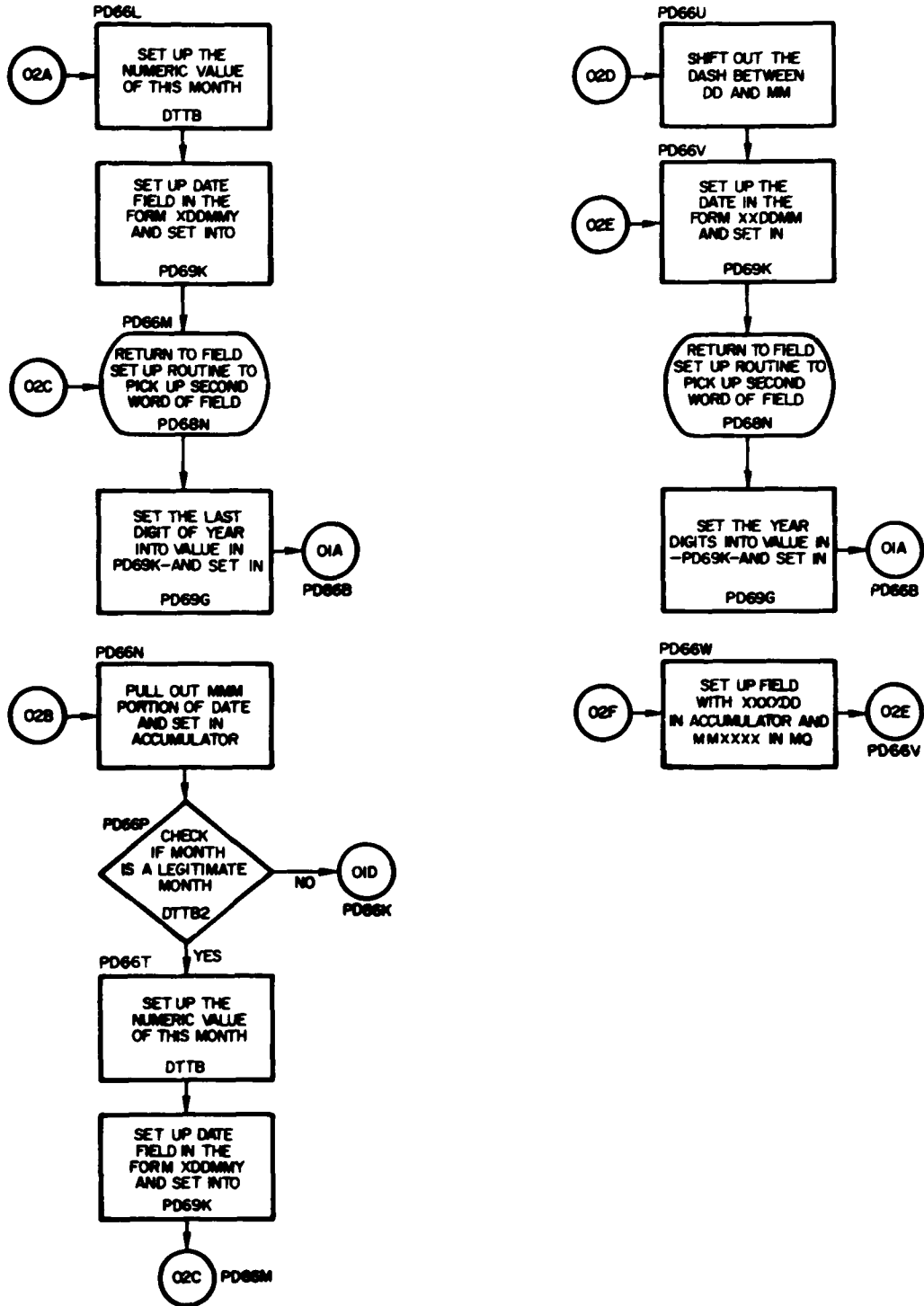
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION PD66

CONVERT A DATE
 INTO A DD-MM-YY
 FORMAT





Region PD67

EXPLANATION OF REGION:

This routine will set the alpha-numeric fields into PTWKA, which may range from 1 character to 9 words or 54 characters.

CALLING SEQUENCE:

L TSX PD67, 4

L + 1 Normal return

INPUT:

USERS TIME TAPE and INPAR parameter table.

The following locations will be modified when routine is used:

PD67D - number of characters in field

PD67H - location in PTWKA where this field is to be started.

OUTPUT:

The selected time information field set up in the PTWKA block.

STORAGE USED:

Not applicable.

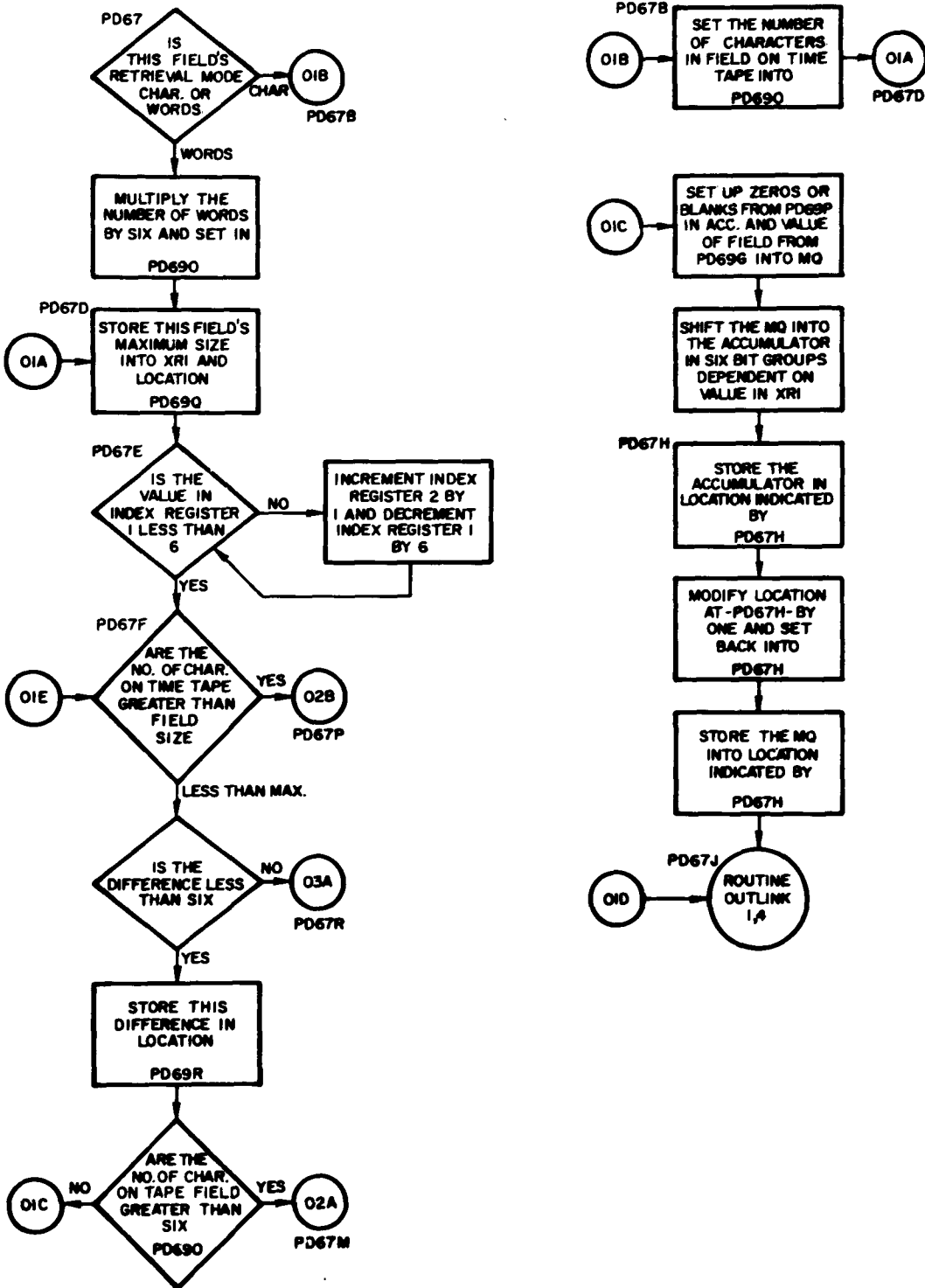
SUBREGIONS AND SUBROUTINES USED:

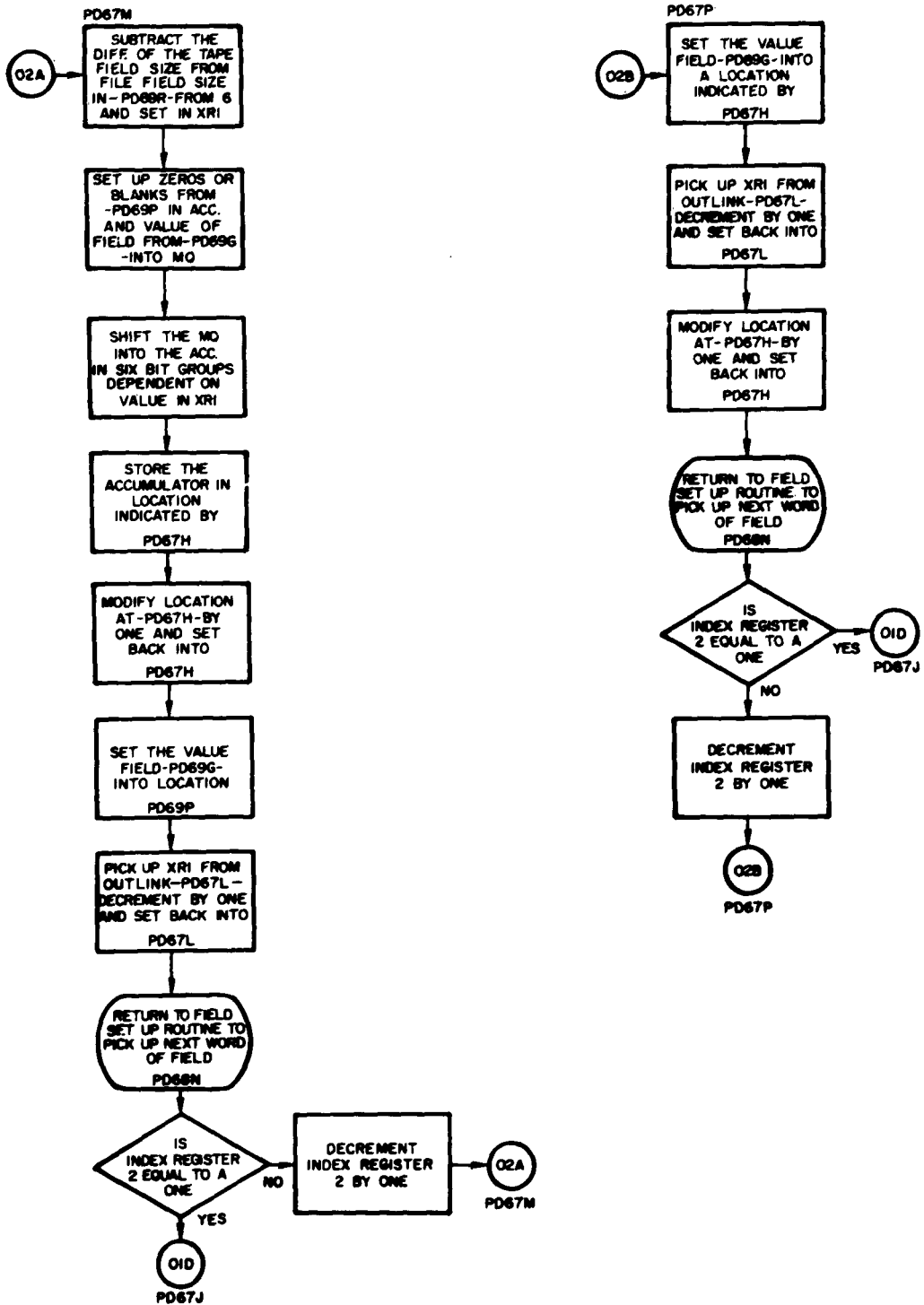
Not applicable.

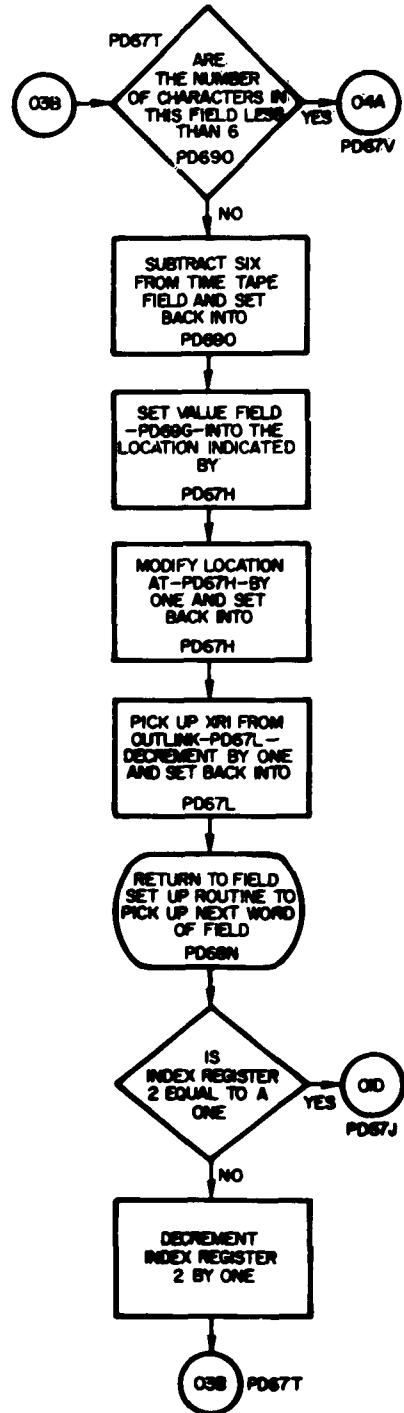
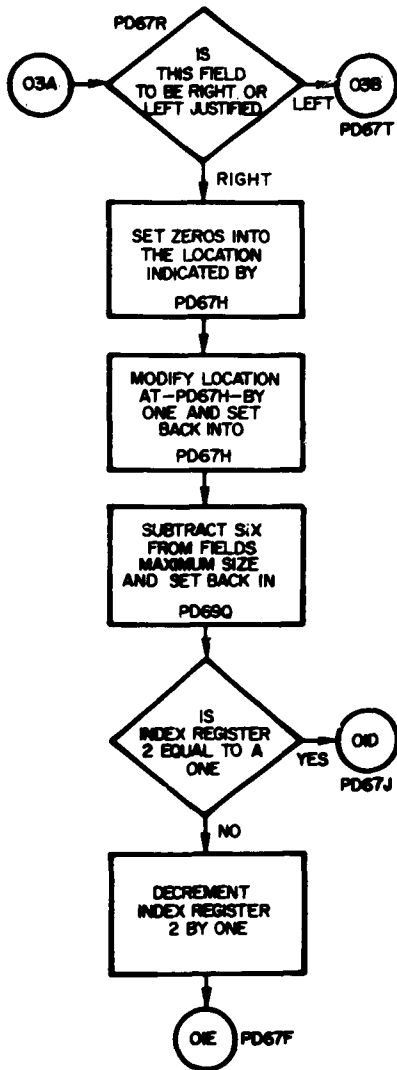
EXPLANATION OF CALLING SEQUENCE:

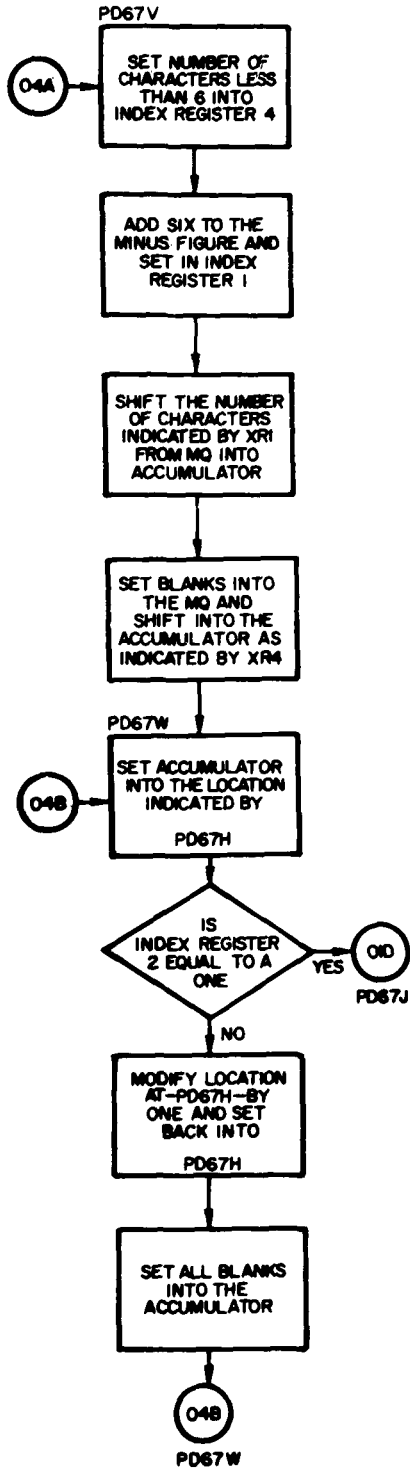
Not applicable.

SET ALPHA NUMERIC FIELDS INTO TIME WORKING AREA (PTWKA)









Region PD68

EXPLANATION OF REGION:

This routine will pick up the data from a location in core that contains the USERS TIME TAPE information and will set it into a computer word PD69G for further processing.

CALLING SEQUENCE:

L TSX PD68, 4
L + 1 Normal return

INPUT:

The USERS TIME TAPE and INPAR table.

The following locations will be modified according to the information in the field description blocks:

PD68B - the word location in the record that the first part of this field is located.

PD68D - the word location, if any, that the next part of field is located.

PD68F - the shifting necessary to get a full word of field.

PD68H - the masking necessary to set up this field.

PD68J - the blanks necessary to make this field usable.

OUTPUT:

The usable field located in PD69G.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

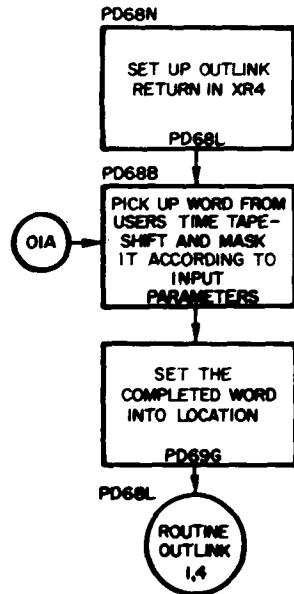
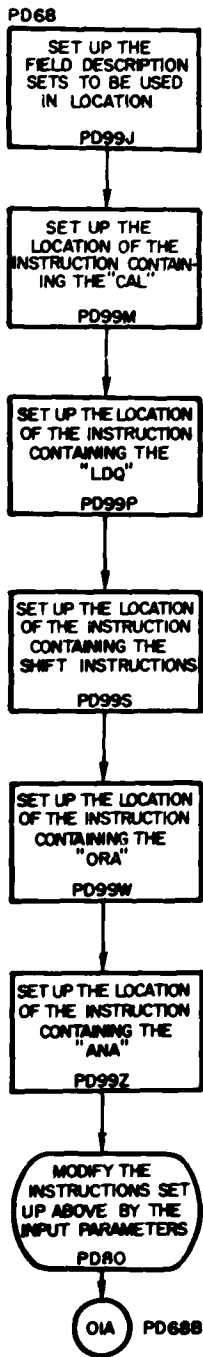
PD80

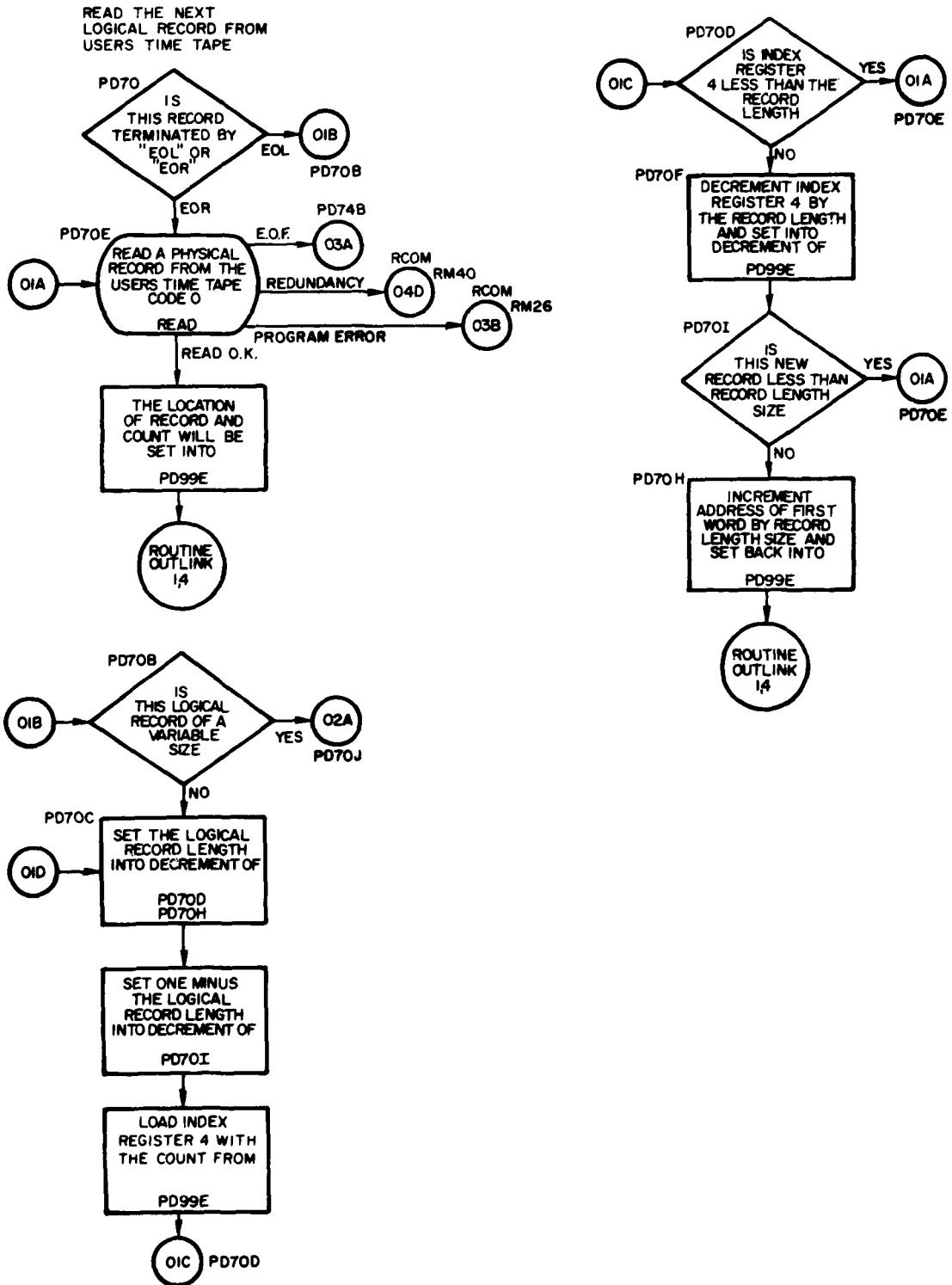
EXPLANATION OF CALLING SEQUENCE:

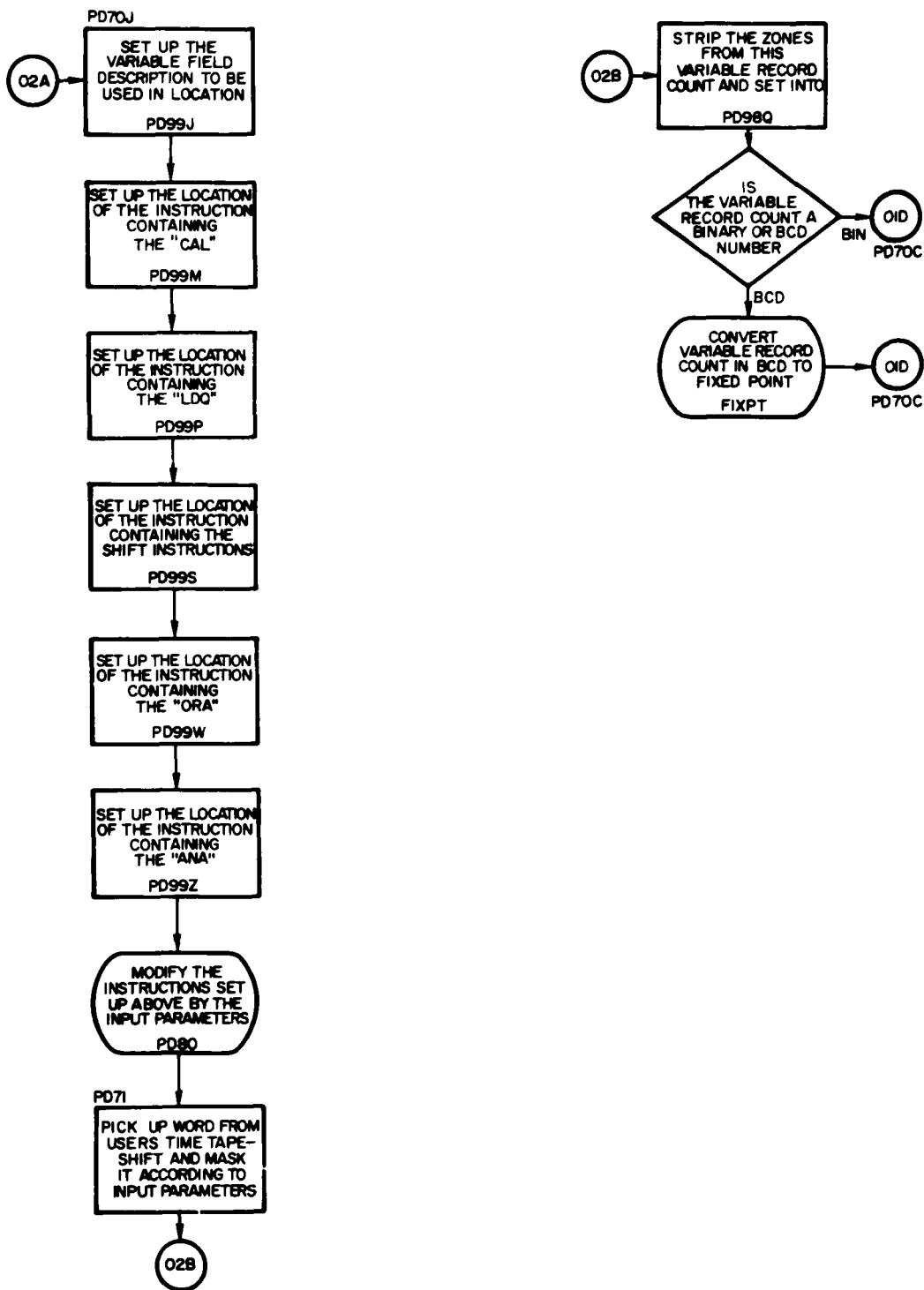
Not applicable.

SET UP FIELDS FROM INPUT PARAMETERS

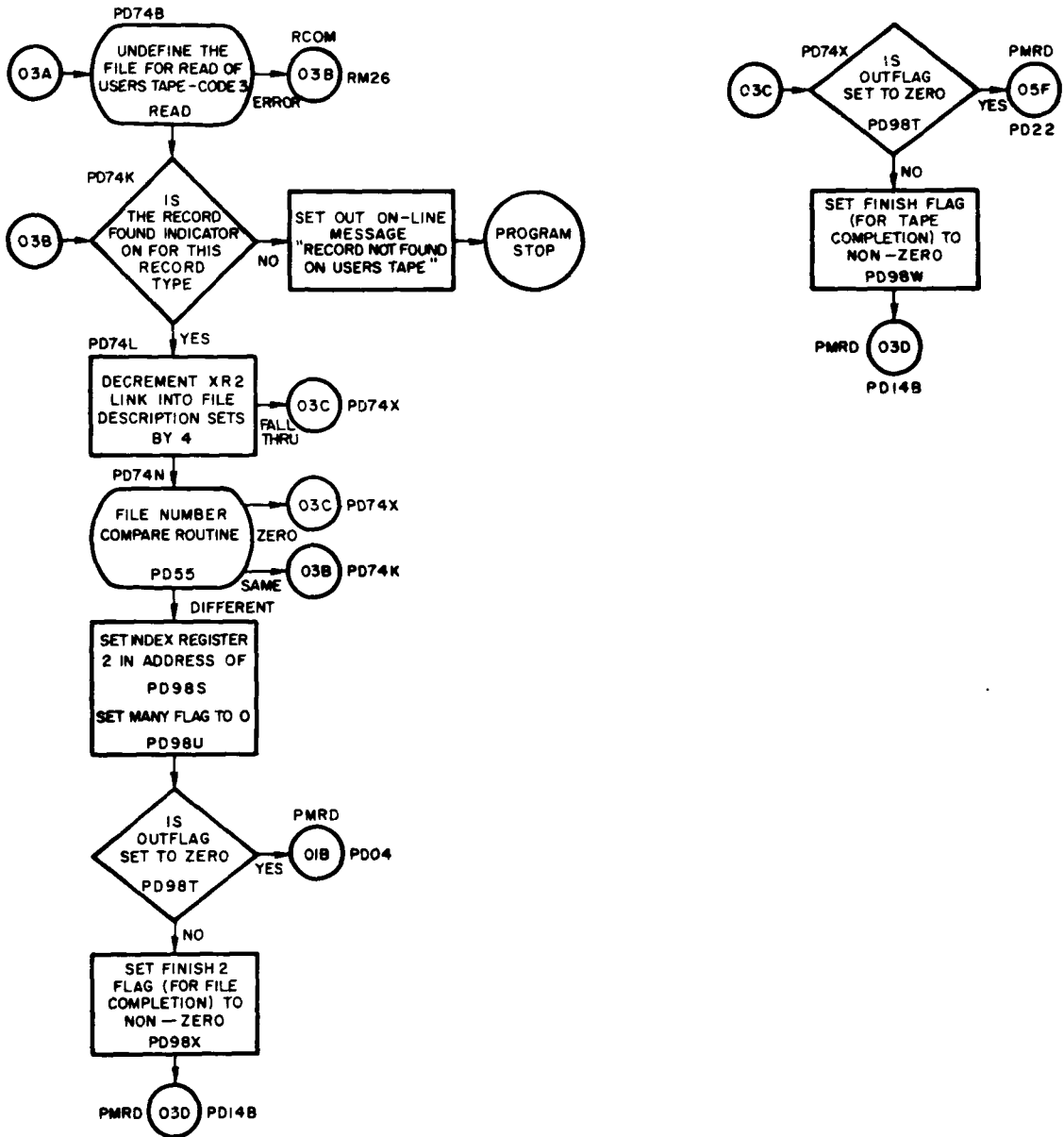
SET UP A SECOND OR ADDITIONAL FIELD FROM INPUT PARAMETERS







REGION PD70



Region PD75

EXPLANATION OF REGION:

This routine will develop the ID record from the USERS TIME TAPE and compare it with the ID records in the file description blocks of the INPAR table.

CALLING SEQUENCE:

L TSX PD75, 4
L + 1 Record ID not found return
L + 2 Record ID found return

INPUT:

The USERS TIME TAPE and INPAR table

The following locations will be modified according to the information in the field description block to develop the ID for each USERS TIME TAPE record.

PD76 - the word location in the record that the first part of the ID is located.
PD77 - the word location, if any, that the next part of field is located.
PD78 - the shifting necessary to get a full word of field.
PD78A - the masking necessary to set up this field.
PD79 - the blanks necessary to make this field usable.

OUTPUT:

Not applicable.

STORAGE USED:

Not applicable.

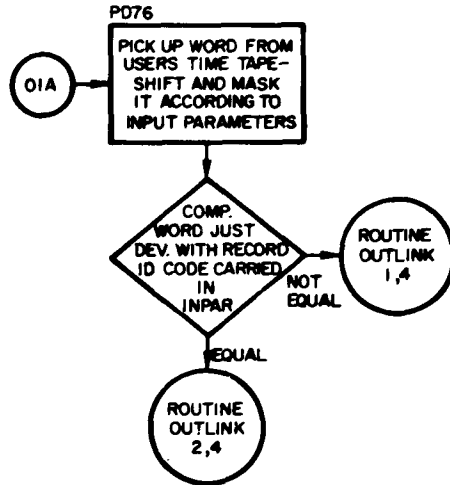
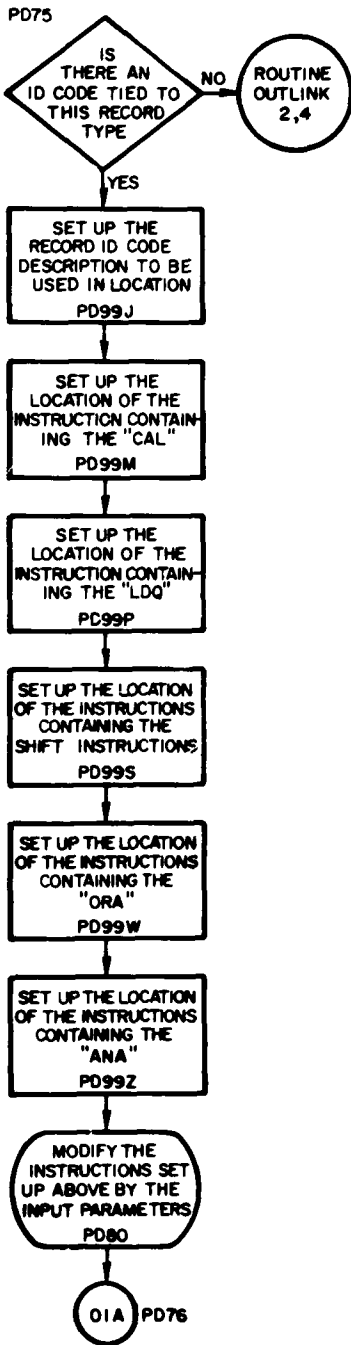
SUBREGIONS AND SUBROUTINES USED:

PD80

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

CHECK THE ID CODE OF THE RECORDS



Region PD80

EXPLANATION OF REGION:

This routine will set up the parameters used to read the fields in PD68, PD70 and PD75 from the INPAR table.

CALLING SEQUENCE:

L TSX PD80, 4
L + 1 Normal return

INPUT:

INPAR parameter table

OUTPUT:

Modify fields in PD68, PD70, and PD75.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

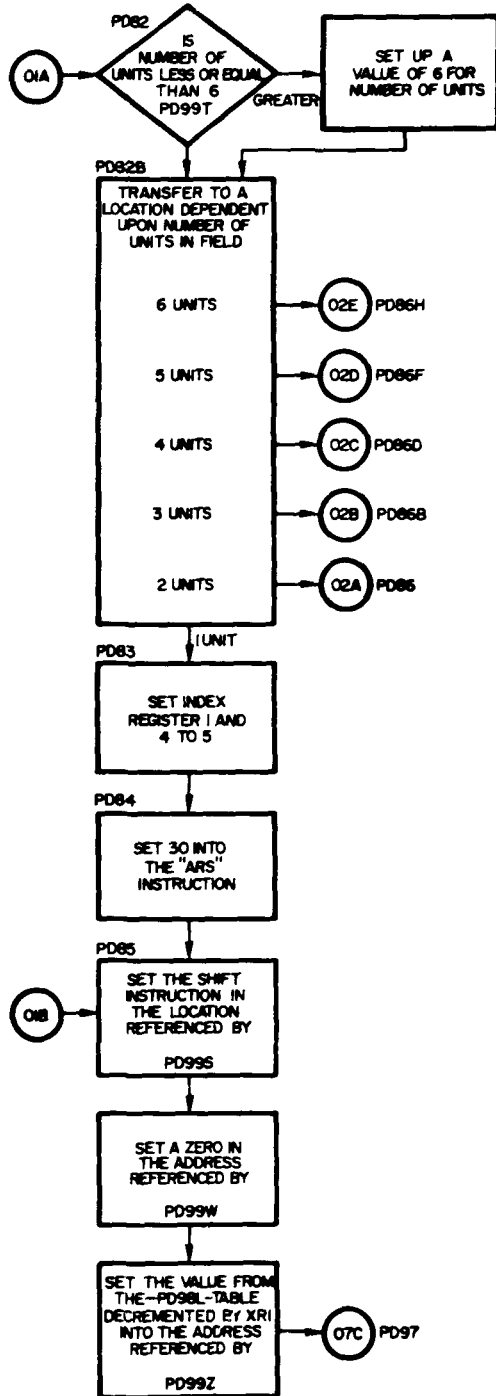
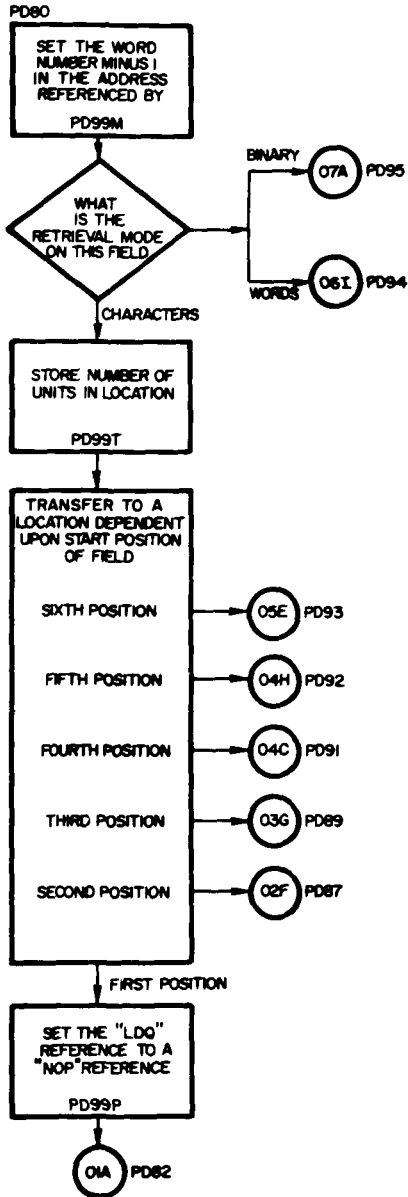
Not applicable.

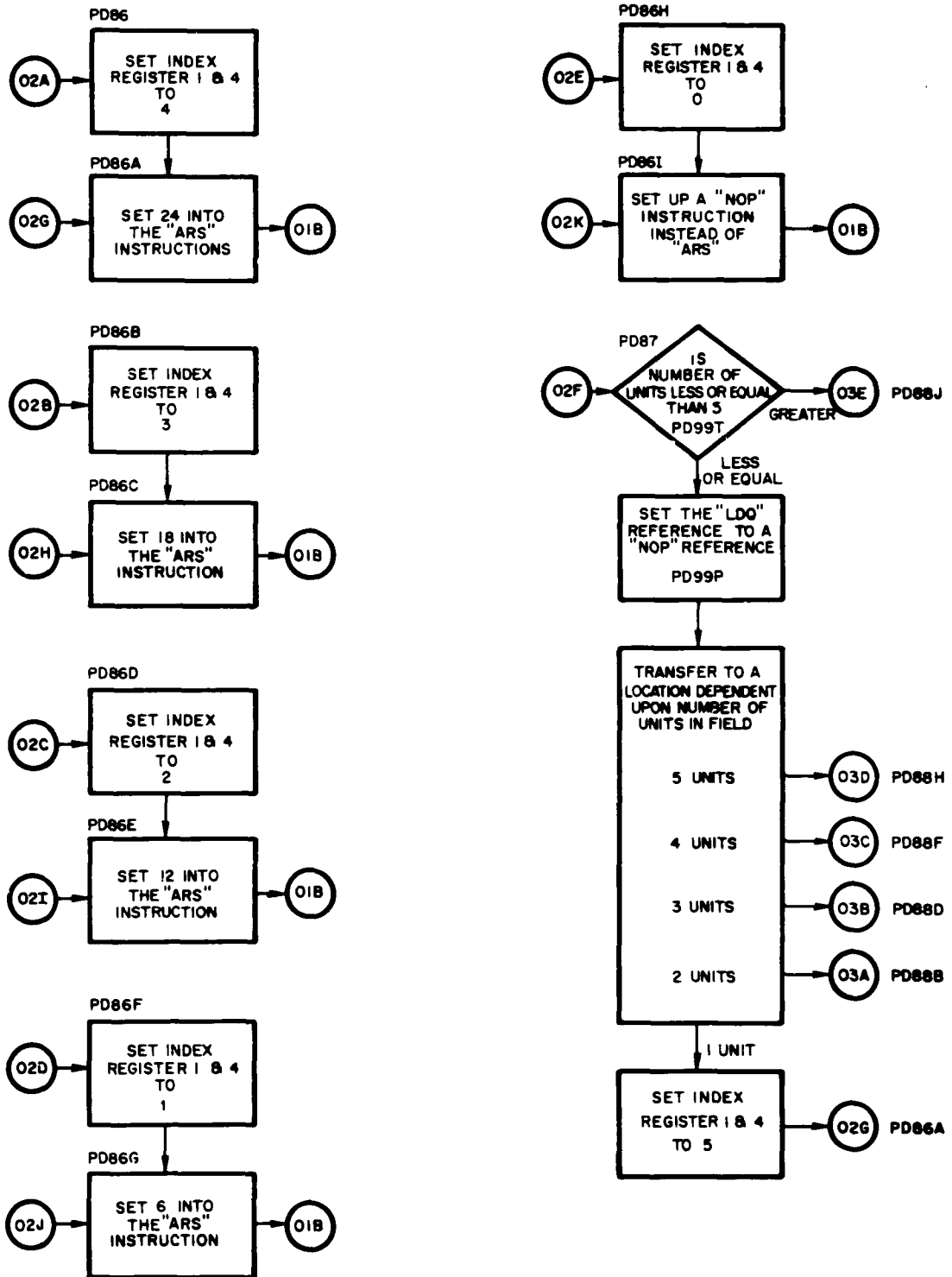
EXPLANATION OF CALLING SEQUENCE:

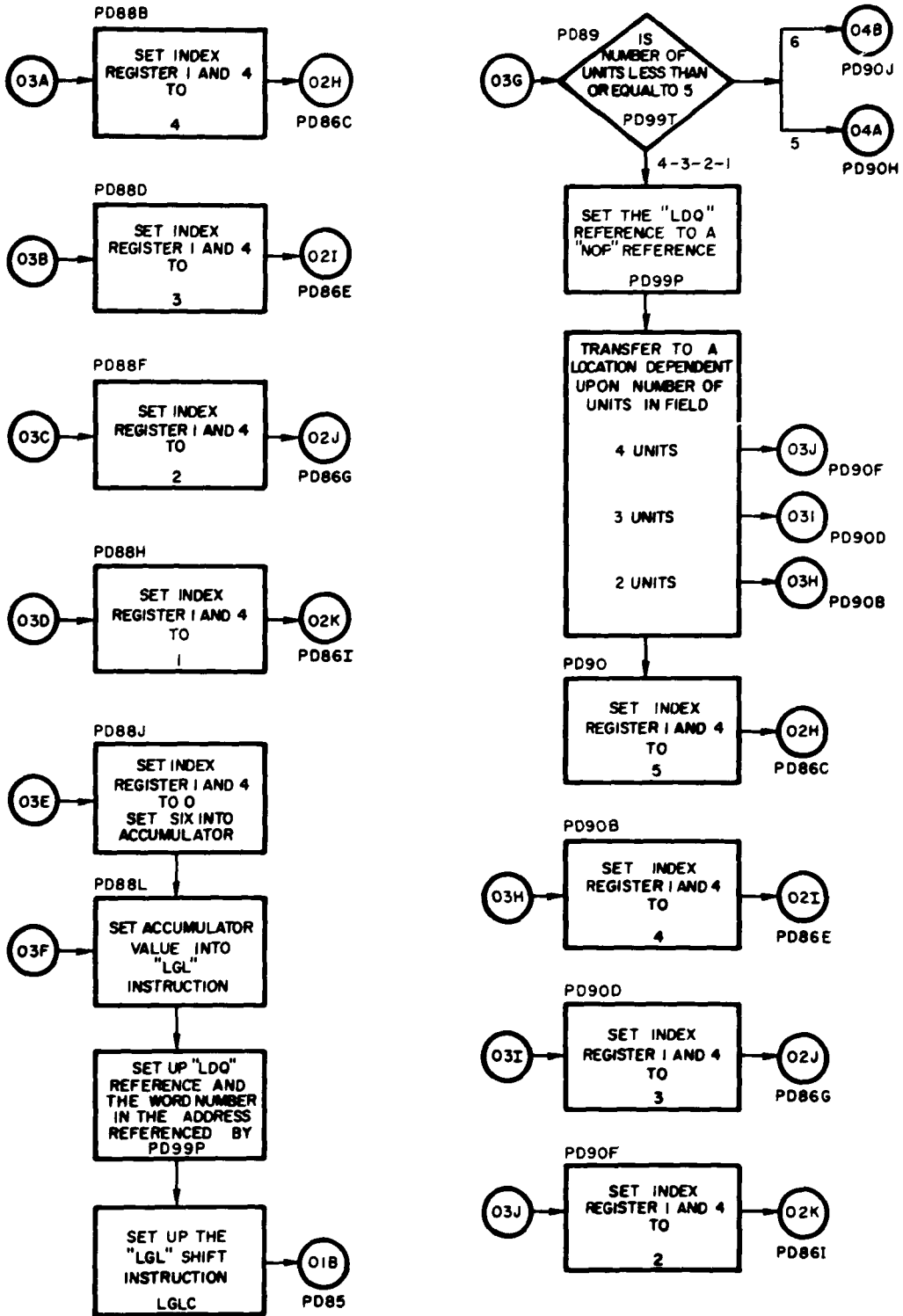
Not applicable.

REGION PD80

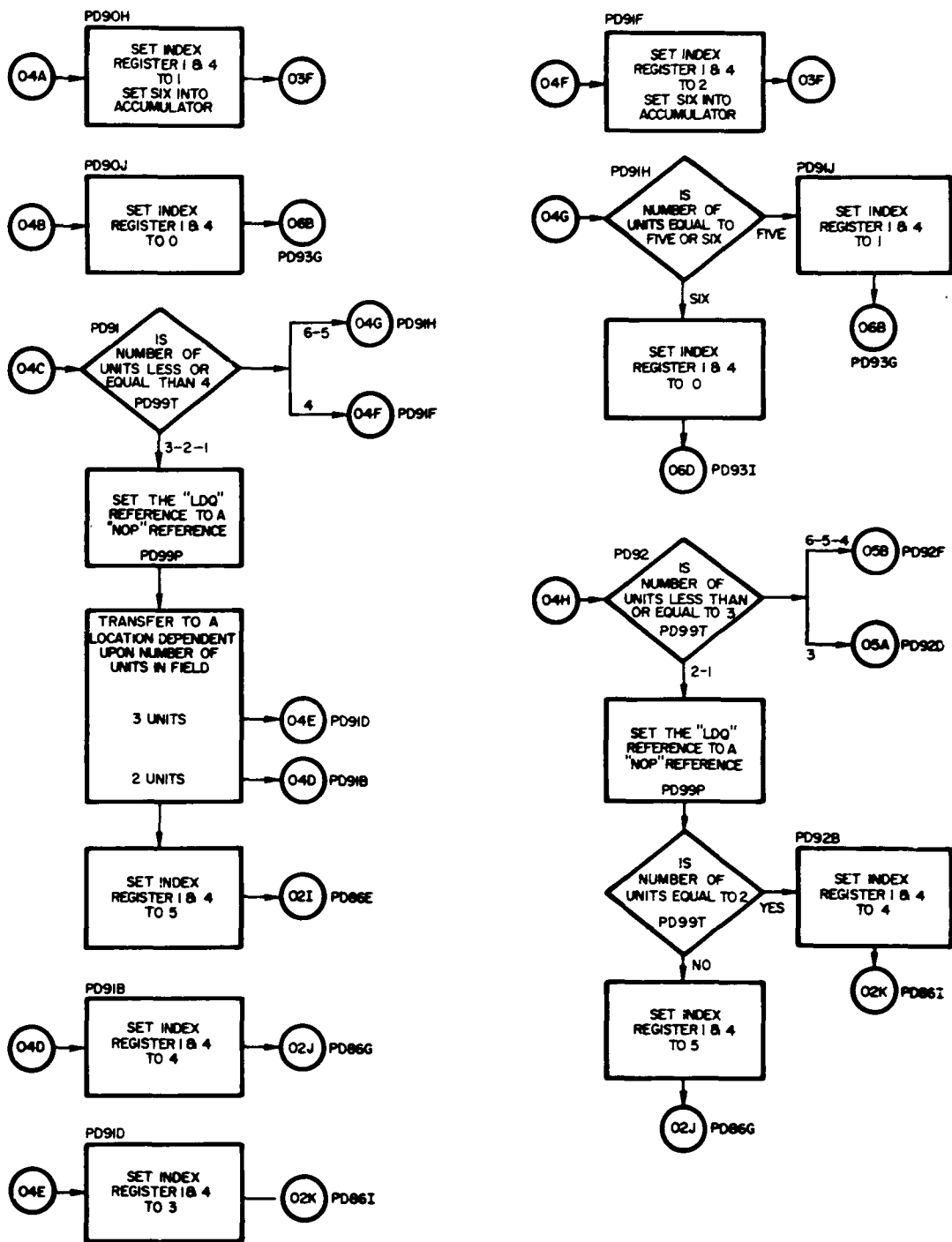
MODIFY THE INSTRUCTIONS TO READ A FIELD FROM USERS TIME TAPE



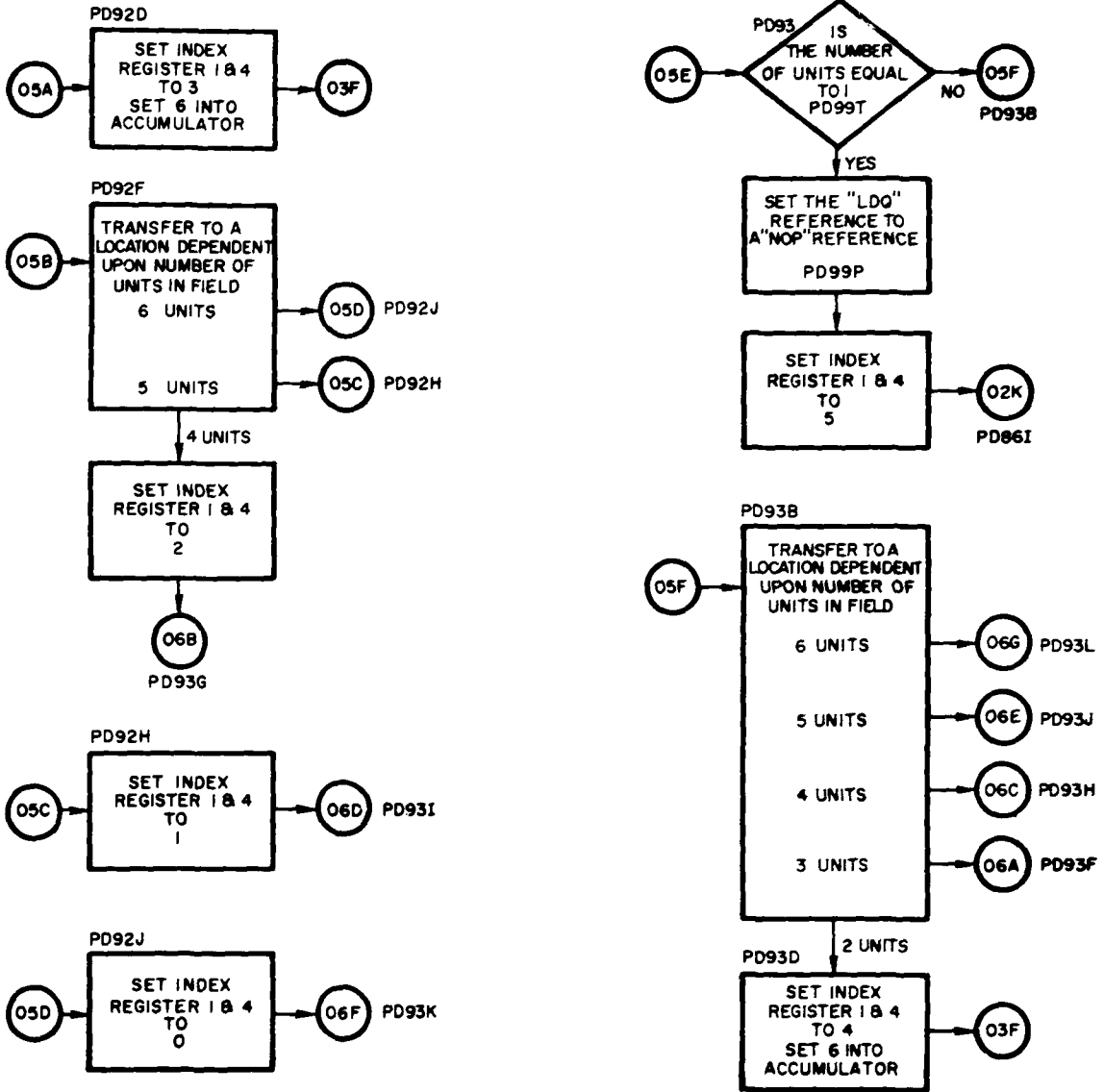


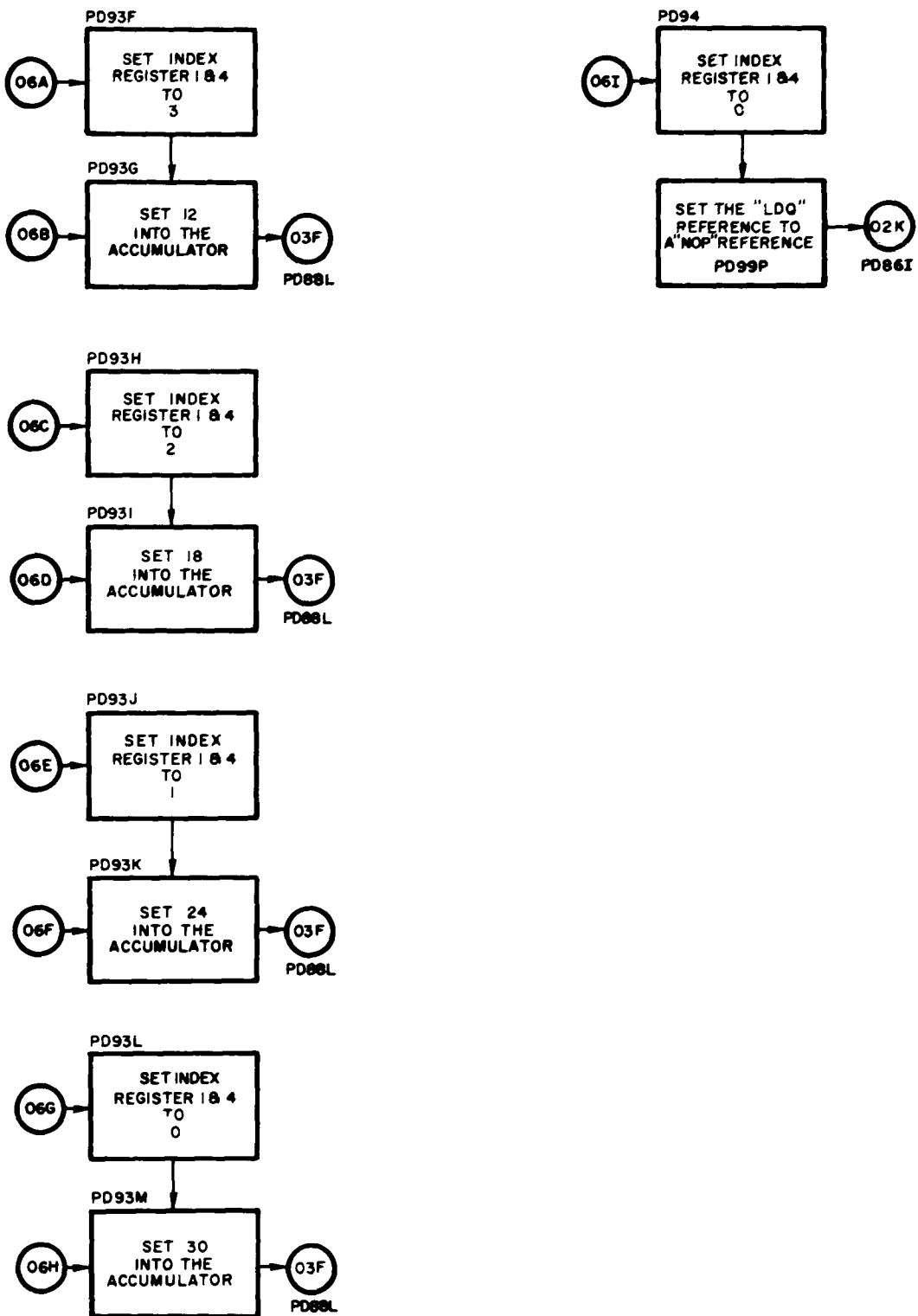


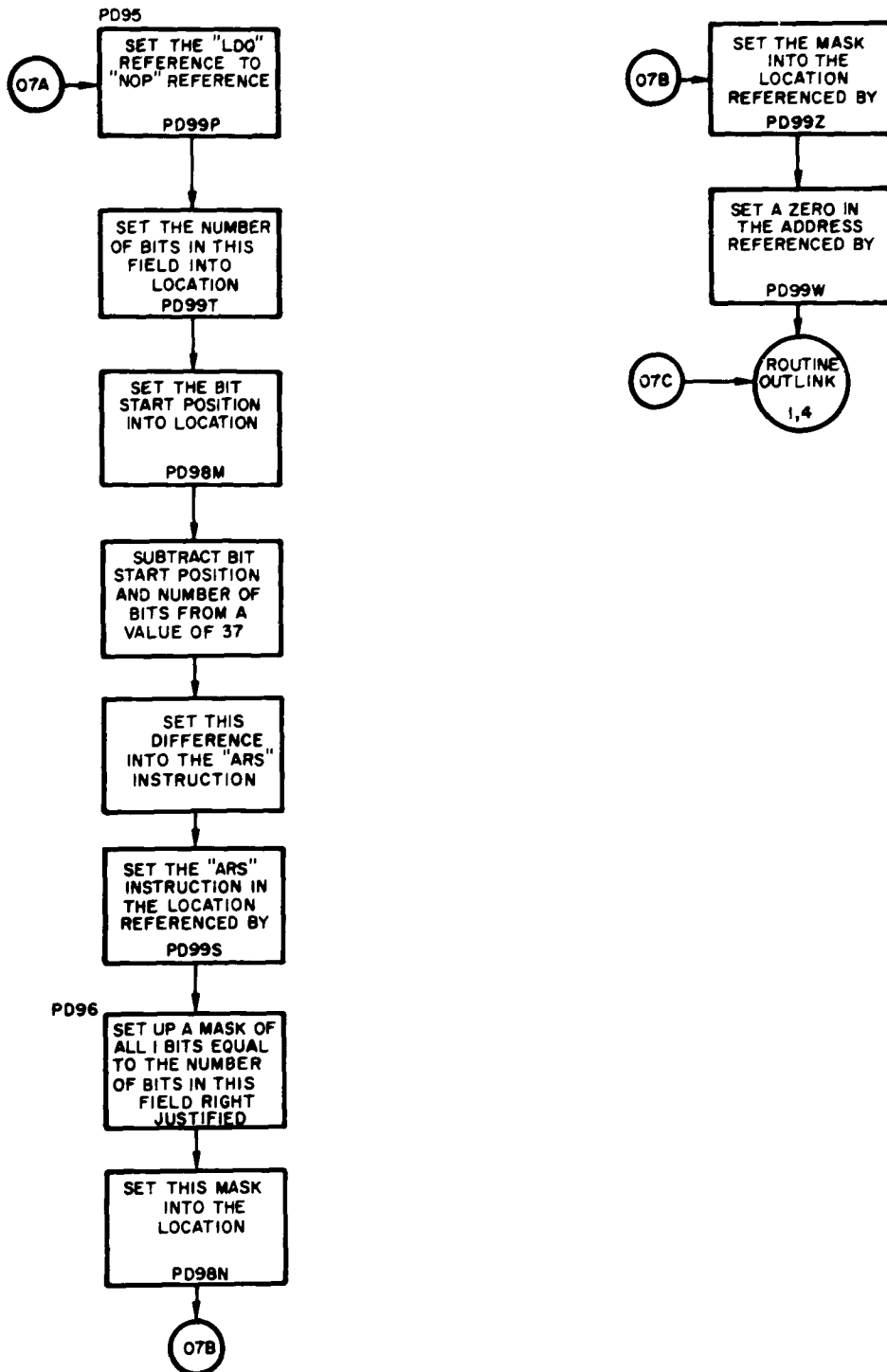
REGION PD80



REGION PD80







Time Merge Phase Tape and Record Layouts

The following layouts will show the tape and record configurations used in the time merge phase.

Figure III-F-6 shows the physical layout of the SECONDARY MASTER. It shows the label that is used with the input parameters and the 350-word input parameter block. Both the label and the input parameter block are ended with an end-of-record gap.

Following the input parameter block is the beginning of the activity-to-charge-number information. This area is headed by a two-record label. The first will indicate the type of information to follow, the date created, and the tape number if the tape is one of a series. The second label will contain the program name. After this label the data records will begin. These records are set in 600-word blocks for all blocks up to the last, which may be from 8 words to 600 words long. Each block will hold 75 logical 8-word records. These records are of two types, as described below.

- (a) Network Code Record Type, Which Contains a 1 as the First Character of the First Word (see Fig. III-F-7).

Following this type code are the network code, which is set up for a maximum of 6 characters, and the network description, which allows for 35 characters. This record type will precede all of the activity-to-charge-number data for that network. There will be only one of these cards for each network code that is used. The network description will be truncated by one character to fit into this record. The last word of this logical record contains the check sum generated by the writer routine.

- (b) Activity-to-Charge Number Record Type, Which Contains a 2 as the First Character of the First Word (see Fig. III-F-8).

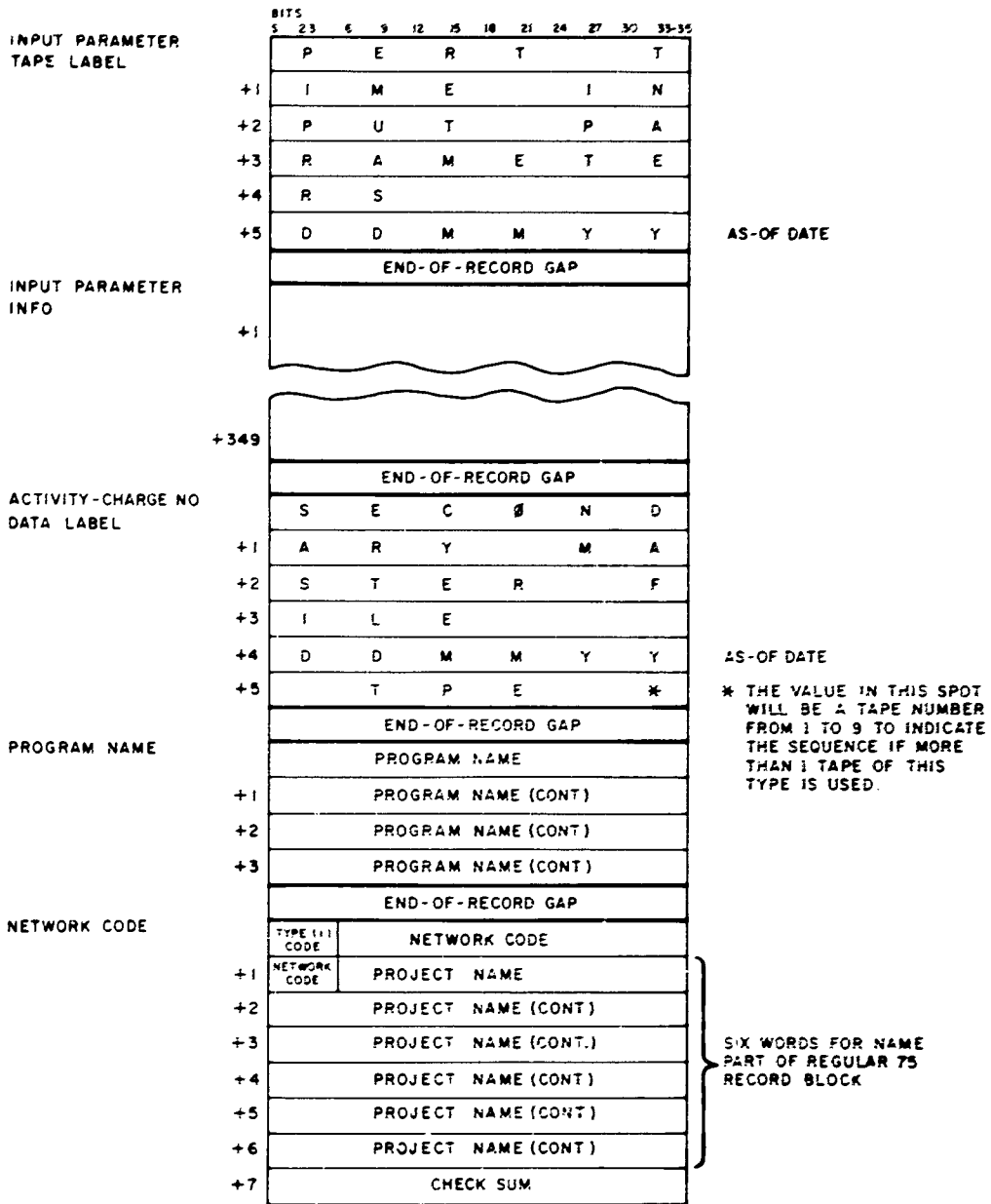
Following this type code, the second word contains a predecessor number of 9 characters, a successor number of 9 characters, and a charge number of 18 characters. These Type 2 records will follow the network code record, and there can be any number of them within a network code, blocked into 600 word records. The last word of this logical record contains the check sum generated by the writer routine.

The end-of-tape conditions that are developed on this tape are shown in Fig. III-F-6. At the end of that SECONDARY MASTER there will always be two end-of-file marks indicating completion of this data.

The 35-word record of selected time information that is sent out to the activity-to-charge-number sort prior to the update phase is shown in Fig. III-F-8. This record will show the fields that are carried as well as how each field is set up. These fields include the following:

- (1) Charge Number (18H). The charge number can contain up to 18 Hollerith characters.
- (2) Activity Flow Time (Weeks \times 10 at B35). The activity flow time is in weeks multiplied by 10 and is carried at a binary point of 35.
- (3) Expected Complete (DDMMYY). The expected complete time is carried as a calendar date by day, month, and year.
- (4) T_S-T_A Flag (Indicator). The first character of this word will contain a blank if it represents T_S or an "A" if it represents T_A.

When this record is developed in core during the time merge phase this record is actually a 39-word record, with the first four words containing the network code, predecessor number, and successor number for comparing operations. The balance of the record is as shown in Fig. III-F-8.



CONTINUED



Fig III-F-6 Physical Layout of Secondary Master Tape

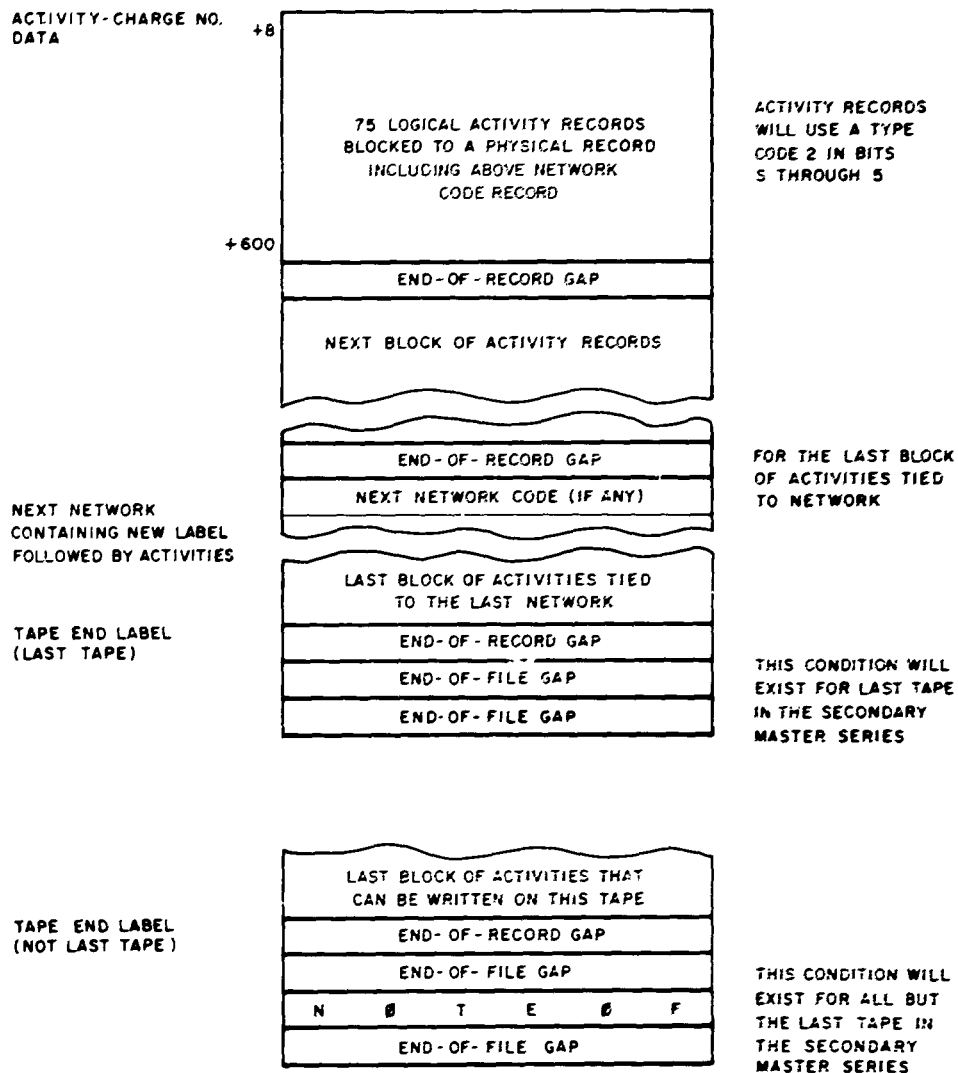


Fig. III-F-6 Physical Layout of Secondary Master Tape (Continued)

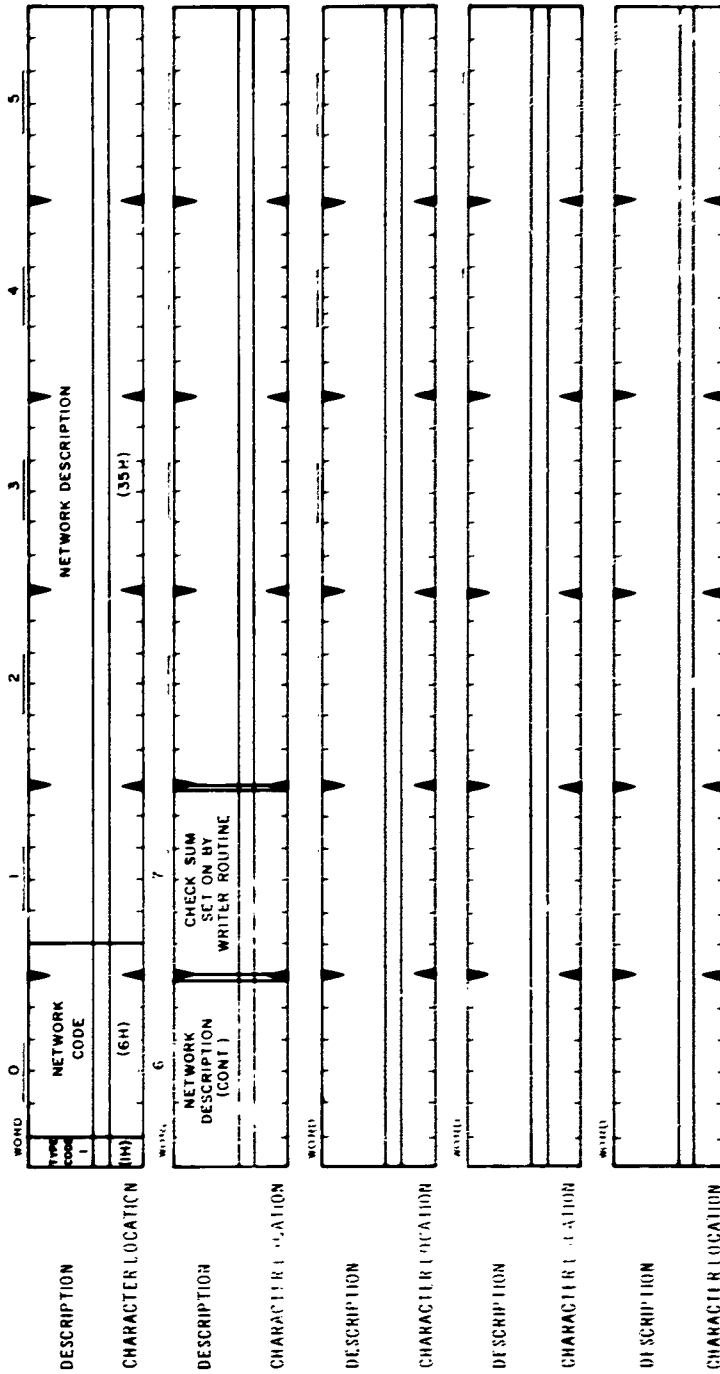
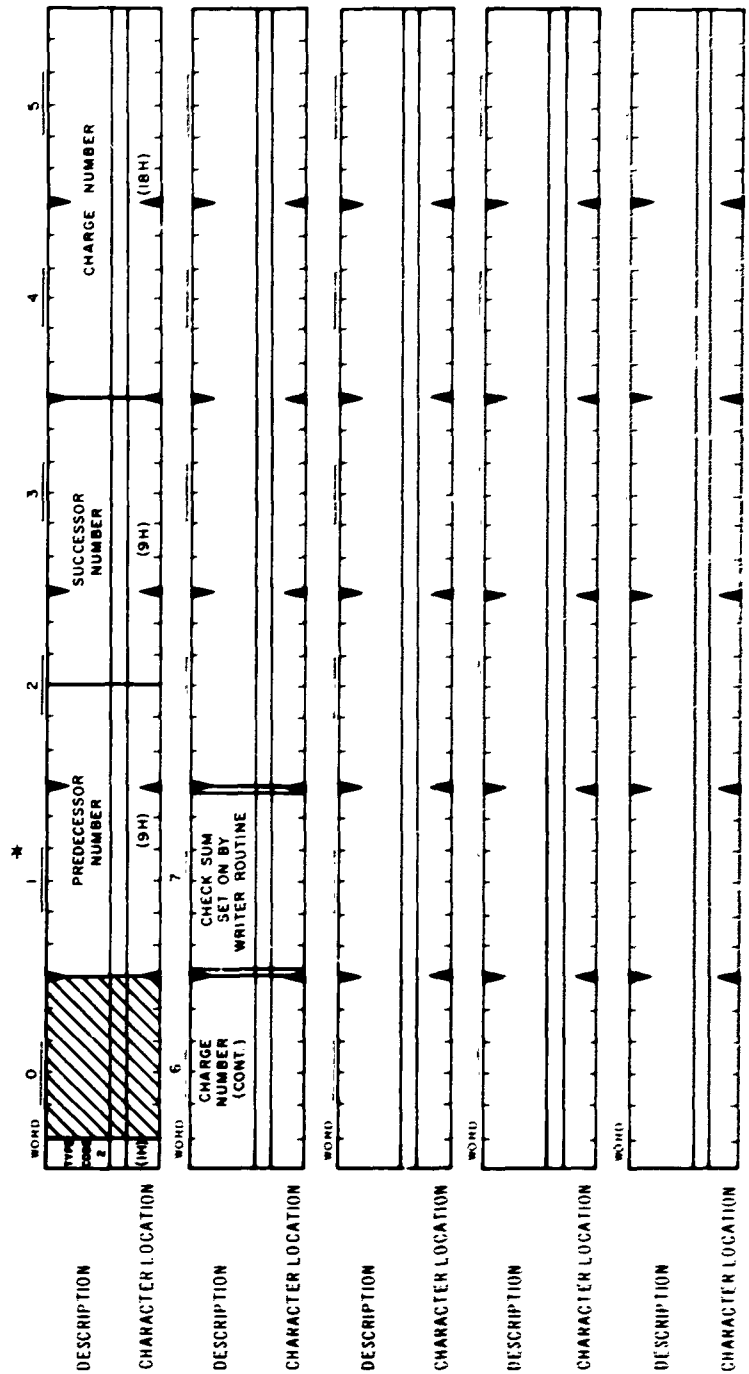


Fig. III-F-7 Secondary Master Network Code Logical Record



* ALWAYS PRED - SUCC SEQUENCE

Fig. III-F-8 Secondary Master Data Logical Record

DESCRIPTION	1	2	3	4	5
CHARACTER LOCATION	6	7	8	9	10
DESCRIPTION	11	12	13	14	15
CHARACTER LOCATION	16	17	18	19	20
DESCRIPTION	21	22	23	24	25
CHARACTER LOCATION	26	27	28	29	30
DESCRIPTION	31	32	33	34	35
CHARACTER LOCATION	36	37	38	39	40

WORD C	1	2	3	4	5
CHARGE NUMBER					
PREDECESSOR NUMBER			(9H)		
SUCCESSOR NUMBER					(9H)

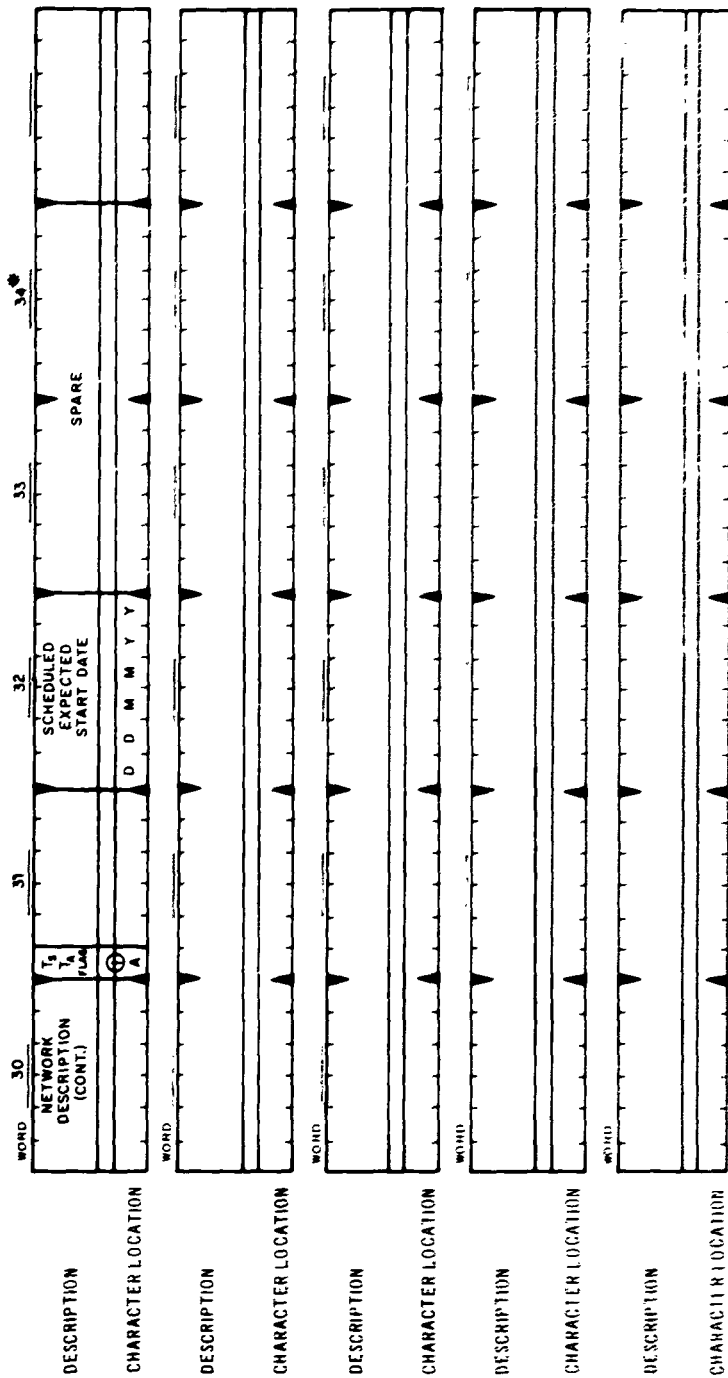
WORD G	6	7	8	9	10	11
SUCCESSOR NUMBER (CONT)						
EXPECTED SCHED COMPLETE S_e						
LATEST ALLOWABLE SCHED. COMPLETION S_L						
LATEST ALLOWABLE COMPLETION T_L						
SCHEDULE/ACTUAL COMPLETE $(T_e - T_a)$						

WORD H	12	13	14	15	16	17
SCHEDULED ACTIVITY FLOW TIME T_s						
ACTIVITY FLOW TIME T_a						
SLACK						
ACTIVITY DESCRIPTION						

WORD I	18	19	20	21	22	23
WK * IO #R35						
WK * IO #R35						(54H)
ACTIVITY DESCRIPTION (CONT.)						

WORD J	24	25	26	27	28	29
NETWORK CODE						
NETWORK DESCRIPTION						
CHARACTER LOCATION						(96H)

Fig. III-F-9 PERT Time Record Developed from User's Time Input and Secondary Master



* IN CORE DURING TIME MERGE - A 39 WORD RECORD IS SET UP - THE 1ST 4 WORDS BEING NETWORK CODE - PREDECESSOR NO AND SUCCESSOR NO - THE BALANCE IS AS SHOWN

Fig. III-F-9 PERT Time Record Developed from User's Time Input and Secondary Master (Continued)

III-G PERT COST UPDATE PHASE

Cost Update General Description

The update phase can be considered to consist of two principal stages: (1) the creation or updating of the rate and skill tables and the initialization of the Update phase, and (2) the creation or updating of the master file and the transmission of data to the reporting phase. Figure III-G-1 diagrams the computer logic for this phase.

At the start of this phase an initialization procedure determines which sort tapes are now available for use and which indicators should be set up for this phase. These indicators will reflect the options and control indications from the control cards. The first record of the SORTED TIME TAPE, OLD PERT COST MASTER, and SORTED DATA TAPE will each be read into their respective buffers. If the program is being run under a "file establish" condition, an end-of-file indicator is set for the OLD PERT COST MASTER and no data will be expected from this tape. If the program is being run under a "no time tape" condition, an end-of-file indicator is set for the USERS TIME TAPE and time information will not be expected. If there have been no Type 7 cards read into the system, an end-of-file indicator is set for the SORTED DATA TAPE.

The rate table and skill table are developed at file establishment time and are carried on the PERT COST MASTER TAPE. These records are read in every cycle and can be updated by 4, 5, and 6 card inputs from the SORTED DATA TAPE.

During the master file creation and update phase a comparison of the charge (or summary) numbers is made between the OLD PERT COST MASTER FILE and the SORTED DATA TAPE (where both tapes are sorted in charge number order). Depending on the outcome of this comparison the program will transfer control to one of three routines:

- (1) OLD MASTER charge number is less than the Input Tape (SORTED DATA TAPE) charge number

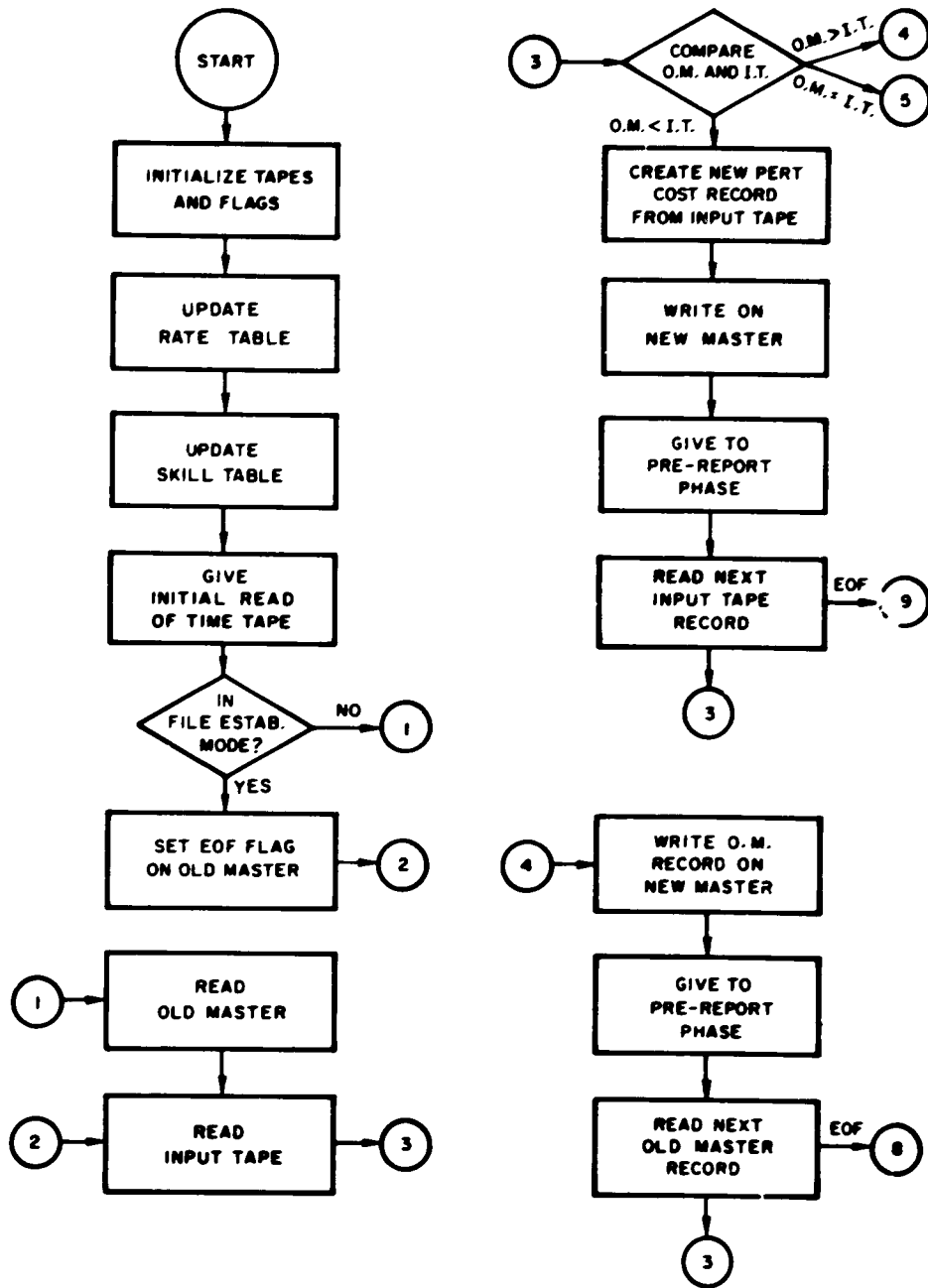


Fig. III-G-1 Flow Diagram of Update Phase

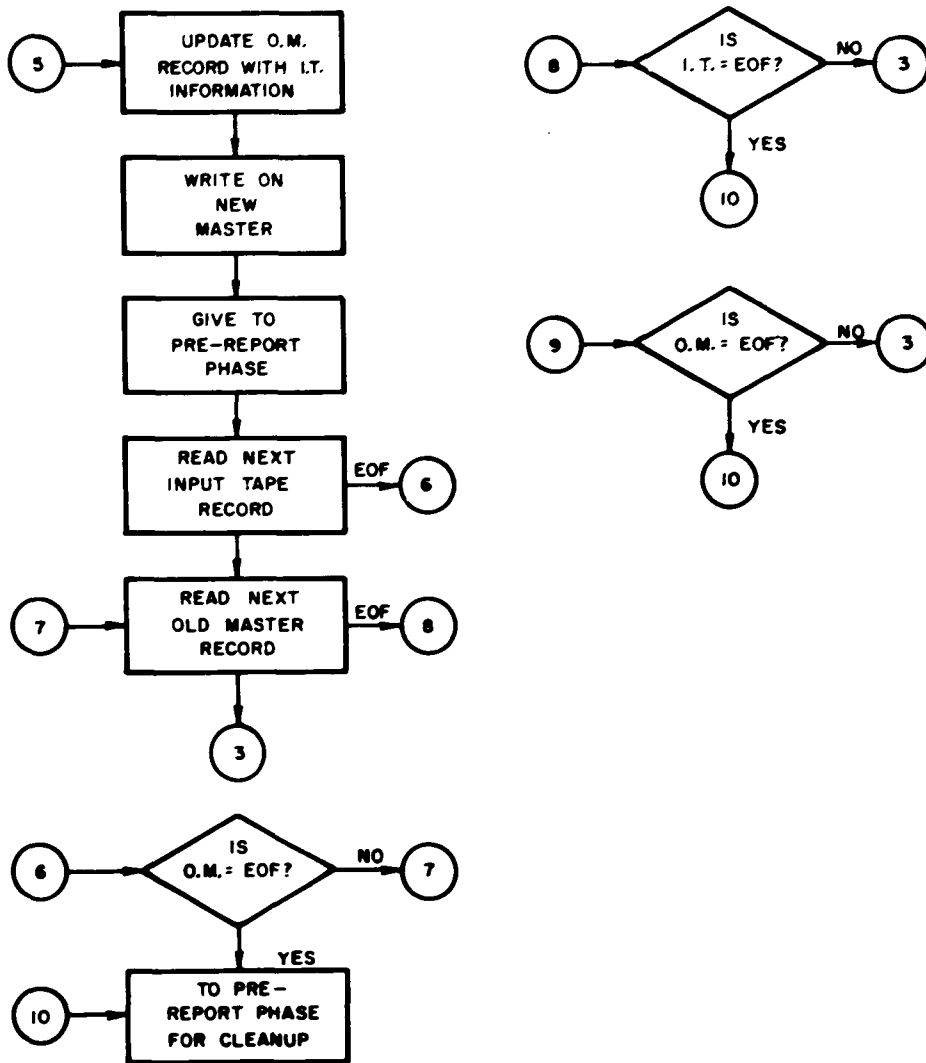


Fig. III-G-1. Flow Diagram of Update Phase (Continued)

- (2) OLD MASTER charge number is greater than Input Tape charge number
- (3) OLD MASTER charge number is equal to the Input Tape charge number

When the end-of-file indicator is set for either of these tapes, the charge number from that tape is set to all octal sevens (the greatest number possible).

For the condition when the OLD PERT COST MASTER TAPE is less than the input, only the information from the OLD MASTER is utilized and the Input Tape information is ignored. In this case the following operations are performed on the three types of information records.

- (a) Type 1 (Charge Number information)
The Type 1 record from the OLD MASTER is placed in a storage block (UCHG). The SORTED TIME TAPE is searched for all activities related to the charge number in UCHG. The activity information is summarized and placed into the pseudo time storage block (UTIME). If no activities are related to the specified charge numbers, UTIME is cleared. The UCHG block is now written on the NEW PERT COST MASTER as a new Type 1 record.
- (b) Type 2 (Performing Organization information)
The Type 2 record is placed in a storage block (UPUN) and then written on the NEW MASTER.
- (c) Type 3 (Resource Code information)
The Type 3 information is placed in a storage block (QRES2), transferred to storage block (QRES1), and written on the NEW MASTER from QRES1. The data in QRES2 is extended through use of the rate table prior to being placed in QRES1. The information in UCHG, UPUN, QRES2, and UTIME is given to the Pre-reporting Phase for processing.

If a Type 1 record is immediately followed by a Type 3 record, or a new charge number is found to be less than the previous charge number, a sequence error message is printed on-line and the computer will halt.

For the condition when the OLD PERT COST MASTER is greater than the input, only the information from the Input Tape is used and the OLD

MASTER is ignored. This condition is essentially the establishment of a new charge number in the master file. The types of input cards used to establish a charge number will be as follows:

(a) Type 7-0, 7-1, 7-2 Cards

The Type 7-0 card must in this condition be entered with a transaction code of "A." The 7-0 card information is transferred into the UCHG block and then updated with the information from the 7-1 and 7-2 cards. The information in the UCHG block (after the search of the Time Tape is performed) is then written on the NEW PERT COST MASTER TAPE as a Type 1 record. If the transaction code of the 7-0 card is not an "A," an exception message will be written on the SYSTEM ERROR TAPE, followed by a display of the 7-0 card in error. The program will then read the next card from the Input Tape and continue normal processing.

If any Type 7 cards are entered for a certain charge number and the 7-0 card for this number is not available or was rejected due to an error in the card, these cards will be rejected and an exception message will be printed on the SYSTEM ERROR TAPE followed by a display of the card.

(b) Type 7-3, 7-4, 7-5 Cards

The Type 7-3, 7-4, and 7-5 cards are used in creating a Type 2 and a Type 3 record for the NEW PERT COST MASTER TAPE. The Performing Organization information will be placed in UPUN and then written out on the NEW MASTER TAPE. The 7-3 card will set the actual cost information into the correct months of the Resource Code block QRES2. The 7-4 and 7-5 cards will place the cost estimates and budgets into the correct months (with respect to the charge number start date) of the QRES2 block. The cost information is packed down and placed into the QRES1 block, from where it is written as a Type 3 record on the NEW MASTER TAPE. If the transaction code of the 7-4 or 7-5 card is not an "A," an exception message will be placed in the Error Report followed by an image of the incorrect card.

For the condition when the OLD PERT COST MASTER TAPE is equal to the SORTED DATA TAPE the records from the OLD MASTER are read into the appropriate storage blocks, are updated by the Type 7 cards from the Input

Tape, and then are written as Type 1, 2, or 3 records on the NEW MASTER TAPE. If a card with an "A" transaction code is received, the card will be rejected and an exception message will be printed on the Error Report. If a Type 7-0 card is input with a "D" transaction code, a "deletion" indicator is set. All charge number, performing organization, and resource code records which do not contain actual cost data will be deleted. If a resource code record contains actual costs, only the cost estimate and budget data will be deleted and the charge number, performing organization, and resource code records will be written on the NEW MASTER. If a 7-4 or 7-5 card is input with a "D" transaction code, the performing organization and resource code records will be deleted unless actual data appears in the record. If actual data appears and is removed from the record (using a 7-3 card), the record will be deleted if the "deletion" indicator is set. If actual data is contained in the record to be deleted, an exception message is placed on the error report.

If a 7-4 or 7-5 card containing a "C" transaction code is input and the "delete" indicator is set, an exception message will be set on the SYSTEM ERROR TAPE followed by a display of the card in error.

When the updating is completed, the NEW PERT COST MASTER will be rewound and unloaded. At the end of the update phase a message indicating the number of errors encountered during the processing will be displayed on the on-line printer. This message will take one of the following forms:

XXXX ERRORS DETERMINED
IF RUN IS TO BE CONTINUED EVEN THOUGH
ERRORS INDICATED HIT START
NO ERRORS DETERMINED

If the first message is printed out, the program will stop. If these errors are to be ignored, the start button at the console is hit and they are bypassed. The program will then go into the output preprocessing sort and then into the output phase. Where no errors are indicated the program will go into the sort and output phase automatically.

Cost Update Rate Table

The rate table used with the PERT Cost system utilizes a very basic approach. It will contain rate information to be applied against the unit value to arrive at direct dollar totals or a rate to be applied against the direct dollars to arrive at total dollars. This table will be used with both estimates and budget values (but not actual values) tied to the performing-unit/resource-code combinations or to just the resource codes. The program will actually make two passes in searching through the rate table. The first pass will be to check whether the performing-unit/resource-code combination can be located in the rate table. If it cannot be found, a second pass is made against only the resource code. If the resource code still cannot be found, it is not in the table.

This table can be updated by means of the Type 4 input from the SORTED DATA TAPE. These input cards can change, add, or delete information in this table. On file establishment this table is developed in core at location RTBAR and, after completing the read-in of all Type 4 cards, is set out on the NEW PERT COST MASTER. On the cyclic updating runs, this table is read in from the OLD PERT COST MASTER and set into core at RTBAR. It is then updated, if any Type 4 cards are present, and then set out on the NEW PERT COST MASTER. The rate table will remain in core during the entire update phase.

The rate table will use the "next available slot" approach, which automatically packs the information and allows for fast retrieval. This approach will be discussed **starting on Page III-G-3.**

The unit rate information carried in this table is of a variable scaling in that any value from ".xxxxxx" to "xxxxxx." can be used. The indicator for the scaling factor is contained in bits 18 - 20 of the first word of a slot, as shown in Fig. III-G-7. The overhead rate is of fixed scaling in the form of "x.xxx" and no scaling factor is needed.

The rate table is broken down into two separate tables or sections. One is 800 words that contain information in 3-word sets. This information is

the performing unit (if any), resource code, and link to the first set of rate data in the second section of the table. The second section of the table is of 3203 words and will contain the rate information. These slots will indicate the year, the quarter (if any), the scaling factor (if any), the link to the next slot that contains information for this performing-unit/resource-code combination, and the overhead and unit rates. It is possible to have only an overhead or only a unit rate in any one slot, or both can be present.

Rate Table Next-Available-Slot Approach

It is believed that a brief description of the next-available-slot approach will help the reader understand the operation of this system. The following are some terms that will be used in the discussion of this method:

- (a) Bucket - A bucket refers to a group or category that the information involved will be split into. An example is the performing-unit/resource-code or resource code combinations in section 1 of the rate table (see Fig. III-G-7).
- (b) Downlink - The downlink portion of the word refers to the channel of the next slot that is part of the same bucket.
- (c) Empty Control - Empty control is basically the bucket for all channels that are not in use.

The way the next-available-slot method works is that a group of buckets are set up, dependent upon input to the system. For discussion purposes, we will set up two locations called Bucket A and Bucket B, and all our information will be split into these categories. We also assume there is a maximum of ten slots in these categories at any one time.

At the start, the Empty Control will contain 10 words, each containing the downlink to the previous channel as shown conceptually in Fig. III-G-2. A bucket downlink of zero indicates this is the last link of the bucket. Thus, at this time, there are no links connected to Bucket A or B.

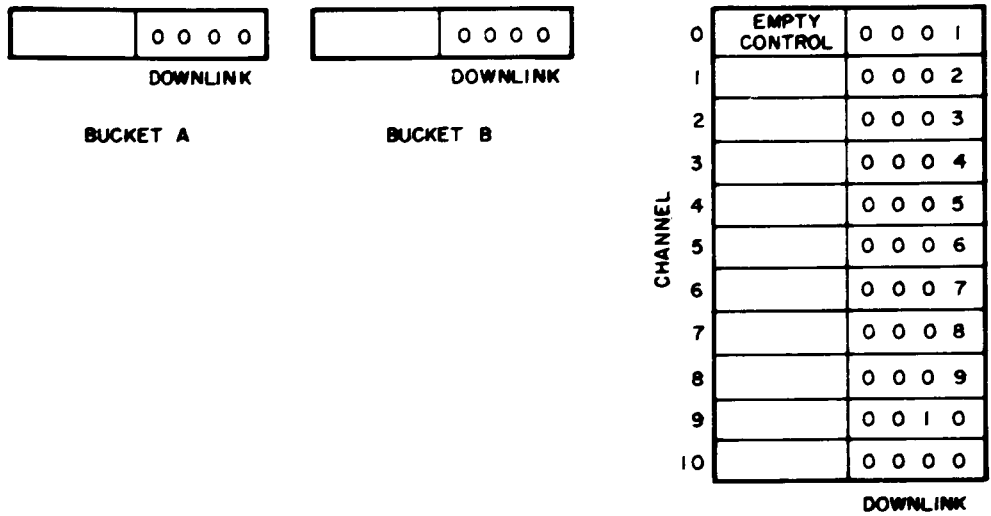


Fig. III-G-2 Start of Next-Available-Slot Method

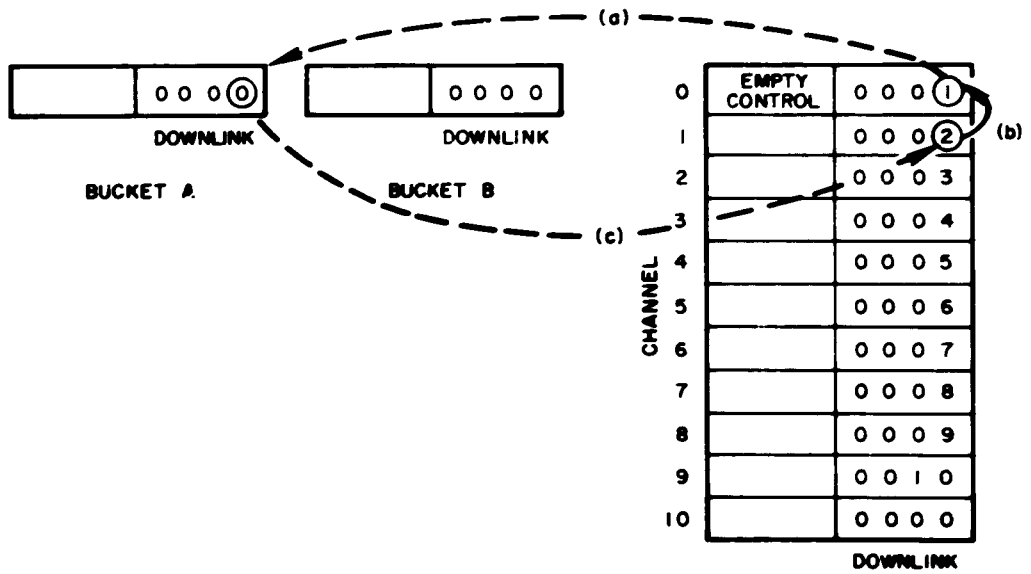


Fig. III-G-3 Sequence of Steps in Adding Information to Rate Table by Next-Available-Slot Method

As information comes into the system to be placed in the proper bucket, the following will result:

- (a) The downlink of the Empty Control will give the channel number of the next empty channel to use, which will be placed in the downlink of the proper bucket.
- (b) The downlink of the next empty channel replaces the previous downlink in Empty Control so as to set up the second empty channel for the next request.
- (c) The downlink that had been in the bucket replaces the downlink in the empty channel.

These steps in adding information are indicated by arrows in Fig. III-G-3, under the assumption the information is to be added to Bucket A.

The above process is illustrated in Fig. III-G-4, using the simplified Bucket A and Bucket B example previously described. Suppose information A-1 and B-1 are to be added to the table. Empty Control will tell us that Channel 1 is the next empty channel. The information is entered in Channel 1, and the number 1 replaces zero as the Bucket A downlink, indicating that the last information in Category A is to be found in Channel 1. The zero

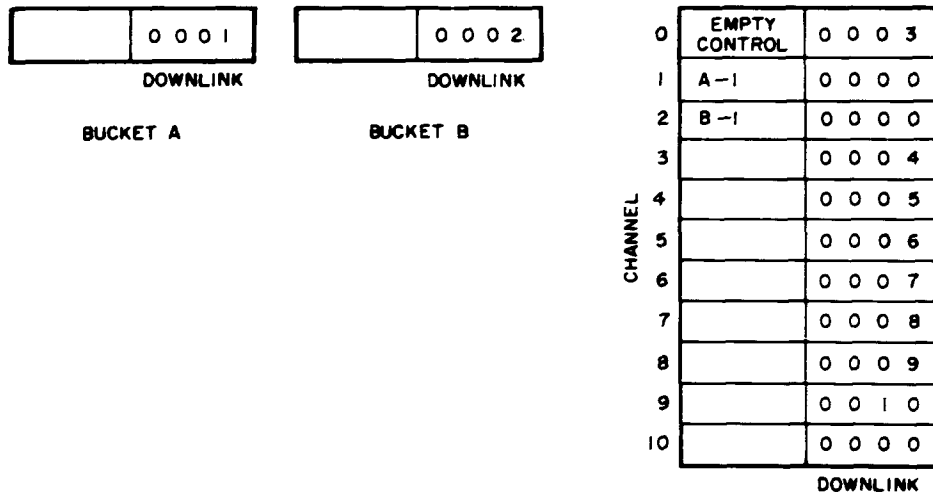


Fig. III-G-4 Adding A-1 and B-1 to Rate Table

now entered as downlink in Channel 1 indicates that no previous links to Bucket A exist in the table. This same procedure will be applied in setting up B-1, except that the information will be stored in Channel 2 and the Bucket B downlink to the table will be a 2. Channel 3 will be entered as the Empty Control downlink.

As additional information comes into the system, this same process continues. Assume A-2, A-5, and A-4 are added to the table, in that order. The results are shown in Fig. III-G-5.

Under the next-available-slot system, as some information becomes outdated it will have to be removed from the bucket in reverse manner to the addition process shown in Fig. III-G-3.

- (a) The table is searched for the duplicate information control bit, such as A-1, A-4, etc. This is located by examining first the channel containing the last information added to this bucket category, as indicated by the appropriate bucket downlink. If the information in this channel does not match the control bit, the next channel up the downlink chain is examined, etc., until the duplicate information control bit is found. At this point, the channel just previously examined will have its downlink replaced by the

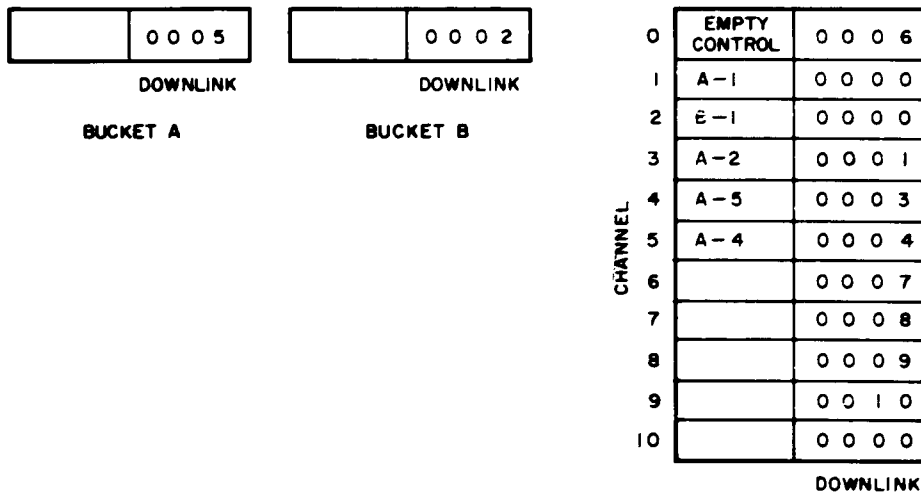


Fig. III-G-5. Adding A-2, A-5, and A-4, in Stated Order, to Rate Table

downlink of the channel being deleted. If the channel being removed is the last piece of information added to this bucket (i. e. , the channel indicated by the bucket downlink), the downlink of the deleted channel replaces the downlink in the bucket.

- (b) The downlink in the Empty Control will then replace the downlink in the deleted channel.
- (c) The deleted (empty) channel becomes the value shown in the Empty Control downlink; that is, it becomes the next available channel.

Continuing the example previously set up, assume A-5 and B-1 are to be deleted. Searching through the table, we find A-5 in Channel 4, with Channel 5 being the next channel in the Bucket A downlink. The downlink from Channel 4 will then replace the downlink in Channel 5, thereby deleting A-5 from the bucket. The now-empty Channel 4 is entered as the downlink to Empty Control, while the previous Empty Control downlink is assigned to Channel 4. The same procedure is followed in deleting B-1 except that the downlink of the deleted B-1 becomes the Bucket B downlink. The result is shown in Fig. III-G-6.

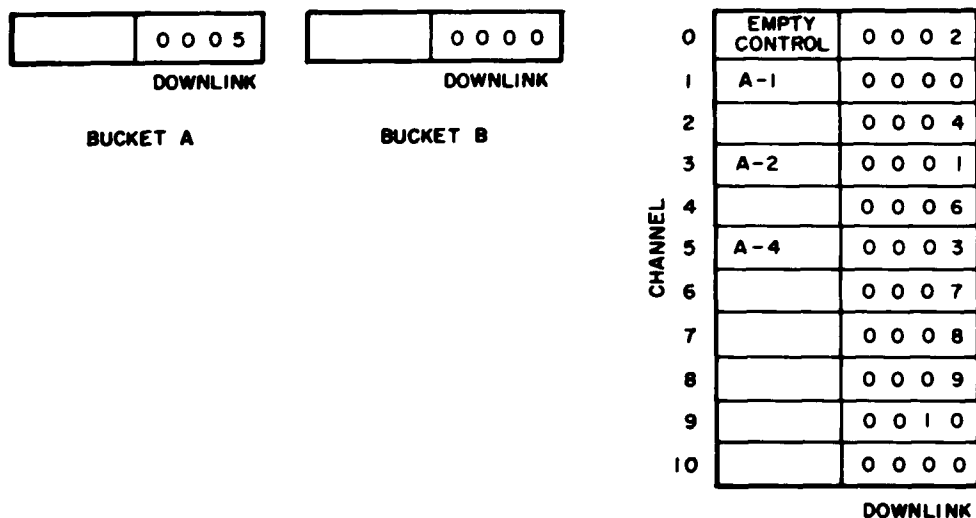


Fig. III-G-6. Deleting A-5 and B-1 from Rate Table

Rate Table Error Messages

In developing and updating the RTBAR table from the Type 4 input cards, the following error or exception messages can be produced, depending on the type of error. All of these errors will be set out on the SYSTEM ERROR TAPE.

- (a) AN ERROR EXISTS ON THE FOLLOWING CARD
YEAR TO BE CHANGED NOT IN CURRENT FILE
XX - 80 characters of input card - XX

This message will be set out when a Type 4 input is attempting to change a rate for a year or a year-and-a-quarter that does not exist. The third line of this message will be an 80-character representation of the input card that caused this error. This representation will also follow all of the messages below.

- (b) AN ERROR EXISTS ON THE FOLLOWING CARD
YEAR TO BE DELETED NOT IN CURRENT FILE

This message will be set out when a Type 4 input is attempting to delete a rate for a year or a year-and-a-quarter that does not exist.

- (c) 15 RESOURCE CODE DELETIONS MAX. FROM RATE
TABLE PER RUN. FOLLOWING CARD NOT ACCEPTED

More than 15 performing unit/resource code or resource code items have been deleted, which is the maximum size of the delete table. The card shown is ignored.

- (d) AN ERROR EXISTS ON THE FOLLOWING CARD
PERF. UNIT AND RES. CODE NOT IN CURRENT FILE

This message will be set out when a Type 4 input is attempting to update the rate for a nonexistent performing unit/resource code combination or resource code.

- (e) RATE TABLE FULL. FOLLOWING CARD NOT
ACCEPTED

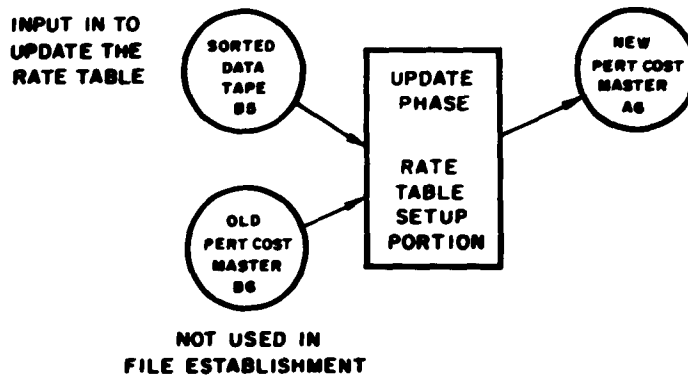
The table has reached its maximum of 266 performing unit/resource code or resource code combinations, and this card is not being processed or it has reached a maximum of 1601 individual year or year-and-a-quarter slots.

- (f) AN ERROR EXISTS ON THE FOLLOWING CARD
PERF. UNIT AND RES. CODE EXIST IN CURRENT
FILE WITH DUPLICATE YEAR AND QUARTER

This message will be set out when a Type 4 input is attempting to add a rate for a year or a year-and-a-quarter that does exist. The program will then continue checking other fields on this card that contain other years and quarters for processing. It is possible to have up to four of these messages pertaining to the same card.

Rate Table Tape Operations

After the completion of the activity-to-charge-number sort, the tape on A6 will contain only the NEW SECONDARY MASTER TAPE. This tape will not be rewound, due to the fact that the NEW PERT COST MASTER will be set on as a second file. The first item set onto the NEW PERT COST MASTER TAPE will be the rate table. If the system is in a file establishment mode, the Type 4 inputs are set into the table at RTBAR, and this table is set out onto the NEW PERT COST MASTER. If this system is to be run without any rates, a rate table of 4003 words is still set out on tape but it will contain no rate information. If this system is not in a file establishment



mode, the rate table is read in from the OLD PERT COST MASTER into its core location at RTBAR. It is then updated, if any Type 4 inputs are present, and written out on the NEW PERT COST MASTER. The above sketch shows the tapes that can be used during this portion of the update phase.

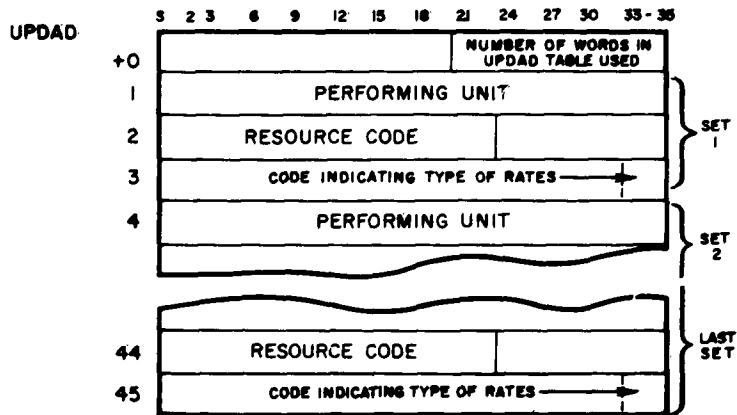
Rate Table Restrictions and Operations

The following rate table restrictions and program operation approaches were used in developing this table.

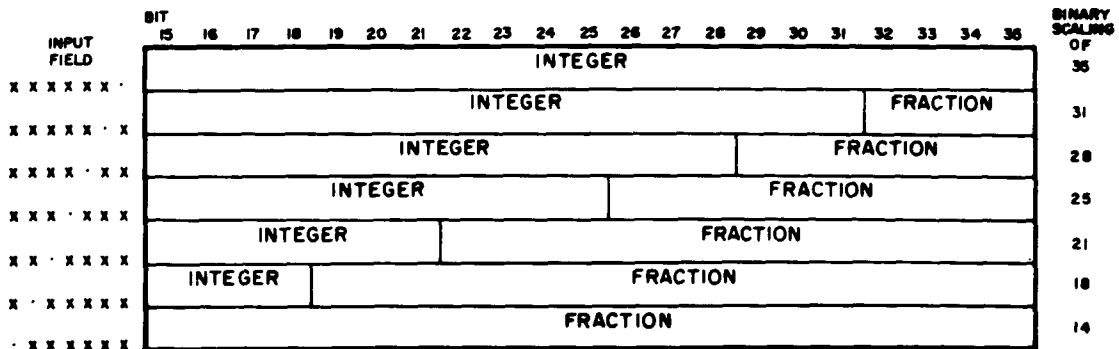
- (a) A maximum of 266 performing unit/resource code or resource code combinations can be set up in this rate table. This maximum is developed by dividing the block allocated to this area, which is 799, by the size of each set of data, which is 3.
- (b) It will provide 1601 individual year-and-quarter or year slots that can be tied to any number of performing unit/resource code slots from 1 to 266. This maximum is developed by dividing the block allocated to this area, which is 3202, by the size of each year-slot (which is 2).
- (c) A maximum of 15 performing unit/resource code or resource code combinations can be deleted from the rate table for any processing run. This maximum is developed by dividing the block allocation, which is 45, by the size of a delete set (3). The information carried in this block contains the performing unit, the resource code, and a code indicating the type of rates being deleted. This code will take the following form:
 - 1 - Only unit rate carried by item deleted
 - 2 - Only overhead rate carried by item deleted
 - 3 - Both unit and overhead rate carried by the item deleted.

The purpose of this delete table located at UPDAD is to be able to remove any rate extensions that were developed in a prior run. The format of this table is shown on

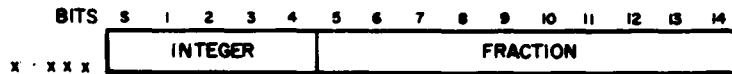
Page III-G-16.



- (d) The floating decimal approach operates in the following manner. The unit rates will have a floating decimal point allowing for a value in the range of .000001 to 999999. This value is converted to a binary number and is carried in a 21-bit portion of the second word of a slot of the rate table (See Fig. III-G-7). These fields will have a fraction portion that varies according to the location of the decimal point. The decimal indicator will carry the number of decimal characters from 0 to 6. For example, 12345.6 will be a 1, while 12.3456 will be a 4. The scaling that will be used in the unit rate field will be as follows:

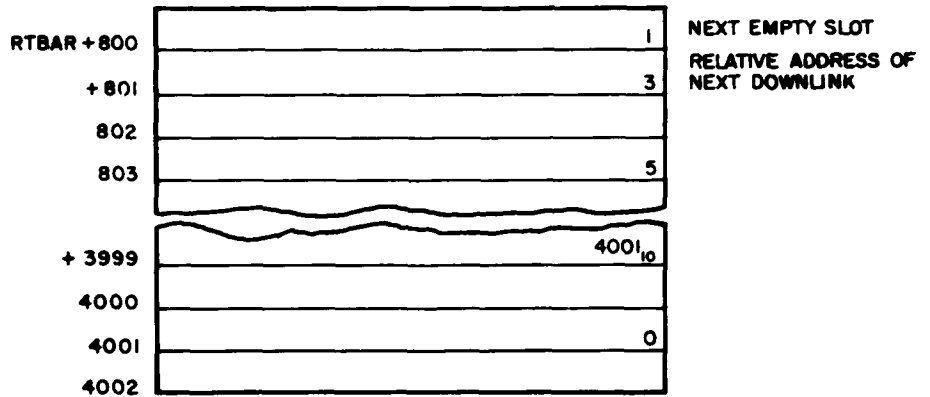


The format of the overhead rate will be fixed for all slots and will take on the following form



Rate Table Layouts

The layout shown in Fig. III-G-7 indicates the RTBAR table as it is carried in core. Initially, the second section of this table is preset with the relative address of its next available slot and will appear as follows



The values in the address of this table will represent relative locations of the next value tied to that word and are carried in binary. The last slot tied to the empty slot indicator will contain a zero.

From this initial setup, the rate table is built up by setting in the values developed from the Type 4 cards, using the next-available-slot approach. This table, as shown in Fig. III-G-7, is divided into two sections. The first section comprises the performing unit-resource code or resource code combination with a maximum of 266. The downlink tied to this combination refers to the relative address of the first slot that contains rate information for this item.

RTBAR	BIT 3	2	1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
WORD 0	NUMBER OF WORDS *																																			
+1	FIRST PERFORMING UNIT NUMBER																	FIRST RESOURCE CODE NUMBER																		
+2	FIRST RESOURCE CODE NUMBER																	LOCATION OF FIRST DOWNLINK TIED TO THE ABOVE PERFORMING UNIT - RESOURCE CODE COMBINATION																		
+3	SECOND PERFORMING UNIT NUMBER																	SECOND RESOURCE CODE NUMBER																		
+4	SECOND RESOURCE CODE NUMBER																	LOCATION OF FIRST DOWNLINK TIED TO THE ABOVE PERFORMING UNIT - RESOURCE CODE COMBINATION																		
+5	NEXT PERFORMING UNIT NUMBER																	NEXT RESOURCE CODE NUMBER																		
+6	NEXT RESOURCE CODE NUMBER																	LOCATION OF FIRST DOWNLINK TIED TO THE ABOVE PERFORMING UNIT - RESOURCE CODE COMBINATION																		
+7	LAST SET																	LOCATION OF FIRST DOWNLINK TIED TO THE ABOVE PERFORMING UNIT - RESOURCE CODE COMBINATION																		
+8	LAST SET																	LOCATION OF NEXT EMPTY SET OF SLOTS IN SECTION 2 OF THIS TABLE																		
+790	SLOT 1																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+800	SLOT 1																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+801	SLOT 2																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+802	SLOT 2																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+803	SLOT 3																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+804	SLOT 3																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+805	LAST SLOT																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+4001	LAST SLOT																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		
+4002	LAST SLOT																	LINK TO ANOTHER YEAR AND QUARTER FOR THIS SAME PERFORMING UNIT - RESOURCE CODE																		

* NUMBER OF WORDS ASSOCIATED WITH A PERFORMING UNIT-RESOURCE CODE COMBINATION IN SECTION 1 IS SORTED BY PERFORMING UNIT-RESOURCE CODE

** SECTION 1 IS SORTED BY PERFORMING UNIT-RESOURCE CODE

*** A VALUE OF ZERO IN THIS FIELD INDICATES THIS IS THE LAST DOWNLINK OF A SET

**** THIS VALUE WILL INDICATE THE NUMBER OF DECIMAL DIGITS IN THE UNIT RATE

Fig. III-G-7. Rate Table Record

The second section comprises the rate information as related to a particular year or year-and-quarter. If there is only one year or year-and-quarter tied to an item in Section 1, the downlink is set to zero to indicate this. If there are more than one year or year-and-quarter tied to an item in Section 1, the downlink is set to the relative location of the next slot tied to this item. This linking will go on until the last slot tied to this item is found, and this slot will contain a zero in the downlink. The year-and-quarter in the first word of a Section 2 slot will be set up in binary.

At RTBAR +800 the relative location of the next available slot to be used can be found. When this number is zero it indicates there are no more slots available.

Rate Table Region Descriptions

This subsection describes the rate table subroutines used in the update phase of the program.

Region QRATE

EXPLANATION OF REGION:

This region will initially create and subsequently update the rate table from type 4 inputs. It will write this table out on the NEW PERT COST MASTER and on cyclic runs will read it in from the OLD PERT COST MASTER. For deletions of performing unit resource code sets this routine will develop the UPDAD delete table that is carried in core only.

CALLING SEQUENCE:

L TSX QRATE, 4
L + 1 Normal return

INPUT:

SORTED DATA TAPE (input type number 4)
OLD PERT COST MASTER TAPE

OUTPUT:

The RTBAR table developed in core and set out on the NEW PERT COST MASTER TAPE.
The UPDAD table

STORAGE USED:

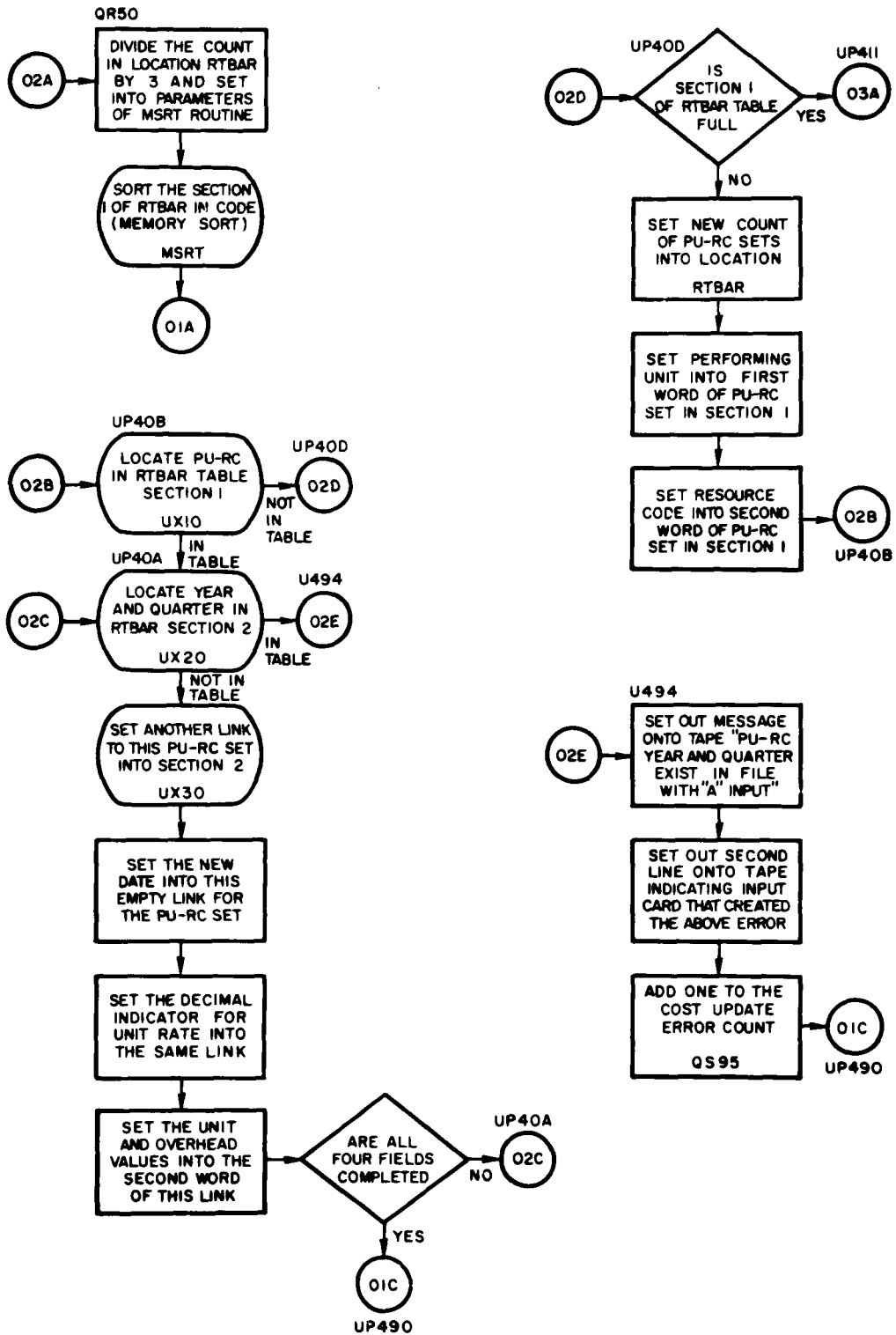
RTBAR - 4003 words - rate table location
UPDAD - 46 words - delete table location
UP 450 - 14 words - card image
UP 451 - 81 words - unpacked card image

SUBREGIONS AND SUBROUTINES USED:

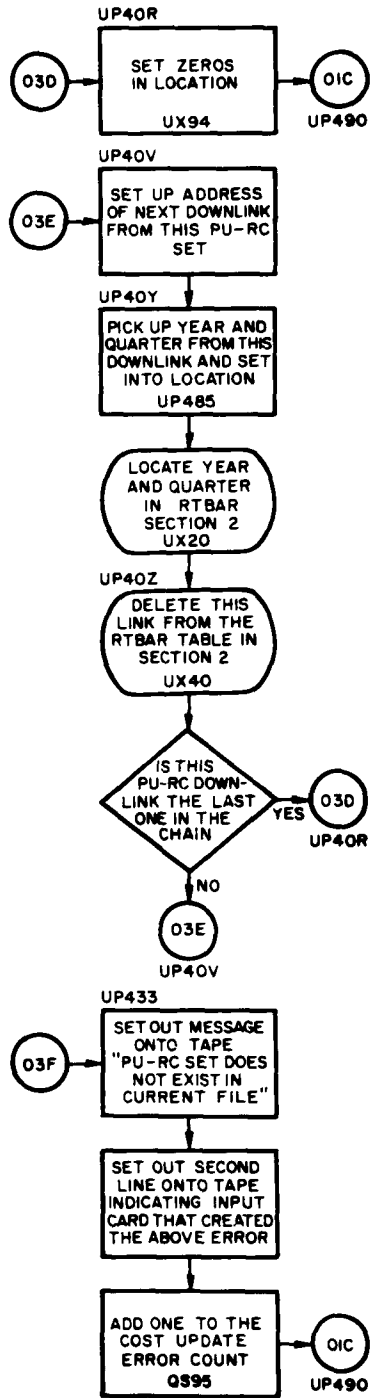
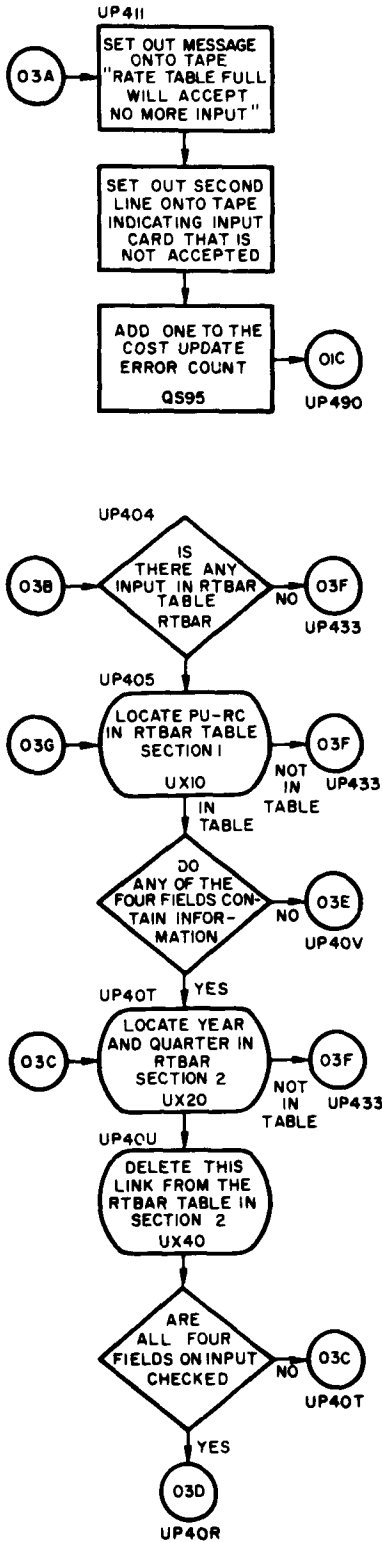
UX10 RRTB
UX20 RCHG
UX30 WRTB
UX40 UPCK
UP475

EXPLANATION OF CALLING SEQUENCE:

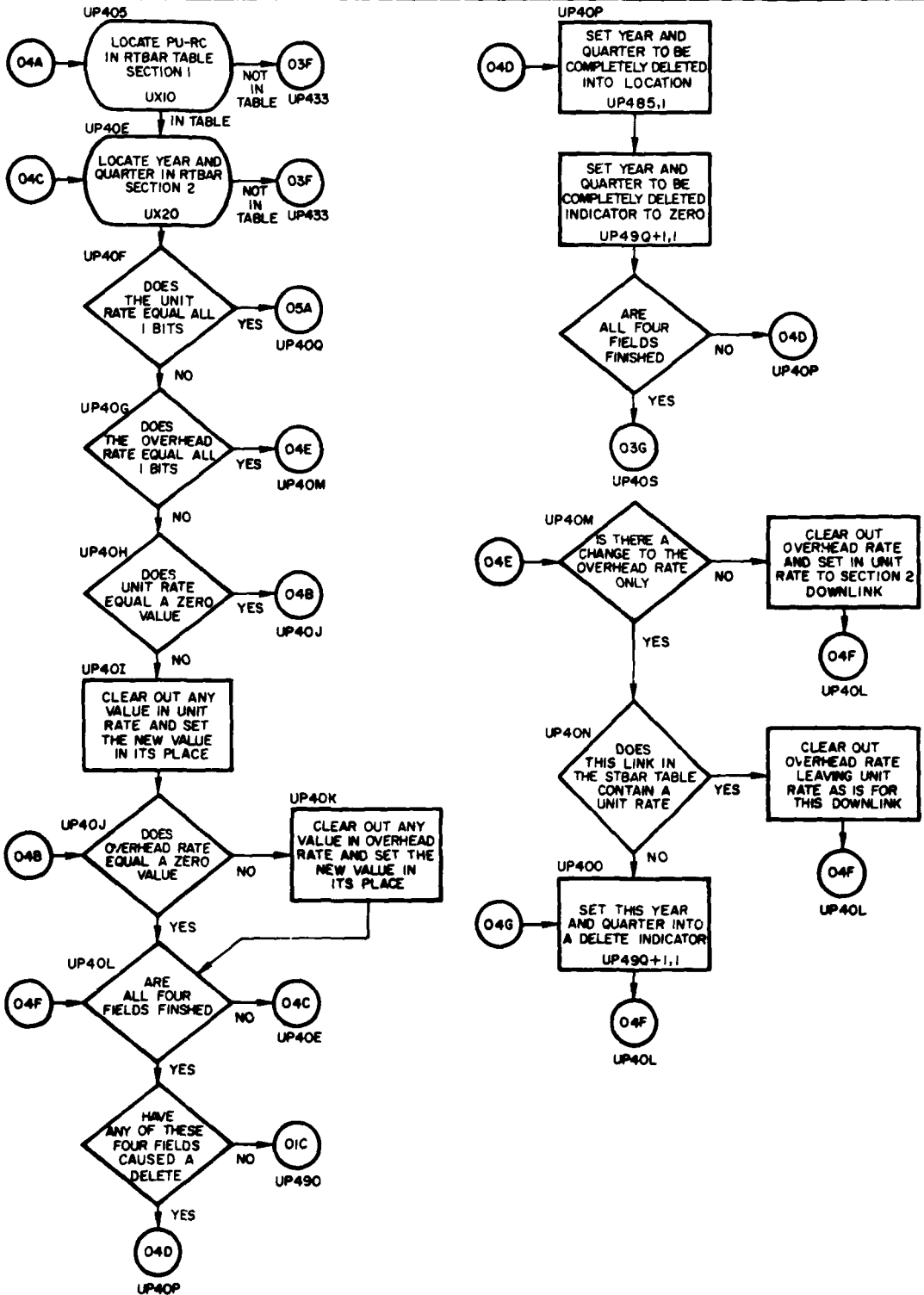
Not applicable.



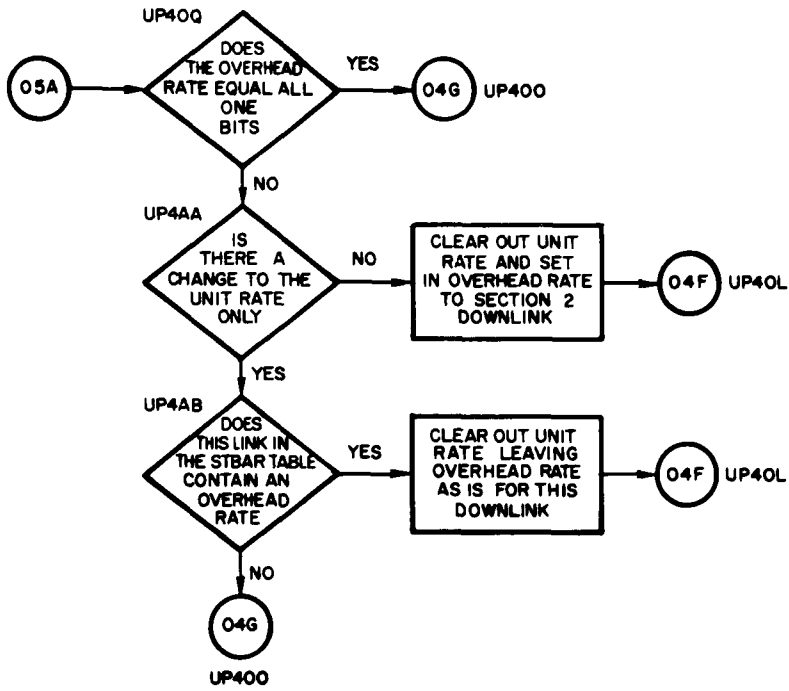
REGION GRATE



REGION GRATE



REGION GRATE



Region UX10

EXPLANATION OF REGION:

This routine will attempt to match up a 4-card performing unit/resource code or resource code combination with the Section 1 items in the table.

CALLING SEQUENCE:

L TSX UX10, 4
L + 1 This combination not located in table return
L + 2 This combination found in table return

INPUT:

The performing unit/resource code in words 2 and 3 of UP450.

OUTPUT:

XR 2 contains the channel of matched-up performing unit/resource code combination.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

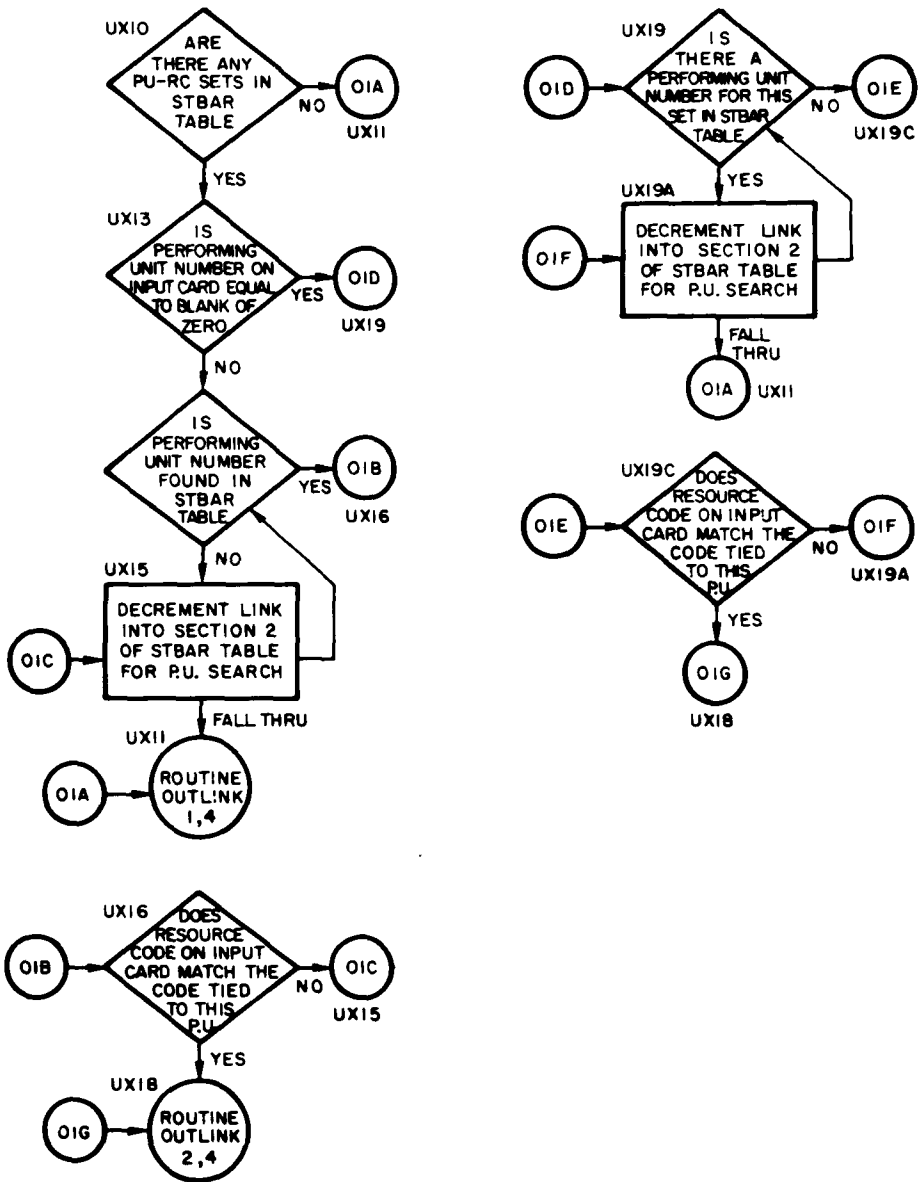
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

The output described in this specification refers to line L+2 of the calling sequence.

REGION UX10

LOCATE PU-RC IN STBAR TABLE - SECTION I



Region UX20

EXPLANATION OF REGION:

This routine will attempt to match up a 4-card year-and-quarter or year, relating to a Section 1 combination, with the data set up in Section 2 of the rate table.

CALLING SEQUENCE:

L TSX UX20, 4
L + 1 The year-and-quarter located in table return
L + 2 The year-and-quarter not found in table return

INPUT:

The year-and-quarter set into location UP485.

OUTPUT:

The absolute location containing the year-and-quarter or year slot in the rate table at UX22.

STORAGE USED:

Not applicable.

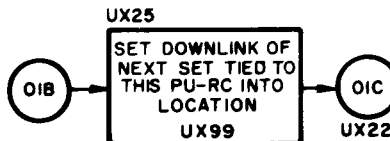
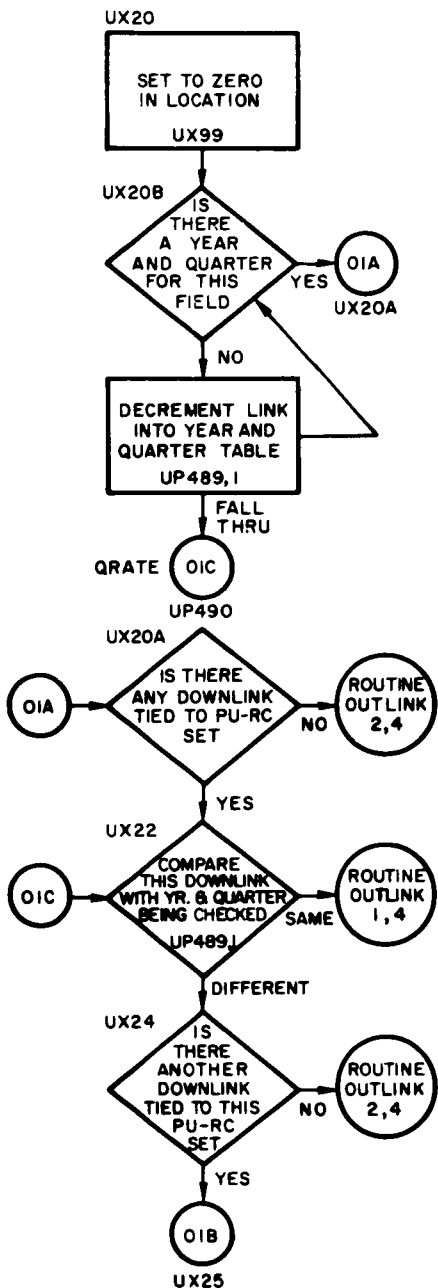
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

The output described in this specification refers to line L+2 of the calling sequence.

LOCATE YEAR AND QUARTER
TIED TO STBAR TABLE -
SECTION 2



Region UX30

EXPLANATION OF REGION:

This routine will tie another link to the performing unit/resource code combination in Section 2 of the rate table. It will set in another year-and-quarter or year for this combination in Section 1.

CALLING SEQUENCE:

L TSX UX30, 4

L + 1 Normal return

INPUT:

Not applicable.

OUTPUT:

The address of UX31 will contain the slot being set up for the new link.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

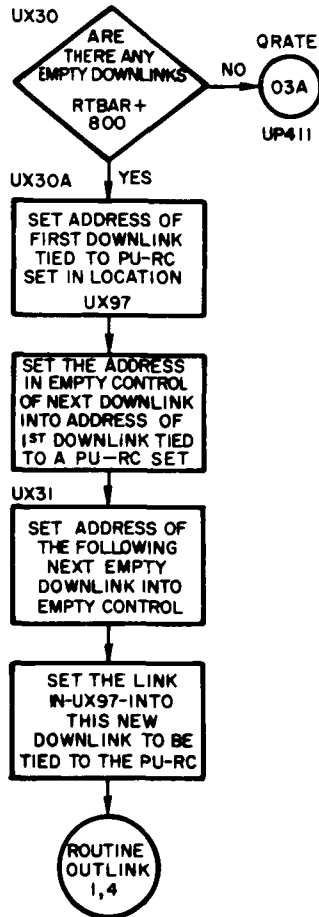
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION UX30

SET ANOTHER LINK TO THE
PU-RC SET IN SECTION 2
OF RTBAR



Region UX40

EXPLANATION OF REGION:

This routine will remove a link from a performing unit/resource code combination in Section 2 of the rate table. If this link was the last one tied to this combination it will set it into the UPDAD delete table.

CALLING SEQUENCE:

L TSX UX40, 4
L + 1 Normal return

INPUT:

Not applicable.

OUTPUT:

UPDAD table.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

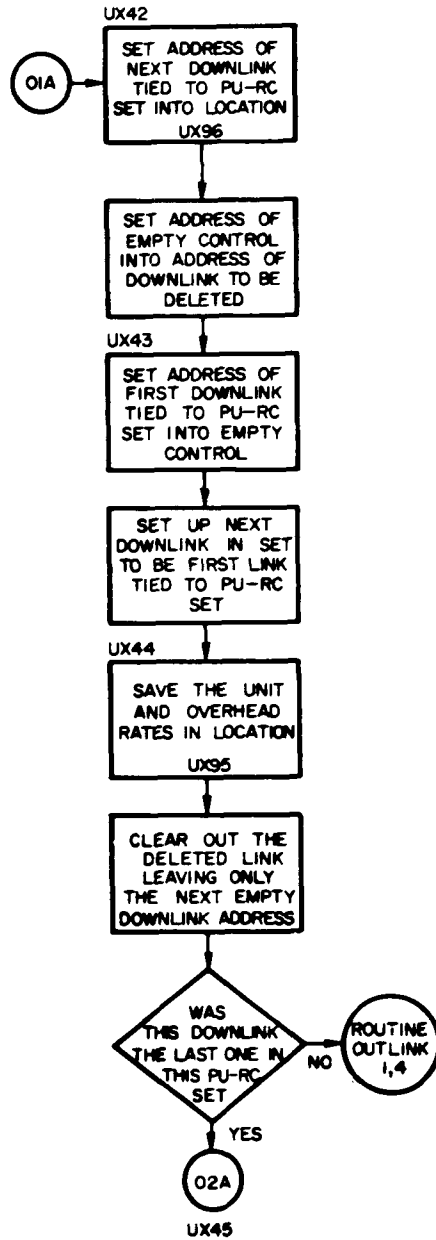
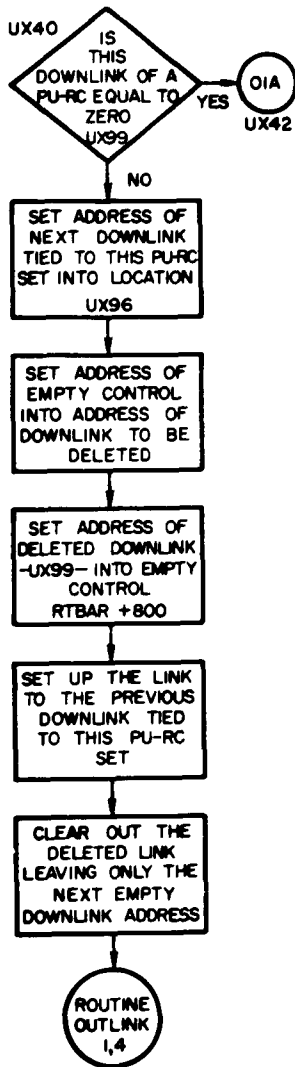
Not applicable.

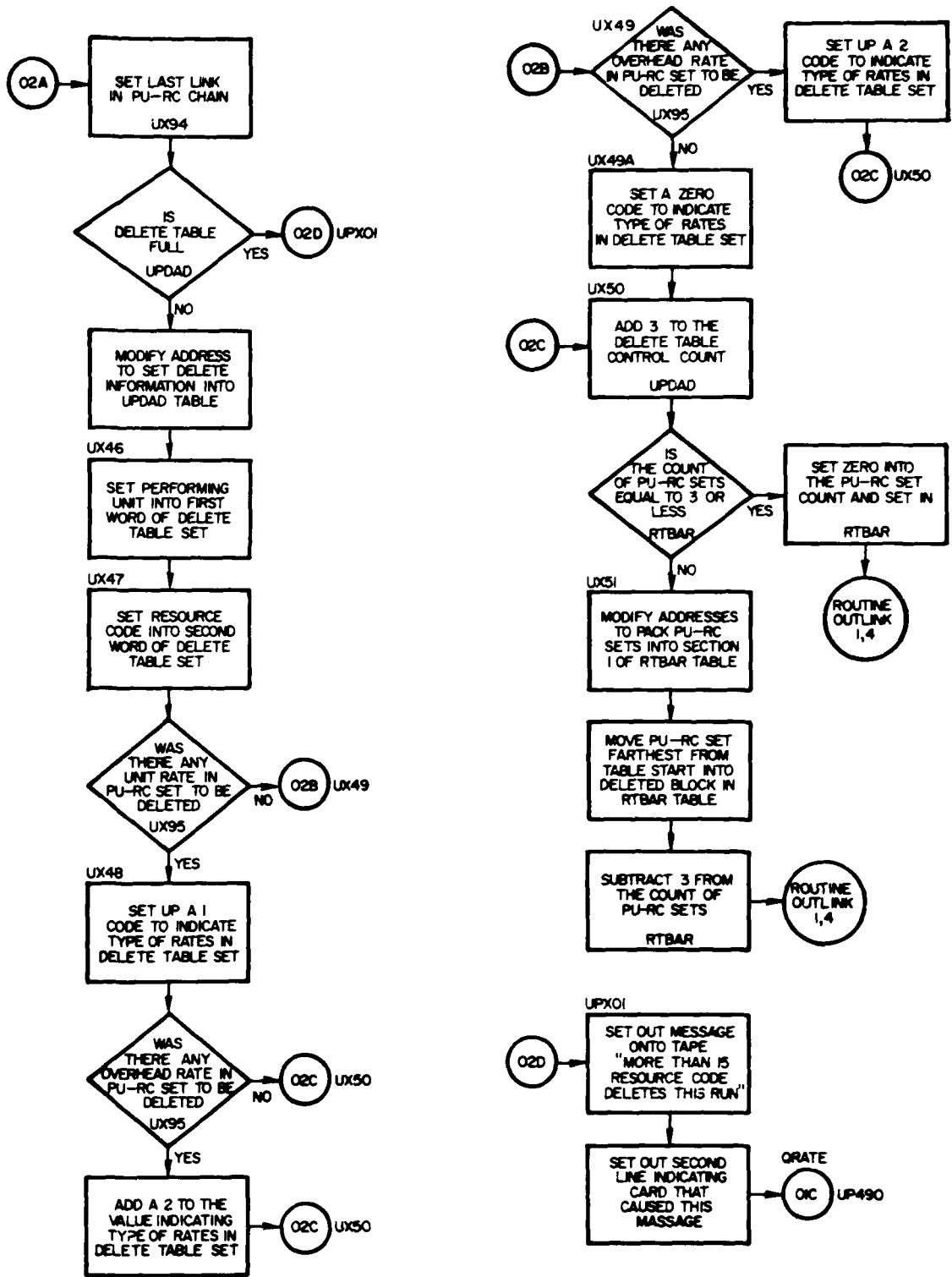
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION UX40

REMOVE A DOWNLINK FROM THE RTBAR TABLE





UP475

EXPLANATION OF REGION:

This routine will decipher the Type 4 card input and set all four fields into a form that is operable. It will set up the correct scaling factors for the unit rates.

CALLING SEQUENCE:

L TSX UP475, 4
L + 1 Normal return

INPUT:

Type 4 input cards

OUTPUT:

The data set into UP481 - UP488 and UP49C - UP49F. These locations represent the four quarters on the input card. If one or more of these quarters are blank these locations will be set to zero.

STORAGE USED:

UP481 - UP484 - 4 words - hold year-and-quarter or year
UP485 - UP488 - 4 words - hold unit and overhead rates
UP49C - UP49F - 4 words - hold decimal indicator for unit rate

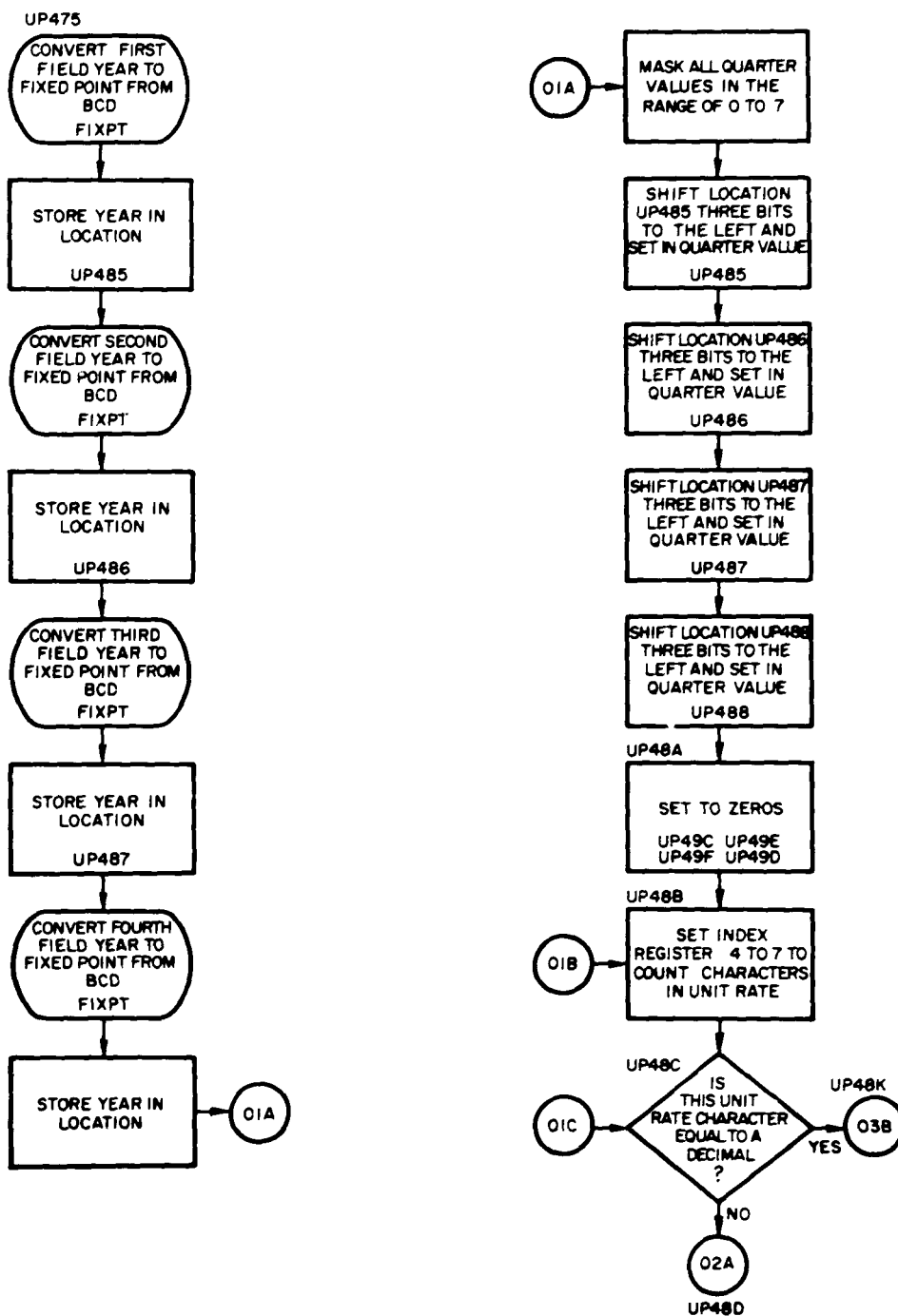
SUBREGIONS AND SUBROUTINES USED:

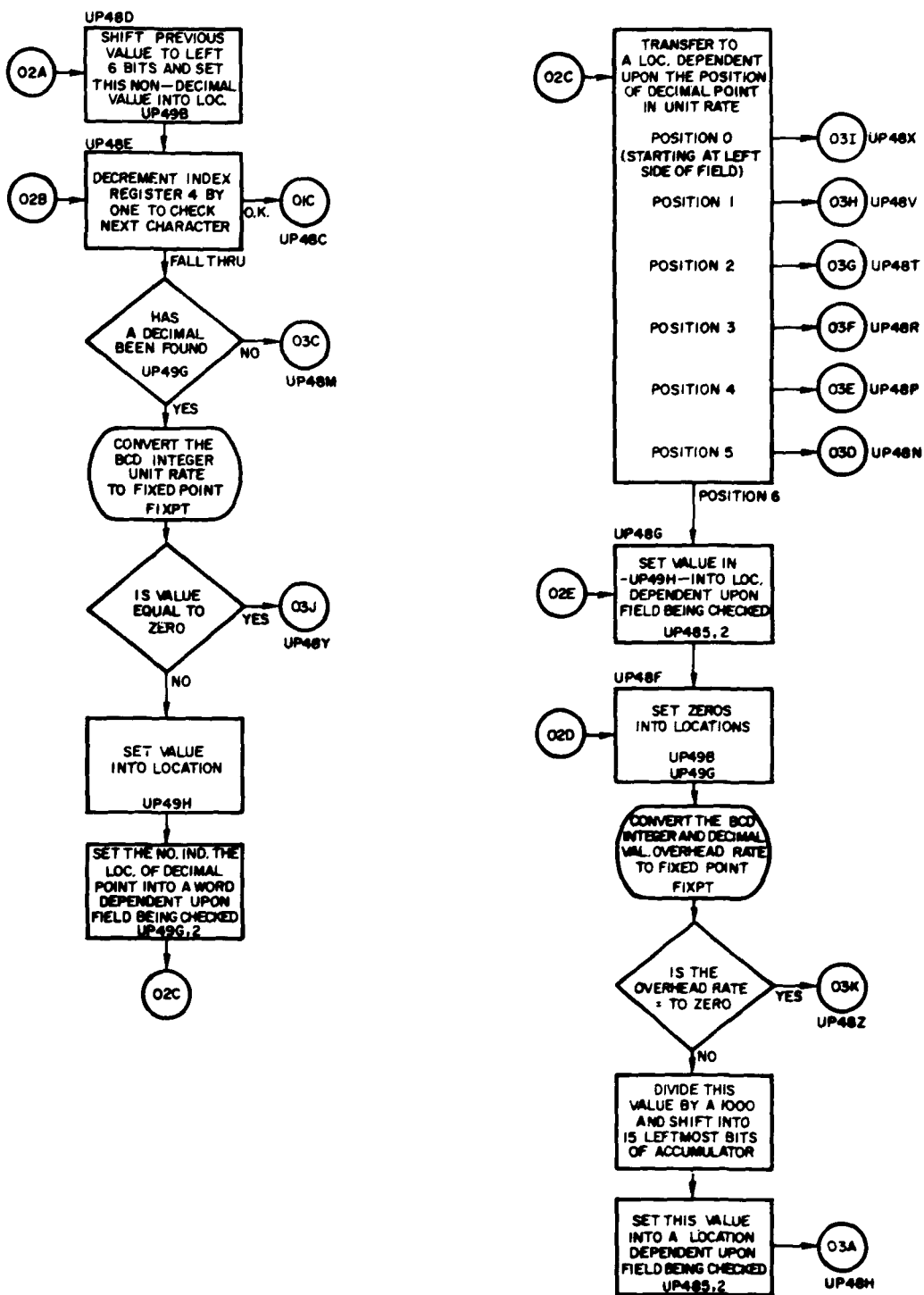
FIXPT

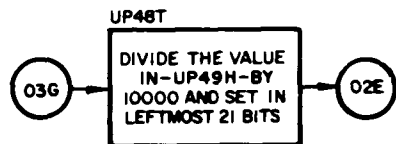
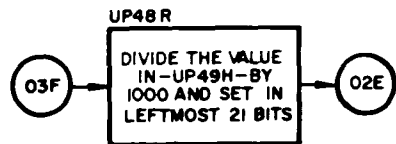
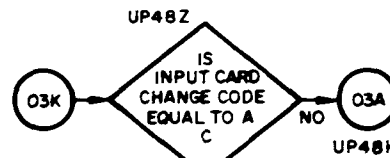
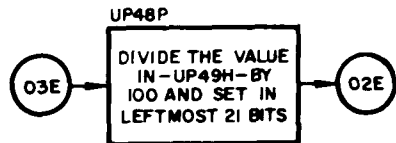
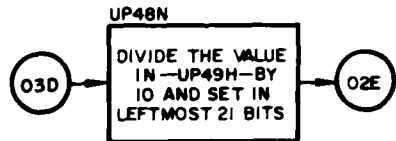
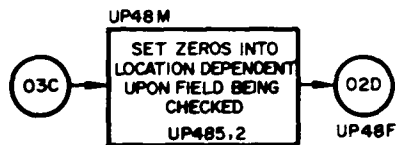
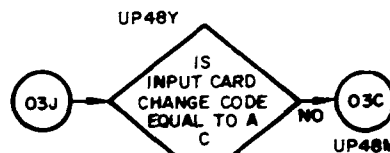
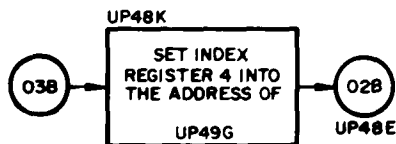
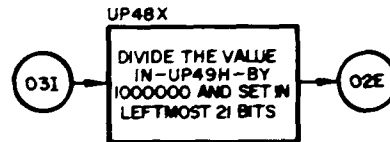
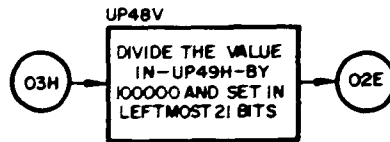
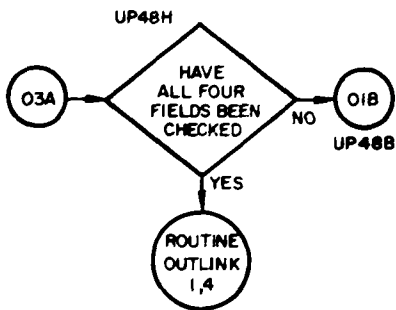
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

FIX THE DATA INPUTS
FROM INPUT DATA TO
WORKING AREA







Cost Update Skill Table

The skill table used in the PERT Cost program will actually perform two functions. It will tie a resource code to a rainbow category as well as to a cost category. Each of these functions will act independently of the other, and other than using the same table they will not have any common relationships. This table will tie together certain families of resource codes to cost categories, and other groupings of resource codes to rainbow categories. This tie-in is accomplished by use of the Type 5 and Type 6 inputs from THE SORTED DATA TAPE and is used to produce the "Cost Category and Rainbow Category Reports."

The Type 5 inputs from the SORTED DATA TAPE are used to change, add, or delete the rainbow category from a resource code, and Type 6 inputs are used to change, add, or delete the cost category from a resource code. Since, as stated earlier, each of these inputs will act independently of the other, an add to one of these categories may not actually add a new resource code to the table but may only set this cost or rainbow category in an existing resource code. This same premise holds true for deletes, in that if a category is deleted from a resource code this resource code may not be removed if the other category still relates to this resource code.

On file establishment, the skill table is developed in core at STBAR, and after completing the read-in of all Type 5 and 6 cards it is set out on the NEW PERT COST MASTER. On the cyclic updating runs, this table is read in from the OLD PERT COST MASTER and set into core at STBAR. It is then updated, if any Type 5 or 6 cards are present, and then set out on the NEW PERT COST MASTER. The skill table will remain in core during the entire cost update phase.

The skill table is broken down into two separate tables, or portions. One section is of 80 words and contains the 4-word rainbow categories, allowing for a maximum of 20 categories. The second portion of this table is of 1000 words consisting of the resource code, the cost category (if any), and the relative location of the rainbow category (if any) in Section 1. (At least one of these categories must be present in order for the resource code to remain in the table.) The resource code set of information will contain five words no matter what categories are present, thereby allowing for a maximum of 200 sets of resource codes in Section 2. It is then possible to have from 1 to 200 cost categories tied to the resource code sets, since each cost category is carried, by name, in the resource code set.

Skill Table Error Messages

In developing and updating the STBAR table from the types 5 and 6 input cards, the following error or exception messages can be produced, depending on the type of error. Both rainbow and cost category input errors will produce the same set of messages. The card image following the message will indicate which of the two categories caused the message. This card image will differ from the actual input due to a reformatting in the edit phase (see Page III-D-11). All of these errors will be set out on the SYSTEM ERROR TAPE.

- (a) AN ERROR EXISTS ON THE FOLLOWING CARD
RESOURCE CODE NOT IN CURRENT FILE
XX - 80 characters of input card - XX

This message will be set out when a Type 5 or 6 input is attempting to change one of the categories that does not exist. The third line of this message will be an 80-character representation of the input card that caused this error. This representation will likewise follow all of the messages below.

- (b) SKILL TABLE FULL. FOLLOWING CARD NOT ACCEPTED.

The table has reached its maximum of 200 resource code sets and this card is not being processed.

- (c) AN ERROR EXISTS ON THE FOLLOWING CARD RESOURCE CODE EXISTS IN THE CURRENT FILE

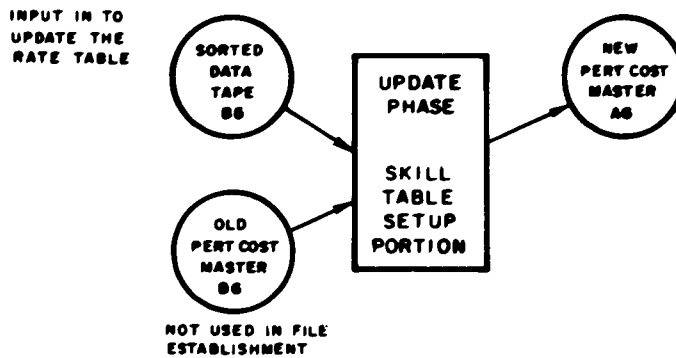
This message will be set out when a Type 5 or 6 input is attempting to add a category type to a resource code that currently contains a category.

- (d) AN ERROR EXISTS ON THE FOLLOWING CARD RAINBOW CATEGORY NOT IN CURRENT FILE

This message will be set out when a Type 5 input is attempting to delete an entire rainbow category from Section 1 and cannot locate it in the STBAR table.

Skill Table Tape Operations

After the rate table has been set on the NEW PERT COST MASTER TAPE the skill table will be set on. If the system is in the file establishment mode, the Type 5 and Type 6 inputs are brought in from the SORTED DATA TAPE and are set into the table at STBAR. This table is set out onto the NEW PERT COST MASTER. If this system is to be run without any tie-in to the cost or rainbow categories, a skill table of 1080 words is set out on tape with all zeros. If this system is not in a file establishment mode, the skill table is read in from the OLD PERT COST MASTER into its core location at STBAR. It is then updated, if any Type 5 or 6 inputs are present, and written out on the NEW PERT COST MASTER. The following will show the tapes that can be used during this portion of the update phase.



Skill Table Layouts

The layout in Fig. III-G-8 shows the STBAR table as it is carried in core. The table is divided into two sections: one of 80 words, and one of 1000 words. The first section of this table will carry the rainbow categories in 4-word blocks. This data will be assigned a relative address in Section 1 of the table and will always be found at that location. The relative address will then be set into the fifth word of the Section 2 resource code set in order to link a rainbow category to a resource code. A zero in the fifth word of the resource code indicates that there is no tie-in to a rainbow category. The relative addresses will be in the range of 1 to 76.

Any rainbow category input entering the system as an add or change that cannot be found in Section 1 of the STBAR table will be automatically set in. The add or change code will refer only to the resource code and not the categories. The delete code, however, can refer to both resource codes and categories.

STBAR	BITS	WORD 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35			
+1		RAINBOW CATEGORY 1 (CONT.)																																						
+2		RAINBOW CATEGORY 1 (CONT.)																																						
+3		RAINBOW CATEGORY 1 (CONT.)																																						
+4		RAINBOW CATEGORY 2																																						
+79		RAINBOW CATEGORY 20 (CONT.) (IF ANY)																																						
+80		RESOURCE CODE																																						
+81		COST CATEGORY *NNN																																						
+82		COST CATEGORY (CONT.)																																						
+83		COST CATEGORY (CONT.)																																						
+84		RELATIVE LOCATION OF RAINBOW CATEGORY IN SECTION 1 THAT IS TIED TO THIS RESOURCE CODE																																						
+85		RESOURCE CODE																																						
+1074		RELATIVE LOCATION OF RAINBOW CATEGORY IN SECTION 1 THAT IS TIED TO THIS RESOURCE CODE																																						
+1075		RESOURCE CODE																																						
+1076		COST CATEGORY																																						
+1077		COST CATEGORY (CONT.)																																						
+1078		COST CATEGORY (CONT.)																																						
+1079		RELATIVE LOCATION OF RAINBOW CATEGORY IN SECTION 1 THAT IS TIED TO THIS RESOURCE CODE																																						

* THIS SECTION IS NOT IN ANY SORTED ORDER AND CAN CARRY UP TO 20 RAINBOW CATEGORIES

** A RESOURCE CODE SET CAN HAVE EITHER A COST OR RAINBOW CATEGORY TIED TO IT OR CAN HAVE BOTH OF THEM TIED TO IT

*** THIS SECTION WILL BE SORTED BY RESOURCE CODE

**** THE SAME COST CATEGORY CAN BE RELATED TO MANY RESOURCE CODES

Fig. III-G-8. Skill Table Record

The second section of this table will be sorted by resource code and packed up to the top so that all unused portions will be at the bottom. The information carried in the second section will be the resource code number, cost category tied to that resource code, if any, and the relative location of the rainbow category in Section 1, if any. The STBAR table will allow for up to 200 resource code sets in Section 2.

Skill Table Region Descriptions

The following is a description of the skill table subroutine used in the update phase of the program.

Region QRAIN

EXPLANATION OF REGION:

This region will initially create and subsequently update the skill table from type 5 and type 6 inputs. It will write this table out on the NEW PERT COST MASTER and on cyclic runs will read it from the OLD PERT COST MASTER.

CALLING SEQUENCE:

L TSX QRAIN, 4
L + 1 Normal return

INPUT:

SORTED DATA TAPE (input types 5 and 6)
OLD PERT COST MASTER TAPE

OUTPUT:

The STBAR table developed in core and set out on the NEW PERT COST MASTER TAPE

STORAGE USED:

STBAR - 1080 words - skill table location
UP450 - 14 words - card image
UP451 - 81 words - unpacked card image

SUBREGIONS AND SUBROUTINES USED:

UPCK RCHG
WSTR RSTR
MSRT

EXPLANATION OF CALLING SEQUENCE:

Entry into this subroutine will be made at QRAIN at which point by translating the input card type and change code a transfer will be made to one of the following locations:

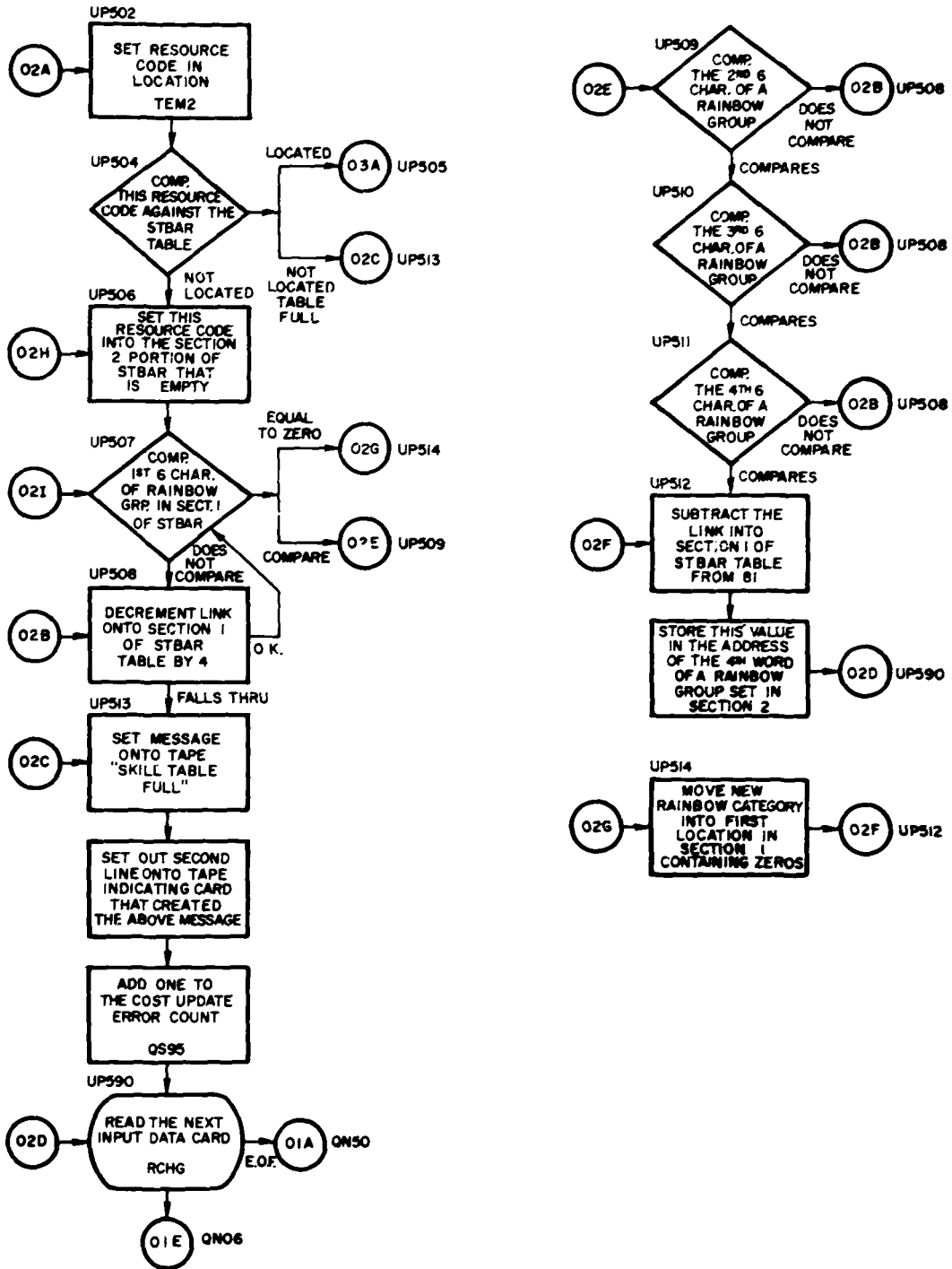
Type 5 Add	- to UP502	Type 6 Add	- to UP602
Type 5 Change	- to UP540	Type 6 Change	- to UP620
Type 5 Delete	- to UP520	Type 6 Delete	- to UP610

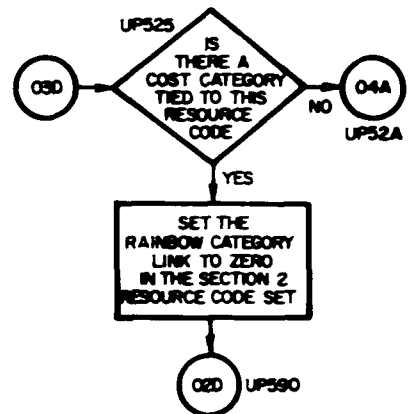
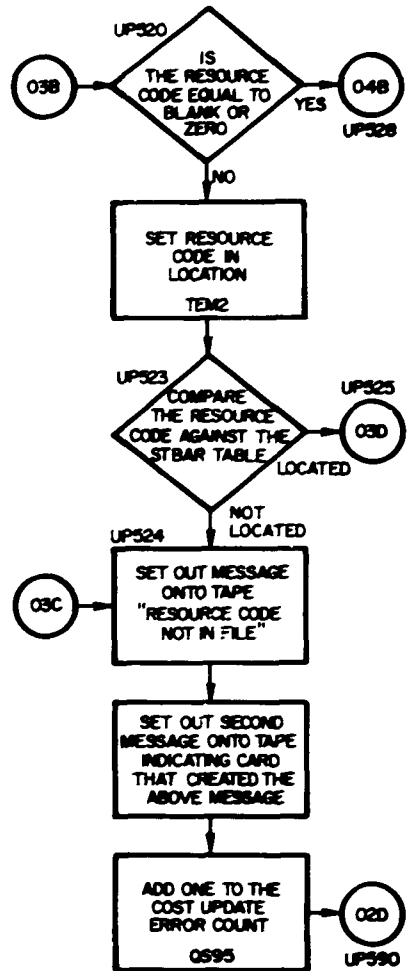
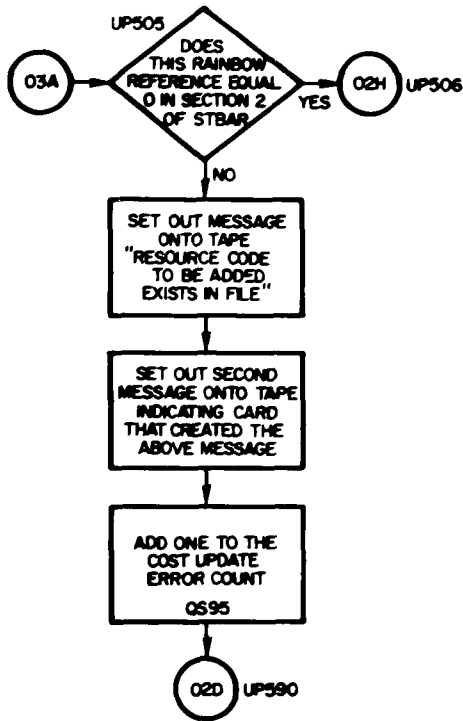
Region QRAIN (continued)

EXPLANATION OF CALLING SEQUENCE: (continued)

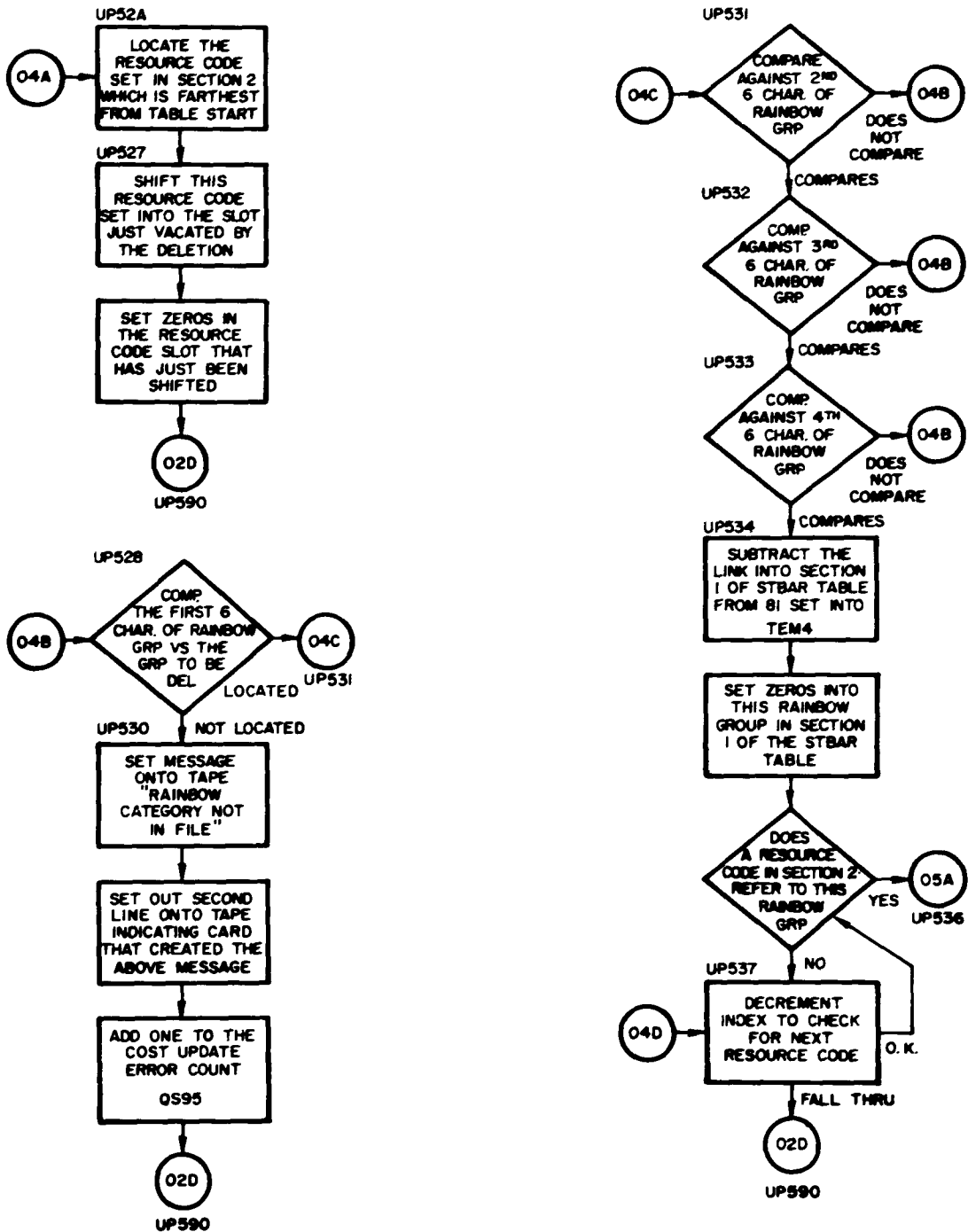
After processing has been completed in these areas the program will then go back and read another input card and transfer to one of the above locations again. After all 5 and 6 input cards have been processed control is returned to the outlink.

REGION GRAIN

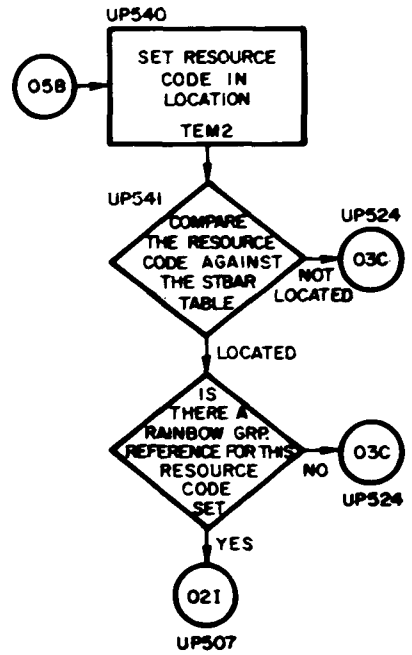
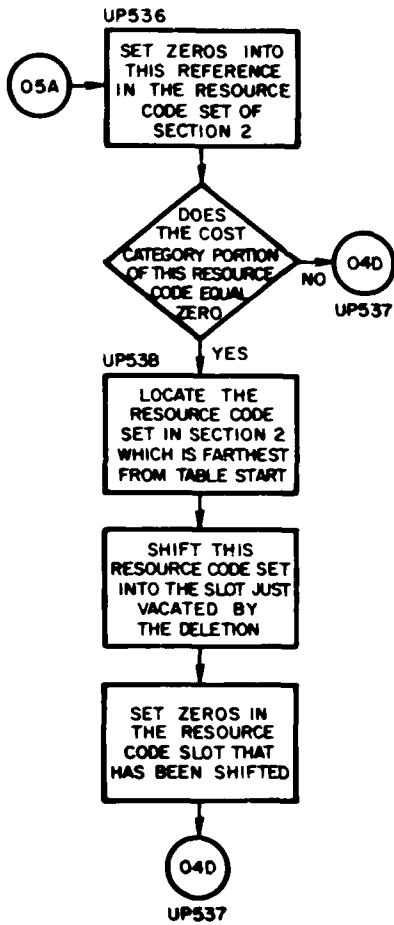


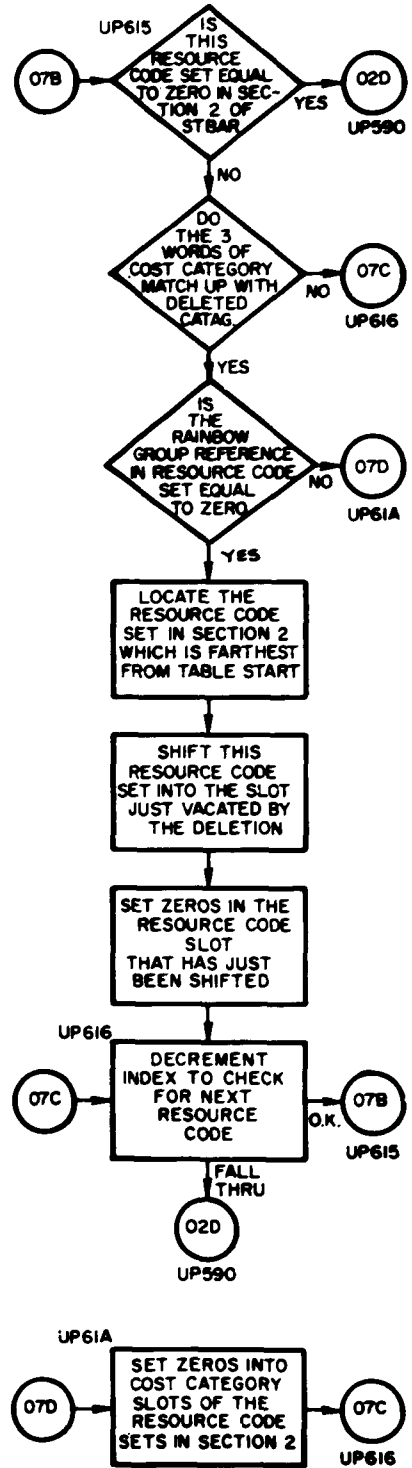
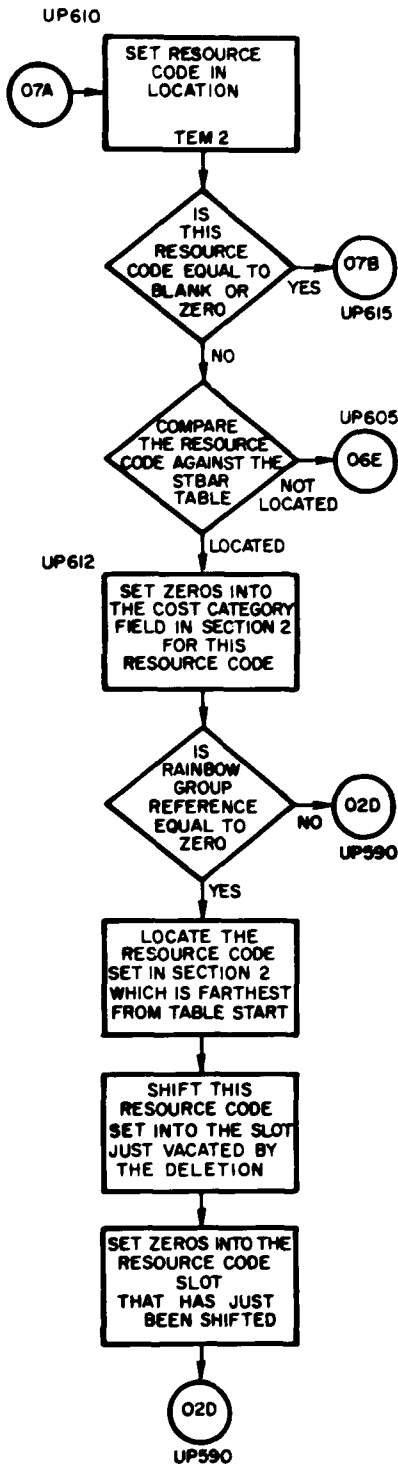


REGION GRAIN



REGION GRAB



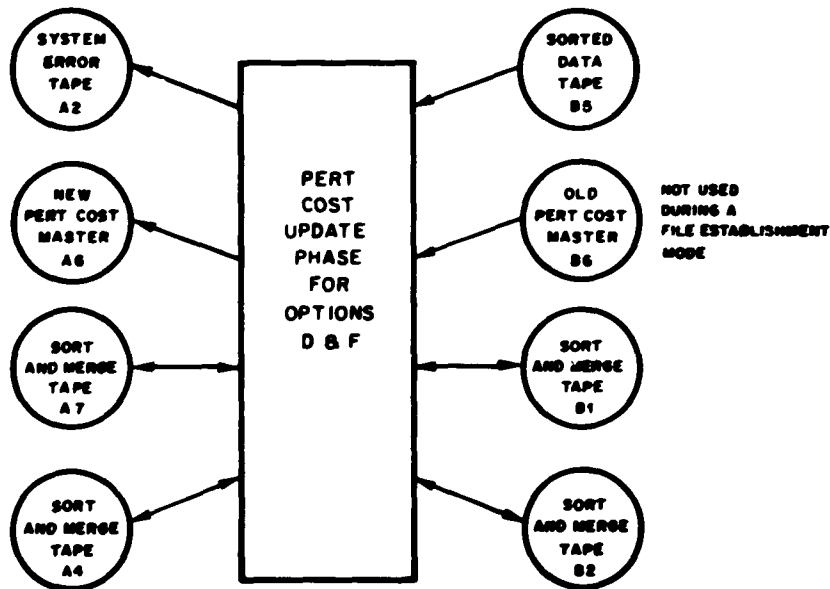


Cost Update Phase Tape Operations

The tape manipulations that are required for the update phase will vary with the option requested. The tape configurations for these three groups of options will be set up as follows.

Options D and F

If the program is running under one of these options it will have read a USERS TIME TAPE in the PERT time merge phase. The time records are then sorted in charge number sequence using the 4-tape sort. The results can be either on channel A or B depending on the number of merge passes. The channel opposite the side containing the results of the time merge will be set up to receive the data to be sorted for output reports, again using the 4-tape sort. The information that is read in during the update phase, excluding file establishment time, will be the SORTED DATA TAPE B5, OLD PERT COST MASTER B6, and the time information from the 4-tape sort. The following tape flow will show the configuration for options D and F in the update phase.



The USERS TIME TAPE B4 has been rewound and unloaded during the time merge phase and is not used during this update phase. When the program is operating in a file establishment mode the OLD PERT COST MASTER TAPE B6 is not needed, since the program will be creating a NEW PERT COST MASTER TAPE from input data only.

Any error messages that will not stop the program will be set out on the SYSTEM ERROR TAPE A2 and the count of the errors will be set out as described on Page III-G-6. This tape will not be rewound at the end of this phase, since it will become the SYSTEM OUTPUT TAPE and most reports will be written as a second file on this tape. The SORTED DATA TAPE will hold all the cost inputs into the system. If these were inputs for the time merge, this tape will be positioned past the last time merge input and will read the first cost input at the beginning of this phase. At the end of the update phase all of the inputs on the SORTED DATA TAPE should be completed and this tape is rewound and unloaded. The OLD PERT COST MASTER, if not in a file establishment mode, and the NEW PERT COST MASTER are both rewound and unloaded at the end of this phase.

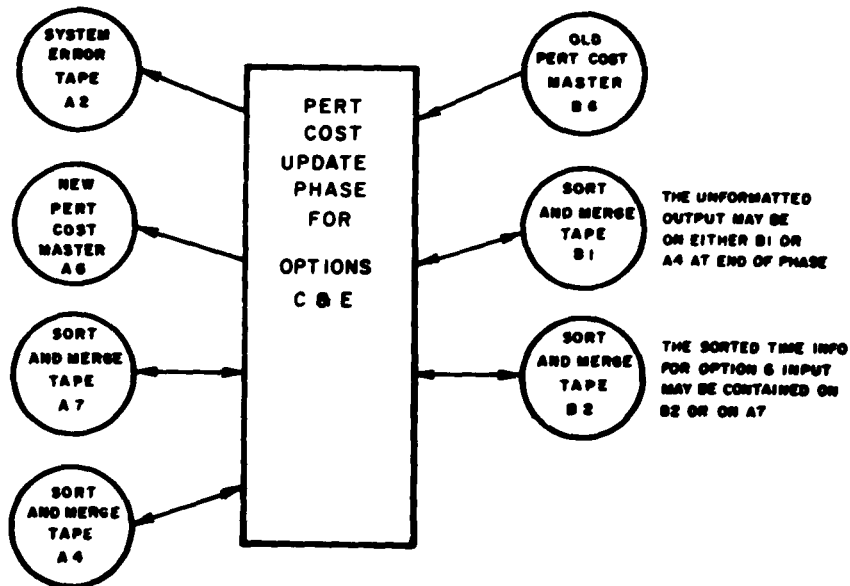
The information making up the PERT COST MASTER is actually the second data file on the tape. The first data file will be the input parameters and the activities tied to charge number information. Two end-of-file marks are placed on this tape behind the activities tied to charge number data when the time merge phase is completed, but the tape is not rewound. At the beginning of the Cost Update phase this second data file, consisting of rate table, skill table, and PERT Cost information, is set onto this PERT COST MASTER. When this phase is completed, two more end-of-file marks are placed on this tape, and it is rewound and unloaded. Both data files on this tape are created in a binary mode and are blocked. A maximum of nine reels of the NEW PERT COST MASTER can be created as well as a maximum of nine reels of the OLD PERT COST MASTER read for any program run.

If it is found necessary to list the SYSTEM ERROR TAPE, it will be printed out off-line at the completion of the update phase. If the errors indicated on this list have to be corrected before any reports can come out, the program

is then removed from the machine. The input errors then are removed from the data deck, corrected, and set back into the deck to begin operating again. The program will then be restarted from the beginning.

Options C and E

Under Option C or E the program essentially bypasses the update phase. During the preceding time merge phase, the program has created a SORTED TIME TAPE to be used when operating under Option G. In the update phase, the program will set out information to print the Work Package/Activity Report, which is an automatic feature for these options. These options can not run under a file establishment mode, since the data needed from the cost files would not be present if running under this mode. The following tape flow will show the configuration for Options C and E in the update phase. The USERS TIME TAPE B4 will have been read previous to this phase as explained in Options D and F. The handling of the sort tapes will vary from that explained in options D and F in that after the completion of the 4-tape sort, where the time records are sorted in charge number sequence, the output information does not go into a sort. The channel opposite the side containing the results of the time merge will be set up to write the SORTED TIME TAPE and the output data for the Work Package/Activity Report.



Tape A7 or B2, depending on the channel available, will be the tape that contains the sorted time information, and A4 or B1 will contain the unformatted output report information.

The SORTED DATA TAPE B5 should be completed during the time merge phase and rewound and unloaded during that phase. The program expects no cost input data during the update phase for Options C and E. The information on the OLD PERT COST MASTER is duplicated on the NEW PERT COST MASTER, with the exception of the program name if the name has changed. All other data is reproduced exactly as carried on the OLD PERT COST MASTER with the following fields being selected for use with the Work Package/Activity Report.

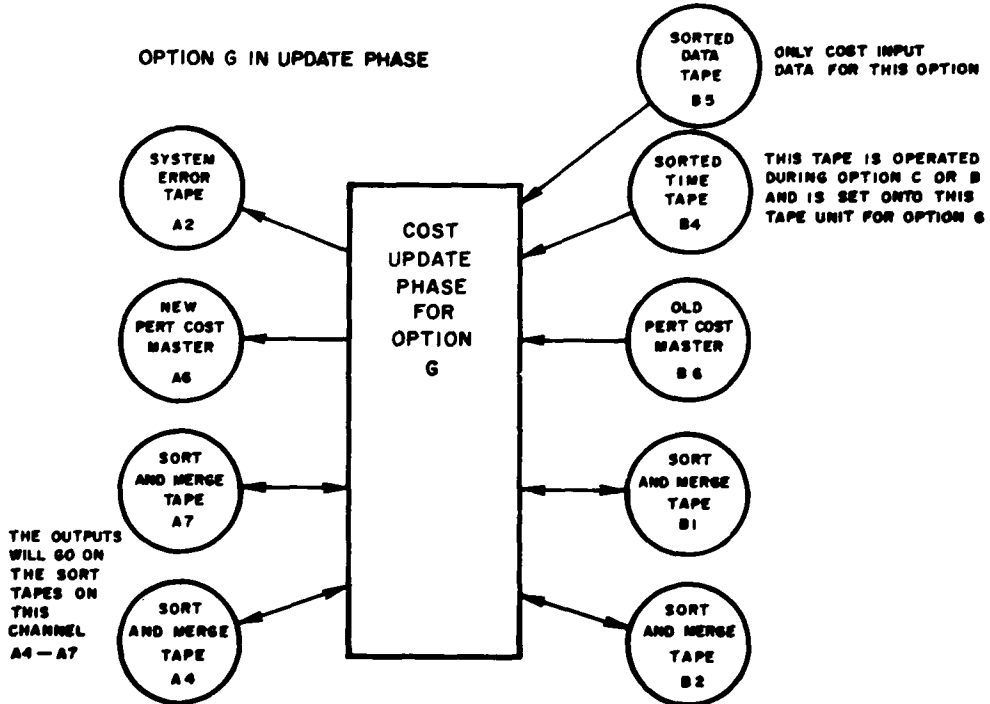
- (1) charge number level
- (2) charge number description
- (3) responsible organization

Option G

Under this option the program will be handled similarly to Options D or F except for the following conditions.

The time information in charge number sequence will be on a SORTED TIME TAPE that was created during Option C or E. This tape will be set onto B4. Since there is no sort involved to get this time information during option G, the data for the output reports can be set on the "A" channel without interrogating the sort program for the right channel. Option G will essentially bypass the time merge phase and therefore does not expect any Type 1 or Type 2 input data. The first record read from the SORTED DATA TAPE will be cost input data for this phase. The following tape flow will show the configuration for Option G in the update phase. It is possible, without any time information, to run Option G for both file establishment and cyclic running as requested by control card input. If this condition is requested, the SORTED TIME TAPE does not have to be present because the program will ignore this tape, and for file establishment the OLD PERT COST

MASTER is ignored. Thus, when time information is to be suppressed, the tape configuration as shown below does not include B4 for cyclic running and omits B4 and B6 for file establishment.



Cost Update Phase On-Line Messages

The messages forthcoming on the on-line printer regarding the update phase are.

- (a) For Option D or F on File Establishment

TAPE A6 HAS BEEN SELECTED FOR WRITING
 TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
 TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
 END OF PERT COST UPDATE PHASE

Following this last line will be the phase-ending messages described on Page III-G-6. These phase-ending messages likewise will follow the messages shown below.

(b) For Option D or F Not a File Establishment

TAPE B6 HAS BEEN SELECTED FOR READING
TAPE A6 HAS BEEN SELECTED FOR WRITING
TAPE B6 IS NOW REWINDING AND SHOULD UNLOAD
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT COST UPDATE PHASE

Even though tapes B6 and A6 had been selected in the time merge phase they are again selected, since the program handles the SECONDARY MASTER and PERT COST MASTER as two separate master files though they are on the same physical tape.

(c) For Option D or F With Multiple Master Tapes

TAPE B6 HAS BEEN SELECTED FOR READING
TAPE A6 HAS BEEN SELECTED FOR WRITING
TAPE B6 IS NOW REWINDING AND SHOULD UNLOAD
SET NEXT REEL OF SERIES ON TAPE B6
TAPE B6 HAS BEEN SELECTED FOR READING
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
SET NEXT REEL OF SERIES ON TAPE A6
TAPE A6 HAS BEEN SELECTED FOR WRITING
TAPE B6 IS NOW REWINDING AND SHOULD UNLOAD
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT COST UPDATE PHASE

The above process of setting the next reel of series onto the tape units can continue for up to nine tapes on both A6 and B6. When this next-reel-of-series

message refers to B6, it is concerned with the next tape in the series that was created in a prior cyclic run. When it refers to A6, it means to set a blank or utility onto this tape unit. Since these tapes are not alternating, the program must wait until the indicated tape is rewound, unloaded, and a new tape loaded before it can proceed.

(d) For Option C or E

TAPE XX HAS BEEN SELECTED FOR WRITING
TAPE B6 HAS BEEN SELECTED FOR READING
TAPE A6 HAS BEEN SELECTED FOR WRITING
TAPE XX IS NOW REWINDING AND SHOULD UNLOAD
*** SAVE TAPE XX FOR NEXT RUN ***
TAPE B6 IS NOW REWINDING AND SHOULD UNLOAD
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT COST UPDATE PHASE

The tape indicated by XX will be the SORTED TIME TAPE that is created for use in Option G. Depending on the channel available for writing this tape, the number will be either A7 or B2. The SORTED DATA TAPE was completed in the time merge phase and the above series of messages does not refer to it.

(e) For Option G With No Time Information

This condition will take the same form as (b) above except for the inclusion of the following line prior to the referenced series of messages:

TAPE B5 HAS BEEN SELECTED FOR READING

This line will be found in the Update Phase messages because the only data carried on this tape will be cost inputs as indicated by Option G.

(f) For Option G With Time Information

This condition will read the SORTED TIME TAPE created in Option C and set onto the same physical tape as the USERS TIME TAPE. The series of messages for this situation are:

TAPE B5 HAS BEEN SELECTED FOR READING
TAPE B4 HAS BEEN SELECTED FOR READING
TAPE B6 HAS BEEN SELECTED FOR READING
TAPE A6 HAS BEEN SELECTED FOR WRITING
TAPE B5 IS NOW REWINDING AND SHOULD UNLOAD
TAPE B4 IS NOW REWINDING AND SHOULD UNLOAD
TAPE B6 IS NOW REWINDING AND SHOULD UNLOAD
TAPE A6 IS NOW REWINDING AND SHOULD UNLOAD
END OF PERT COST UPDATE PHASE

The order in which some of the tapes rewind and unload is dependent on the amount of information carried and the end-of-file mark. Therefore, some of the messages may vary slightly from that shown above.

Cost Update Phase Error Messages

The errors determined during the cost update phase are set out on the on-line printer when they will cause the system to stop, or they are set out on the SYSTEM ERROR TAPE if they do not cause a stop in the program.

The error messages that are set out on the SYSTEM ERROR TAPE, with the reason for each message, are as follows:

(a) AN INSERTION COULD NOT BE MADE FOR THE FOLLOWING CARD DUE TO NO 7-0 CARD.

XX - 80 characters of input card - XX

An input being processed by the system is attempting to add a new Performing Unit/Resource Code to a charge or summary number that has never been set up by means of a 7-0 card. The last line of this message will be a reproduction of the input card for which this message

applies. A reproduction of the troublesome input card will usually follow the other messages in this section.

(b) THE FOLLOWING CARD WAS AN UNMATCHED DELETION OR CHANGE

An input being processed by the system is attempting to delete or change a field in a charge or summary number record that does not exist.

(c) THE FOLLOWING CARD WAS A MATCHED ADDITION

An input being processed by the system is attempting to set up a charge or summary number, or Performing Unit/Resource Code for one that presently exists.

(d) CANNOT UPDATE A DELETED RECORD, CARD REJECTED

The input is attempting to update a record that has been deleted by a prior input card. This record may be a charge or summary number, or a Performing Unit/Resource Code.

(e) A DATE HAS NON-NUMERIC CHARACTERS IN THE DD OR YY

The charge number start or end date has a bad day or year in the 7-2 card as will be shown in the format set up below this message.

(f) CANNOT LOCATE AN INDICATED MONTH

The charge number start or end date has an illegitimate month field.

(g) THE DAYS DO NOT FALL IN THE RANGE SPECIFIED BY ITS MONTH

The number of days associated with a particular month does not fall in the range specified for that month.

(h) XXX FIELD IN ACTUAL INPUT CARD OUT OF BOUNDS

The date in one of the fields of this actual input varies by more than 60 months from the data presently carried in the file. The field on the actual input card that is involved will be indicated at the position marked XXX in the message.

The XXX will stand for the following information:
1 = 1st, 2 = 2nd, 3 = 3rd, 4 = 4th.

(i) XXX FIELD TRIED TO DELETE ACTUAL NOT IN FILE

One of the fields on an actual input card is attempting to delete an actual field that has never been set up. The XXX refers to the same data as explained in (h) above.

(j) INPUT ON A DELETED RESOURCE CODE

After a resource code of a particular charge number and performing unit has been deleted, additional input attempting to modify this resource code is found. Every input of this type will be bypassed, and the above message with a reproduction of the card in error will be set out.

(k) THIS RESOURCE CODE IS RESERVED FOR XXXXX

Each resource code, if tied to hours or units, is so flagged in its record, and any input at the hours or units level must match this indicator. The XXXXX field in this message refers to (1) HOURS or (2) UNITS.

(l) DOLLAR INPUT FOR RESOURCE CODE WITH UNIT RATE

Since the dollar value will be a result of an extension using the rate table, the program will not accept any dollar inputs if that Performing Unit/Resource Code or Resource Code combination is tied to a unit rate.

(m) TOTAL DOLLARS FOR RESOURCE CODE WITH OVER-HEAD RATE

Since the total dollar value will be a result of an extension using the rate table, the program will not accept any total dollar inputs if that Performing Unit/Resource Code or Resource Code combination is tied to an overhead rate.

(n) DUPLICATE INPUTS FOR BUDGETS OR ESTIMATES

If two inputs are found to refer to the same charge number, performing unit, and resource code for the same months, the first input will be processed normally and the second will be bypassed, with the above message printed out.

The following messages will not have the 80 characters of the input card as a last line tied to the message.

- (o) TOTAL DOLLAR FIELD IS LESS THAN DIRECT DOLLARS
ON XXXXXXXXXX

CHARGE NO. XXXXXXXXXXXXXXXXXXXX P. U. XXXXXX
R. C. XXXX

When a particular month or set of months contain less dollar value in total dollars than in direct dollars, but not a zero value, this message is set out. On the first line the X's refer to one of the following three categories: (1) budgets, (2) estimates, (3) actuals. The second line will contain the charge number, performing unit, and resource code involved in this situation.

- (p) ACTUAL TOTAL DOLLAR FIELD IS ZERO WITH A VALUE
IN DIRECT DOLLARS

CHARGE NO. XXXXXXXXXXXXXXXXXXXX P. U. XXXXXX
R. C. XXXX DATE MMMYY

When a particular month in the actual fields contains a zero in the total dollars and a value in direct dollars this message is set out. The second line will contain the charge number, performing unit, resource code, and month and year concerned with this problem. The program will move, for output purposes only, the direct dollars into the total dollars field. If budgets and estimates are also involved with this problem, the program will move the direct dollars into the total dollars field for output reporting only, but will not put out an exception message.

- (q) THE FOLLOWING ITEM COULD NOT BE DELETED DUE
TO ACTUALS IN FILE

CHARGE NO. - XXXXXXXXXXXXXXXXXXXX
PERF. ORG. - XXXXXX
RES. CODE - XXXX

In attempting to delete a charge or summary number some actual dollar values were found which prevented this item from being deleted. The last portion of this message will contain the charge number, performing unit, and resource code that contain the actuals.

- (r) TIME RECORD IN ERROR -
CHG. NO. XXXXXXXXXXXXXXXXXXXX
PRED. XXXXXXXXXX SUCC. XXXXXXXXXX

The SORTED TIME TAPE contains a charge number that does not exist on the PERT COST MASTER TAPE. This message will contain the charge number involved, plus its predecessor and successor numbers. Each record found in error will be printed out.

The following messages will be set out on the on-line printer and will stop the system.

- (s) SEQUENCE ERROR ON FOLLOWING CARD
XX - 80 characters of input card - XX

If the input cards from the SORTED DATA TAPE are not in a correct sequence this message is forthcoming. It will also print out the card that is out of sequence.

- (t) SEQUENCE ERROR ON OLD PERT MASTER

If the OLD PERT COST MASTER is not in a correct sequence this message will be set out. This will apply at the charge or summary number level as well as at the performing unit and resource code levels.

Cost Update Phase Region Descriptions

The following region descriptions will describe the major subroutines used in the cost update phase as well as the cost update itself.

Region PUAO-SA00

EXPLANATION OF REGION:

This region will handle the control section for the update phase. It will develop and modify the rate table, skill table, and PERT Cost data. It will read in the OLD PERT COST MASTER, the SORTED TIME TAPE and SORTED DATA TAPE, and write out the NEW PERT COST MASTER and the preliminary sort tape for the output phase.

CALLING SEQUENCE:

L TRA PUAO

INPUT:

OLD PERT COST MASTER FILE
SORTED TIME TAPE
SORTED DATA TAPE

OUTPUT:

NEW PERT COST MASTER FILE
Pre-reporting input tape

STORAGE USED:

UCHG - 25 words - charge number record in core
UPUN - 2 words - performing unit record in core
QRES1 - 600 words - packed resource code information for writing
on tape
QRES2 - 600 words - unpacked resource code information for
handling data

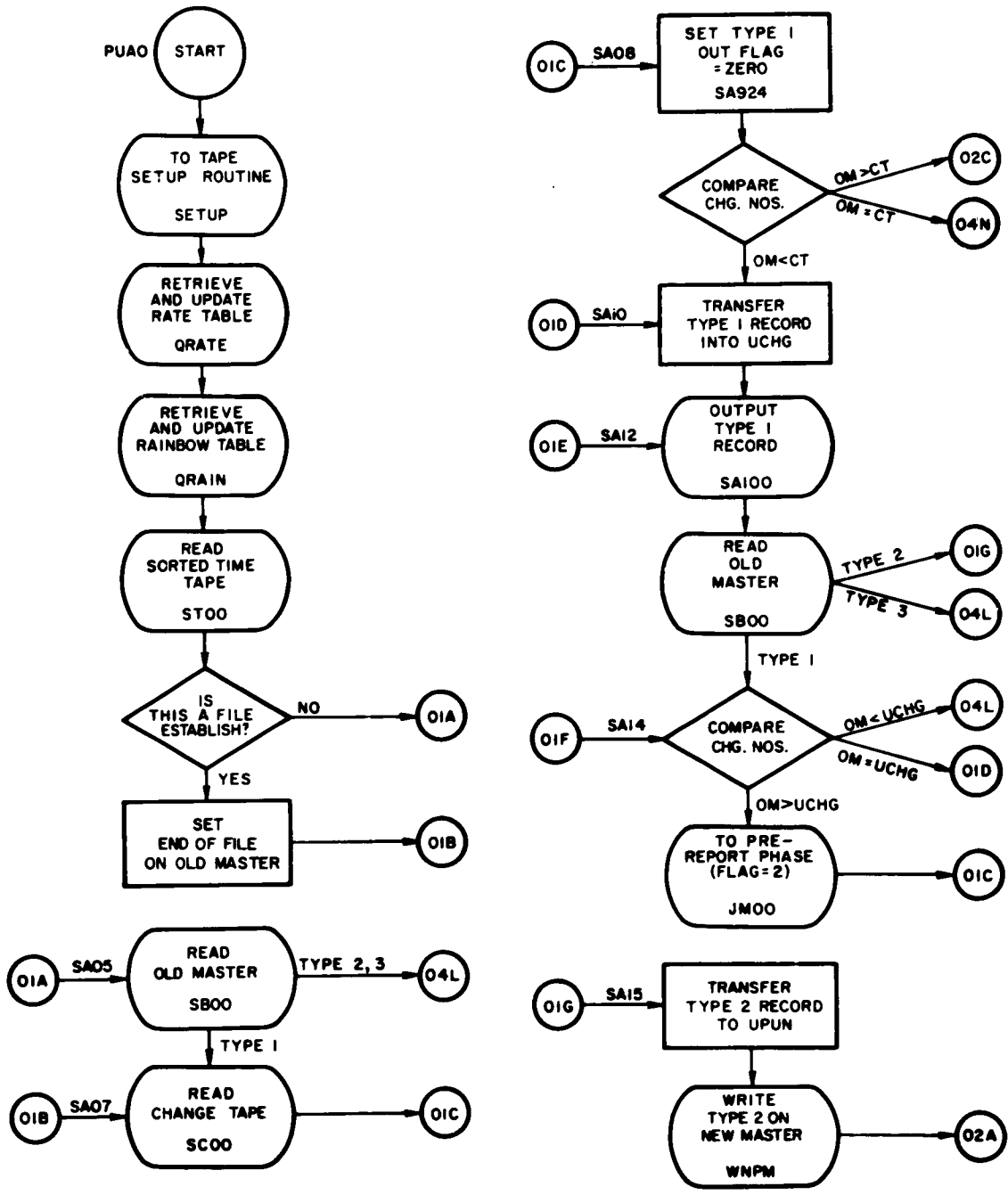
SUBREGIONS AND SUBROUTINES USED:

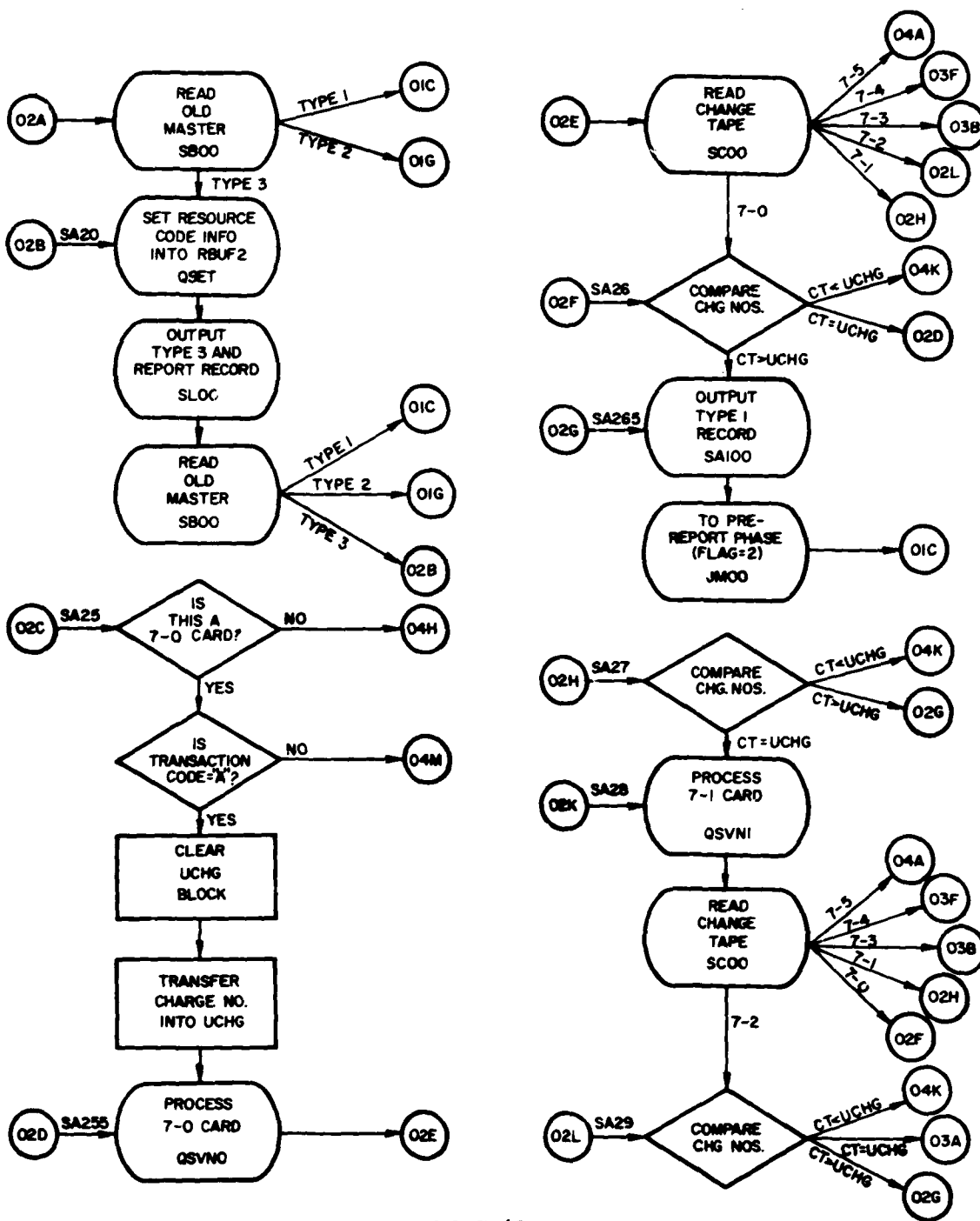
QRATE	QSET	STOO	QSVN1	QSVN5
QRAIN	QSRCH	SDOO	QSVN2	WNPM
SBOO	QCLN	SFOO	QSVN3	SETUP
SCOO	JMOO	QSVNO	QSVN4	QSRTB

EXPLANATION OF CALLING SEQUENCE:

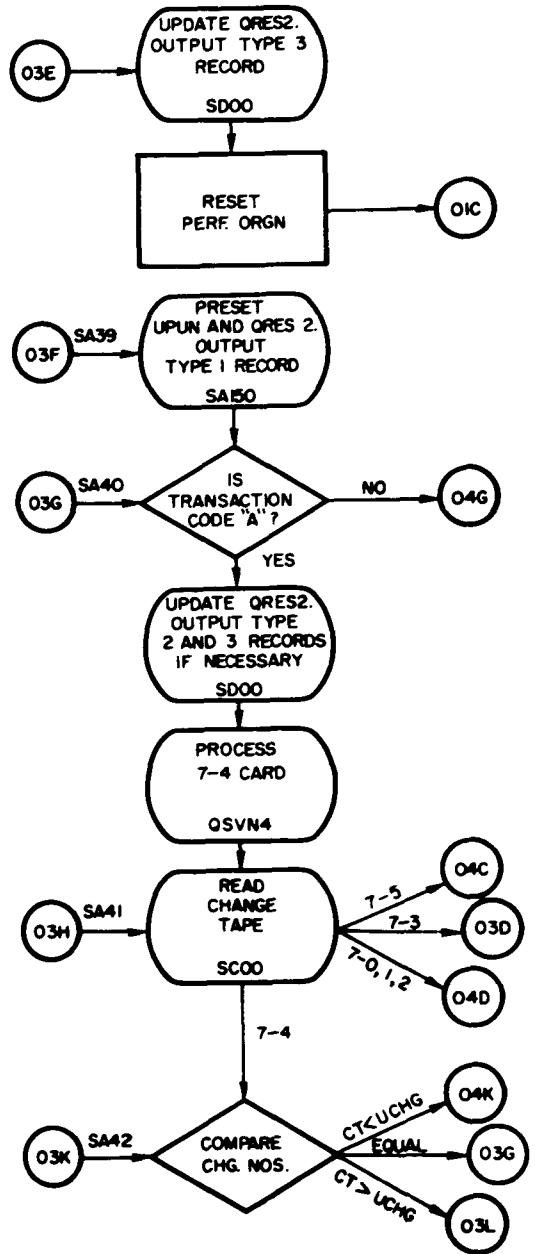
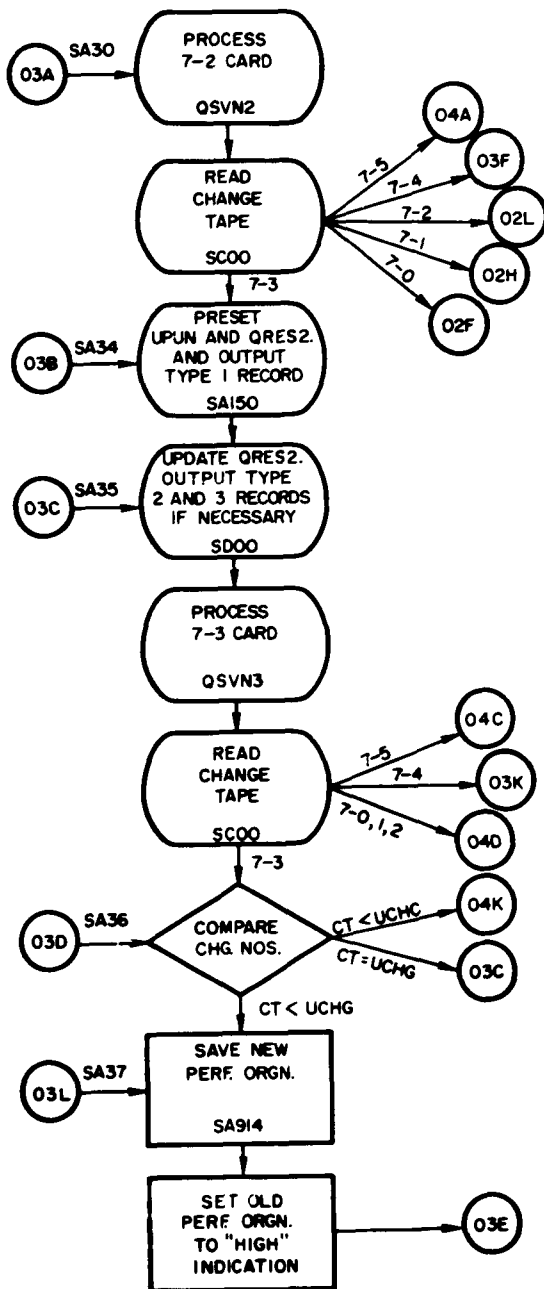
When all of the inputs are at end-of-file the program will transfer control out of the update into the 4-tape sort for preliminary sort on output data.

The locations PUAO and SA00 are equal.

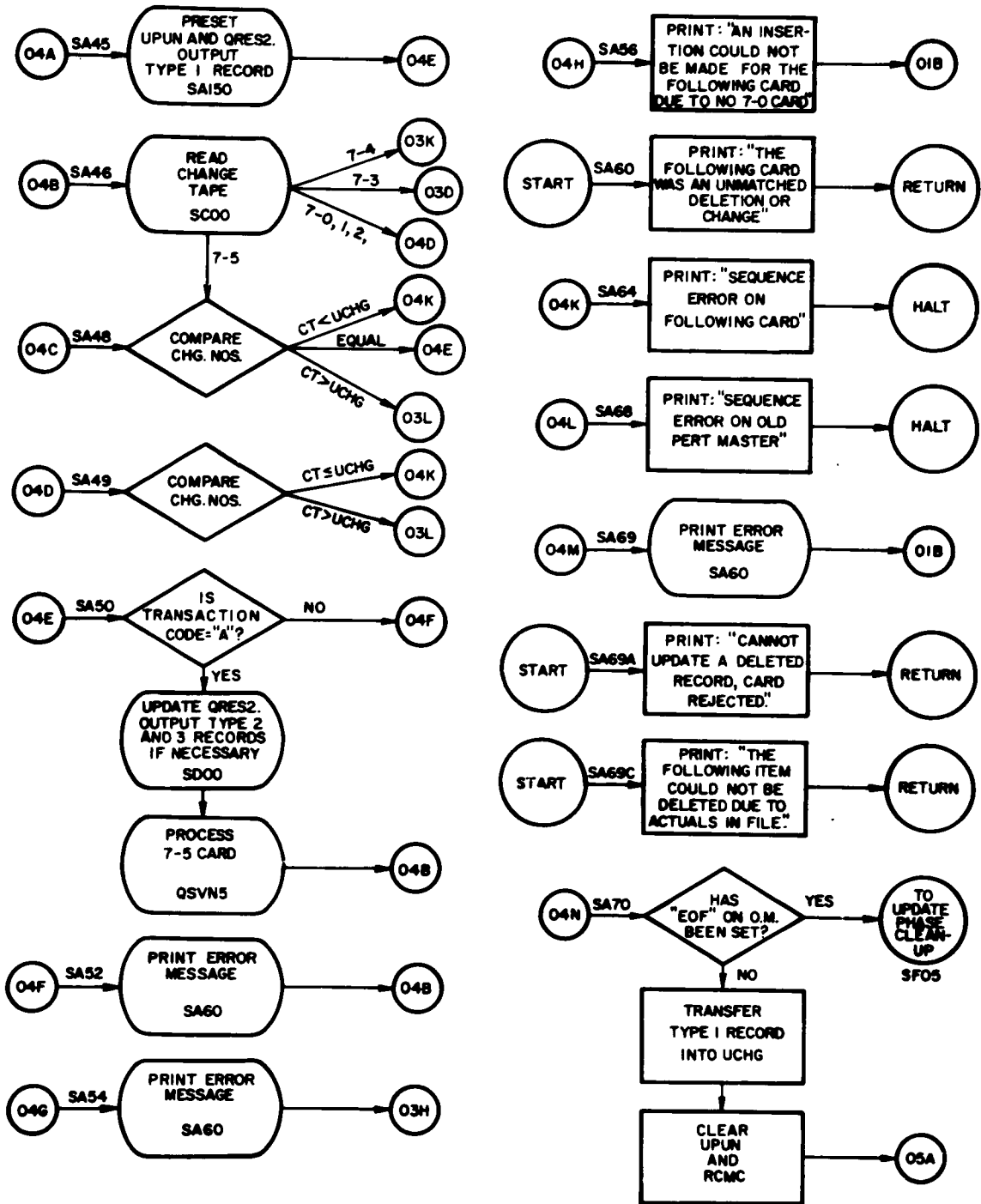


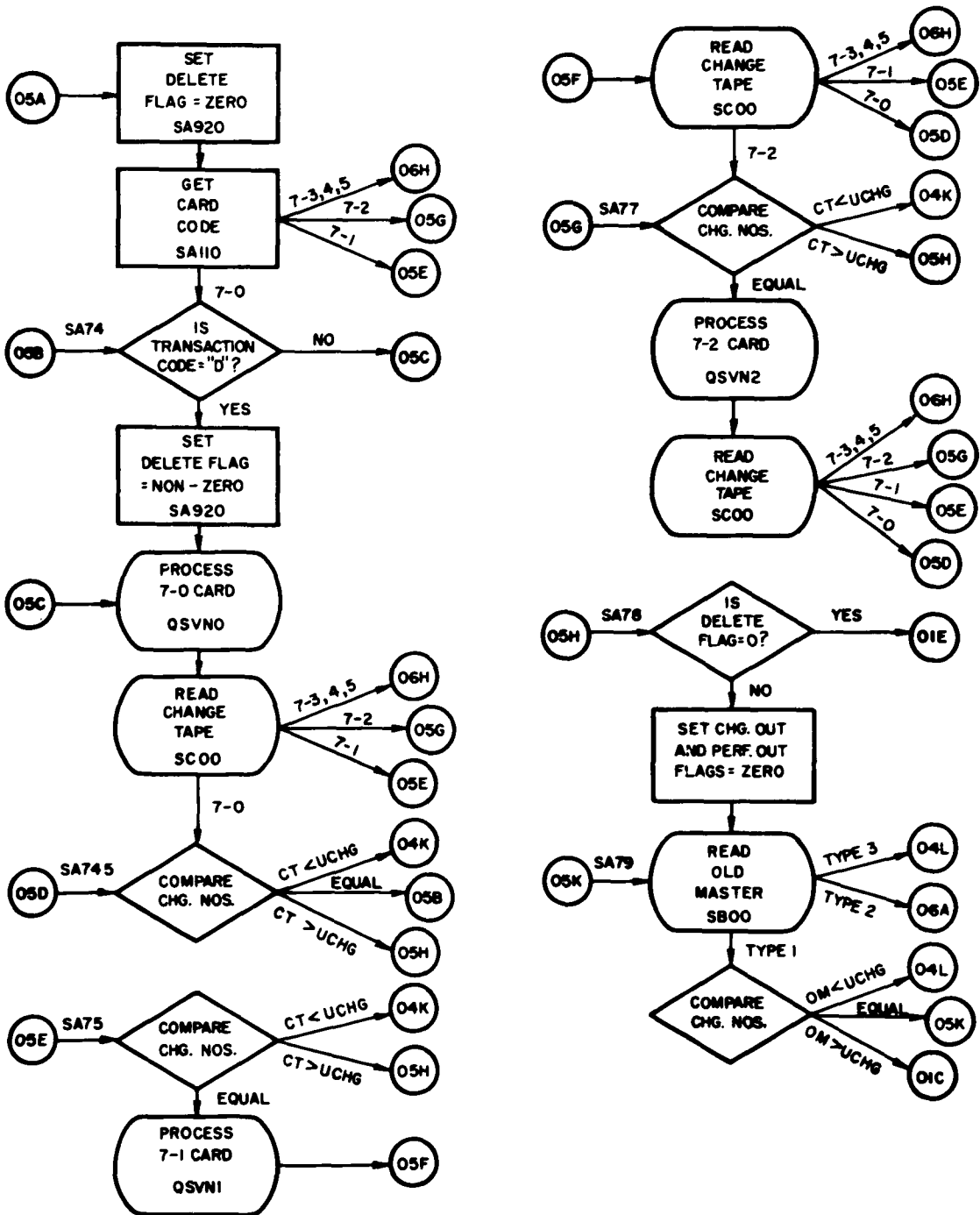


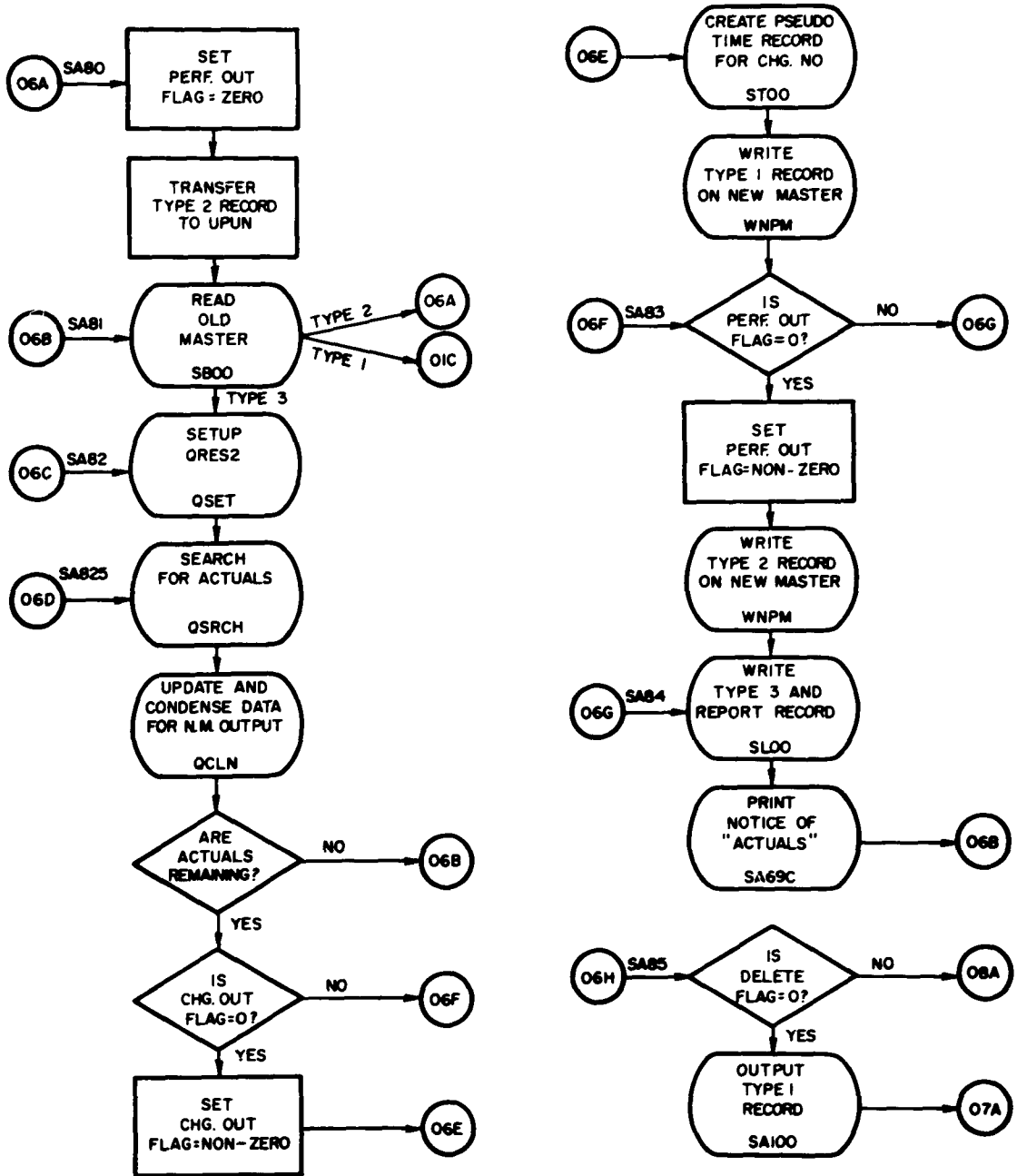
REGION PUAO



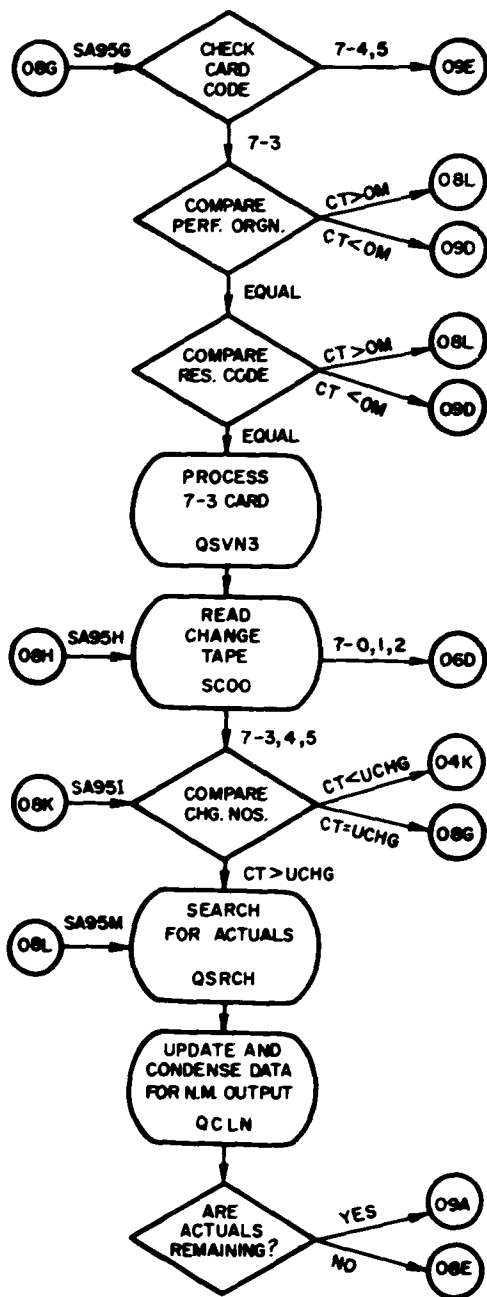
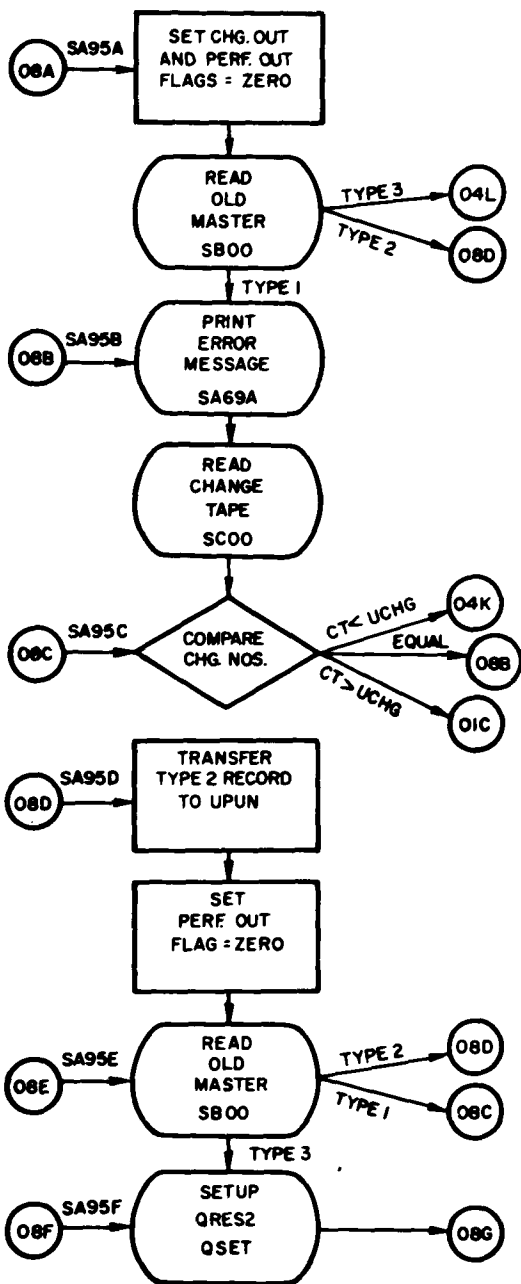
REGION PUAO



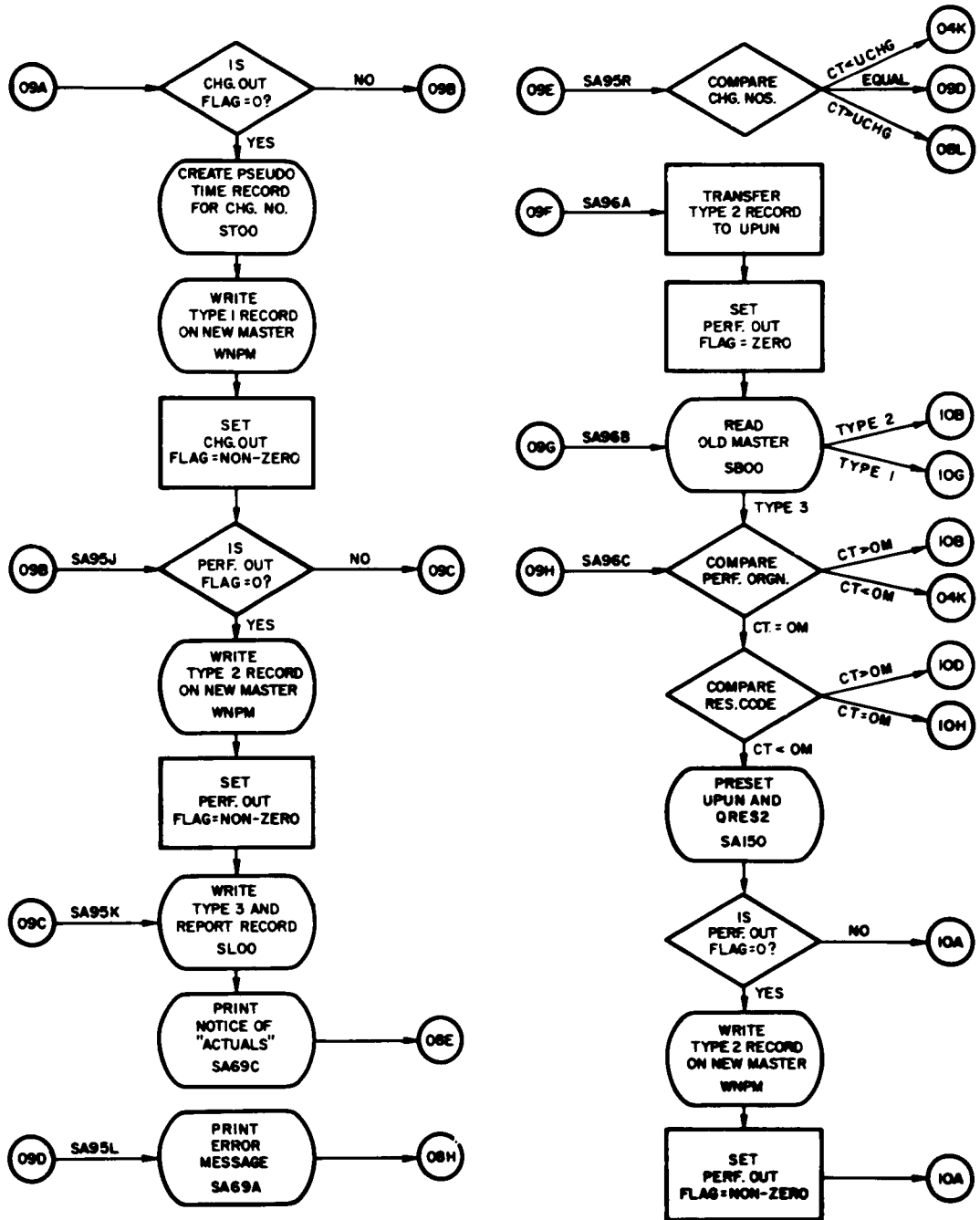




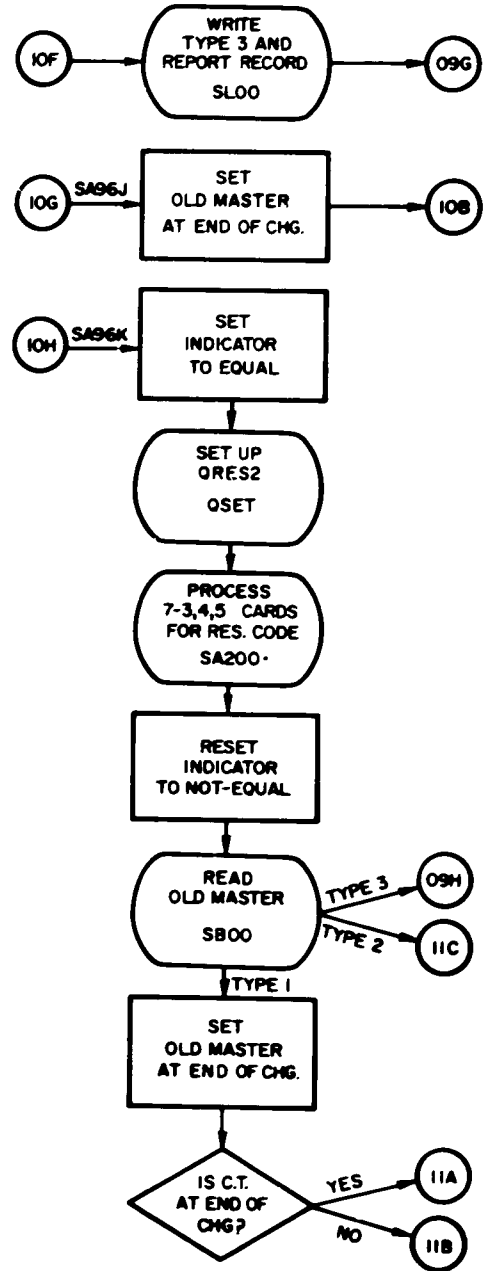
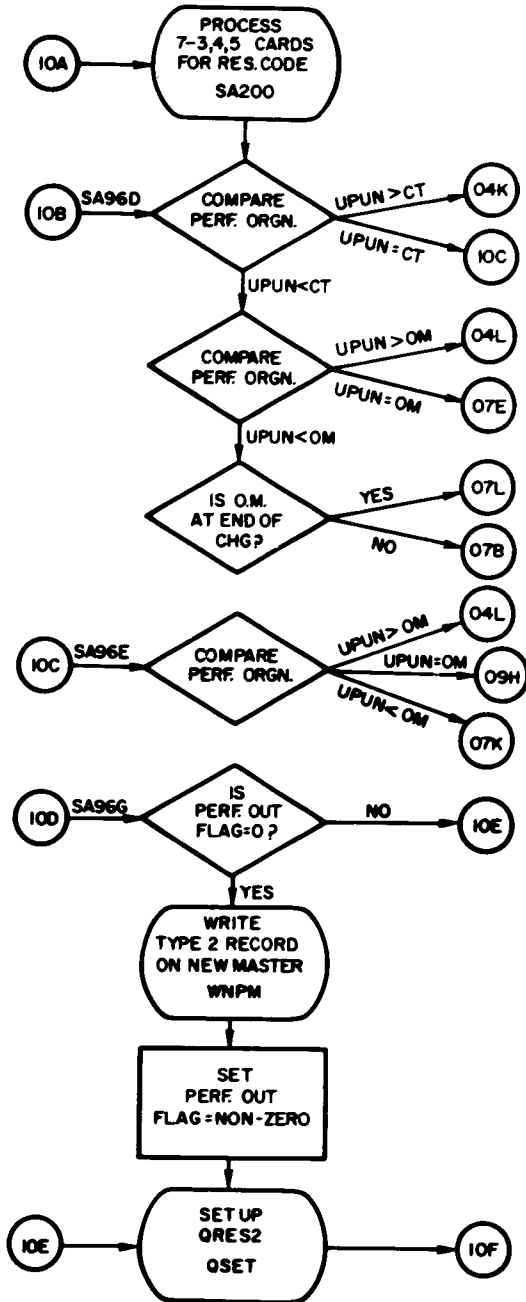
REGION PUAO

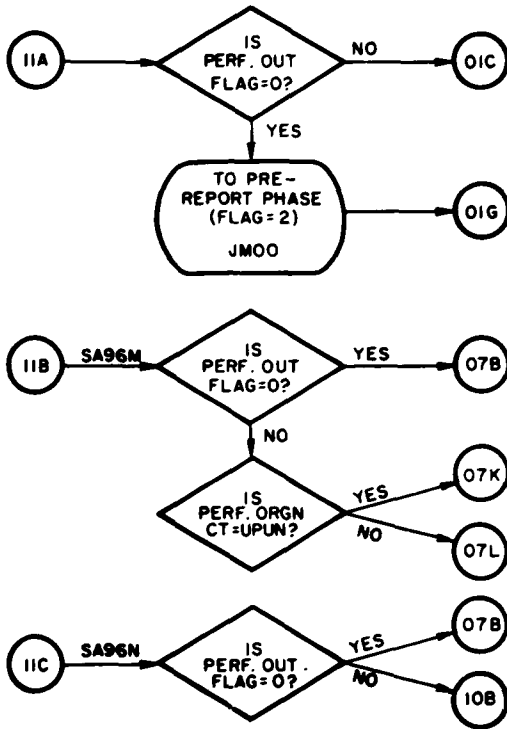


REGION PUAO

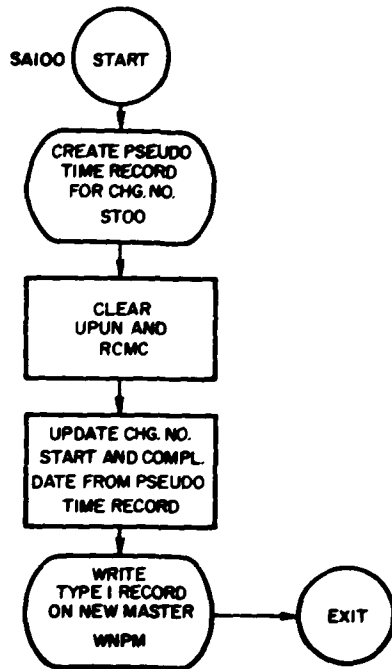


REGION PUAO

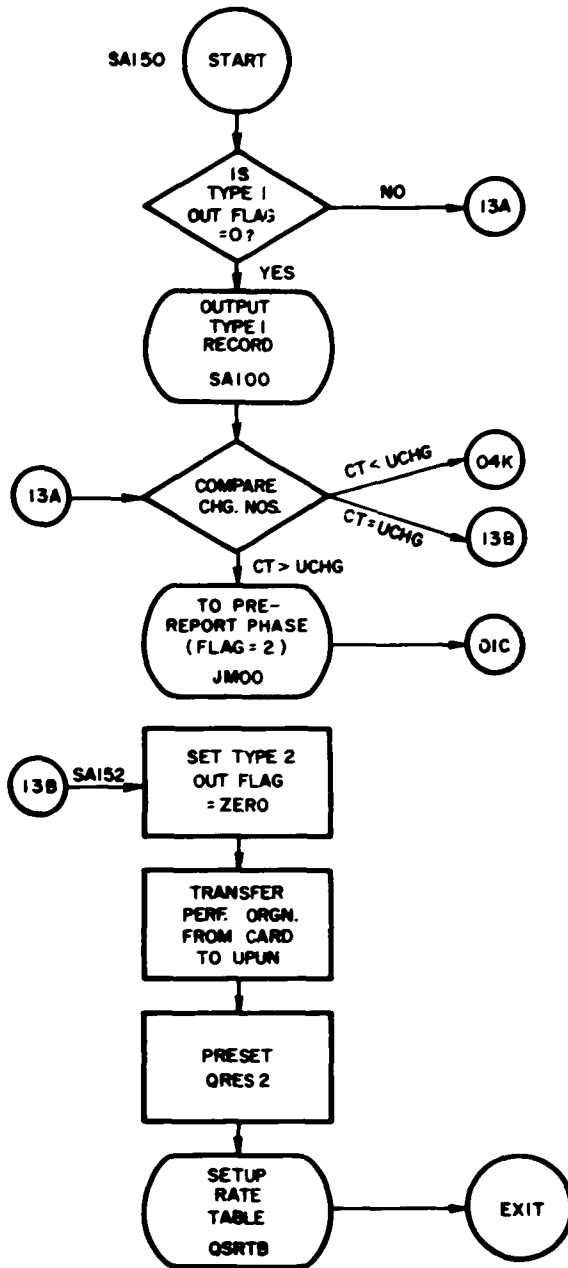




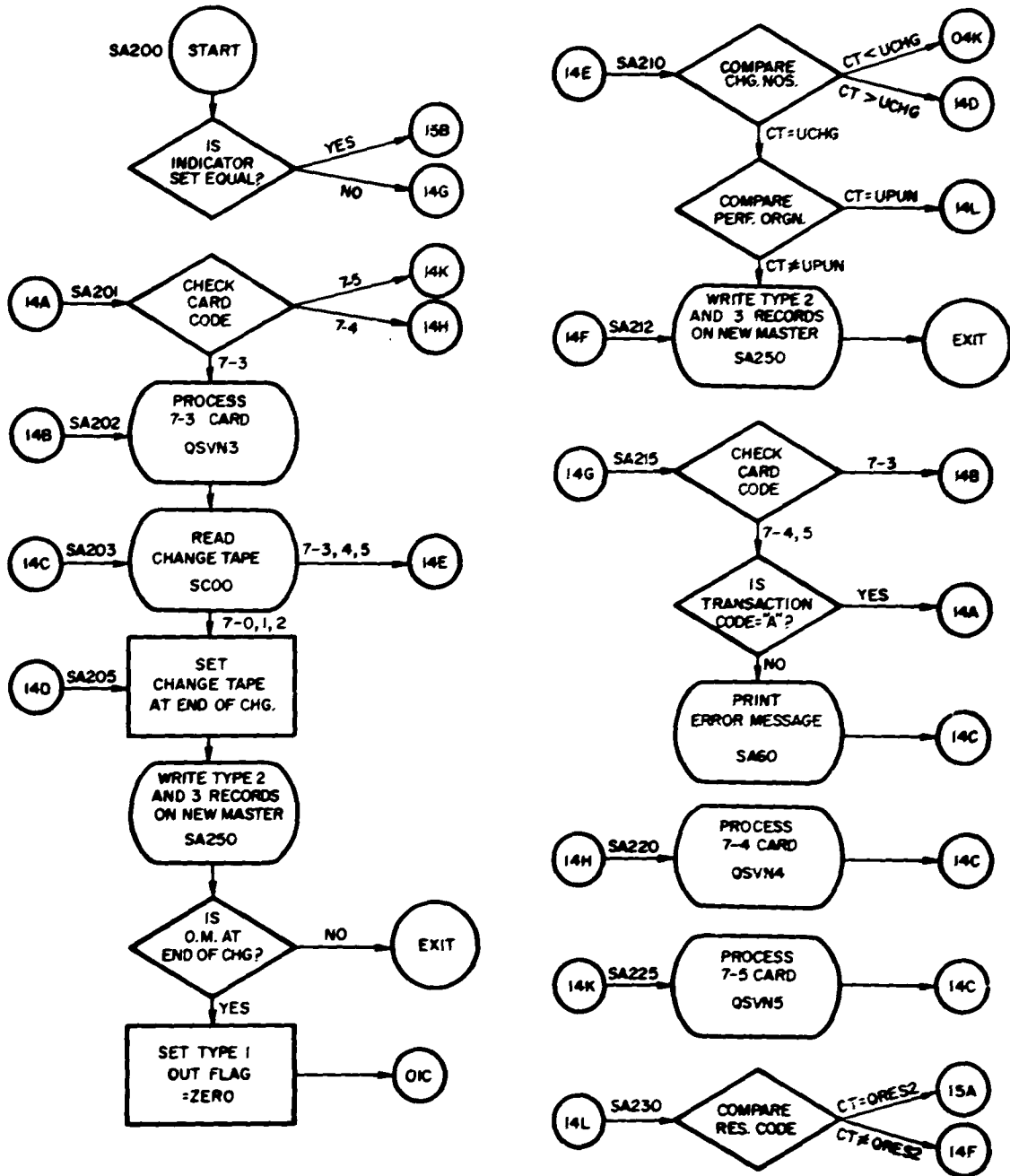
REGION PUAO
SUBREGION SAIOO



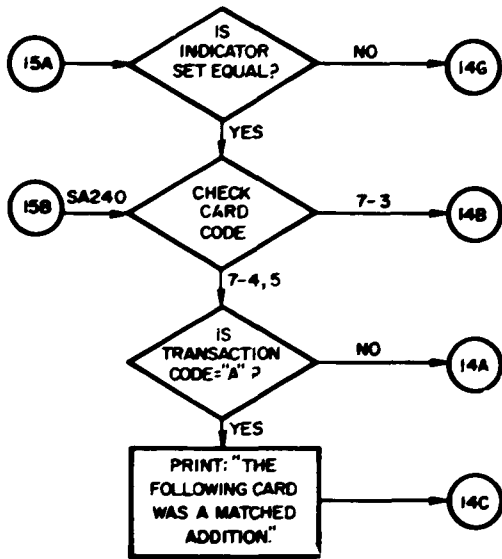
REGION PUAO
SUBREGION SA150



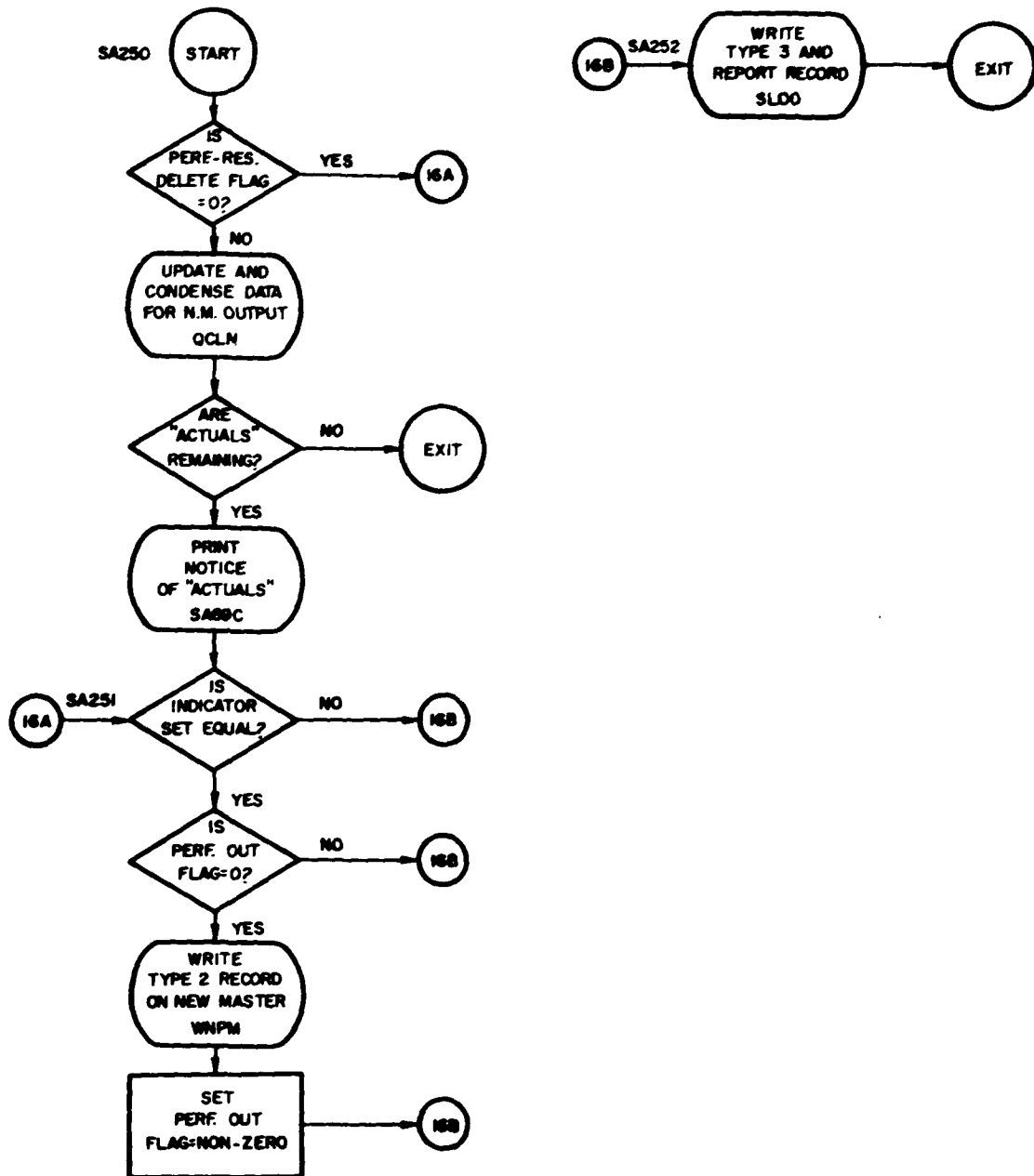
REGION PUAO
SUBREGION SA200



REGION PUAO
SUBREGION SA200



REGION PUAO
SUBREGION SA250



Region SB00

EXPLANATION OF REGION:

To read a record from the OLD PERT COST MASTER FILE

CALLING SEQUENCE:

L TSX SB00, 4
L + 1 Exit with Type 3 record
L + 2 Exit with Type 2 record
L + 3 Exit with Type 1 record or end-of-file*

INPUT:

OLD PERT COST MASTER FILE

OUTPUT:

SA901 = Location of record in address, count in decrement.
If Type 1, charge number in SA904 (3 words)
If Type 2, performing organization in SA904+3 (1 word)
If Type 3, resource code in SA904+4 (1 word)

STORAGE USED:

Not applicable

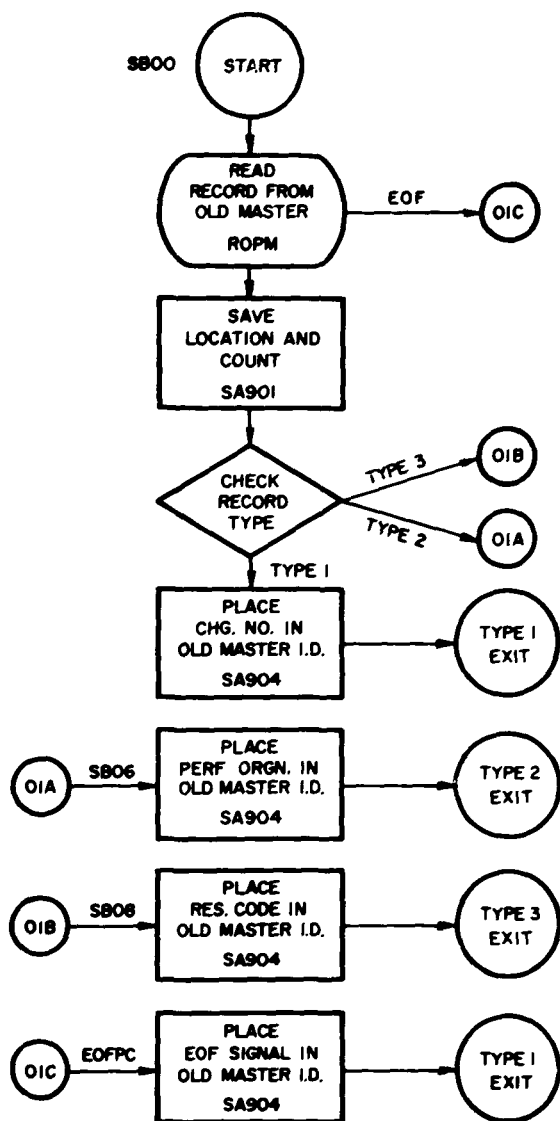
SUBREGIONS AND SUBROUTINES USED:

ROPM

EXPLANATION OF CALLING SEQUENCE:

* If end-of-file, SA904 contains 3 words of octal 7's.

REGION 8000



Region SC00

EXPLANATION OF REGION:

To read one card from the SORTED DATA TAPE.

CALLING SEQUENCE:

L TSX SC00, 4
L + 1 Exit with Type 75 card
L + 2 Exit with Type 74 card
L + 3 Exit with Type 73 card
L + 4 Exit with Type 72 card
L + 5 Exit with Type 71 card
L + 6 Exit with Type 70 card or end-of-file*

INPUT:

SORTED DATA TAPE

OUTPUT:

CHHLD = Location of card in address, count in decrement
SA905 = Charge number (3 words)
SA905+3 = Performing organization (1 word) } type 73, 74, 75
SA905+4 = Resource code (1 word) } cards only
UP451+1 - UP451+80 contains card image, one character per word

STORAGE USED:

Not applicable.

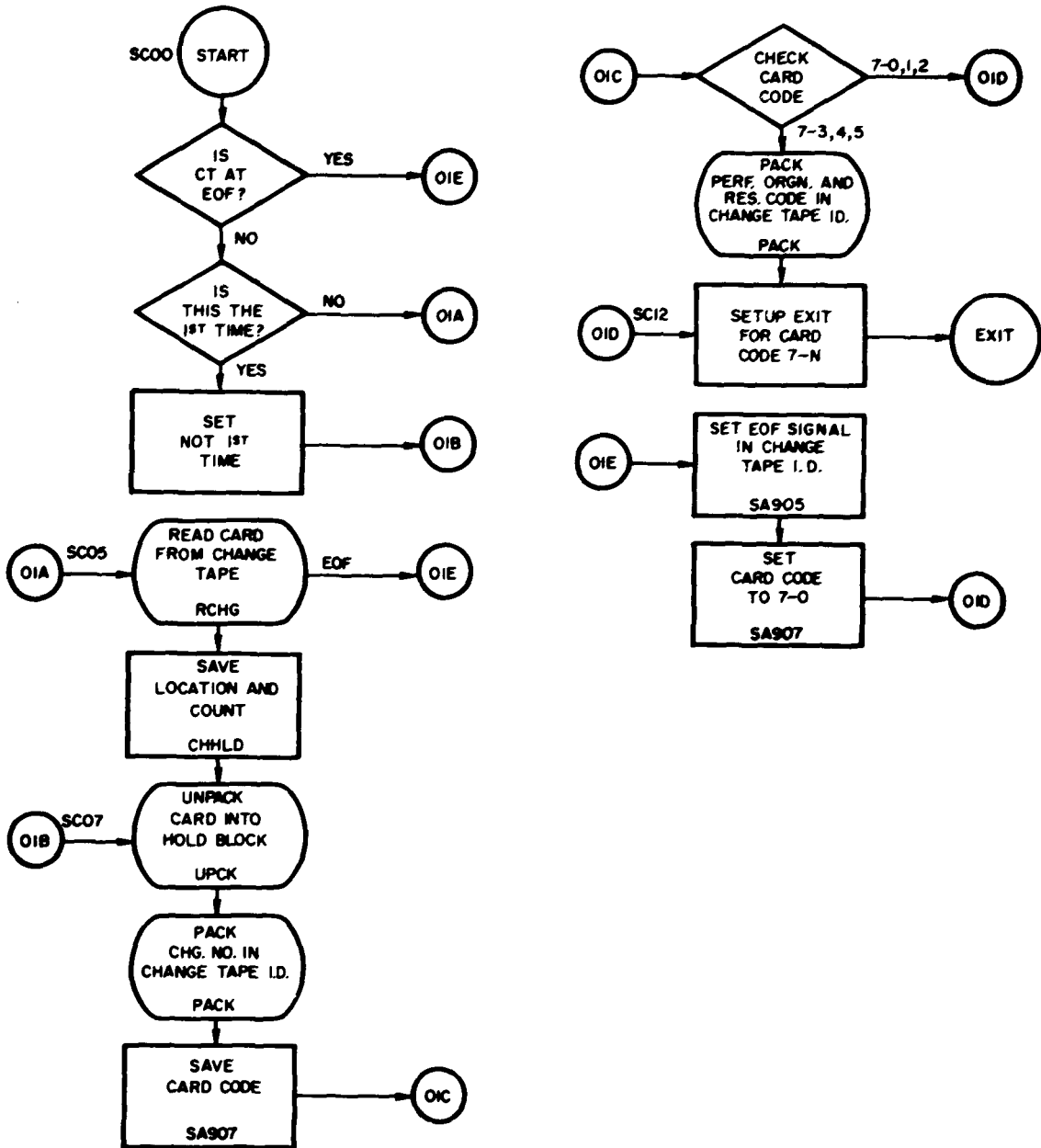
SUBREGIONS AND SUBROUTINES USED:

RCHG
UPCK
PACK

EXPLANATION OF CALLING SEQUENCE:

If end of file, SA905 contains 5 words of octal 7's and CHHLD = 0.

REGION SC00



Region SD00

EXPLANATION OF REGION:

To write performing organization and resource code records on NEW PERT COST MASTER FILE and give one charge number, performing organization, resource code item to pre-reporting control routine.

CALLING SEQUENCE:

L TSX SD00, 4
L + 1 Normal return

INPUT:

Performing organization in UPUN (2 words)
Resource code in ORES2 (N words, 600 max)

OUTPUT:

Type 2 and 3 records on NEW PERT COST MASTER
One CHG-PERF-RES item to pre-reporting (JM00)

STORAGE USED:

Not applicable

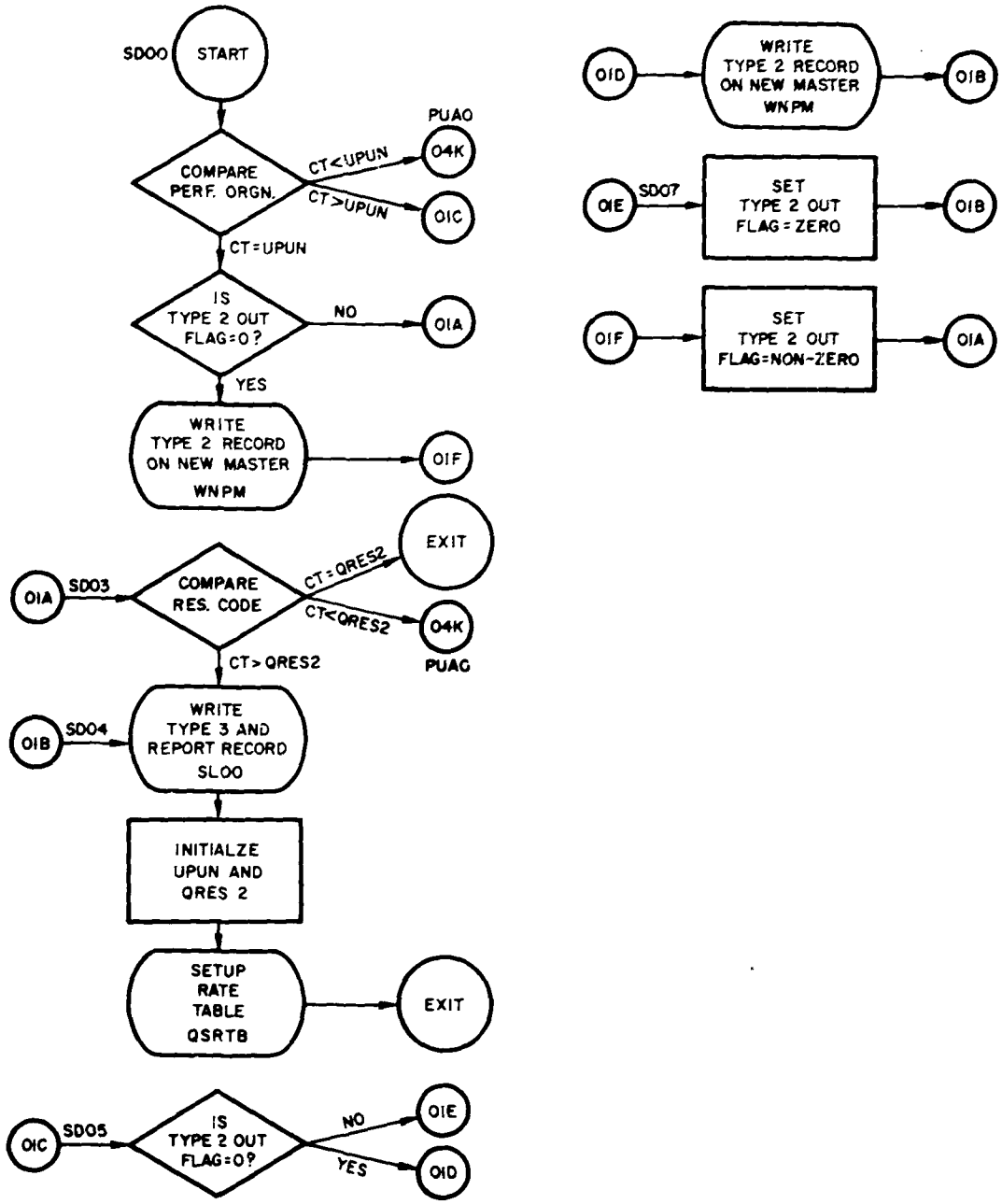
SUBREGIONS AND SUBROUTINES USED:

WNPM
JM00
QCLN
QSRTB

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION S000



Region SF00

EXPLANATION OF REGION:

Cleanup of Update phase.

CALLING SEQUENCE:

L TRA SF05

INPUT:

Not applicable

OUTPUT:

End-of-update-phase message.

Exit to cleanup pre-reporting phase.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

WDNP

ST00

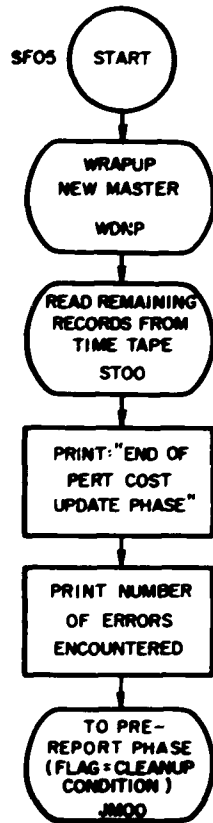
FTB

JM00

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION SFOO



Region ST00

EXPLANATION OF REGION:

To read from SORTED TIME TAPE all activities concerned with present charge number and print out activities connected to non-existent charge numbers.

CALLING SEQUENCE:

L TSX ST00, 4
L + 1 Normal return

INPUT:

UCHG+1 = charge number (3 words)
SORTED TIME TAPE

OUTPUT:

PSEUDO TIME RECORD - UTIME
Activity records to pre-reporting routine.

STORAGE USED:

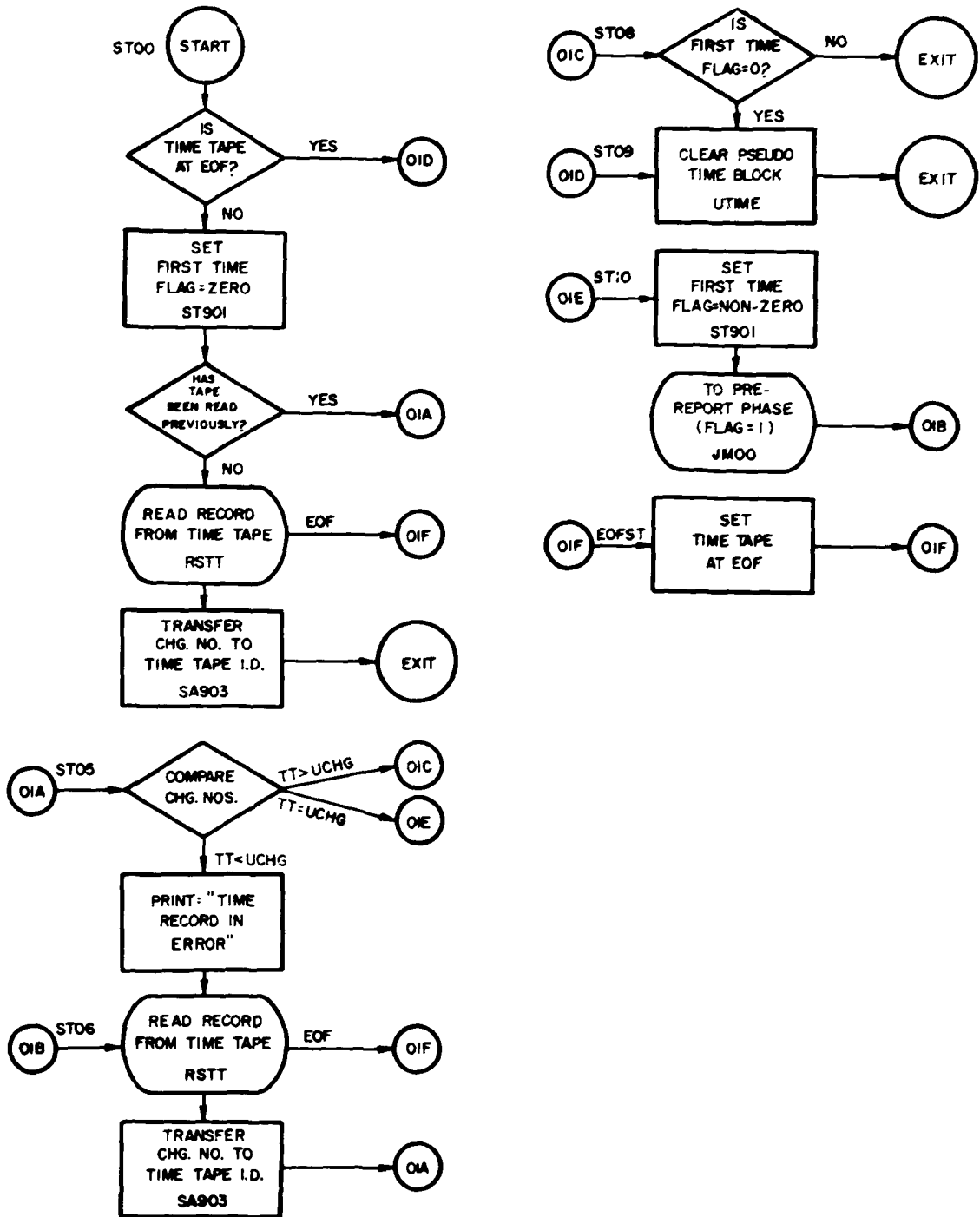
UTIME - 25 words - layout in sec 3.7

SUBREGIONS AND SUBROUTINES USED:

JM00
RSTT

EXPLANATION OF CALLING SEQUENCE:

Not applicable



Region SL00

EXPLANATION OF REGION:

To write out Resource Code record on the new Master File, extend the costs thru the Rate Table, and write a Charge No. , Performing Organization, Resource Code record on the Report Tape.

CALLING SEQUENCE:

L TSX SL00, 4
L+1 Normal return

INPUT:

Information: UCHG - charge No.
 UPUN - performing organization
 RBUF2 - resource code (unextended costs)
 UTIME - pseudo time

OUTPUT:

1. Resource Code record on the New Master File
2. Report record on the Report Tape

STORAGE USED:

RBUF1 - resource code (extended costs)

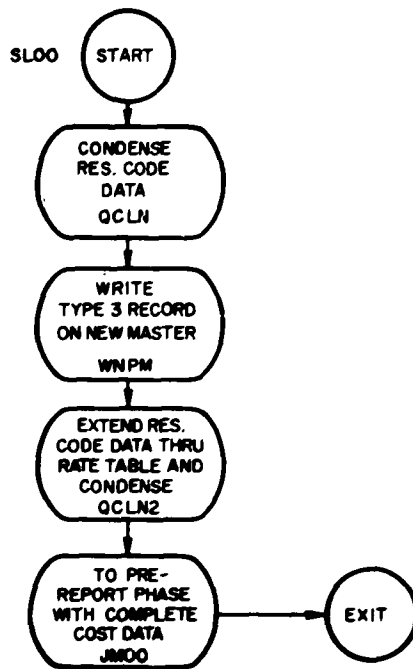
SUB-REGIONS AND SUBROUTINES USED:

QCLN JM00
WNPM
QCLN2

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION SLOO



Region QSET

EXPLANATION OF REGION:

This routine will set up the rate table for the resource code being operated upon, as well as set up QRES2 with the resource code data cleared of the rate table extensions from the previous cycle.

CALLING SEQUENCE:

L TSX QSET, 4
L + 1 Location of resource code record in PTBF5 or PTBF6
L + 2 Normal return

INPUT:

Record in PTBF5 or PTBF6 from OLD SECONDARY MASTER.

OUTPUT:

A resource code record that has been cleared of all rate extensions, located in an unpacked format in QRES2.

STORAGE USED:

QRES2 - 600 words - unpacked resource code block.

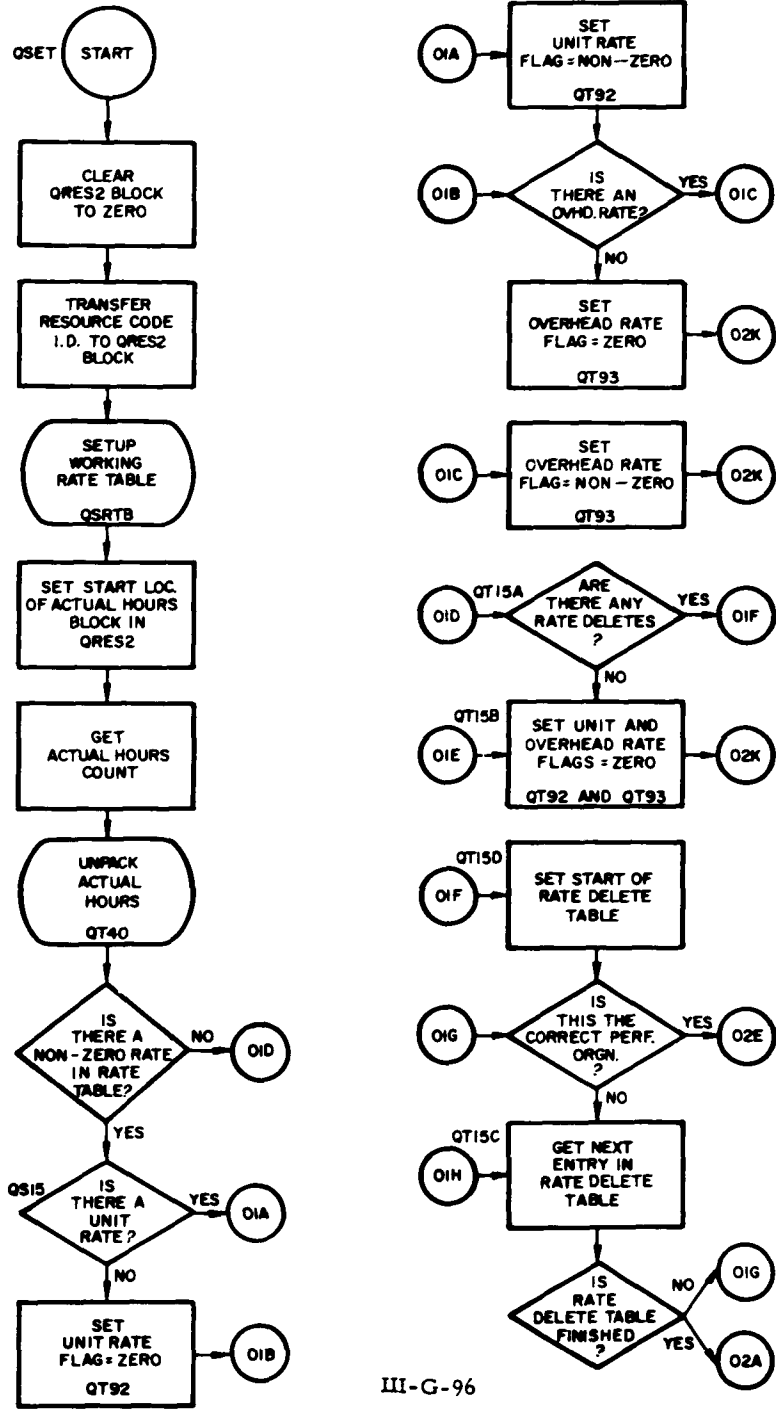
SUBREGIONS AND SUBROUTINES USED:

QSRTB

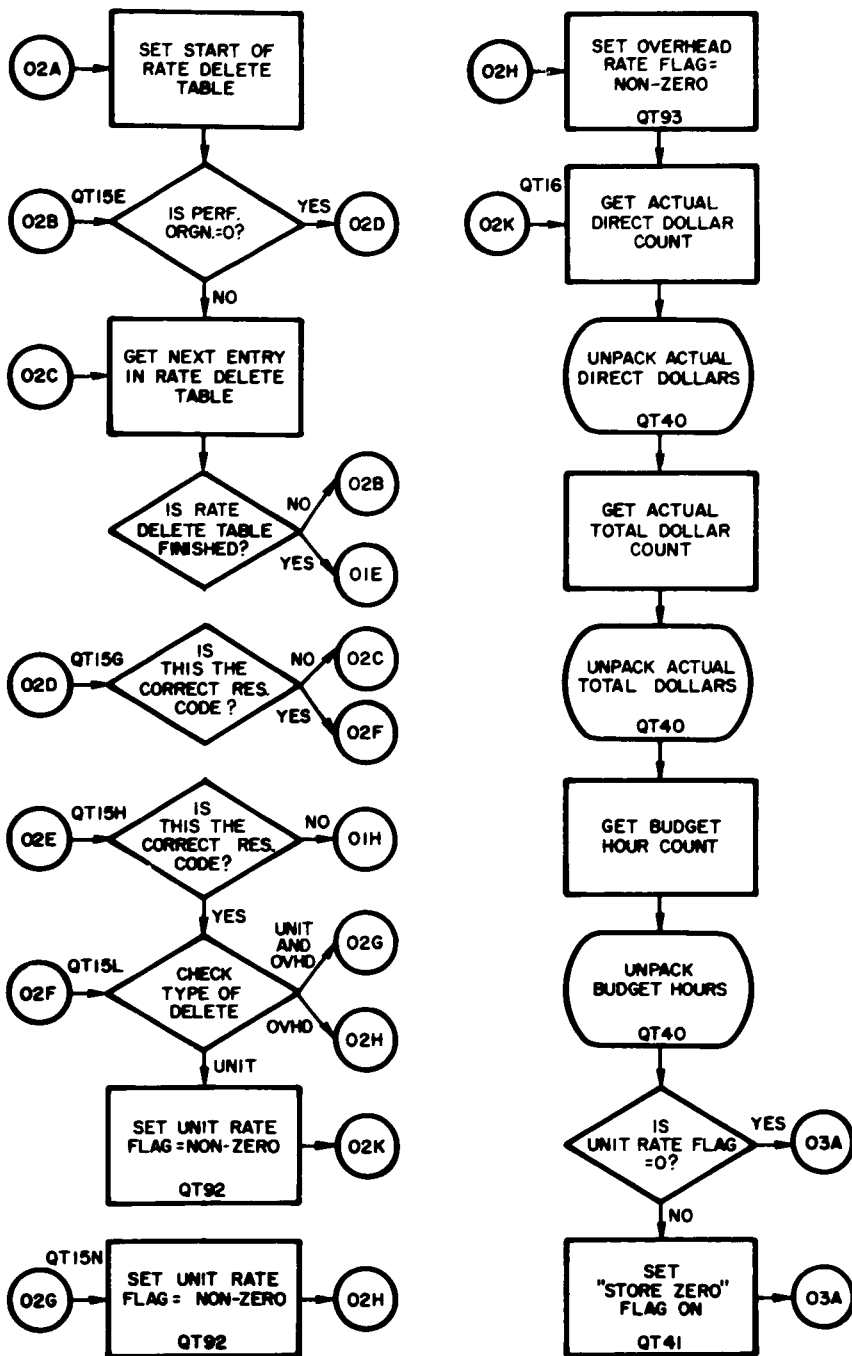
EXPLANATION OF CALLING SEQUENCE:

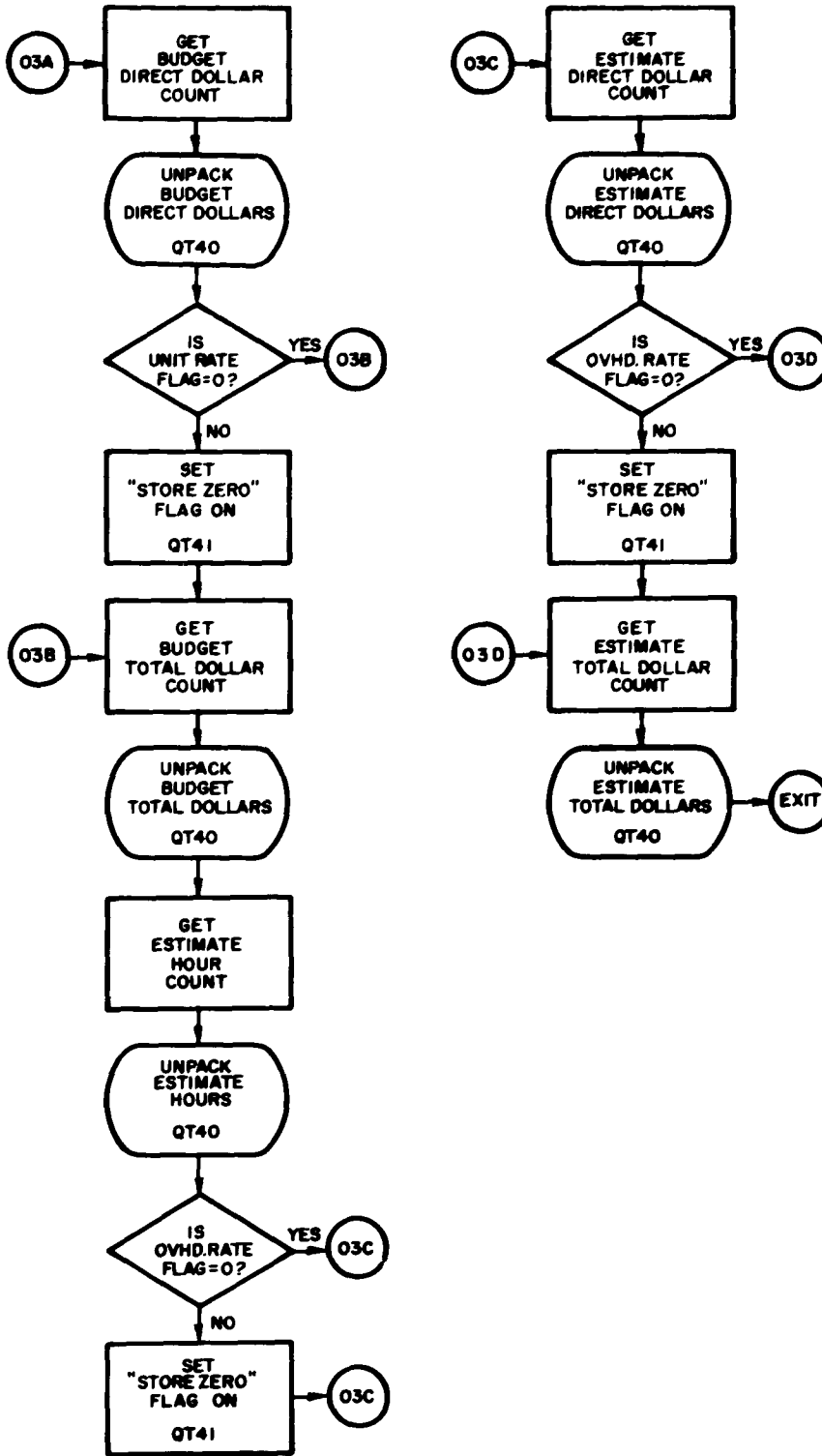
Not applicable

REGION QSET

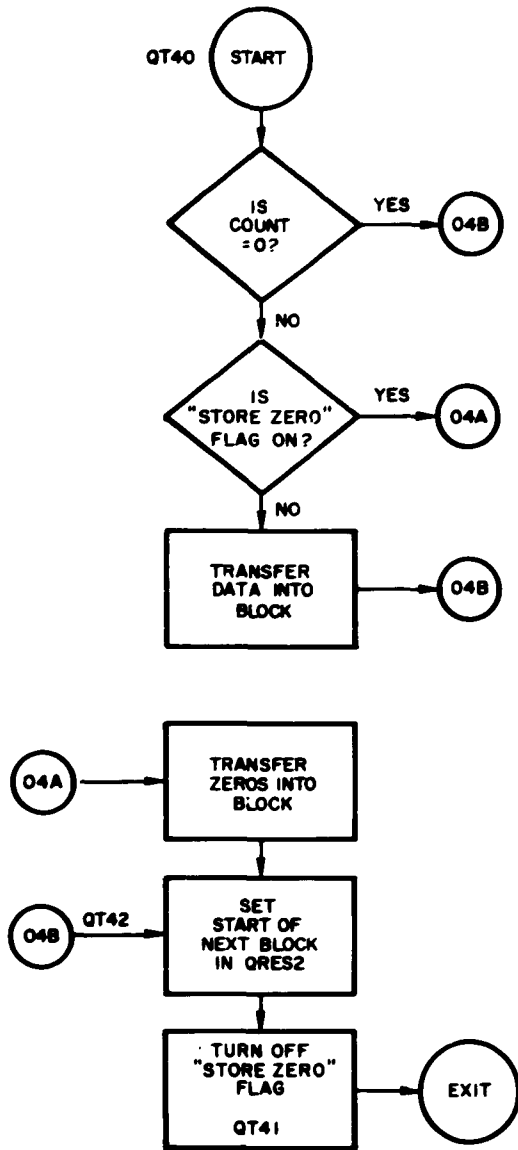


REGION QSET





REGION QSET
SUBREGION QT40



Region QSRCH

EXPLANATION OF REGION:

This routine will delete all of the estimates and budgets, hours or units, and direct dollars and total dollars from the QRES2 table.

CALLING SEQUENCE:

L TSX QSRCH, 4
L + 1 Normal return

INPUT:

Resource code record set into QRES2.

OUTPUT:

Resource code record in QRES2 without any budget or estimate values.

STORAGE USED:

Not applicable.

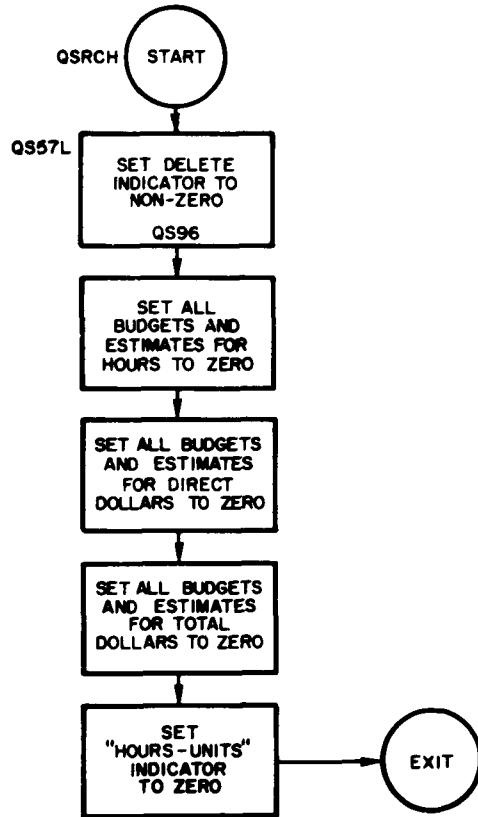
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION QSRCH



Region QCLN

EXPLANATION OF REGION:

This routine will set up the rainbow and cost category record and will extend the budget and estimate hours (and direct dollars, where applicable) by the rate table. It will also move and pack the resource code record into QRES1..

CALLING SEQUENCE:

L TSX QCLN
L+1 Normal return

INPUT:

The resource code record in QRES2..

OUTPUT:

An extended resource code record in QRES1 in a packed format and the count of the number of words in this resource code record less the indicative information.

The rainbow and cost category record in RCMC

STORAGE USED:

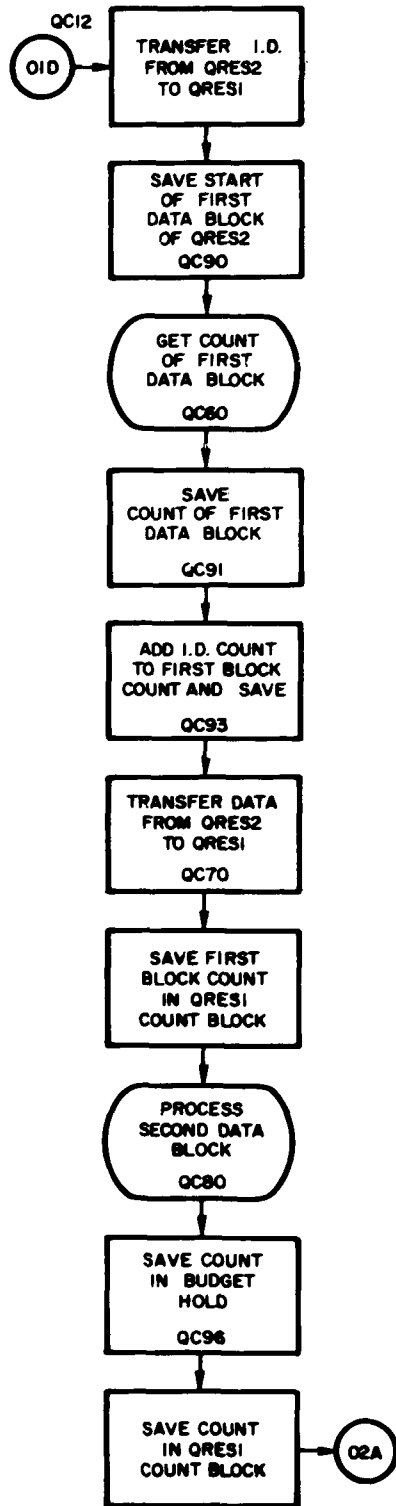
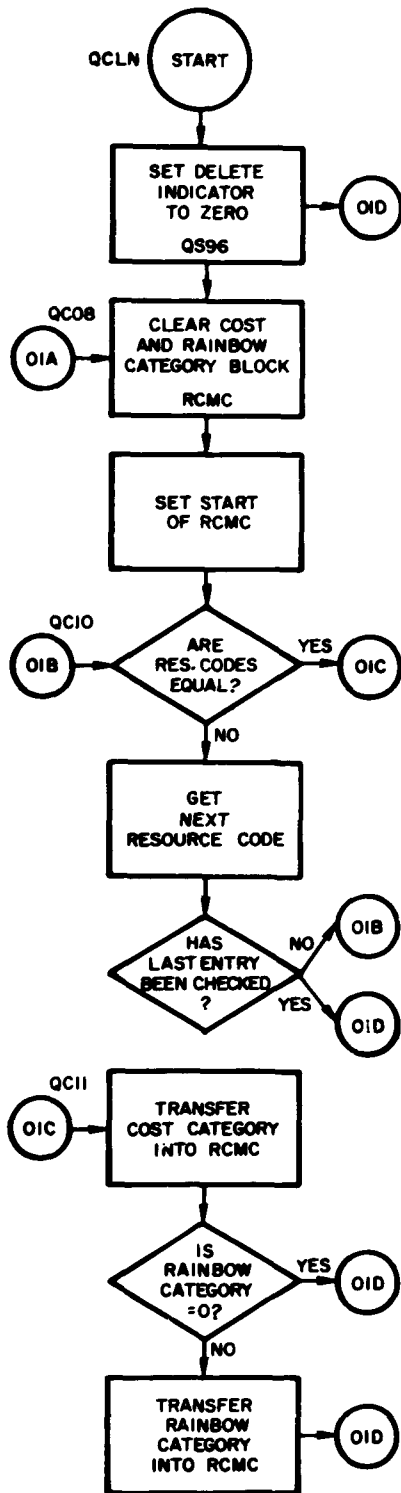
QRES1 - 600 words - packed resource code record.

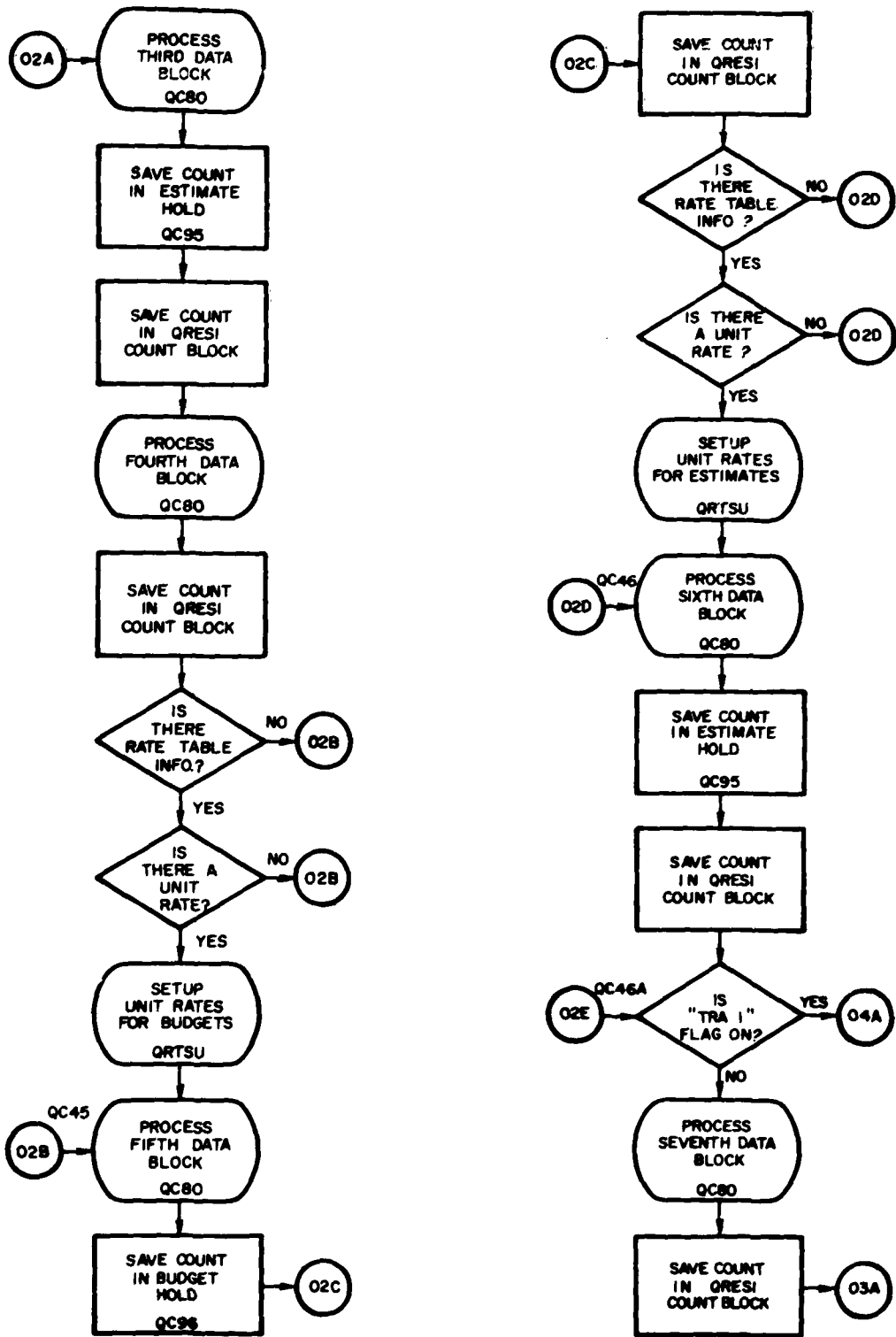
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

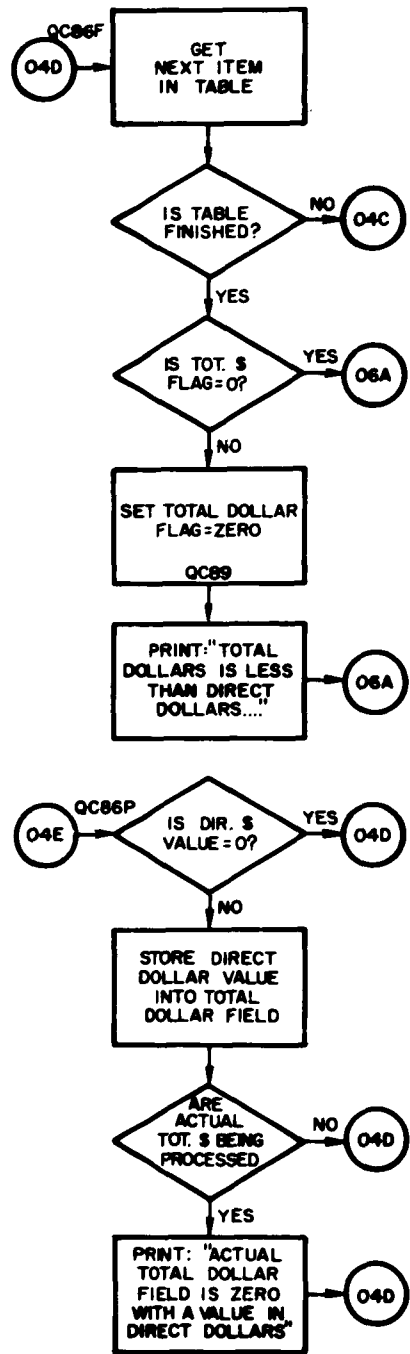
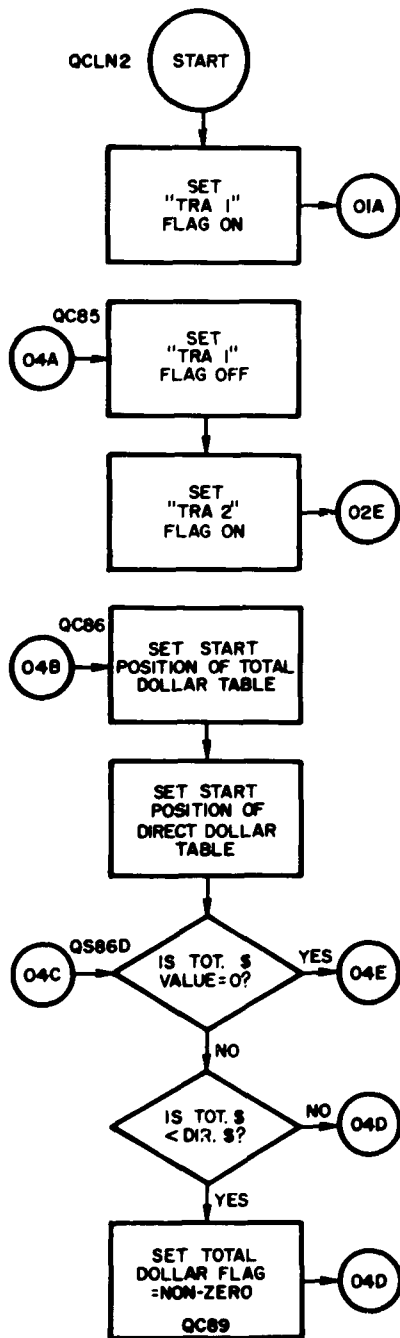
EXPLANATION OF CALLING SEQUENCE:

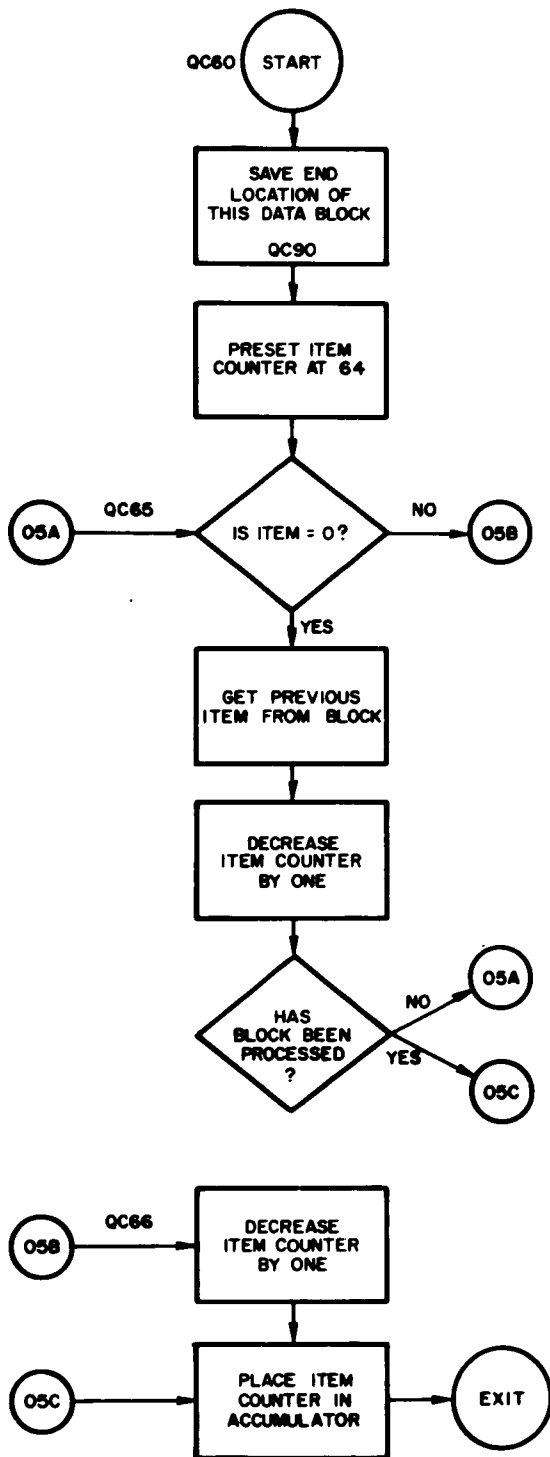
Not applicable.



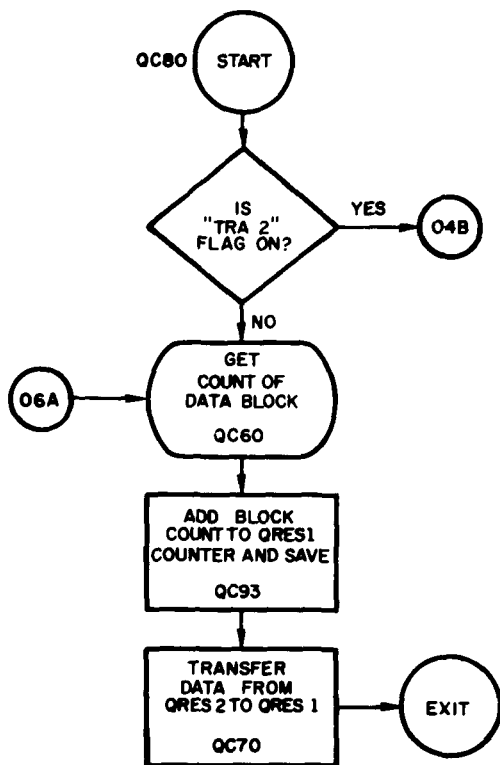


REGION QCLN
SUBREGION QCLN2

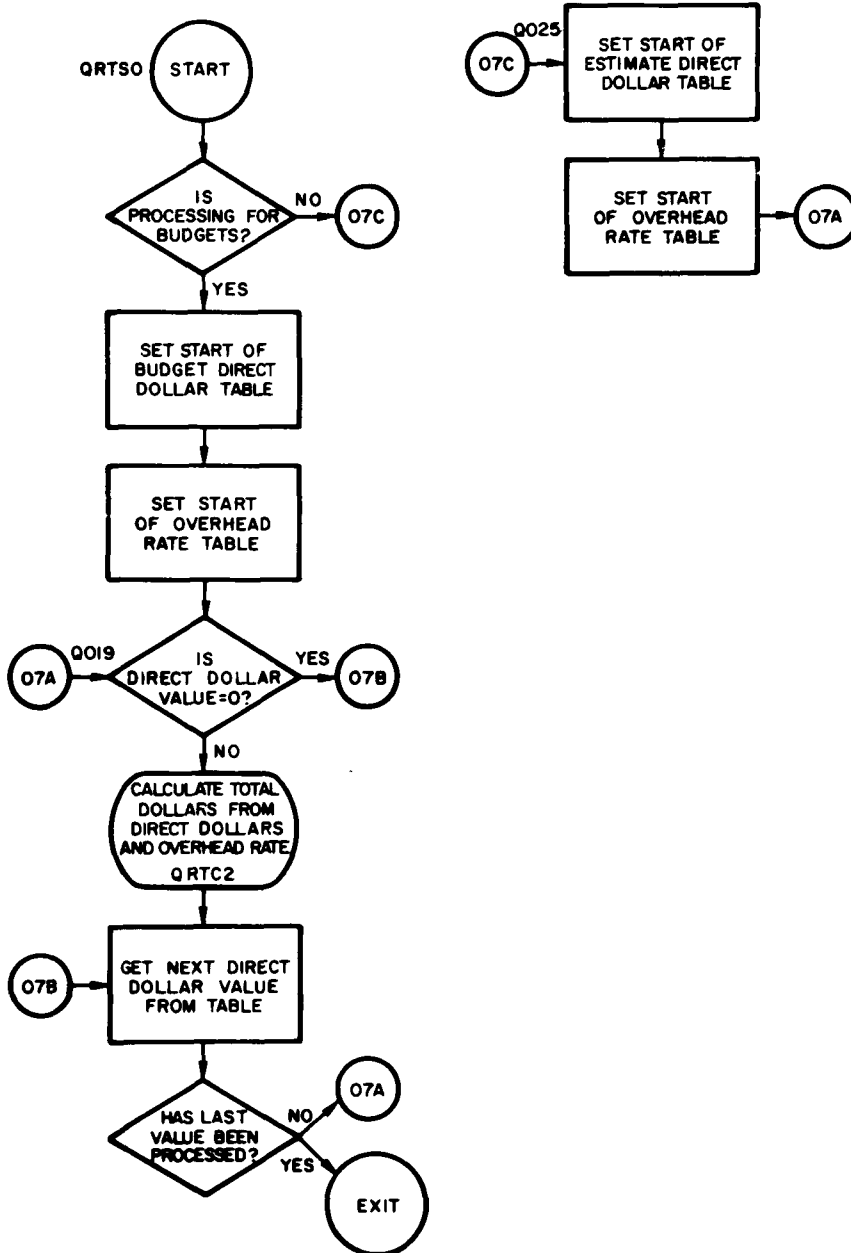




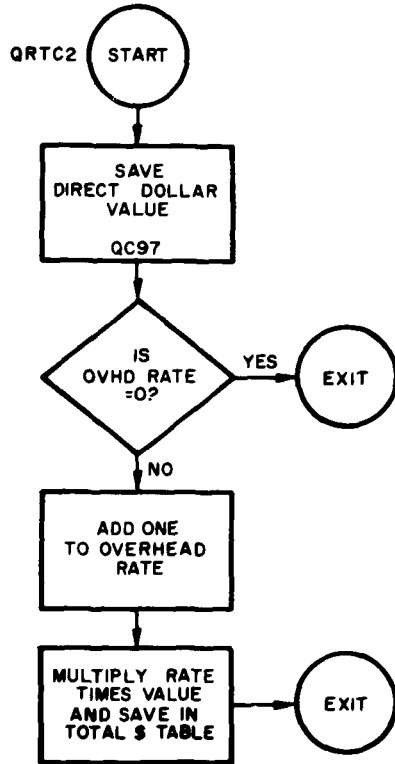
REGION QCLN
SUBREGION QC80



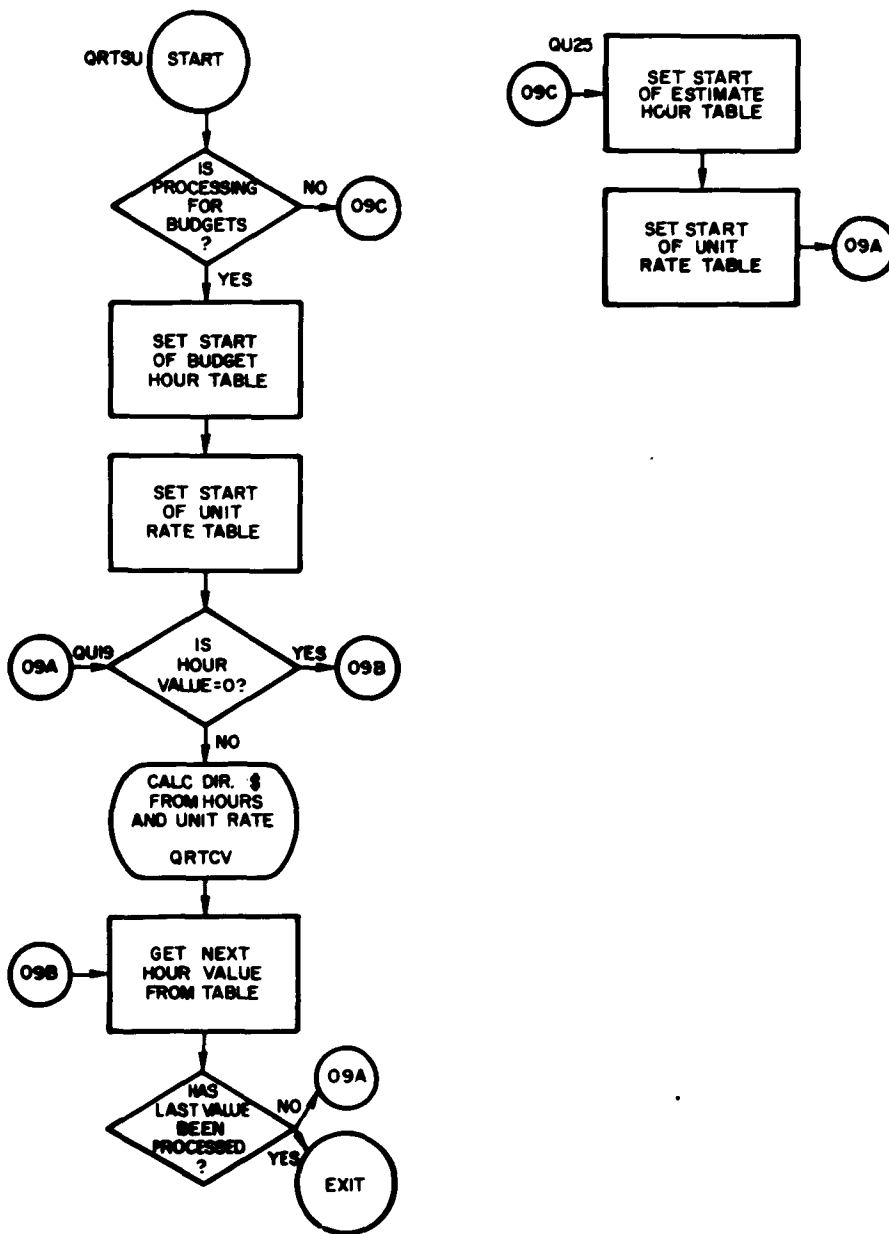
REGION QCLN
SUBREGION QRTS0



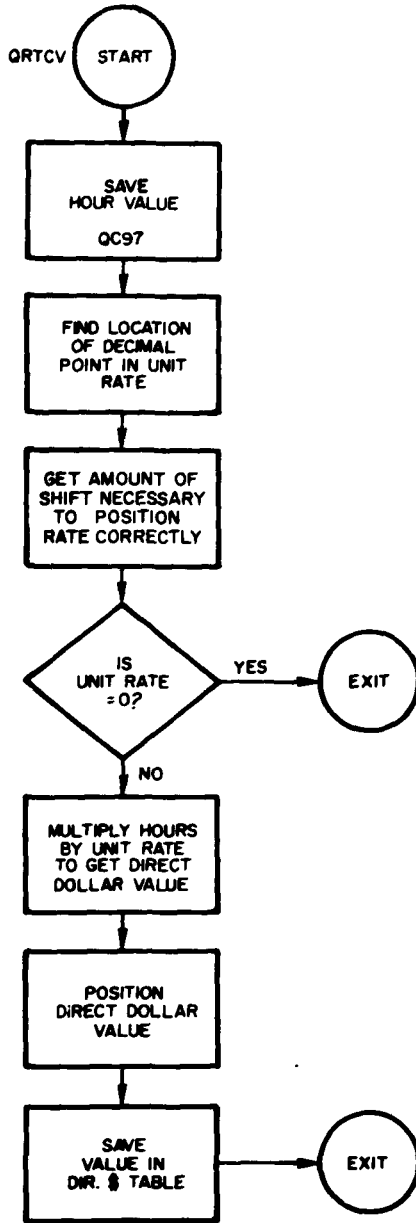
REGION QCLN
SUBREGION QRTC2



REGION QCLN
SUBREGION QRTSU



REGION QCLN
SUBREGION QRTCV



Region QSVN0

EXPLANATION OF REGION:

This region will operate on all the 7-0 cards that are to be processed by the system.

CALLING SEQUENCE:

L TSX QSVN0, 4
L+1 Normal return

INPUT:

A 7-0 type input card from SORTED DATA TAPE.

OUTPUT:

The 7-0 information set into the UCHG record.

STORAGE USED:

Not applicable.

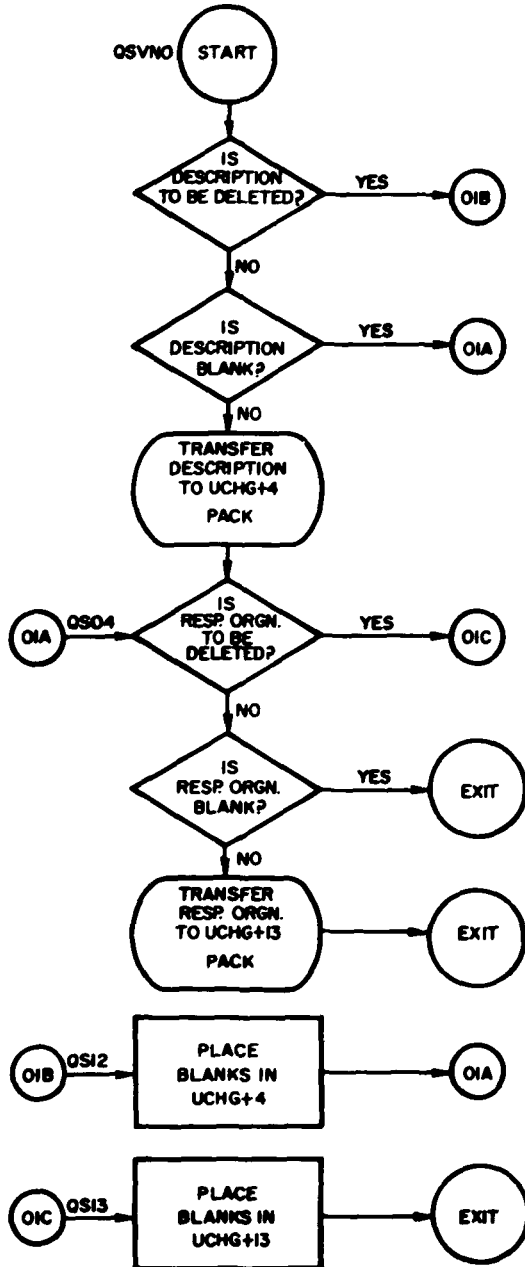
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION QSVNO



Region QSVN1

EXPLANATION OF REGION:

This region will operate on all the 7-1 cards that are to be processed by the system.

CALLING SEQUENCE:

L TSX QSVN1, 4

L+1 Normal return

INPUT:

A 7-1 type input card from SORTED DATA TAPE.

OUTPUT:

The 7-1 information set into the UCHG record.

STORAGE USED:

Not applicable.

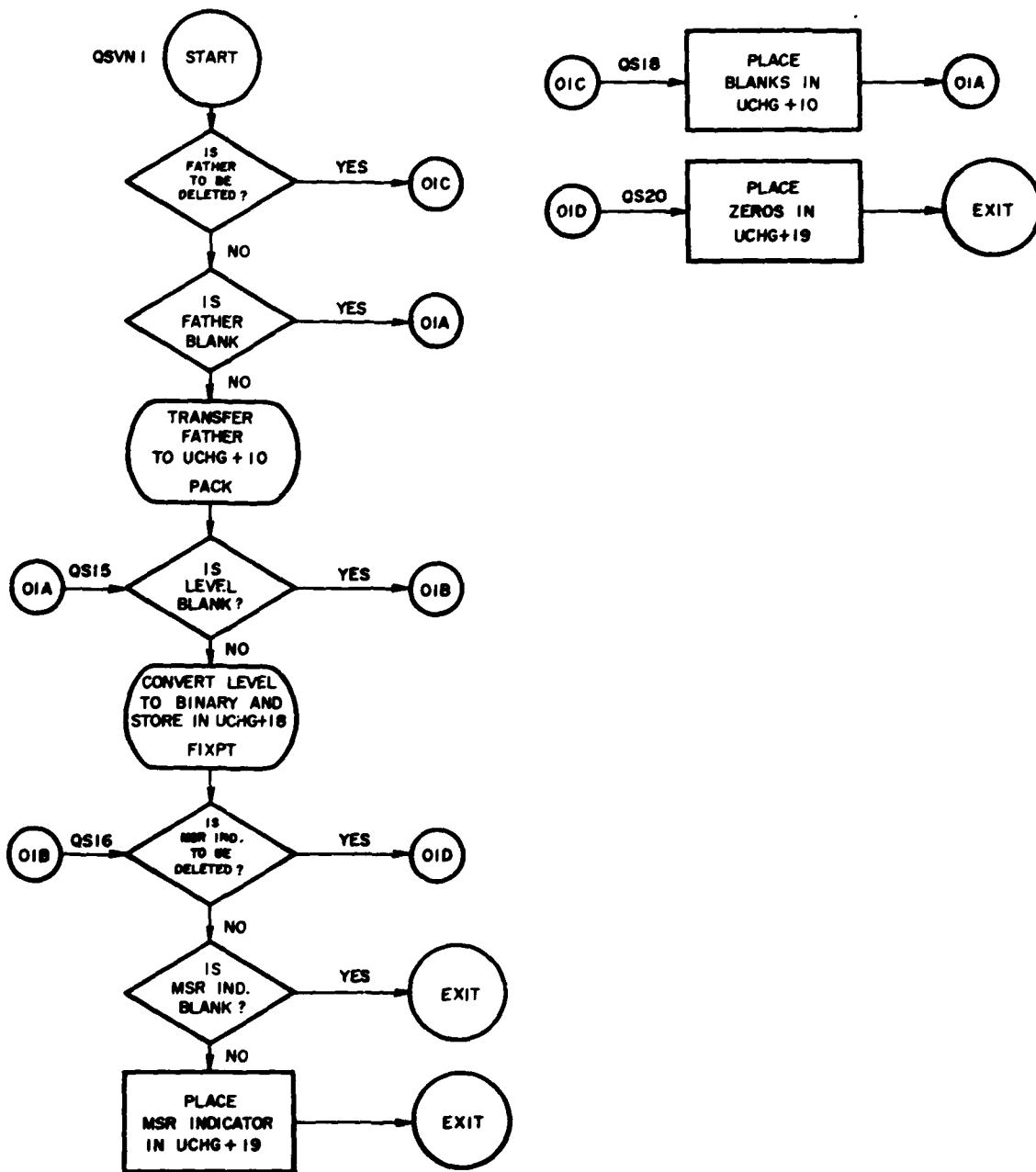
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION QSVN1



Region QSVN2

EXPLANATION OF REGION:

This region will operate on all the 7-2 cards that are to be processed by the system.

CALLING SEQUENCE:

L TSX QSVN2, 4
L+1 Normal return

INPUT:

A 7-2 type input card from the SORTED DATA TAPE.

OUTPUT:

The 7-2 information set into the UCHG record.

STORAGE USED:

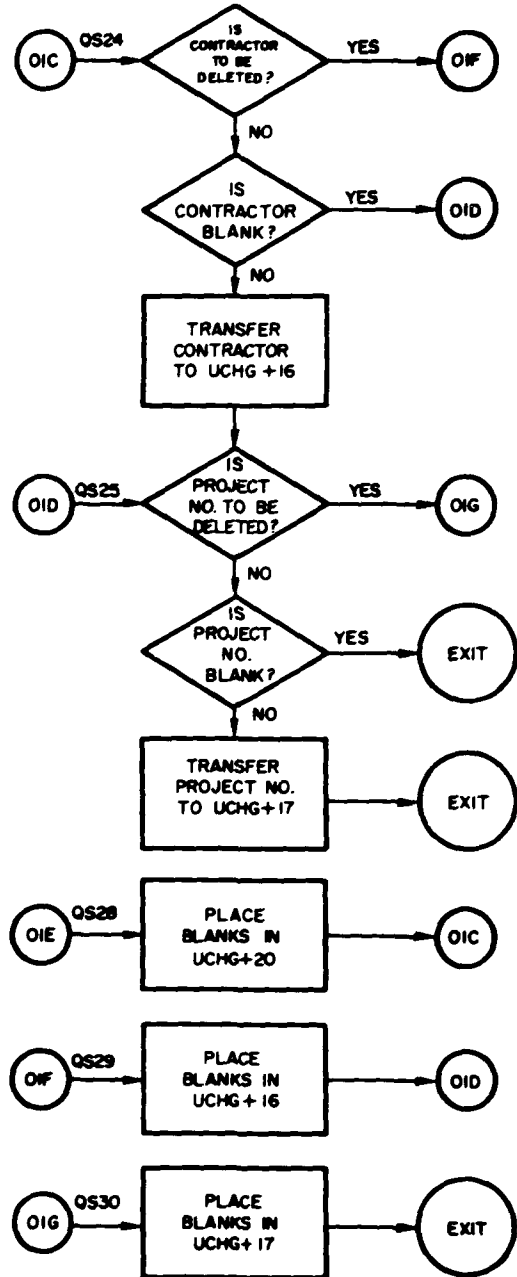
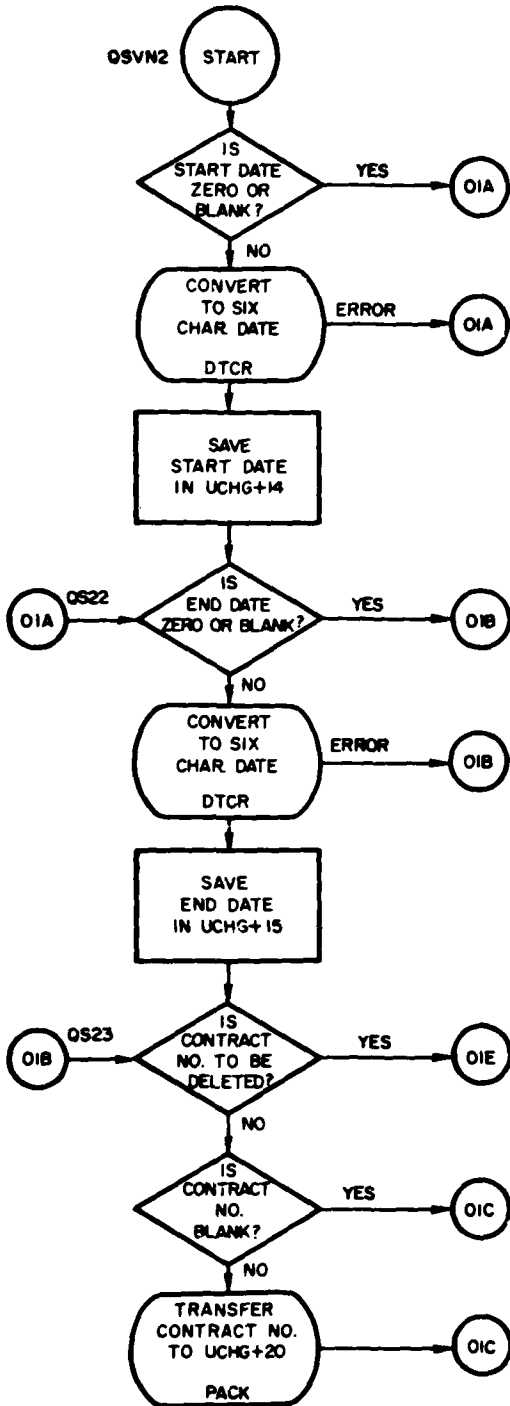
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



Region QSVN3

EXPLANATION OF REGION:

This region will operate on all 7-3 cards that are to be processed by the system.

CALLING SEQUENCE:

L TSX QSVN3, 4
L+1 Normal return

INPUT:

A 7-3 type input card from the SORTED DATA TAPE.

OUTPUT:

The 7-3 information set into UPUN or QRES2 records in core.

STORAGE USED:

Not applicable.

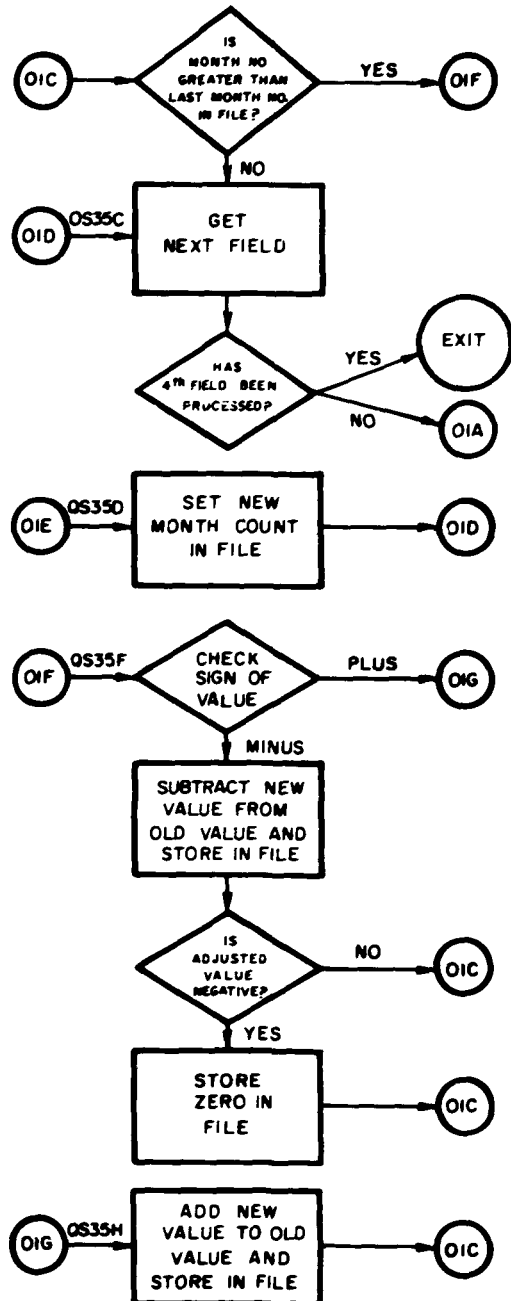
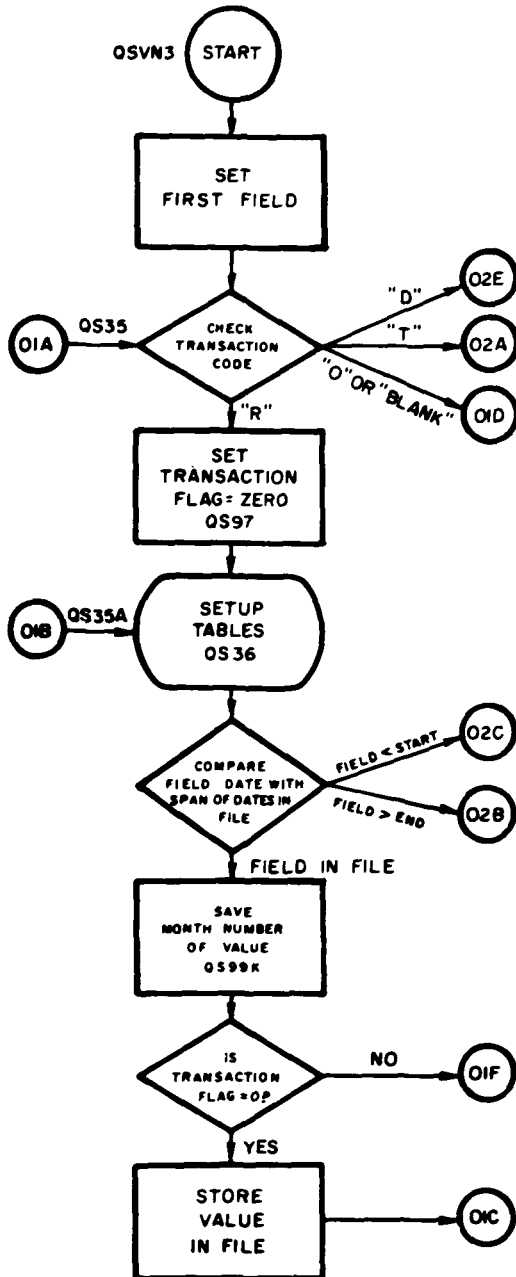
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

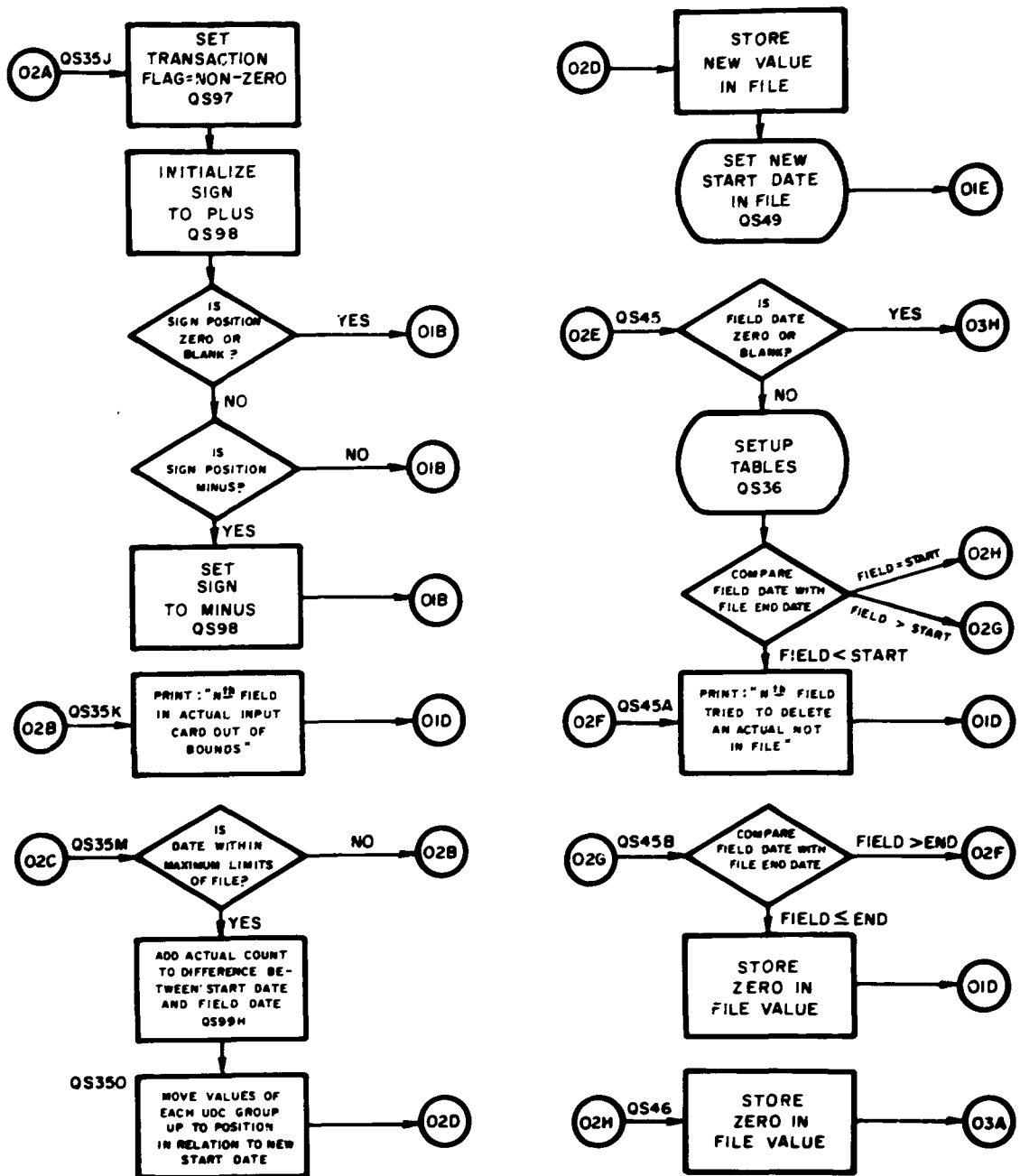
EXPLANATION OF CALLING SEQUENCE:

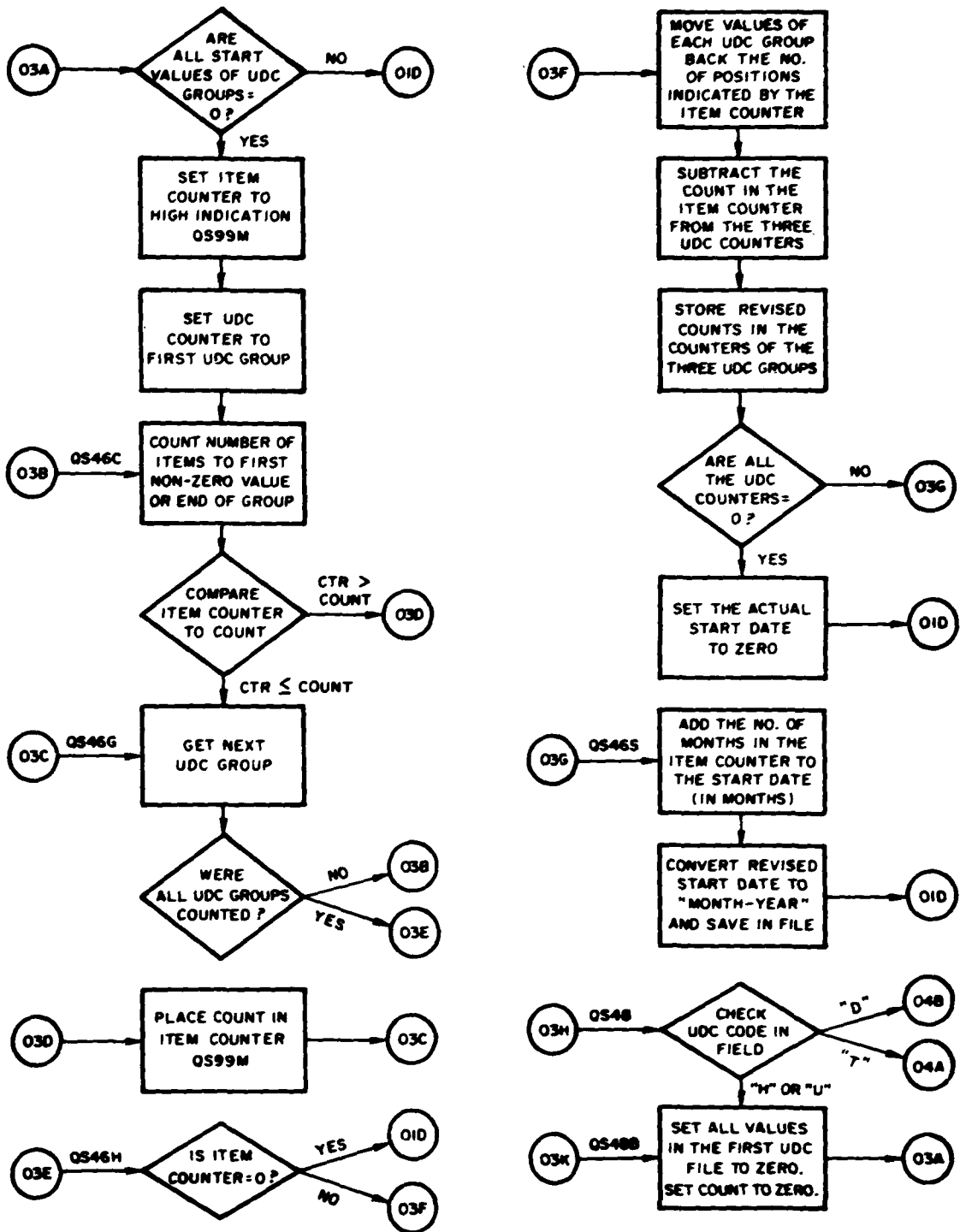
Not applicable.

REGION QSVN3

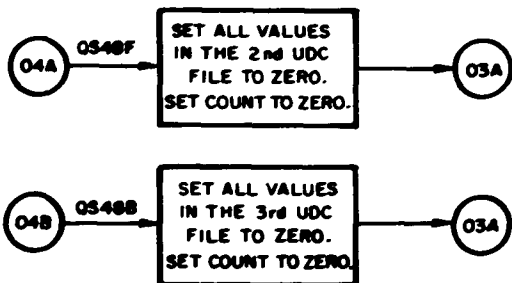


REGION QSVN3

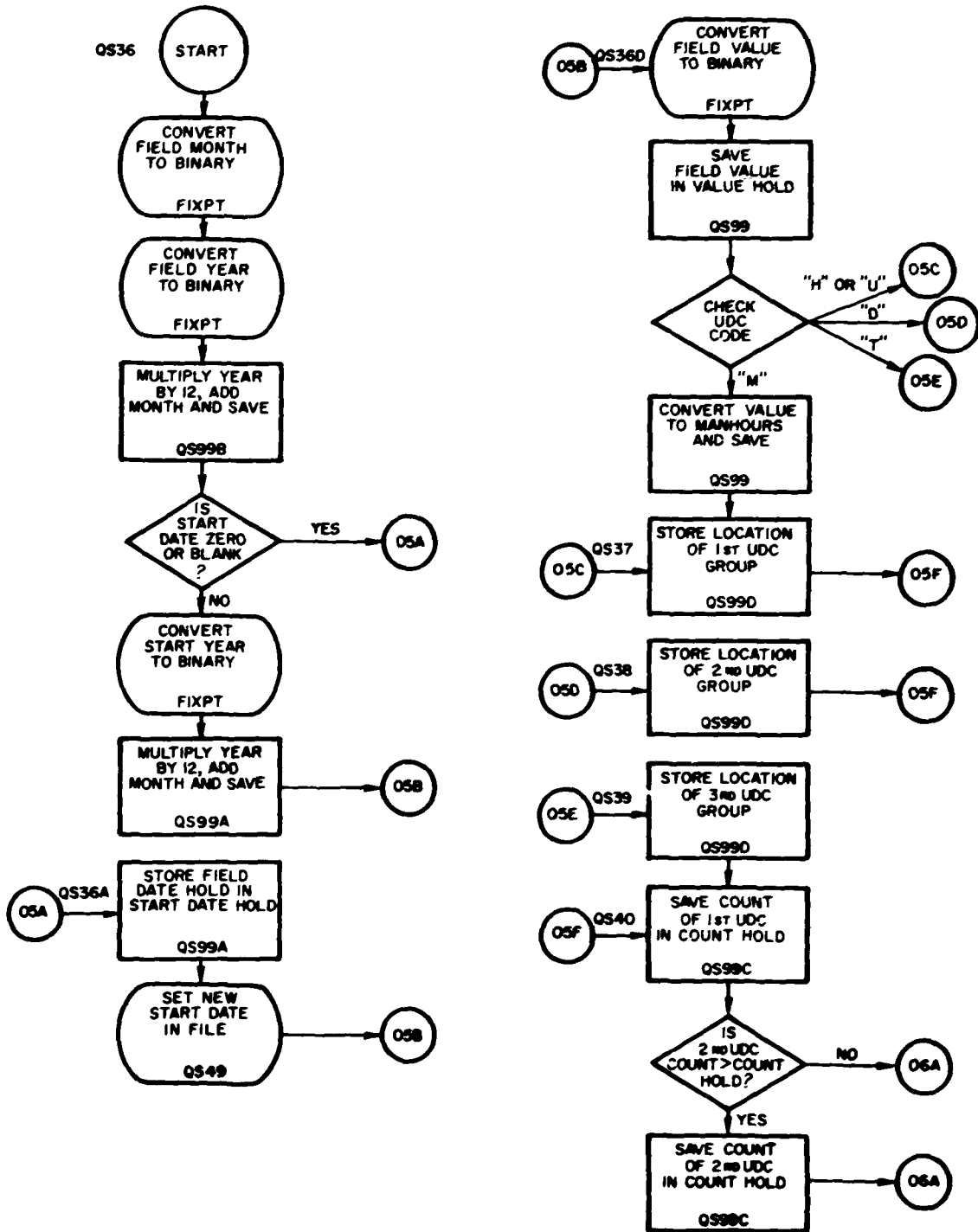




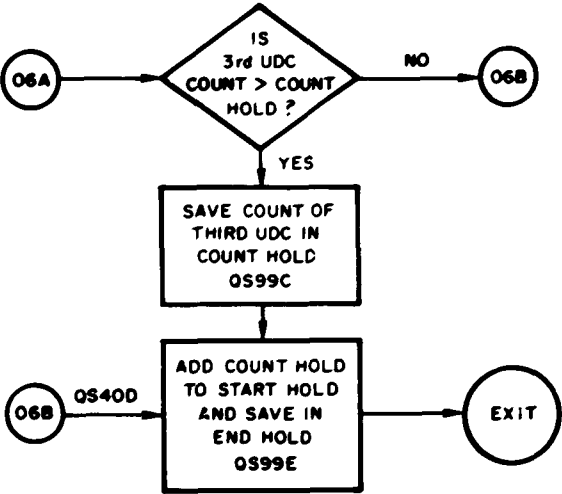
REGION Q8VNS



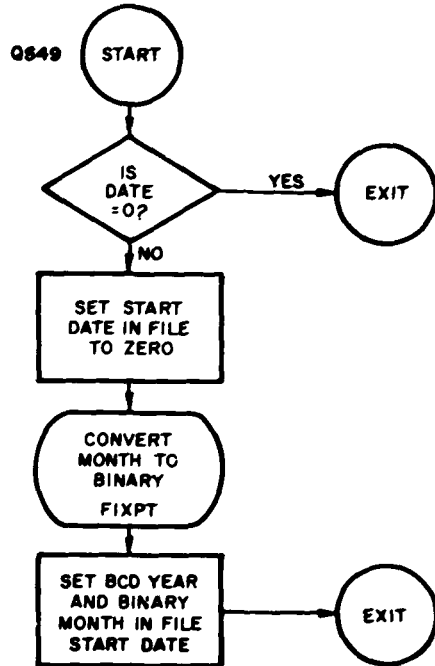
REGION Q8VN3
SUBREGION Q536



REGION QSVN3
SUBREGION QS36



REGION Q@VNS
SUBREGION Q549



Region QSVN4

EXPLANATION OF REGION:

This region will operate on all the 7-4 cards that are to be processed by the system.

CALLING SEQUENCE:

L TSX QSVN4, 4
L+1 Normal return

INPUT:

A 7-4 type input card from the SORTED DATA TAPE.

OUTPUT:

The 7-4 information set into the UPUN or QRES2 records in core.

STORAGE USED:

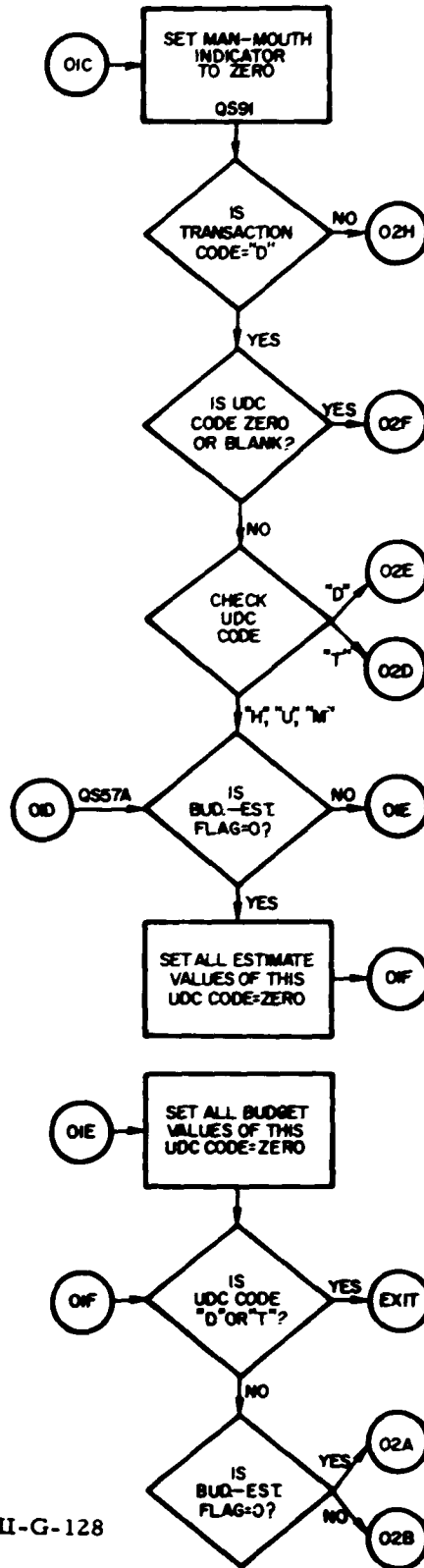
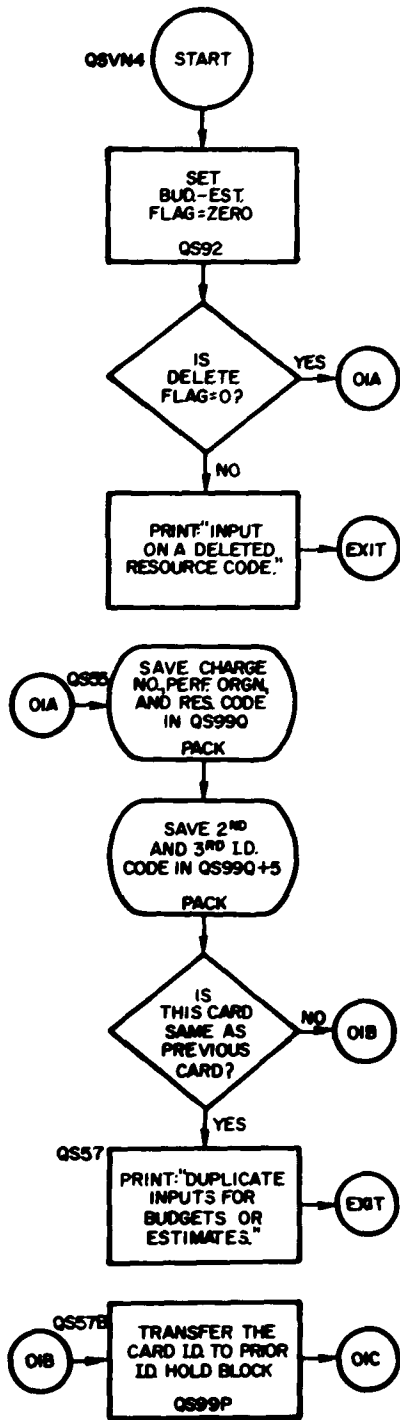
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

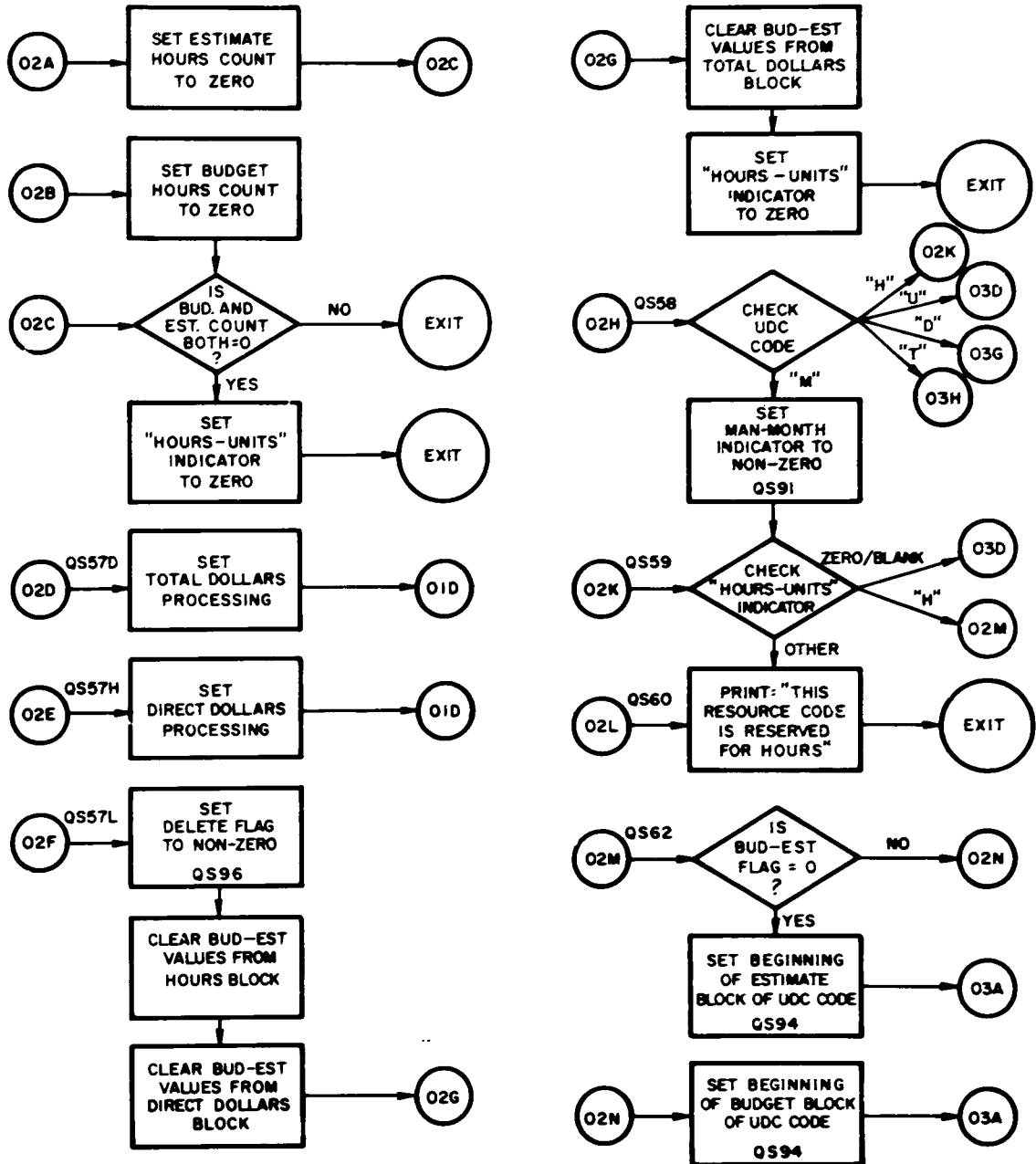
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

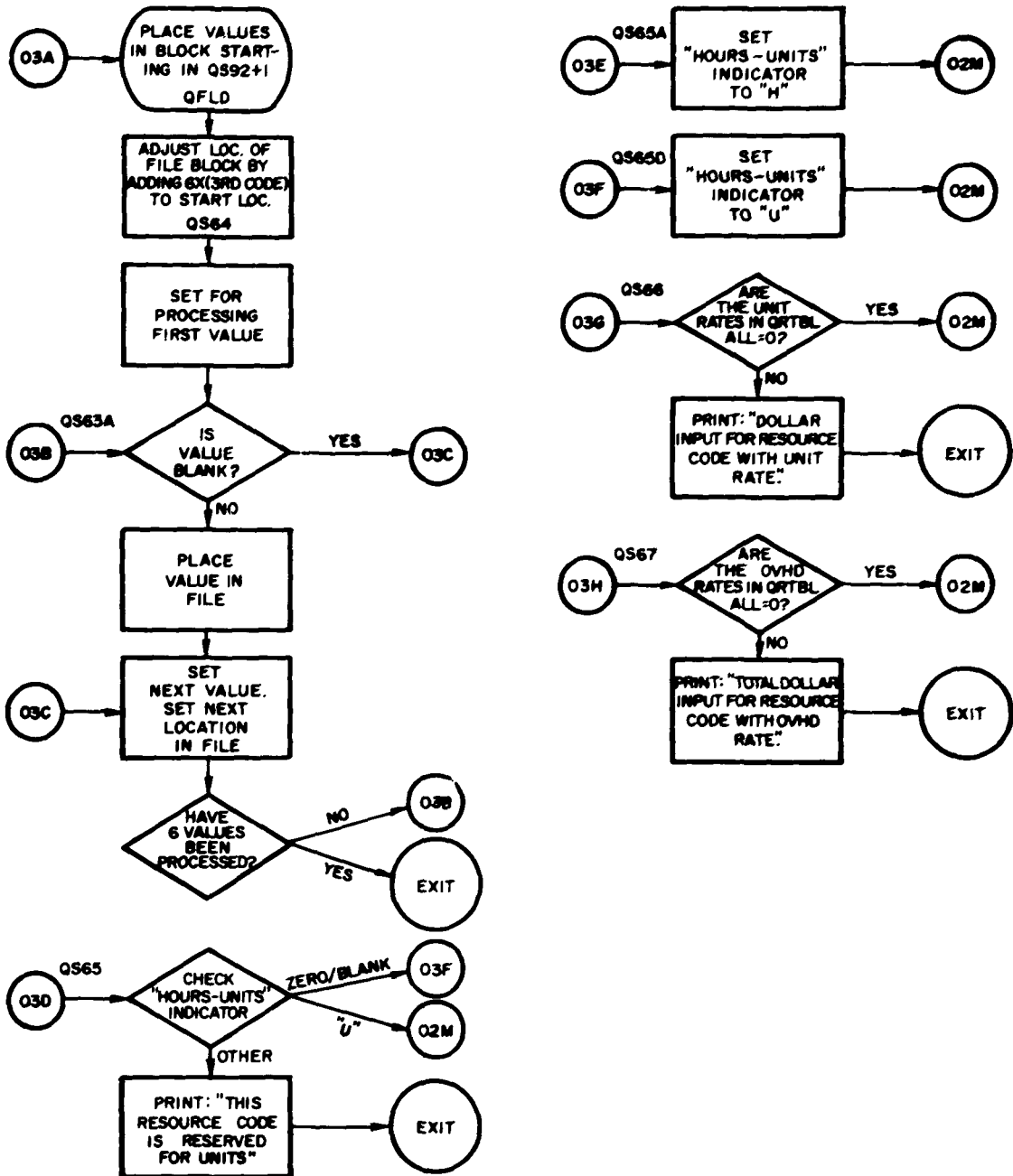
Not applicable.



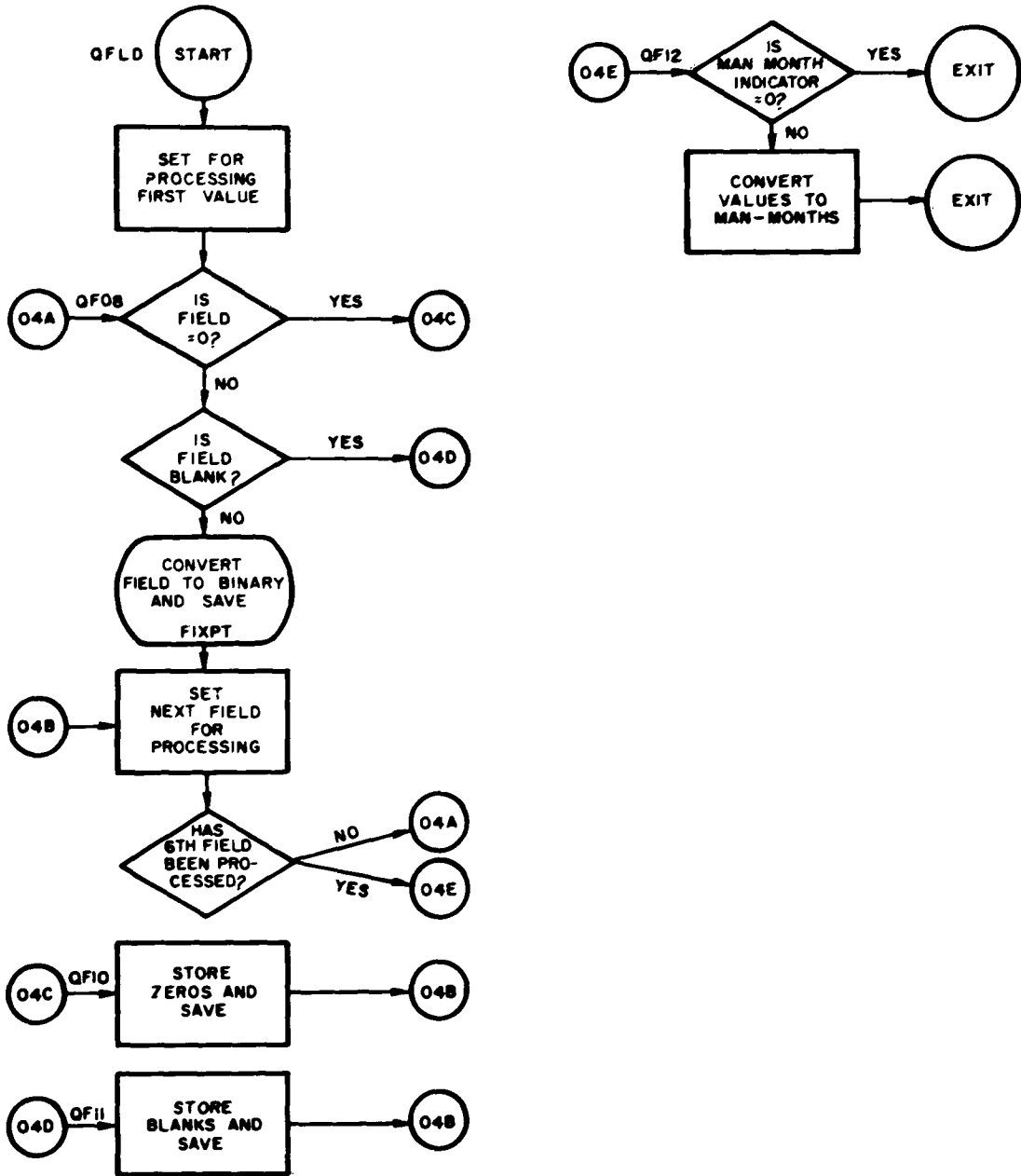
REGION Q8VN4



REGION Q8VN4



REGION Q8VN4
SUBREGION QFLD



Region QSVN5

EXPLANATION OF REGION:

This region will operate on all the 7-5 cards that are to be processed by the system.

CALLING SEQUENCE:

L TSX QSVN5, 4

L+1 Normal return

INPUT:

A 7-5 type input card from the SORTED DATA TAPE.

OUTPUT:

The 7-5 information set into the UPUN or QRES2 records in core.

STORAGE USED:

Not applicable.

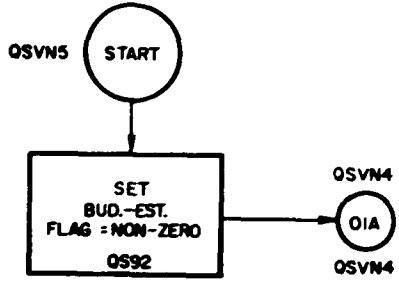
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION QSVN5



Region SETUP

EXPLANATION OF REGION:

This region will set up the proper channels on the sort tapes for the output pre processing using the 4-tape sort.

CALLING SEQUENCE:

L TSX SETUP, 4

L+1 Normal return

INPUT:

Not applicable.

OUTPUT:

Proper setup of sort tapes.

STORAGE USED:

Not applicable.

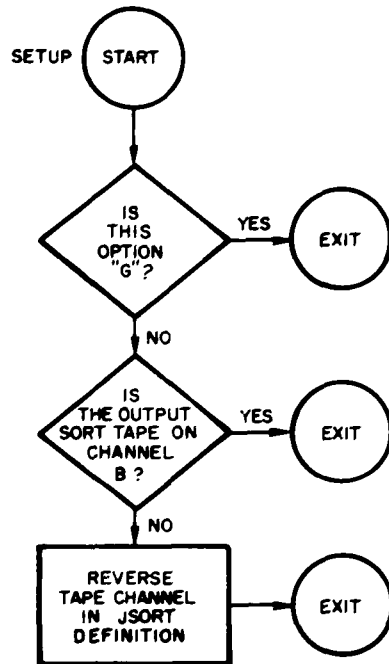
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION SETUP



Region QSRTB

EXPLANATION OF REGION:

This routine will set up the working rate table to be used in extending rates into QRES2. This table will be set up at core location QRTBL and QRTB2.

CALLING SEQUENCE:

L TSX QSRTB, 4
L+1 Normal return

INPUT:

The rate table at RTBAR.

OUTPUT:

A working rate table for a particular Performing Unit/Resource Code combination at QRTBL and QRTB2.

STORAGE USED:

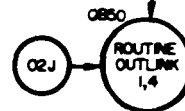
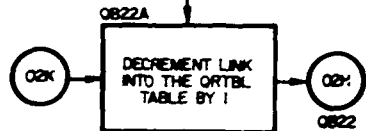
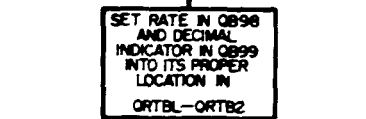
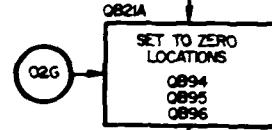
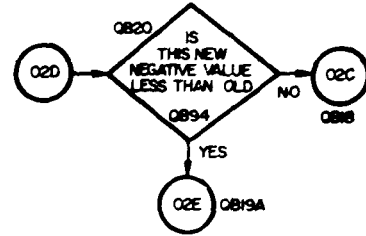
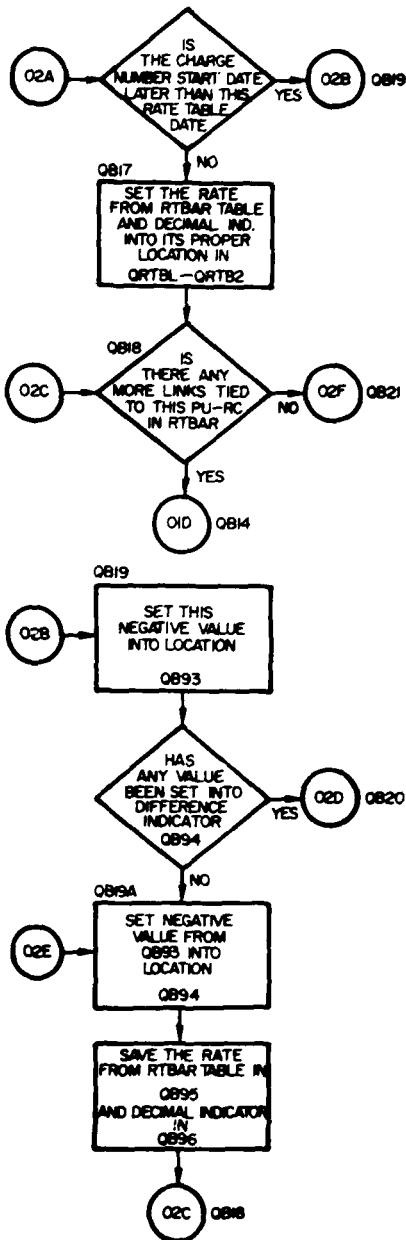
QRTBL - 64 words - the unit and overhead rates for a particular month tied to charge number start date.
QRTB2 - 64 words - the scaling indicator for the unit rate.

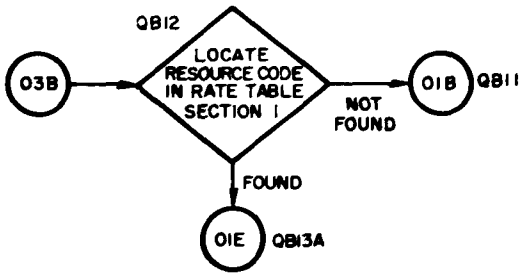
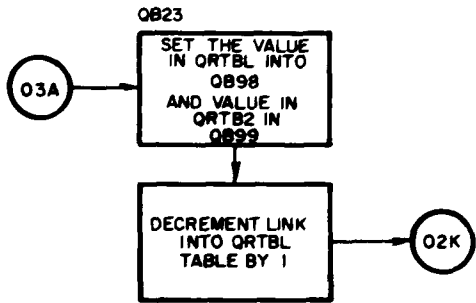
SUBREGIONS AND SUBROUTINES USED:

FIXPT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.





Cost Update Tape and Table Layouts

The following tape and table layouts will illustrate the manner in which the cost update phase will operate.

PERT COST MASTER FILE Tape Layout

The PERT Cost data is actually the second file on this physical tape, the first being the SECONDARY MASTER TAPE. The data carried on this second file consists of a rate table and a skill table, both preceded by a label, and a data file, also preceded by a label (see Fig. III-G-9). This file is written in a binary mode.

The rate table label is one record of 6 words, which is followed by the rate table record of 4003 words. This table is the first item on the PERT COST MASTER TAPE and will contain no checksum, since it is a fixed-length write. The date in the label refers to the last update cycle date for cost data processing.

The skill table label is one record of 6 words, which is followed by the skill table record of 1080 words. This table is the second item on the PERT COST MASTER TAPE and will contain no checksum, since it is a fixed-length write. The date in the label refers to the last update cycle date for cost data processing.

The charge or summary number data file label is made up of two records. One is the label name, date, and tape number; the other is the program name. These labels will contain no checksum, since they are a fixed-length write. Following the labels will be the data records in blocks up to 600 words. These records, since they are variable and written by the Writer routine (Page IV-G-1), will contain a count record and a checksum.

Each charge or summary number record will begin with a type 1 record in bits S through 2. This is the fixed-portion data of this number and will relate to all of the following Performing Unit Resource Code combinations, if any. This fixed portion record will always contain a word count, preceding

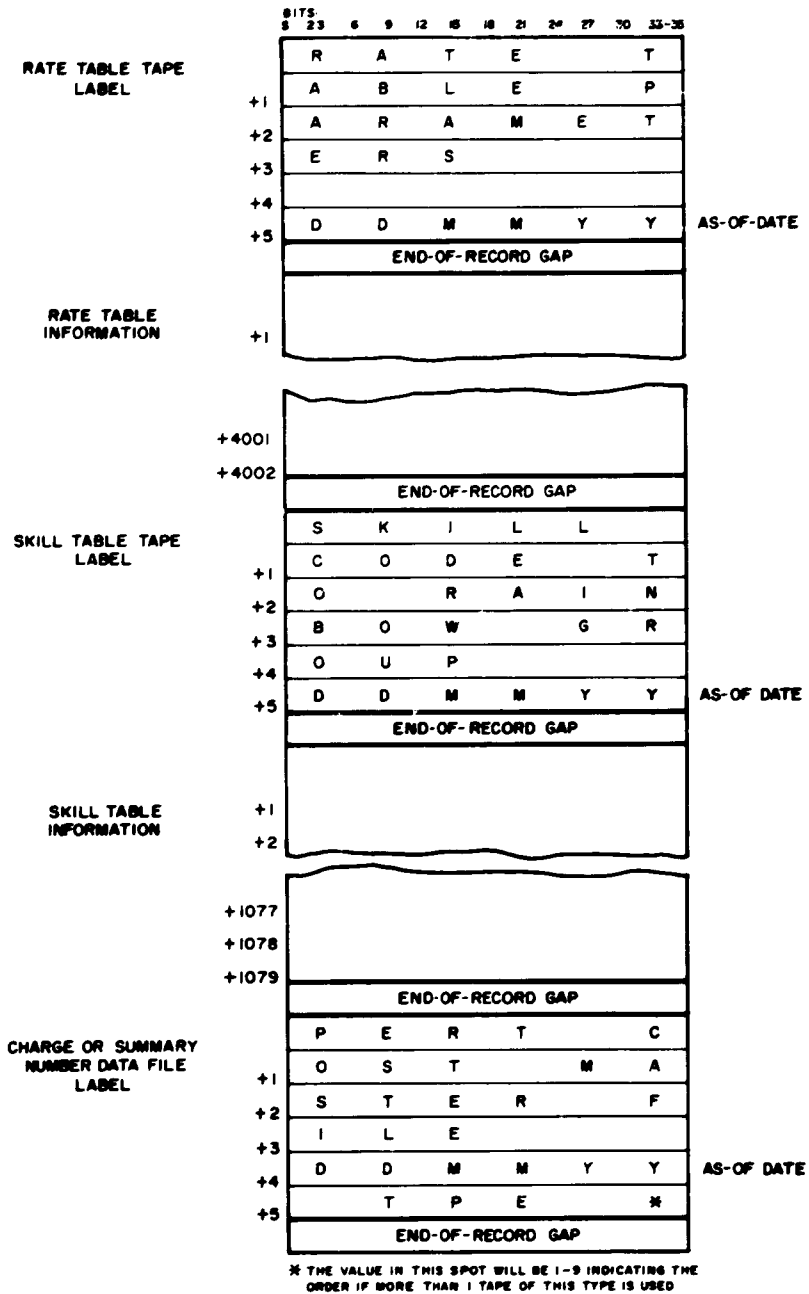


Fig. III-G-9. Physical Layout of PERT COST MASTER

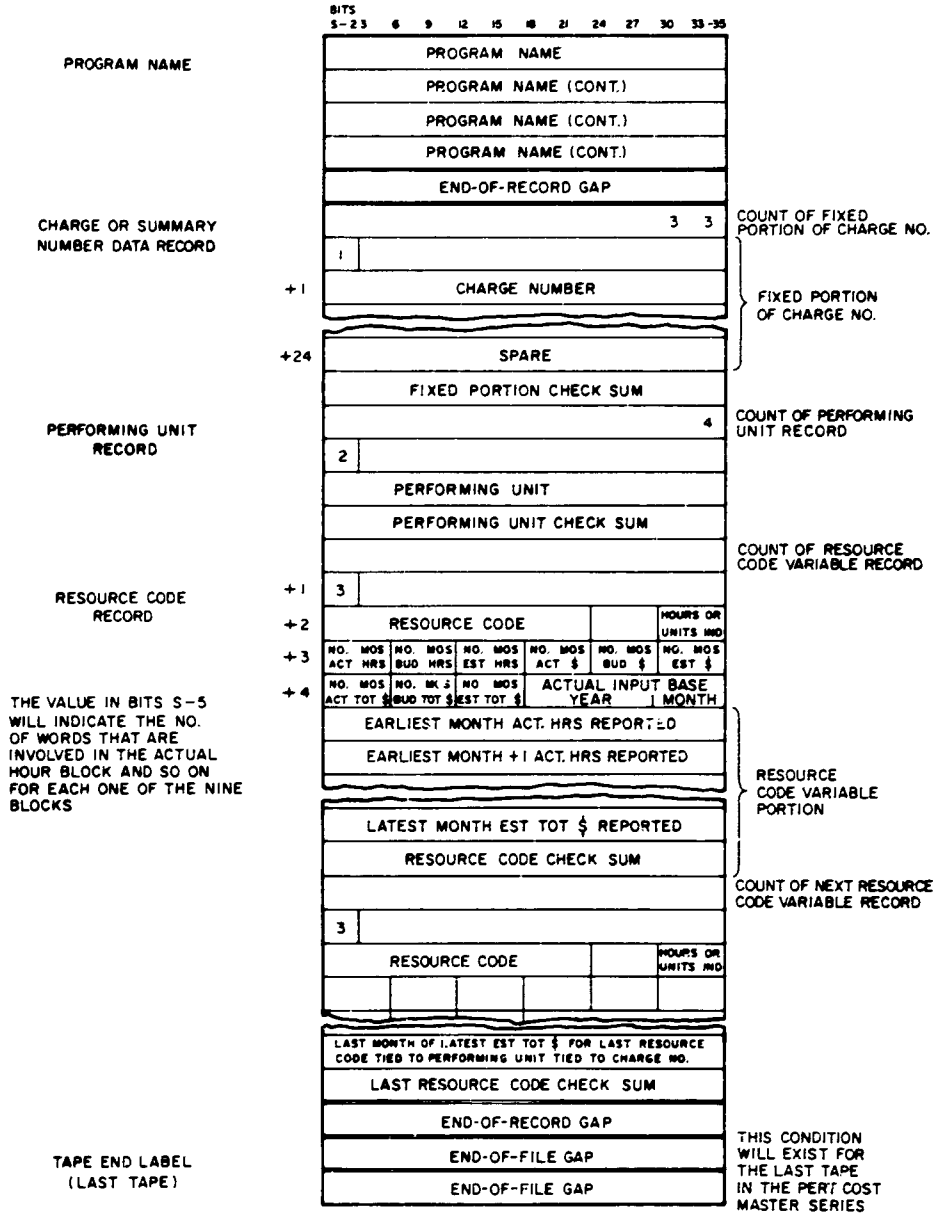


Fig. III-G-9. Physical Layout of PERT COST MASTER (Continued)

the code 1 word, of an octal 33, indicating there are 27 decimal words in this logical record including the count and checksum.

If the charge or summary number contains a Performing Unit/Resource Code combination, the record following the fixed portion changes is a performing unit record. This record may have one or many resource codes tied to it, but in either case it will appear only once in front of all of its tied resource codes. This performing unit record will always contain a word count of 4 in bits 5 through 2 preceding the code 2, indicating there are 4 words in this logical record including the count and checksum.

The resource code record is the lowest level of record on the PERT COST MASTER TAPE and varies in size according to the number of months that carry costs. This records count will vary from a minimum of 6 to a maximum of 573 and in the word following the count will be a 3 code in bits 5 through 2 to signify a resource code record. An indicator is carried in the word following the 3 code, in the sixth character, to signify whether hours or units are carried by this resource code. An "H" will signify hours and a "U" will mean units. The information following this code in the +3 and +4 words will indicate the number of words that are involved with each one of the nine blocks that is associated with this data. Each of the nine blocks will contain a number from 0 to octal 77, indicating the number of months that carry costs for that particular field. The variable portion of the resource code will be made up by packing the number of words carried in each one of the blocks, starting with actual hours and ending with estimated total dollars. The actual input base date in the +4 word will contain the BCD year in characters 4 and 5 and the month in octal in character 6. Following each resource code logical record will be a checksum.

PERT Cost Charge Number, Performing Unit, and Resource Code Table Layouts

These record layouts will show the 3 types of records making up the PERT Cost data file. They will show in detail the information carried as well as

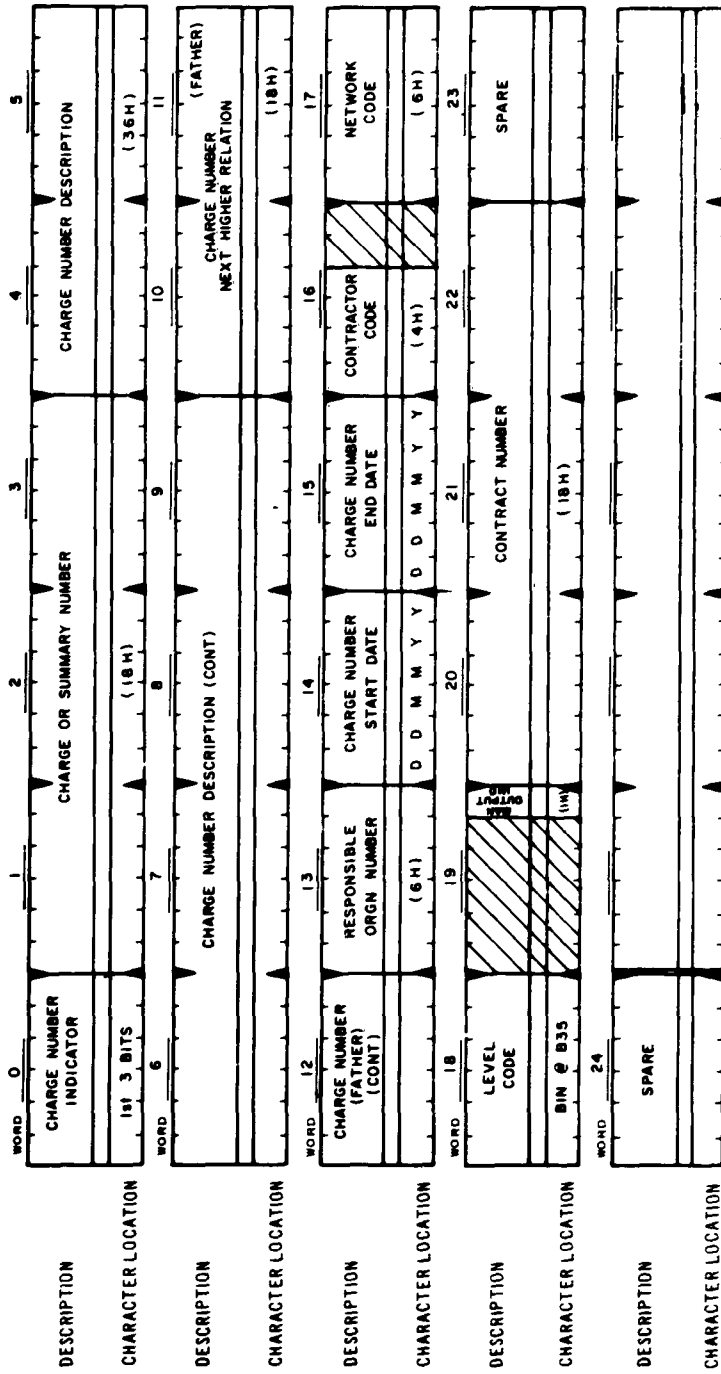


Fig. III-G-10. Tape Format of Charge or Summary Number Fixed-Portion Record (UCHG)

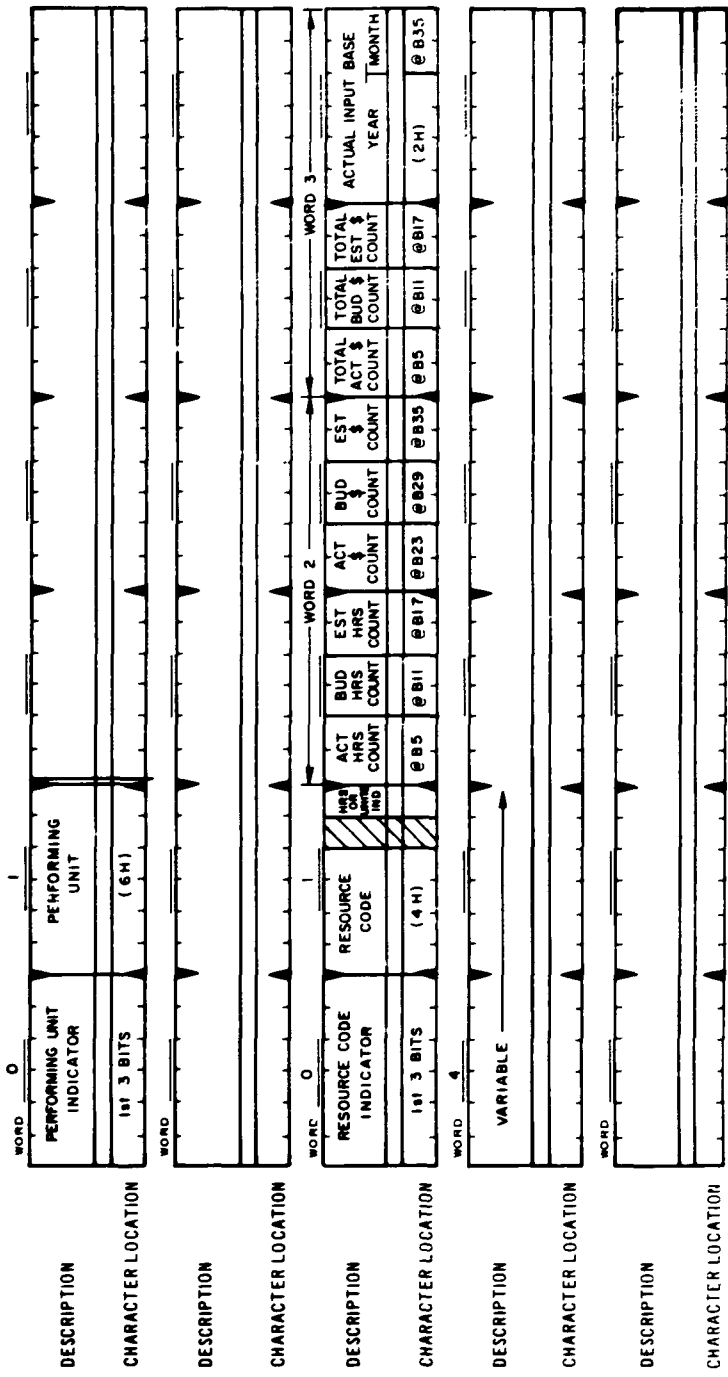


Fig. III-G-11. Tape Format of QRES2 and QRES1 Logical Records on PERT COST MASTER

the position in the record of this data. Figure III-G-10 is the record format for the charge number fixed-portion data, and is carried in core at location UCHG. Figure III-G-11 shows the detail record layouts for both the performing unit and resource code indicators which would be carried in core at UPUN and QRES2, respectively.

Resource Code Tables in Core

The record area in the QRES2 Table (Fig. III-G-12) is the working area for the resource code. Each of the nine fields is set up to its maximum and the packed data from the OLD PERT COST MASTER is unpacked into its respective field. The actual data is shifted in this record relative to a change in the actual base date, and the rate extensions are made in this table, where applicable, for the budgets and estimates. When 7-3, 7-4, or 7-5 input for this resource code is processed from the SORTED DATA TAPE, the changes will be made in the QRES2 Table. At the completion of all inputs for this table the data is packed again and set out onto QRES 1 (Figure III-G-13) to be written on the NEW PERT COST MASTER TAPE.

Rainbow Category and Cost Category Record

This record will contain the rainbow category and cost category related to a particular resource code. It will be set up in core location RCMC in the following format.



RECORD RCMC

Working Rate Table

The working rate table is created for a particular Performing Unit/ Resource Code or resource code combination related to the charge number start date. This table will set up the rates carried in the rate table at

QRES2

BITS											
5	23	6	9	12	15	18	21	24	27	30	33-36
	3										
+1	RESOURCE CODE									HOURS OR UNIT IND	
+2	NO. MOS ACT HRS	NO. MOS BUD HRS	NO. MOS EST HRS	NO. MOS ACT \$	NO. MOS BUD \$	NO. MOS EST \$					
+3	NO. MOS ACT TOT \$	NO. MOS BUD TOT \$	NO. MOS EST TOT \$	ACTUAL INPUT YEAR		BASE MONTH					
+4	63 MONTHS OF POSSIBLE DATA RELATING TO ACTUAL INPUT BASE FOR ACTUAL HOURS										
+66											
+67											
+130	63 MONTHS OF POSSIBLE DATA RELATING TO THE CHARGE NUMBER START DATE FOR BUDGET HOURS										
+193	63 MONTHS OF POSSIBLE DATA RELATING TO THE CHARGE NUMBER START DATE FOR ESTIMATE HOURS										
+256	REPEAT OF THE FIRST THREE 63 WORD FIELDS FOR DIRECT DOLLARS										
+319											
+382											
+445	REPEAT OF THE FIRST THREE 63 WORD FIELDS FOR TOTAL DOLLARS										
+508											
+570											

Fig. III-G-12. Physical Layout of QRES2 Table

QRES1

BITS
5 2 3 6 9 12 15 18 21 24 27 30 33-36

	3					
+1	RESOURCE CODE					HOURS OR UNITS IND
+2	NO. MOS ACT HRS	NO. MOS BUD HRS	NO. MOS EST HRS	NO. MOS ACT \$	NO. MOS BUD \$	NO. MOS EST \$
+3	NO. MOS ACT TOT \$	NO. MOS BUD TOT \$	NO. MOS EST TOT \$	ACTUAL INPUT YEAR		BASE MONTH
+4	<p>THIS PORTION OF THE RECORD IS VARIABLE DEPENDENT ON THE NUMBER OF MONTHS THAT CONTAIN DATA IN THE NINE CATEGORIES ABOVE</p> <p>THE COUNT IN EACH ONE OF THE NINE FIELDS ADDED TOGETHER WILL GIVE THE NUMBER OF WORDS IN THIS VARIABLE PORTION</p>					
+570						

Fig. III-G-13. Physical Layout of QRES1 Table

RTBAR, if any, for 63 individual months from the charge number start date. The program will use this working rate table to make all rate extensions that are needed. This table will be located in core at QRTBL and QRTB2. If the rate information for unit and overhead rates are in the RTBAR Table, the table at QRTB2 will contain the rates in the same format as the RTBAR Table. The only difference will be that the rates in the QRTBL Table refer to a month period. If there are no rates for a particular resource code, this table will contain zeros. The table at QRTB2 will contain the scaling factor for the unit rates that relate to a respective month. Both of these tables will be 63 words in length.

III-H PRE-REPORTING PHASE

All the information from the Update Phase is input to the Pre-Reporting Phase. This includes the Updated PERT Cost master file items and the information selected from the User's PERT Time tape.

Input of PERT Time Record

To input a record from the PERT Time tape, the following calling sequence is used:

```
L      TSX   JM00, 4
L + 1  PZE   L, 1, C
L + 2   Normal return
```

where the "1" indicates a time record, "L" is the location of the record, and "C" is the count. This information is used to create a Work Package/Activity Report record to be given to the JSORT routine. The information is also used to generate a Pseudo Time record for the charge number contained in the UCHG block. The Pseudo Time record is the summarized information of all the activities connected to the specific charge number.

Input of Complete PERT Cost Item

To input a complete PERT cost item (charge number, performing organization, and resource code information), the following calling sequence is used:

```
L      TSX   JM00, 4
L + 1  PZE   L, 0, C
L + 2   Normal return
```

where the "0" indicates a PERT cost item, and "L" and "C" are the location and count of the resource code information. The charge number information will be found in UCHG, the performing organization will be in UPUN, the rainbow category and cost category in RCMC, and the Pseudo-Time information in UTIME. This information will generate the Type 3, Type 4, Type 5, and Type 6 records of the JSORT routine.

Input of Partial PERT Cost Item

To input a partial PERT Cost item (only charge number information is available), the following calling sequence will be used:

L	TSX	JM00, 4
L + 1	PZE	0, 2, 0
L + 2	Normal return	

where the "2" denotes a partial PERT Cost item. The charge number information will be found in UCHG, the Pseudo Time information in UTIME, and no performing organization, resource code, rainbow category, or cost category information is available. This information will generate the Type 3, 4, 5, and 6 records for JSORT.

End of Data Condition

When all the PERT Cost information has been processed, control is given to the Pre-Reporting Phase with the following calling sequence:

L	TSX	JM00, 4
L + 1	PZE	0, 0, 0

where all zeros indicate the end-of-data condition. A cleanup is performed in the Pre-Reporting Phase and control is then given to the JSORT routine, where the information is sorted for input into the Intermediate Reporting Phase.

Option C or E Condition

If the program is run under option "C" or "E", only Report 1 information is generated. On the end of data condition, the information is sorted and transferred to the Intermediate Reporting Phase.

Pre-Reporting Phase Region Descriptions

(See following pages.)

Region JM00

EXPLANATION OF REGION:

To set up information for Work Package/Activity reports (1 and 2), Christmas Tree routine, and Reporting master file.

CALLING SEQUENCE:

L TSX JM00, 4
L + 1 PZE L, F, C
L + 2 Normal return

INPUT:

UCHG - Charge number information
UPUN - Performing organization information
L, 0, C - Resource code information location
L, 1, C - Individual time record location

OUTPUT:

Reports 1 and 2 to JSORT.
Type 3, 4, 5, 6 records to JSORT.
UTIME - Pseudo-time information

STORAGE USED:

Not applicable

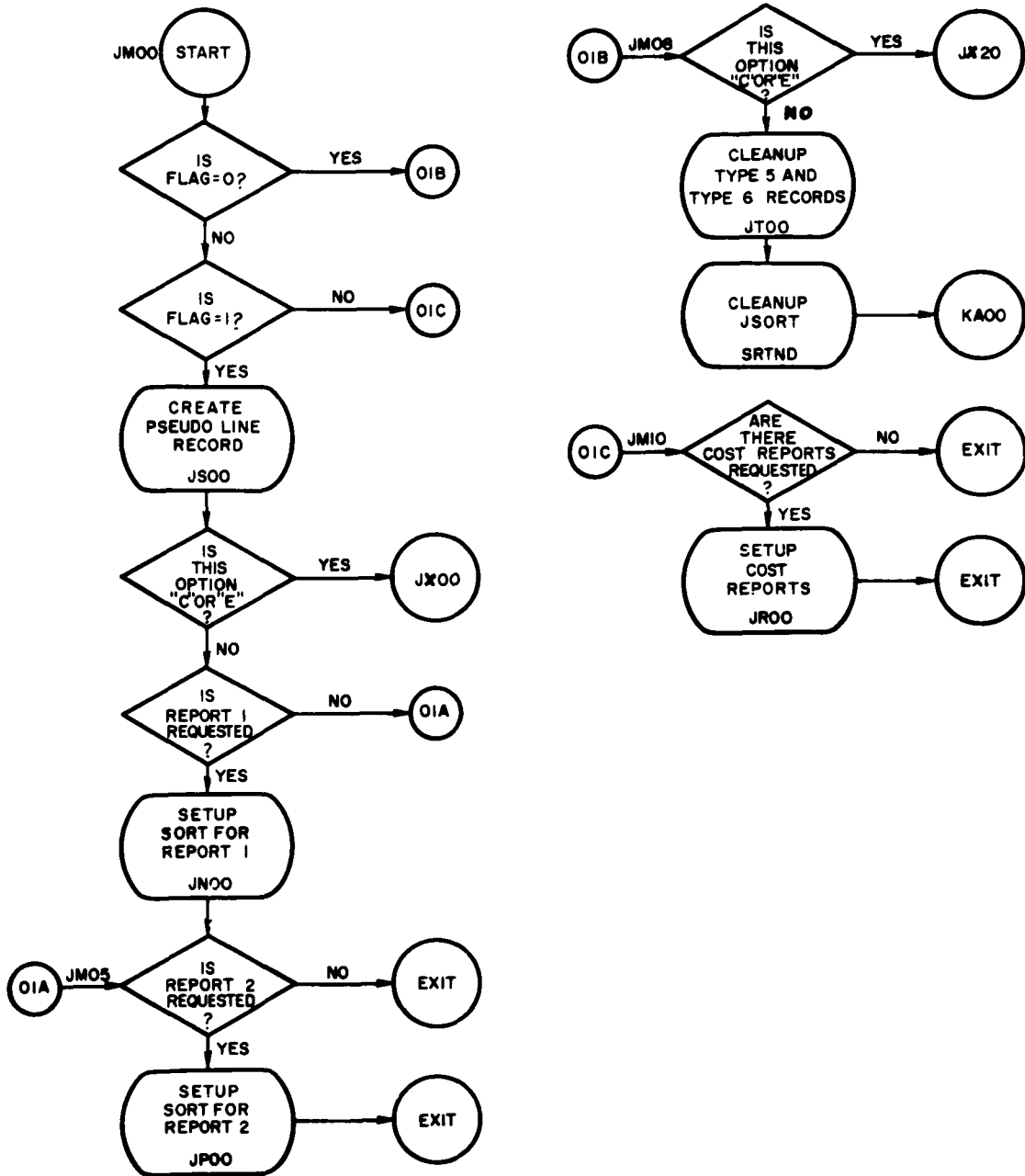
SUBREGIONS AND SUBROUTINES USED:

JN00	JSORT
JP00	JX00
JR00	

EXPLANATION OF CALLING SEQUENCE:

L = location of 1st word of block of information
C = count of the number of items in block
F = 0: L and C refer to resource code
 = 1: L and C refer to individual time record
 = 2: No resource code information available
If L, C, and F are all zero, the end-of-data is indicated

REGION JM00



Region JN00

EXPLANATION OF REGION:

To select information needed for producing Report 1 and give it to JSORT.

CALLING SEQUENCE:

L TSX JN00, 4

L + 1 Normal return

INPUT:

1. Time record information
2. Associated charge number information

OUTPUT:

Report 1 record

STORAGE USED:

Not applicable

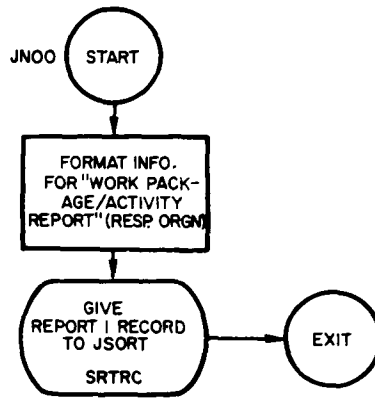
SUBREGIONS AND SUBROUTINES USED:

JSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION JNOO



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 1

WORD #	1	2	3	4	5	6
DESCRIPTION	REPORT NO.	RESPONSIBLE ORGN.		CHARGE NUMBER		PREDECESSOR EVENT
CHARACTER LOCATION	1 @ B35	(6H)		(18H)		(9H)
DESCRIPTION	PRED. EVENT (CONT.)	SUCCESSOR EVENT		CHARGE NUMBER		PREDECESSOR EVENT
CHARACTER LOCATION		(9H)		(18H)		(9H)
DESCRIPTION	PRED. EVENT (CONT.)	SUCCESSOR EVENT		SCHED. EXP. COMPL. DATE	EXPECTED COMPL. DATE	SCHED. LATEST COMPL. DATE
CHARACTER LOCATION		(9H)		D D M M Y Y	D D M M Y Y	D D M M Y Y
DESCRIPTION	LATEST COMPL. DATE	SCHED/ACTUAL COMPL. DATE	SCHEDULED FLOW TIME	EXPECTED FLOW TIME	SLACK	ACTIVITY DESCR.
CHARACTER LOCATION	D D M M Y Y	D D M M Y Y	WK x IO @ B35	WK x IO @ B35	WK x IO @ B35	(54H)
DESCRIPTION		ACTIVITY DESCRIPTOR (CONT.)				
CHARACTER LOCATION						

* FIRST 7 WORDS ARE FOR SORTING PURPOSES ONLY

Fig. III-H-1. Tape Format of Report 1 Record

RECORD FORMAT

Region JP00

EXPLANATION OF REGION:

To select information needed for producing Report 2 and give it to JSORT.

CALLING SEQUENCE:

L TSX JP00, 4

L + 1 Normal return

INPUT:

1. Time record information
2. Associated charge number information

OUTPUT:

Report 2 record

STORAGE USED:

Not applicable

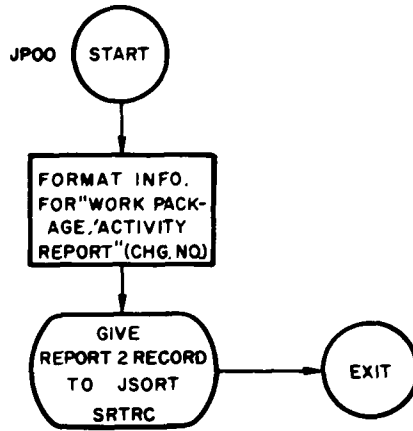
SUBREGIONS AND SUBROUTINES USED:

JSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION - JPOO



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 2

DESCRIPTION	WORD	1	2	3	4	5	6
CHARACTER LOCATION							
		REPORT NO.	CHARGE NUMBER	PREDECESSOR EVENT			
		2 @ B35	(10H)	9H			
	WORD	7	8	9	10	11	12
DESCRIPTION		SUCCESSOR EVENT	CHARGE NUMBER	PRODECESSOR EVENT			
CHARACTER LOCATION		(9H)	(10H)	(9H)			
	WORD	13	14	15	16	17	18
DESCRIPTION		SUCCESSOR EVENT	SCHED. EXP. COMPL. DATE	EXPECTED COMPL. DATE	SCHED. LATEST COMPL. DATE	LATEST COMPL. DATE	
CHARACTER LOCATION		(9H)	DDMMYY	DDMMYY	DDMMYY	DDMMYY	
	WORD	19	20	21	22	23	24
DESCRIPTION		SCHED/ACTUAL COMPL. DATE	SCHEDULED FLOW TIME	EXPECTED FLOW TIME	SLACK	ACTIVITY DESCR.	
CHARACTER LOCATION		DDMMYY	WK x 10 @ B35	WK x 10 @ B35	WK x 10 @ B35	(54H)	
	WORD	25	26	27	28	29	30
DESCRIPTION			ACTIVITY DESCRIPTOR (CONT.)				
CHARACTER LOCATION							

* THE FIRST 7 WORD ARE FOR SORTING PURPOSES ONLY.

Fig. III-H-2. Tape Format of Report 2 Record

RECORD FORMAT

PROGRAM NUMBER PERT COST
 NAME OF RECORD REPORT 2 (CONT.)

DESCRIPTION	WORD 31	32	33	34	35	36
CHARACTER LOCATION		NETWORK CODE (6H)		NETWORK DESCRIPTOR		
DESCRIPTION	WORD 37	38	39	40	41	42
CHARACTER LOCATION		NETWORK DESCR. (CONT.) (11H)	TS/TA INDICATOR (Hatched)	SCHED. EXP. START DATE (D D M M Y Y)	RESPONSIBLE ORGN. (6H)	CONTRACTOR (4H)
DESCRIPTION	WORD 43	44	45	46	47	48
CHARACTER LOCATION		CONTRACT NUMBER (18H)		LEVEL CODE (8B35)		CHARGE NO. DESCRIPTOR (36H)
DESCRIPTION	WORD 49	50	51	52		
CHARACTER LOCATION			CHARGE NO. DESCRIPTOR (CONT.)			
DESCRIPTION	WORD					
CHARACTER LOCATION						

Fig. III-H-2. Tape Format of Report 2 Record (Continued)

Region JR00

EXPLANATION OF REGION:

To set up information for Christmas Tree routine and Reporting master file, and give it to JSORT.

CALLING SEQUENCE:

L TSX JR00, 4
L + 1 Normal return

INPUT:

UCHG - Charge number information
UPUN - Performing organization information
QRES1 - Resource code information
UTIME - Pseudo-time information

OUTPUT:

Type 3, 4, 5, 6 records for JSORT

STORAGE USED:

Not applicable

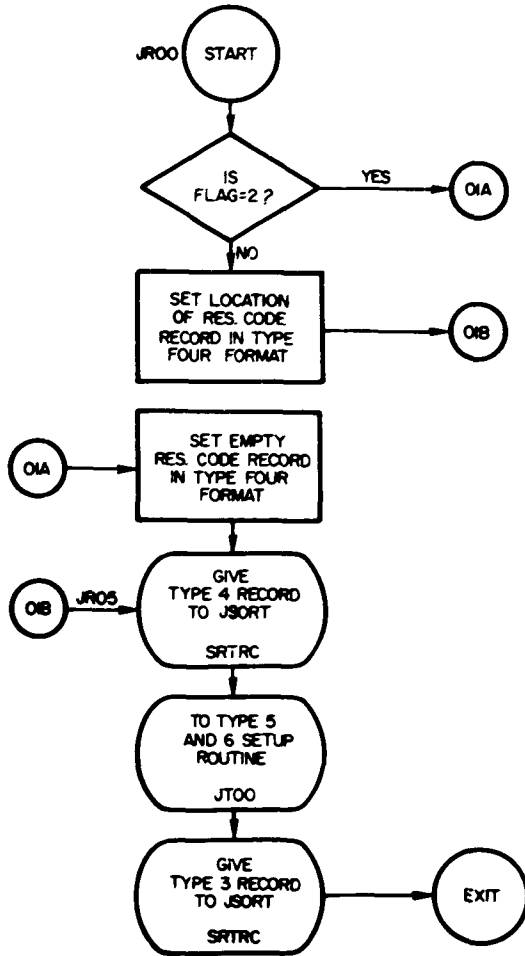
SUBREGIONS AND SUBROUTINES USED:

JSORT JT00

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION - JROO



RECORD FORMAT

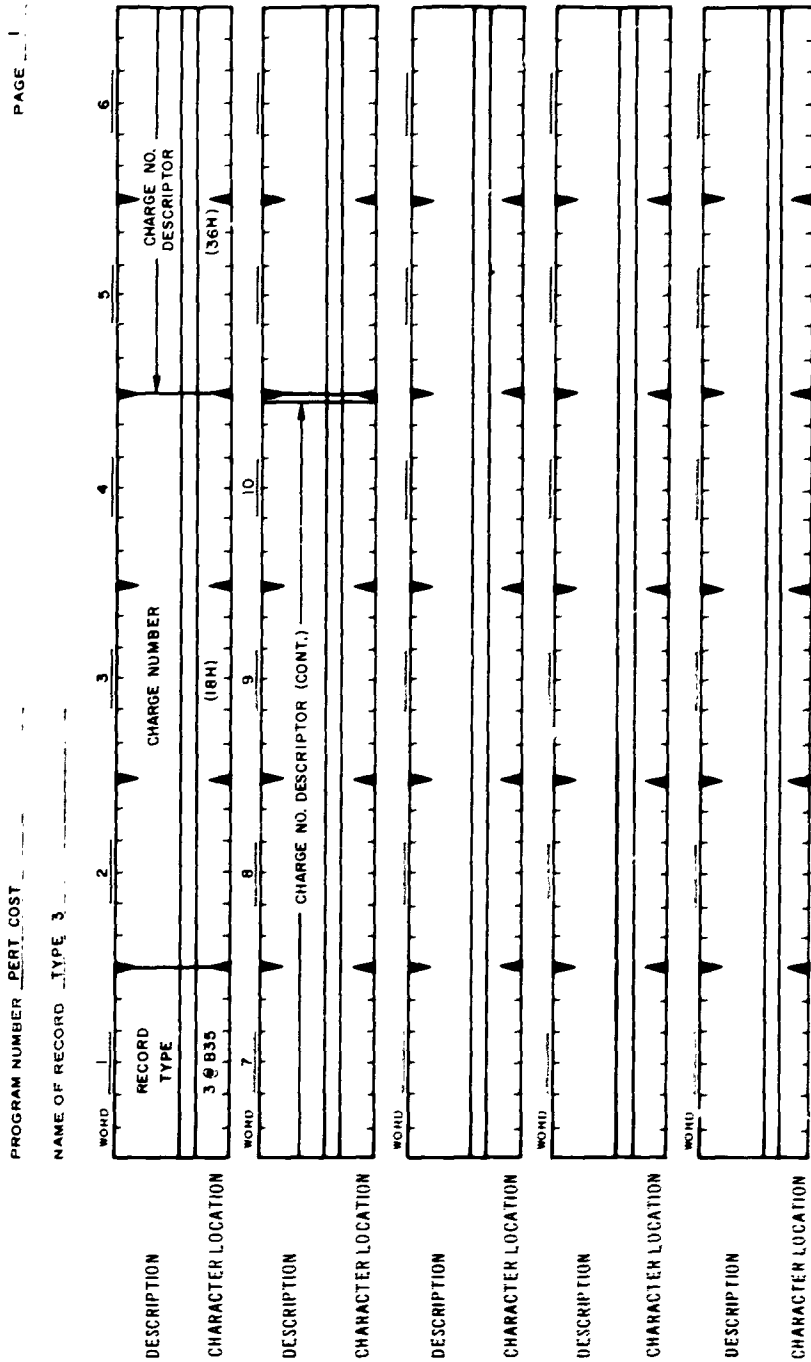


Fig. III-H-3. Tape Format of Type 3 Record

RECORD FORMAT

PAGE

PROGRAM NUMBER PERT COST

NAME OF RECORD TYPE 4

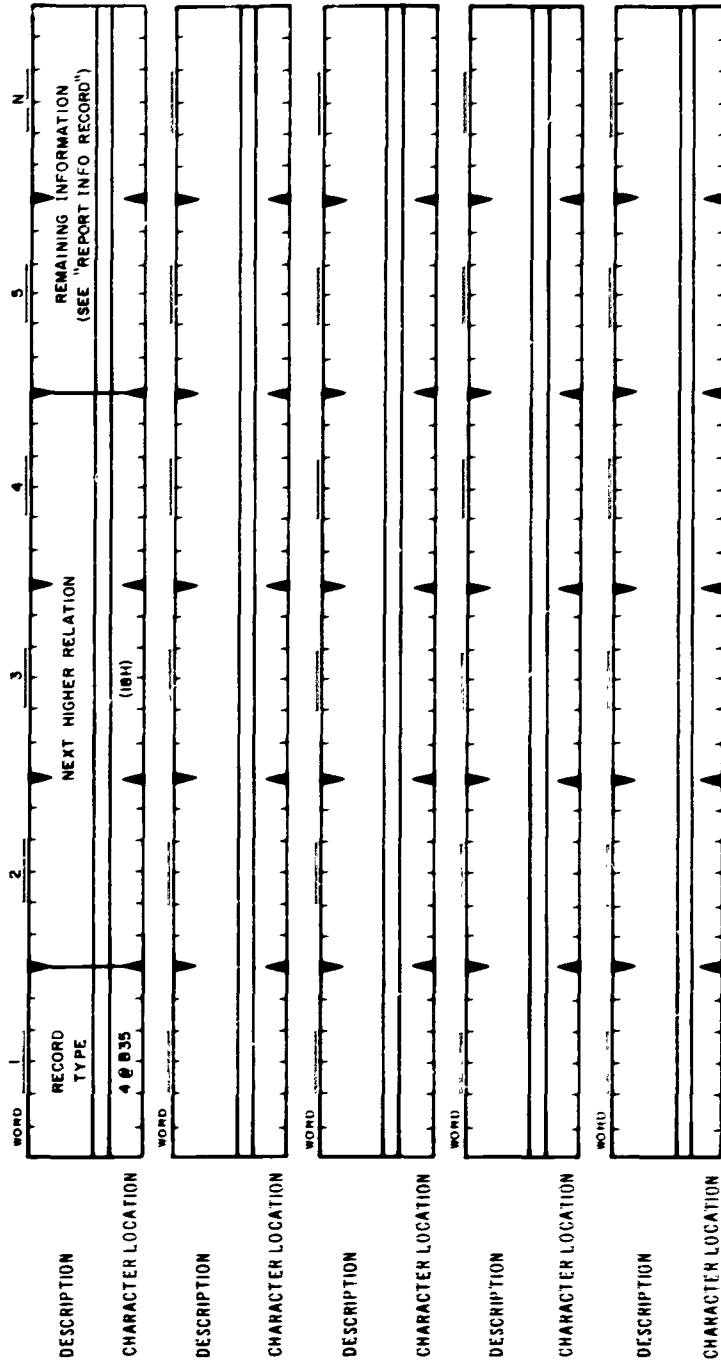


Fig. III-H-4. Tape Format of Type 4 Record

RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE

NAME OF RECORD TYPE 5

	WORD 1	WORD 2	WORD 3	WORD 4
DESCRIPTION	RECORD TYPE		NEXT HIGHER RELATION	
CHARACTER LOCATION	5 @ B35		(18H)	
DESCRIPTION				
CHARACTER LOCATION				
DESCRIPTION				
CHARACTER LOCATION				
DESCRIPTION				
CHARACTER LOCATION				
DESCRIPTION				
CHARACTER LOCATION				
DESCRIPTION				
CHARACTER LOCATION				

Fig. III-H-5. Tape Format of Type 5 Record

RECORD FORMAT

PAGE

PROGRAM NUMBER PERT COST

NAME OF RECORD TYPE 6

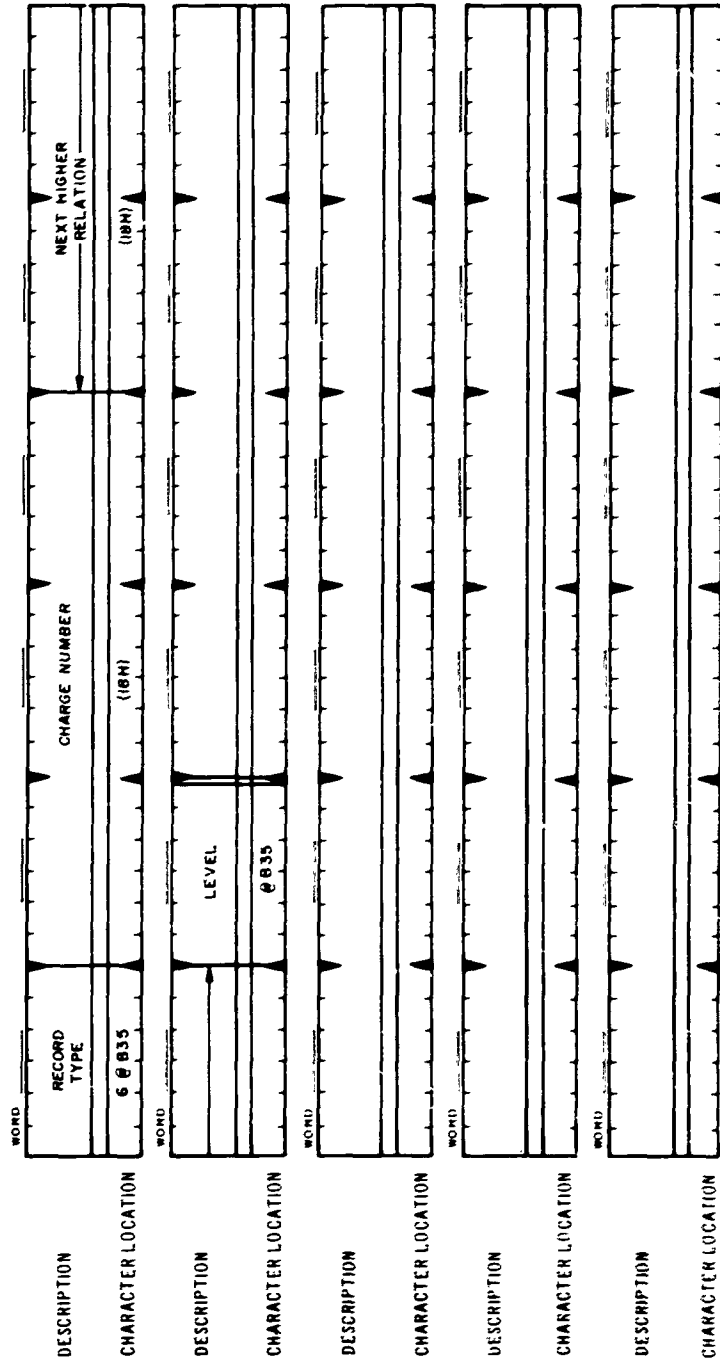


Fig. III-H-6. Tape Format of Type 6 Record

Region JS00

EXPLANATION OF REGION:

To create and update pseudo time-record.

CALLING SEQUENCE:

L TSX JS00, 4

L + 1 Normal return

INPUT:

Address of JM900 contains start of time record.

OUTPUT:

Pseudo-time record starting in UTIME.

STORAGE USED:

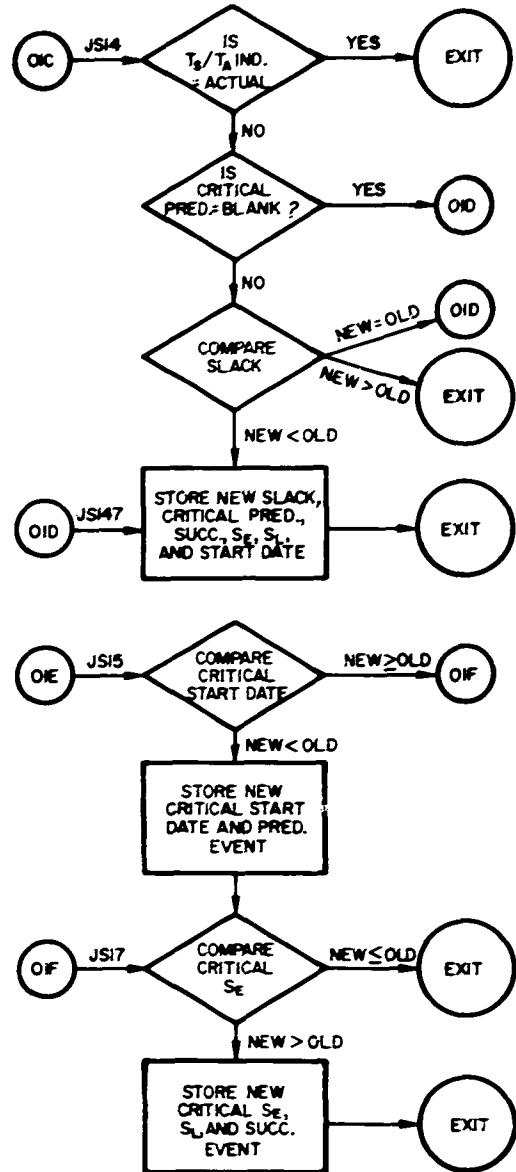
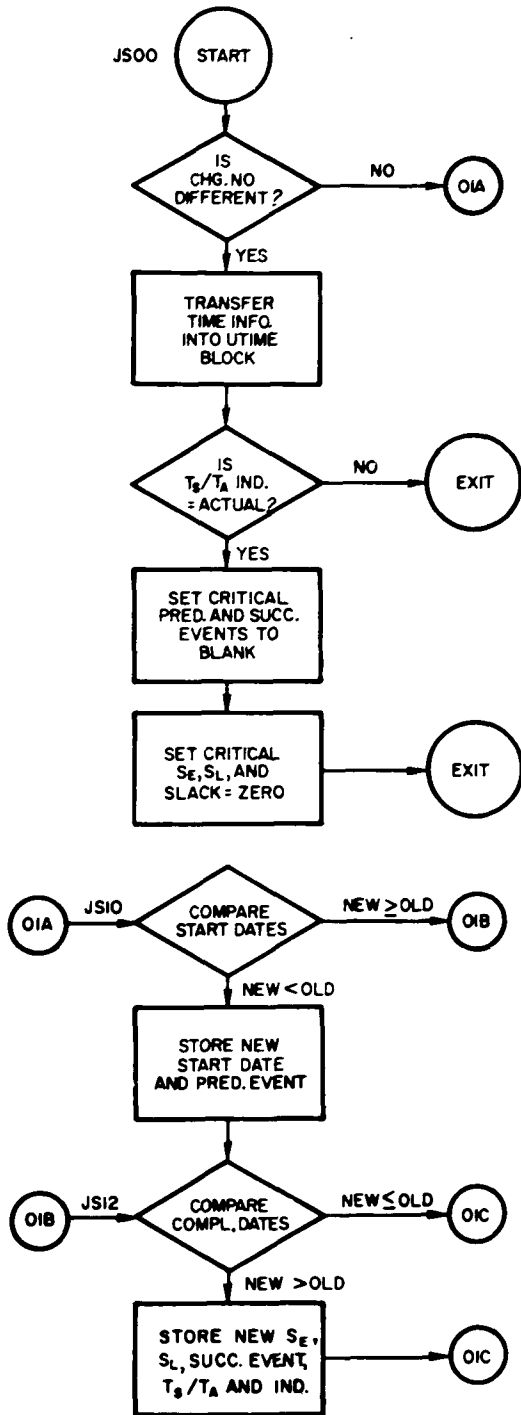
Not applicable

SUBREGIONS AND SUBROUTINES USED:

YDCMP YCOMP

EXPLANATION OF CALLING SEQUENCE:

Not applicable



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE

NAME OF RECORD SUM TAPE

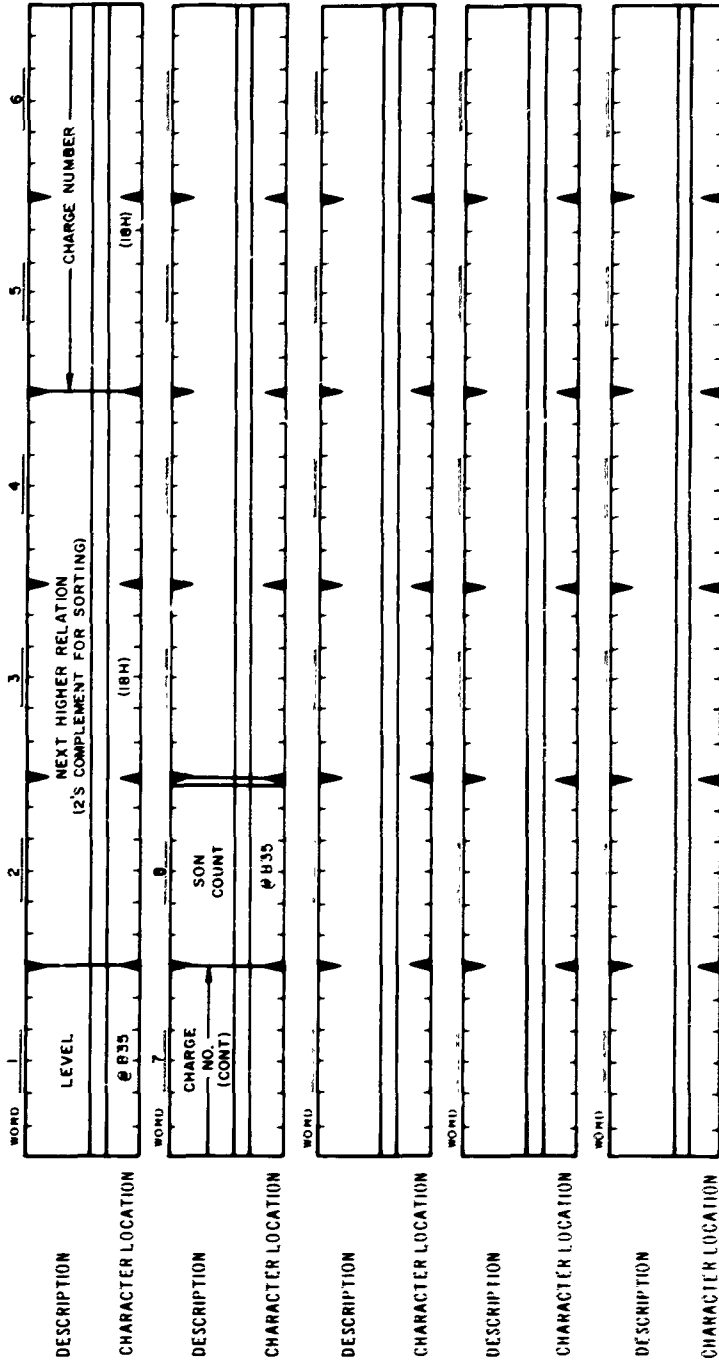


Fig. III-H-7. Tape Format of Pseudo Time Record

Region JT00

EXPLANATION OF REGION:

To set up Record Types 5 and 6 and give them to JSORT

CALLING SEQUENCE:

L TSX JT00, 4

L + 1 Normal return

INPUT:

UCHG - Charge number information

OUTPUT:

Types 5 and 6 records for JSORT

STORAGE USED:

Not applicable

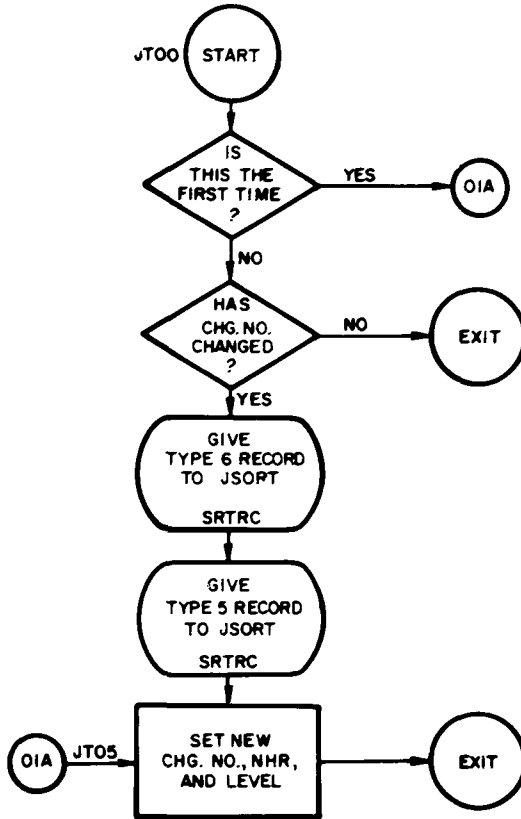
SUBREGIONS AND SUBROUTINES USED:

JSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION JTOO



Region JX00

EXPLANATION OF REGION:

To select information needed for producing Report 1. On end of data condition, sort the information and transfer control to Intermediate Reporting Phase.

CALLING SEQUENCE:

L TRA JX00

INPUT:

1. Time information
2. Associated charge number information

OUTPUT:

Report 1 record.

STORAGE USED:

Not applicable

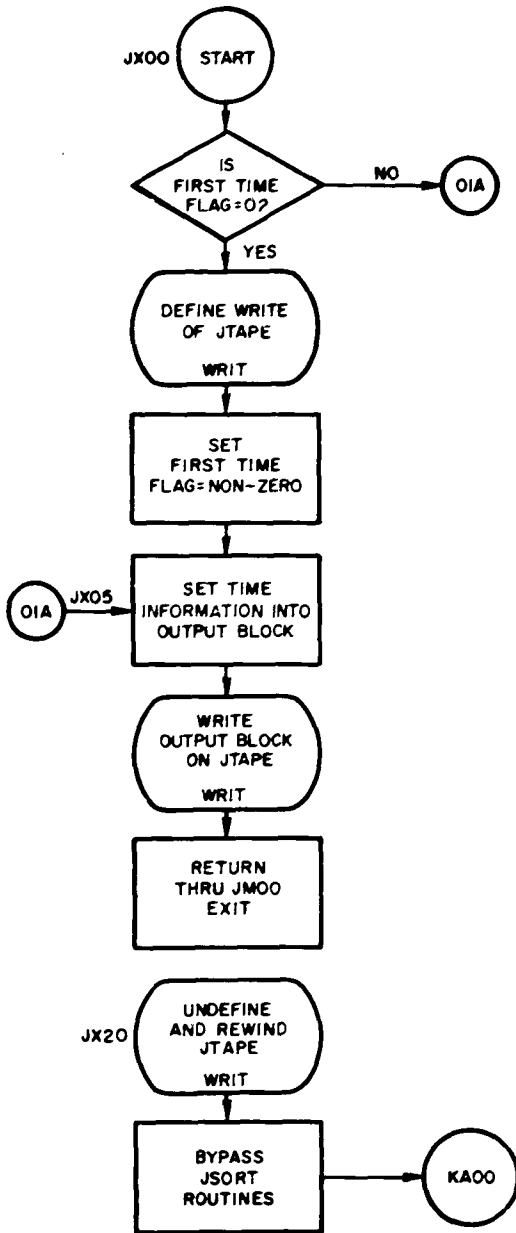
SUBREGIONS AND SUBROUTINES USED:

SORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION JX00



III-I INTERMEDIATE REPORTING PHASE

In the Intermediate Reporting Phase the Work Package/Activity Reports (if requested) are generated on the output tape, the Christmas Tree Indicators for the Work Breakdown structure are generated, and the information necessary for the construction of the specified reports is gathered for input into the Final Reporting Phase.

No Reports or Time Reports Only

If no reports are selected, the processing will end in this phase with a message:

THERE WERE NO REPORTS PRODUCED DURING THIS
RUN

If only Work Package/Activity Reports were selected, processing will end after these reports are generated.

Option C or E

If running under the control of option "C" or "E", processing will end after Report 1 is generated (Work Package/Activity Report with responsible organization as the major sort item).

Insertion of Next Higher Relation Descriptor

Since the descriptor of the "next higher relation" of the charge number is not readily available from the PERT Cost master file, and is necessary in the generation of the reports, it must be inserted into the Report Information master file. This is accomplished by generating a list of charge numbers and their descriptors sorted in charge number order (Type 3 record) and merging them with their "next higher relation" counterparts in the Cost Report file sorted by "next higher relation" (Type 4 record). The Cost Report file is then sorted back into charge number order. The sorted Cost Report file will be referred to as the FILE 1 tape.

Christmas Tree Generation Routine

General Description

The "Christmas Tree" routine is a method by which each charge number or summary number in the Work Breakdown Structure can be related to all its predecessor charge numbers (father, grandfather, etc.) and to all its successor charge numbers (sons, grandsons, etc.). The Christmas Tree Indicators which will be created will enable cost and time information to be summarized up the levels of the Work Breakdown structure to the charge numbers at the indicated reporting levels.

Procedure

The Work Breakdown Structure of Fig. III-I-1 will be used to better illustrate the procedure necessary for the creation of the Christmas Tree Indicators. The charge number information, sorted with charge number major, will enter the routine as illustrated in Table III-I-1.

Table III-I-1
Data Sorted by Charge Number (Son)

Charge No. (Son)	Next Higher Relation (Father)	Level	Related Information
100	000	1	-
200	100	2	-
300	100	2	-
400	100	2	-
500	200	3	-
600	200	3	-
700	400	3	-
800	400	3	-
900	500	4	-
1000	600	4	-
1100	300	4	-
1200	800	4	-

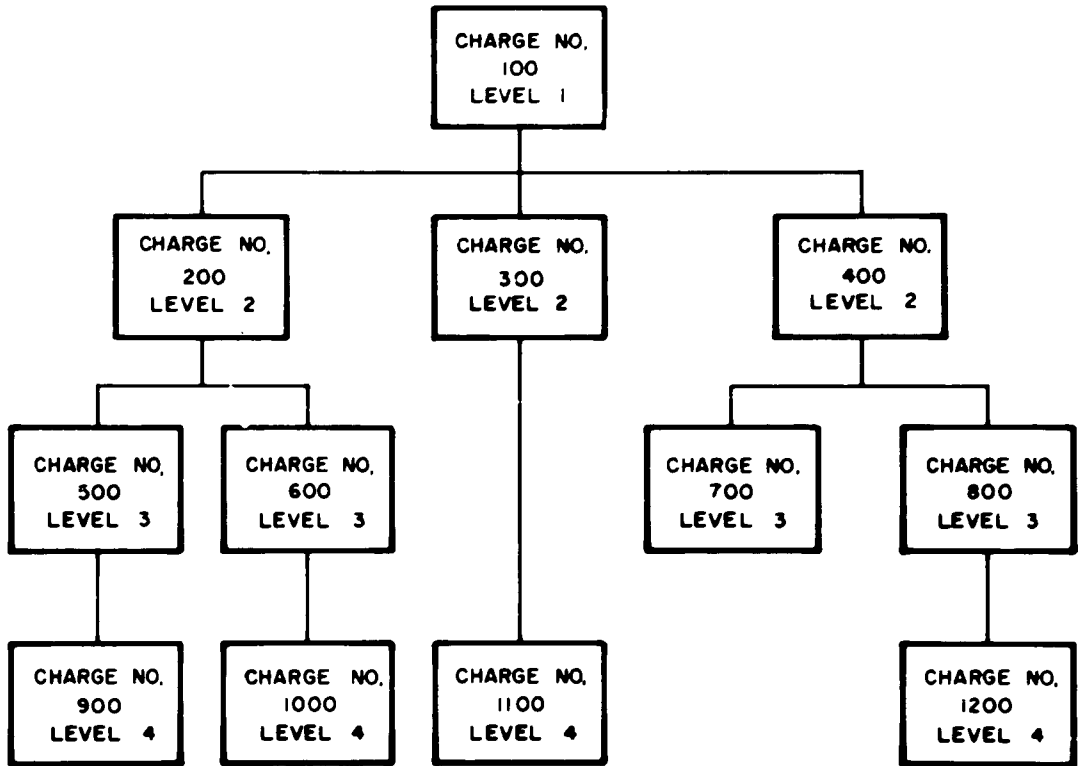


Figure III-I-1 - Sample Work Breakdown Structure

The "next higher relation" or father of each charge number will be retrieved from Table III-I-1 , placed into Table III-I-2 , and then sorted.

Table III-I-2

Father Sort

000
100
100
100
200
200
300
400
400
500
600
800

The number of times each father appears in the table is then determined and the count is placed in Table III-I-3. This count will be the number of sons directly related to each individual charge number. Those charge numbers not appearing in Table III-I-3 will have zero sons.

Table III-I-3

Father-Son Count

Charge No.	Count	Charge No.	Count
000	1	400	2
100	3	500	1
200	2	600	1
300	1	800	1

The charge number, next higher relation, and level information from Table III-I-1 is then merged with Table III-I-3 to form Table III-I-4 Table III-I-4 will be sorted with level major and father minor.

Table III-I-4

Data Sorted by Level and by Father

Item No.	Level	Son	Father	Count
1	-	000	-	1
2	1	100	000	3
3	2	200	100	2
4	2	300	100	1
5	2	400	100	2
6	3	500	200	1
7	3	600	200	1
8	3	700	400	0
9	3	800	400	1
10	4	1100	300	0
11	4	900	500	0
12	4	1000	600	0
13	4	1200	800	0

A set of sixteen 6-bit indicators are formed to associate an individual charge number with all of its predecessor charge numbers. There will be one 6-bit indicator for each of the 16 levels possible. The set of 16 indicators forms one Christmas Tree Indicator.

Method of Generating Christmas Tree Indicators

- A. Get the first item (charge number record) from Table III-I-4 . Place the son (all zeros), count and a Christmas Tree Indicator (CTI) of all zeros into a "working table."
- B. Get the next charge number item from Table III-I-4
- C. Find the son in the working table that matches the father in the current charge number item. Decrease the count for this working table item by one.
- D. Get the CTI in the working table item and increase by one the L^{th} level indicator (i. e., the indicator pertaining to the level of the current charge number item).
- E. Place the son from the current charge number item and the new CTI in an output table.

- F. If the count of the working table item is zero, set the item in the Working Table to a "complete" condition.
- G. If the count of the current item in Table III-I-4 is non-zero, place the son, count, and new CTI into the Working Table, and return to step B. If the count is zero, return directly to step B.

Exception Messages

If the Working Table should become filled, the completed items will be removed and the table will be condensed to fill the vacant spaces. If there are no completed items to remove, the following message will be printed:

WORKING TABLE TOO SMALL

and the computer will halt.

Cleanup

When all the items in Table III-I-4 have been processed, the information in the Output Table is sorted on son (charge number) and then the CTI is merged with the information in Table III-I-5 to create a Pert Cost Reporting File. By sorting the PERT Cost Reporting File with CTI major, the Work Breakdown structure will be placed in a topological order from the top to the bottom. To invert this ordering, the CTI may be complemented (one's complement) prior to sorting.

If a charge number has a "next higher relation" that does not appear as a charge number elsewhere in the Work Breakdown Structure, the following message will be printed:

THE FOLLOWING SON HAS NO FATHER XXXXXX

When all the charge numbers of this type have been printed, the computer will halt.

Illustration of Christmas Tree Indicator Generation

The illustration of the generation of the CTI will utilize the data in Table III-I-4, and reference the steps given on Page III-I-5 under

"Method of Generating Christmas Tree Indicators." For reasons of space, only the first four indicators of the CTI will be shown in the illustration.

Step A

Place the son and count of item No. 1 along with a CTI of all zeros into the Working Table. The Working Table now contains:

Son	Count	CTI
000	1	00/00/00/00/...

Step B

Get item 2 from Table III-I-4 , showing:

Level	Son	Father	Count
1	100	000	3

Step C

Find son 000 in the Working Table and decrease its count by 1. The Working Table now contains:

Son	Count	CTI
000	0	00/00/00/00/...

Step D

Increase the first indicator of the CTI of the item in the Working Table by 1. The Working Table now contains:

Son	Count	CTI
000	0	01/00/00/00/...

Step E

Place the son in item No. 2 of Table III-I-4 together with the new CTI from the Working Table into the Output Table. The Output Table now contains:

Son	CTI
100	01/00/00/00/...

Step F

Since the count of the item in the Working Table is now 0, the item will be set to a completed condition. The Working Table now contains:

Son	Count	CTI
000	0	01/00/00/00/...

Step G

Since the count of item 2 in Table III-I-4 is non-zero, the son, count, and new CTI is placed in the Working Table. The Working Table now contains:

Son	Count	CTI
000	0	01/00/00/00/...
100	3	01/00/00/00/...

Control is now returned to Step B and the next charge number item in Table III-I-4 is processed.

Step B

Get item No. 3 from Table III-I-4 .

Step C

After the completion of this step, the Working Table will contain:

Son	Count	CTI
000	0	01/00/00/00/...
100	2	01/00/00/00/...

Step D

Upon the completion of this step the Working Table contains:

Son	Count	CTI
000	0	01/00/00/00/...
100	2	01/01/00/00/...

Step E

Upon completion of this step the Output Table contains:

Son	CTI
100	01/00/00/00/...
200	01/01/00/00/...

Step F

The count of the Working Table item is non-zero, and the Working Table is unchanged.

Step G

Upon completion of this step the Working Table contains:

Son	Count	CTI
000	0	01/00/00/00/...
100	2	01/01/00/00/...
200	2	01/01/00/00/...

After all the items in Table III-I-4 have been processed, the Output Table will contain:

Charge Number	CTI
100	01/00/00/00/...
200	01/01/00/00/...
300	01/02/00/00/...
400	01/03/00/00/...
500	01/01/01/00/...
600	01/01/02/00/...
700	01/03/01/00/...
800	01/03/02/00/...
1100	01/02/00/01/...
900	01/01/01/01/...
1000	01/01/02/01/...
1200	01/03/02/01/...

Intermediate Reporting Phase Region Descriptions

The region specifications are given on the following pages, together with corresponding report formats or tape record formats when appropriate.

Region KA00

EXPLANATION OF REGION:

This is the master control region for the Intermediate Reporting Phase, controlling output of time reports, Christmas Tree generation, and initial sort for remaining reports.

CALLING SEQUENCE:

L TRA KA00

INPUT:

Sorted PRE-REPORTING TAPE.

OUTPUT:

Reporting tape with information for generation of each report broken down by report and level.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED

KB00

KC00

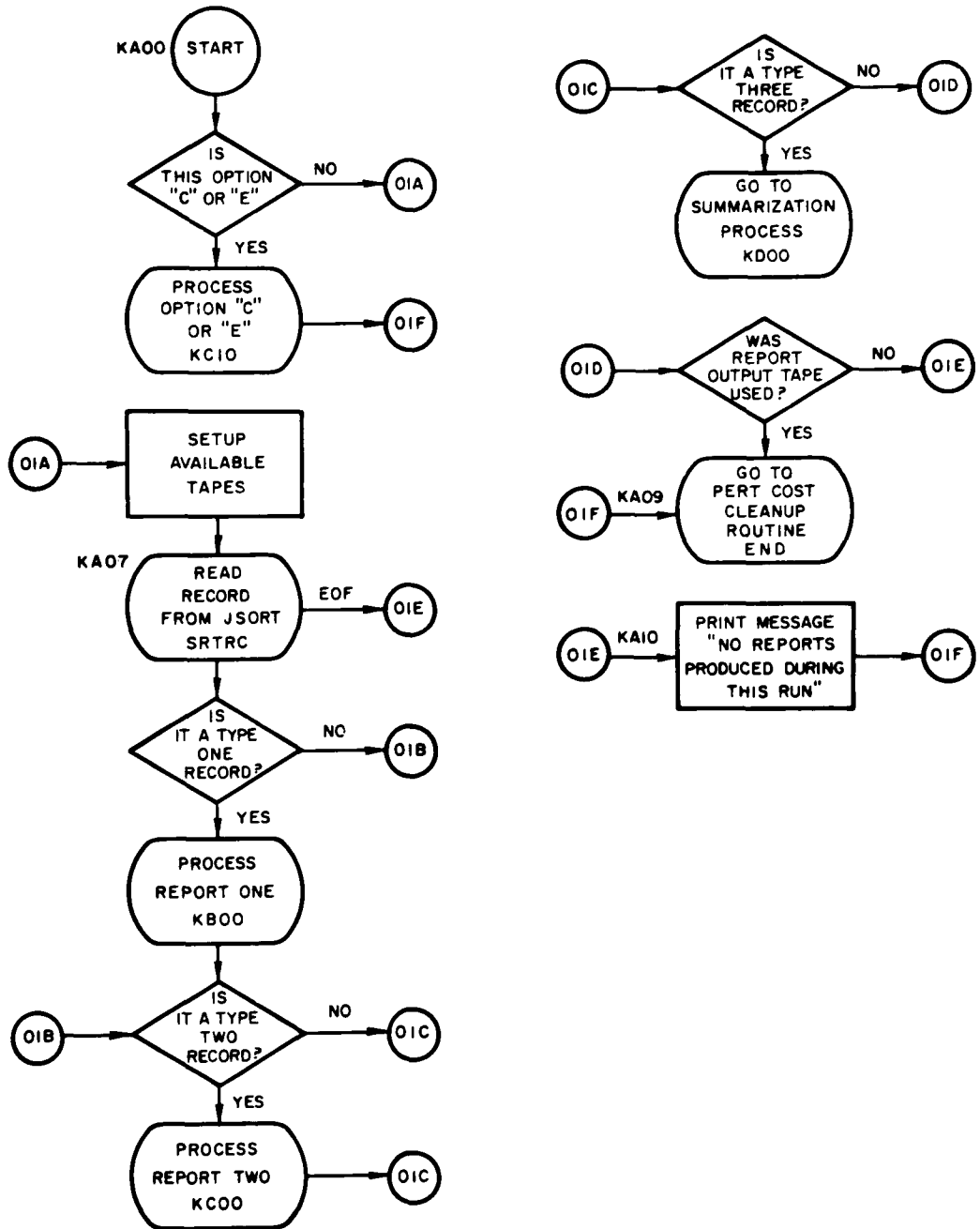
KC10

KD00

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION KA00



Region KB00

EXPLANATION OF REGION:

To print Report No. 1, "Work Package/Activity." Sort sequence:
responsible organization, charge number, predecessor charge number,
successor charge number.

CALLING SEQUENCE:

L TSX KB00, 4
L + 1 Normal return

INPUT:

First sorted item of information for report number 1 located in
address of YCNT.

OUTPUT:

Report number 1 on OUTPUT REPORT TAPE.

STORAGE USED:

Not applicable

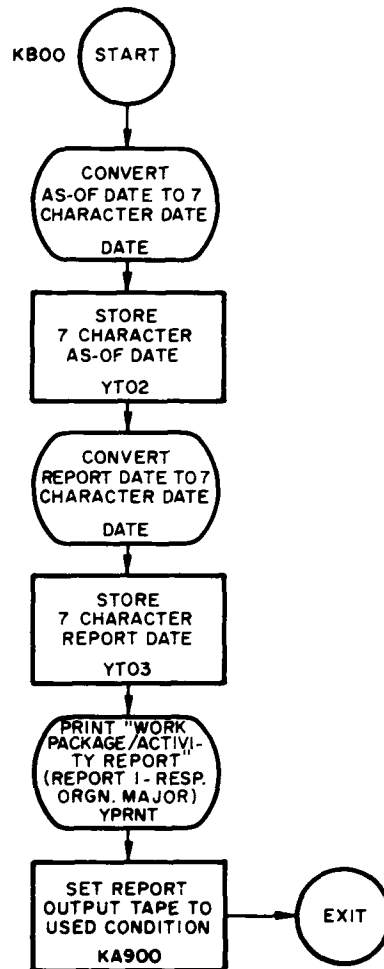
SUBREGIONS AND SUBROUTINES USED:

DATE YPRNT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION K800



Region KC00

EXPLANATION OF REGION:

To print report number 2, "Work Package/Activity." Sort sequence:
charge number, predecessor number, successor number.

CALLING SEQUENCE:

L TSX KC00, 4
L + 1 Normal return

INPUT:

First sorted item of information for report number 2 located in
address of YCNT

OUTPUT:

Report number 2 on output report tape

STORAGE USED:

Not applicable

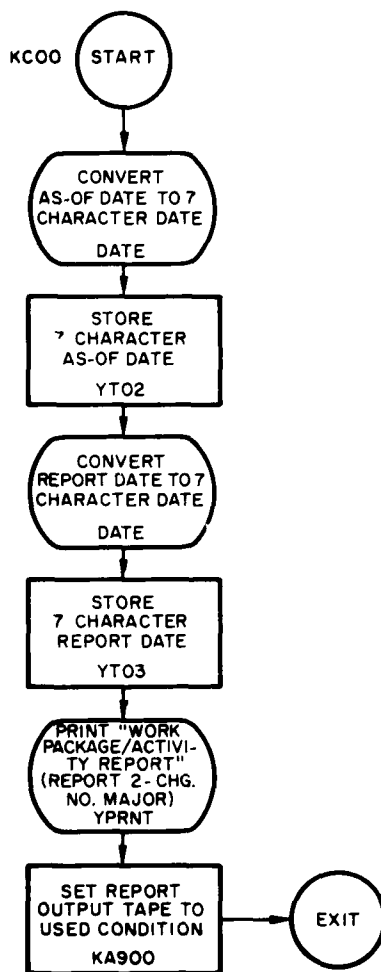
SUBREGIONS AND SUBROUTINES USED:

DATE YPRNT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION KCOO



Region KC10

EXPLANATION OF REGION:

To print Report 1 under option "C" or "E."

CALLING SEQUENCE:

L TRA KC10

INPUT:

Report 1 information on JTAPE.

OUTPUT:

Report 1 on OUTPUT REPORT TAPE.

STORAGE USED:

Not applicable

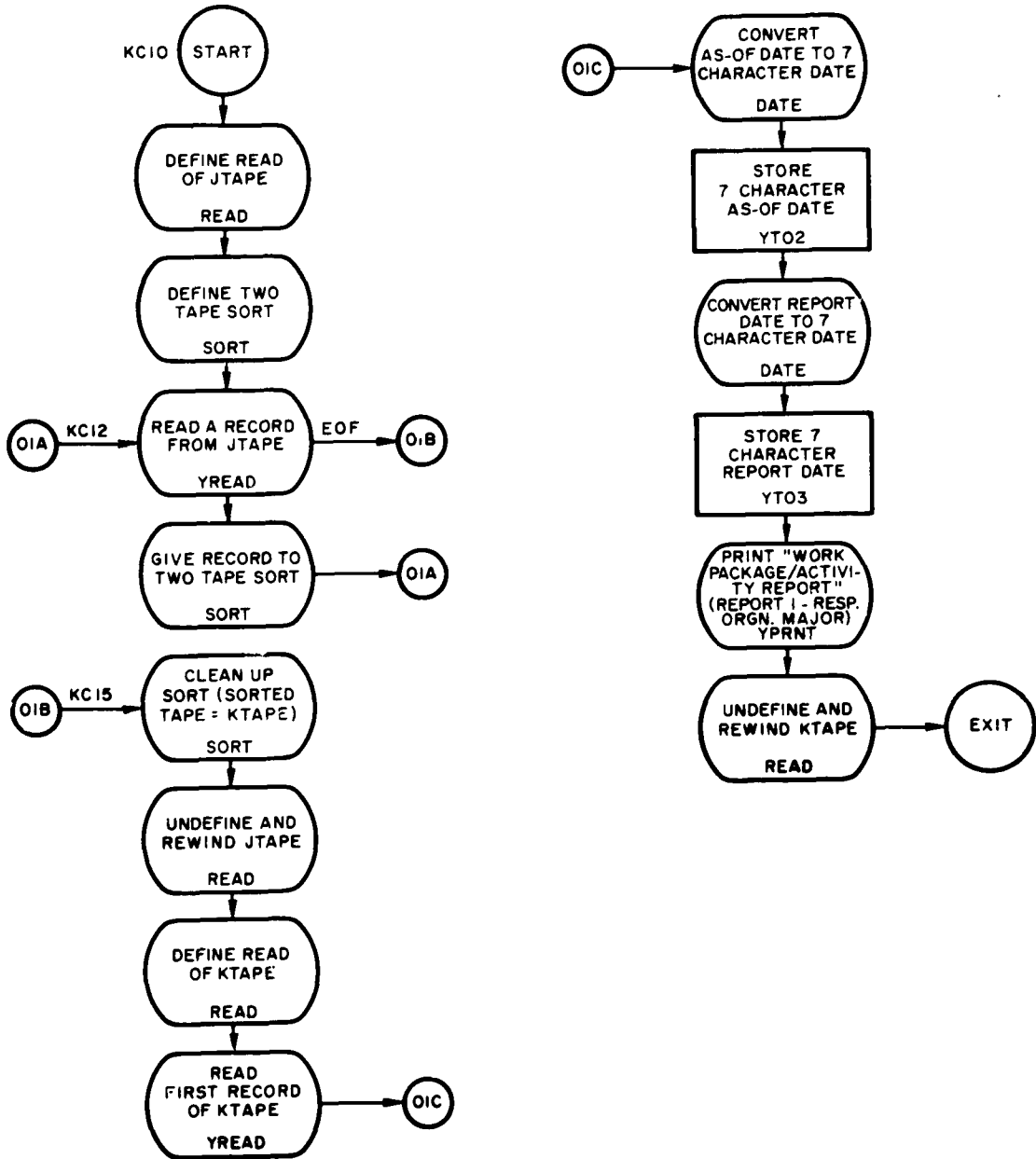
SUBREGIONS AND SUBROUTINES USED:

DATE YPRINT READ SORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION KC10



Region YPRNT

EXPLANATION OF REGION:

To print the "Work Package/Activity Report"

CALLING SEQUENCE:

L TSX YPRNT, 4
L+1 PZE T, , K
L+2 PZE R
L+3 PZE B, I, C
L+4 PZE L_T, F, L_B
L+5 PZE L, , N
L+6 Normal return

INPUT:

Report 1 or 2 from Intermediate Report Tape

OUTPUT:

Report 1 or 2 on Output Report tape

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

YBRAK YPAGE YSEC YREAD

EXPLANATION OF CALLING SEQUENCE:

K	= length of sort key	L _T	= location of top header
R	= report number	L _B	= location of bottom title
B, I	= location of field for break page	L	= location of body format region
C	= length of break page field (words)	N	= number of lines allocated to body portion of report
T	= 0: read from J SORT tape = X: read from tape X	F	= 0: security No. not used = 1: security No. used

Region KD00

EXPLANATION OF REGION:

Master control for summarization routines and report data breakdown.

CALLING SEQUENCE:

L TSX KD00, 4
L + 1 Normal return

INPUT:

1. Summarization routine information.
2. PERT Cost master file in report form.

OUTPUT:

Reporting tape with report breakdown.

STORAGE USED:

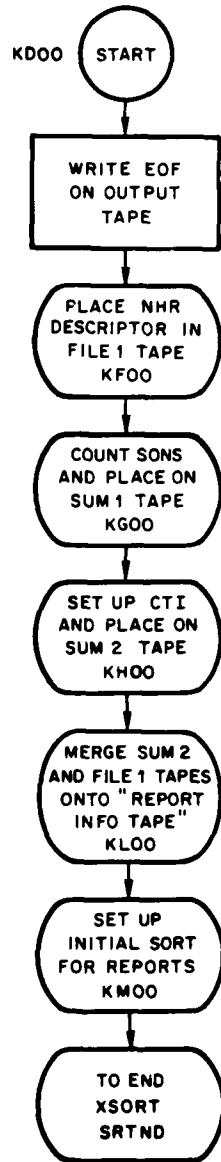
Not applicable

SUBREGIONS AND SUBROUTINES USED:

KF00	KL00
KG00	KM00
KH00	

EXPLANATION OF CALLING SEQUENCE:

Not applicable



Region KF00

EXPLANATION OF REGION:

To place the "next higher relation" description onto the FILE 1 tape.

CALLING SEQUENCE:

L TSX KF00, 4
L + 1 Normal return

INPUT:

1. TYPE 3 record on JSORT tape.
2. TYPE 4 record on JSORT tape.

OUTPUT:

FILE 1 tape

STORAGE USED:

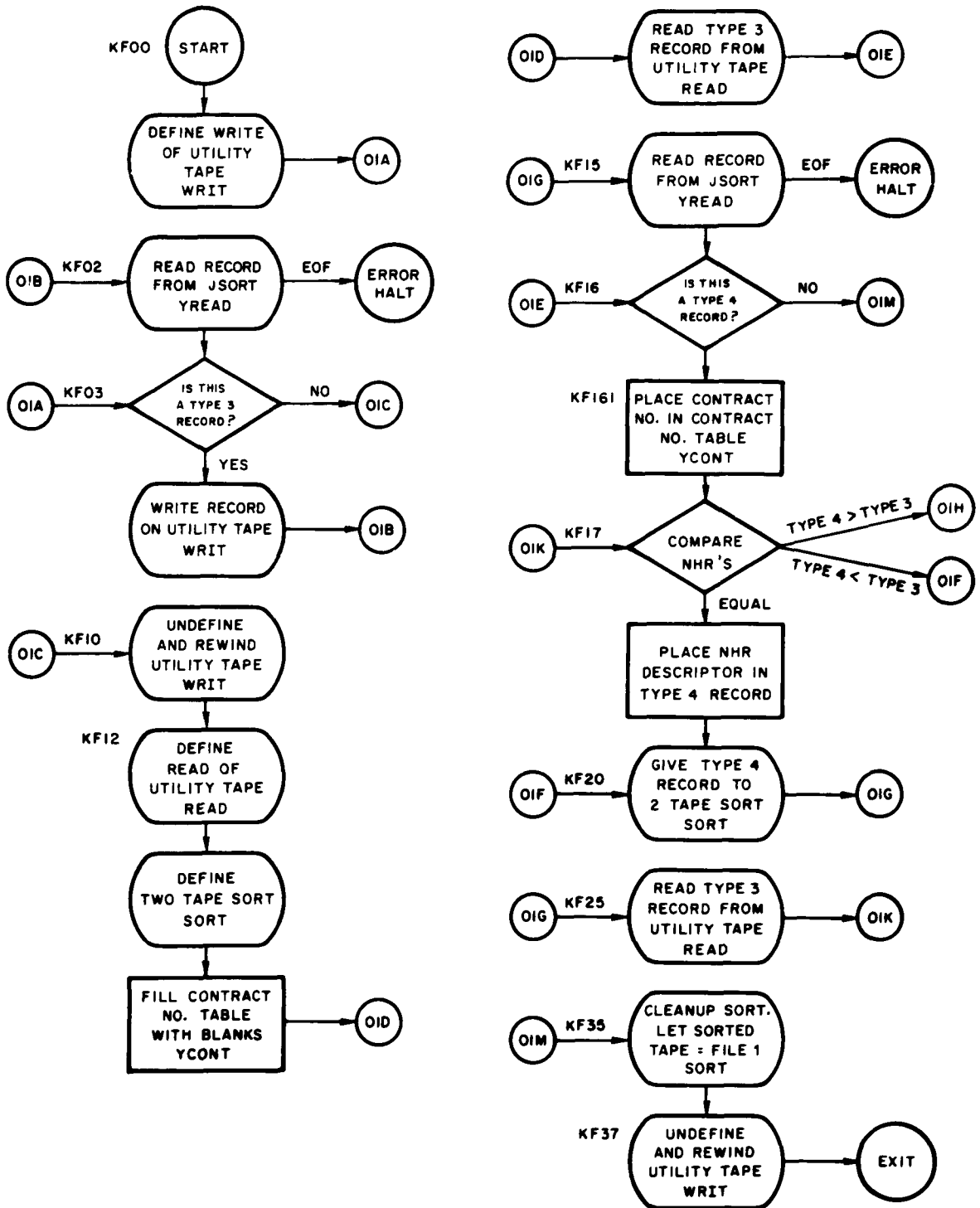
Not applicable

SUBREGIONS AND SUBROUTINES USED:

READ YREAD
WRIT YCOMP
SORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable



Region KG00

EXPLANATION OF REGION:

To count the number of sons for each charge number and place the counts on the SUM 1 tape.

CALLING SEQUENCE:

L TSX KG00, 4

L + 1 Normal return

INPUT:

1. TYPE 5 record from JSORT tape.
2. TYPE 6 record from JSORT tape.

OUTPUT:

SUM 1 tape.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

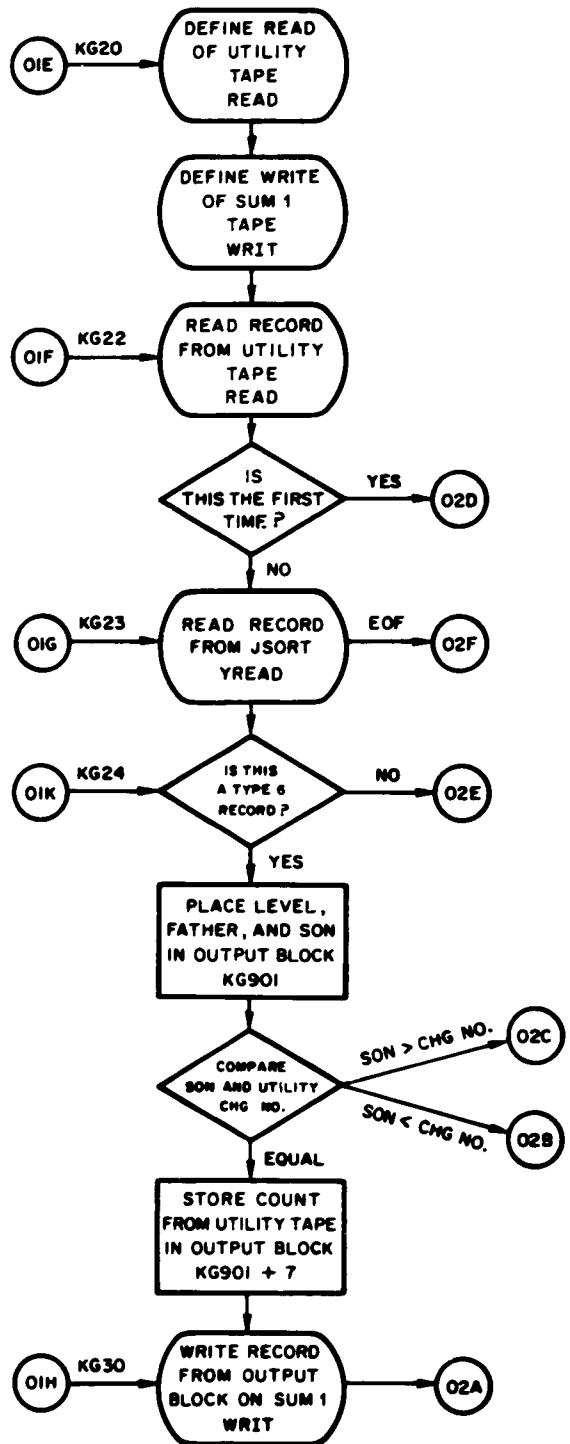
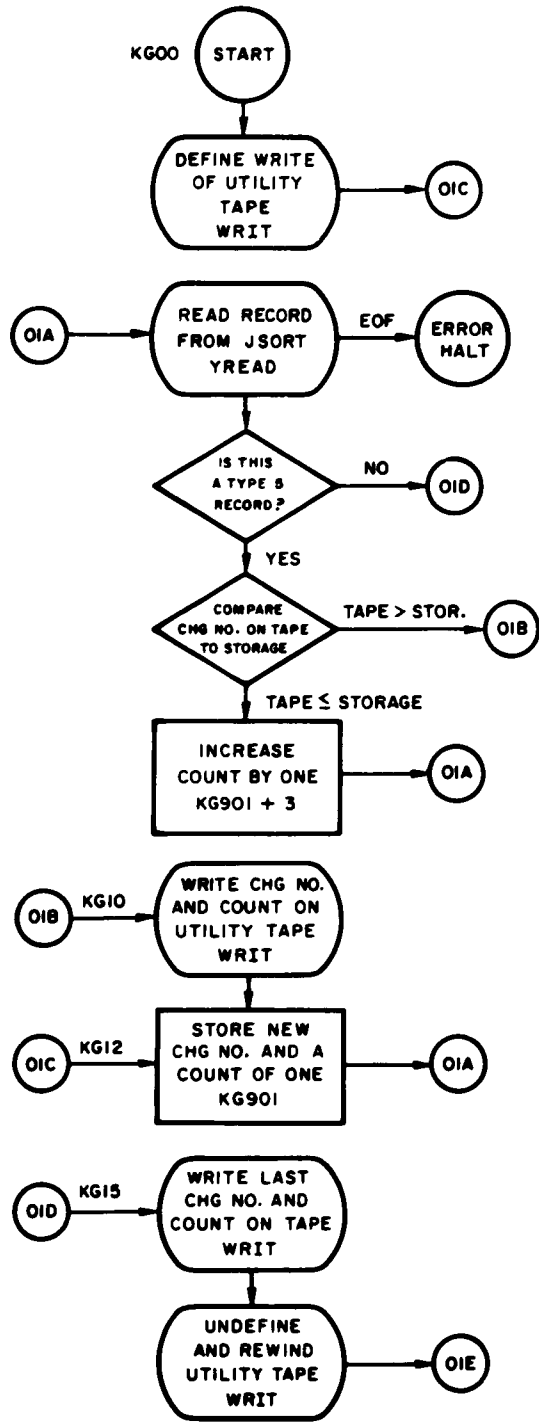
READ YCOMP

WRIT YREAD

SORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable



RECORD FORMAT

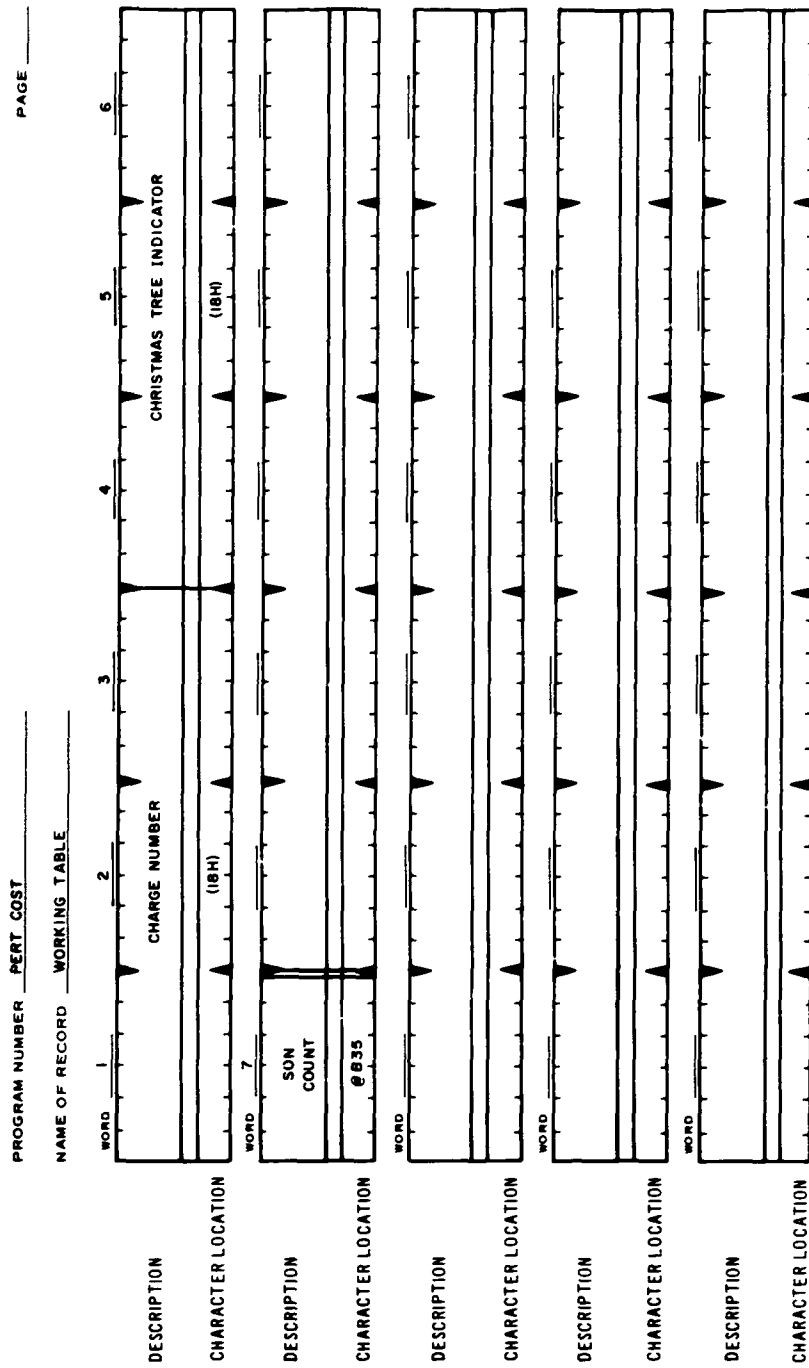


Fig. III-I-2 Format of SUM1 Tape Record

Region KH00

EXPLANATION OF REGION:

To set-up Christmas Tree Indicators and place them on SUM 2 tape in charge number order.

CALLING SEQUENCE:

L TSX KH00, 4
L + 1 Normal return

INPUT:

SUM 1 tape.

OUTPUT:

SUM 2 tape

STORAGE USED:

Working table - 5000 Words
Output table - 6 Words

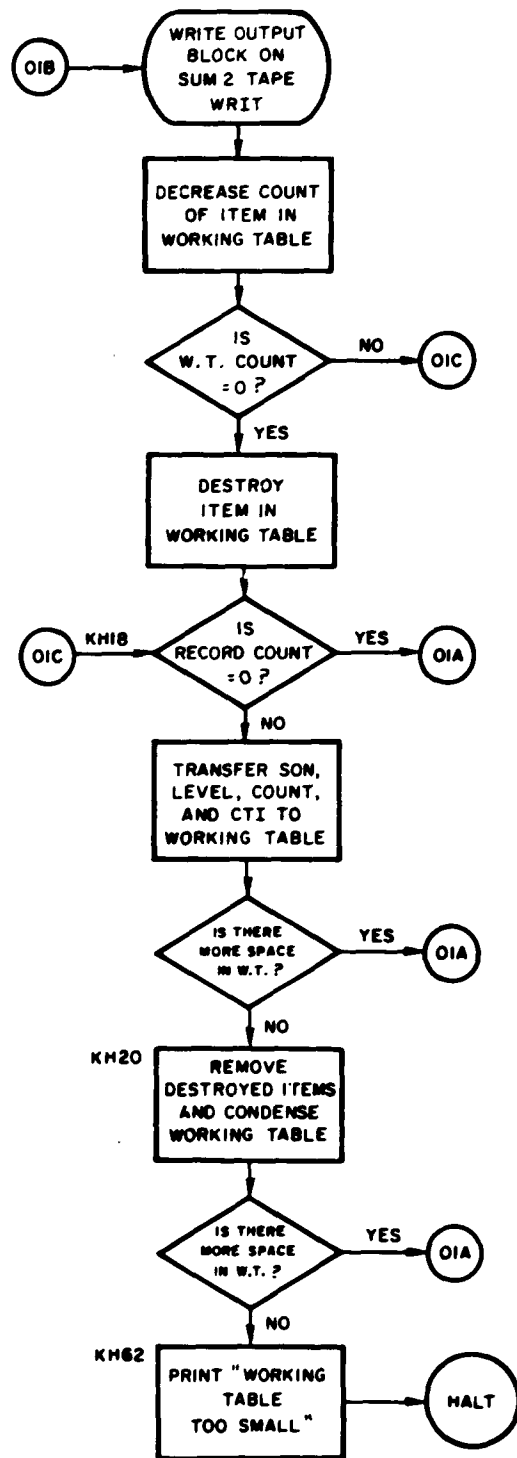
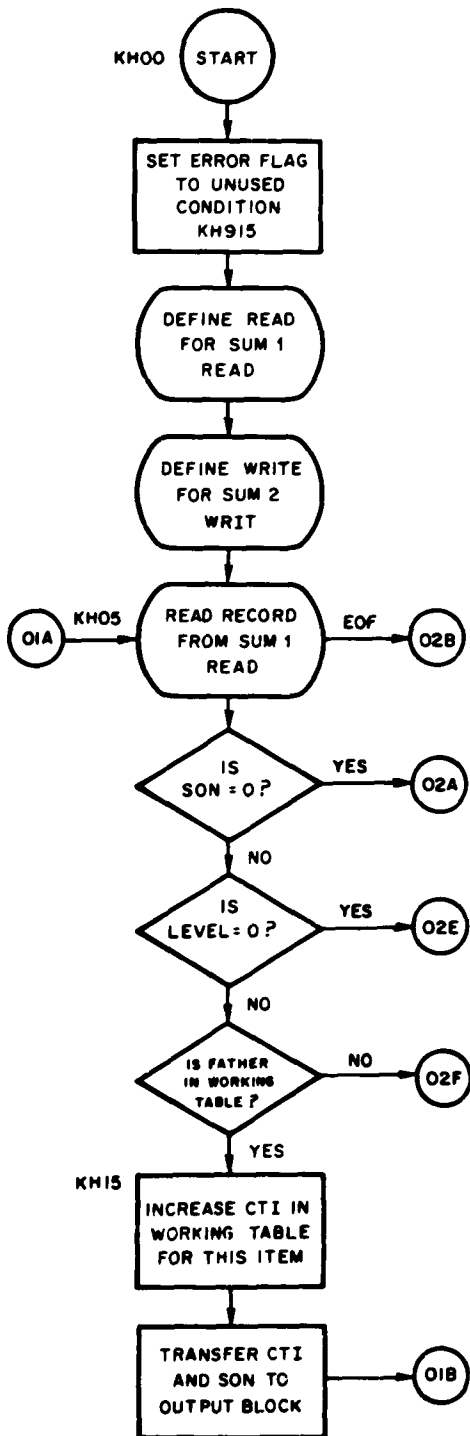
SUBREGIONS AND SUBROUTINES USED:

READ SORT
WRIT YCOMP

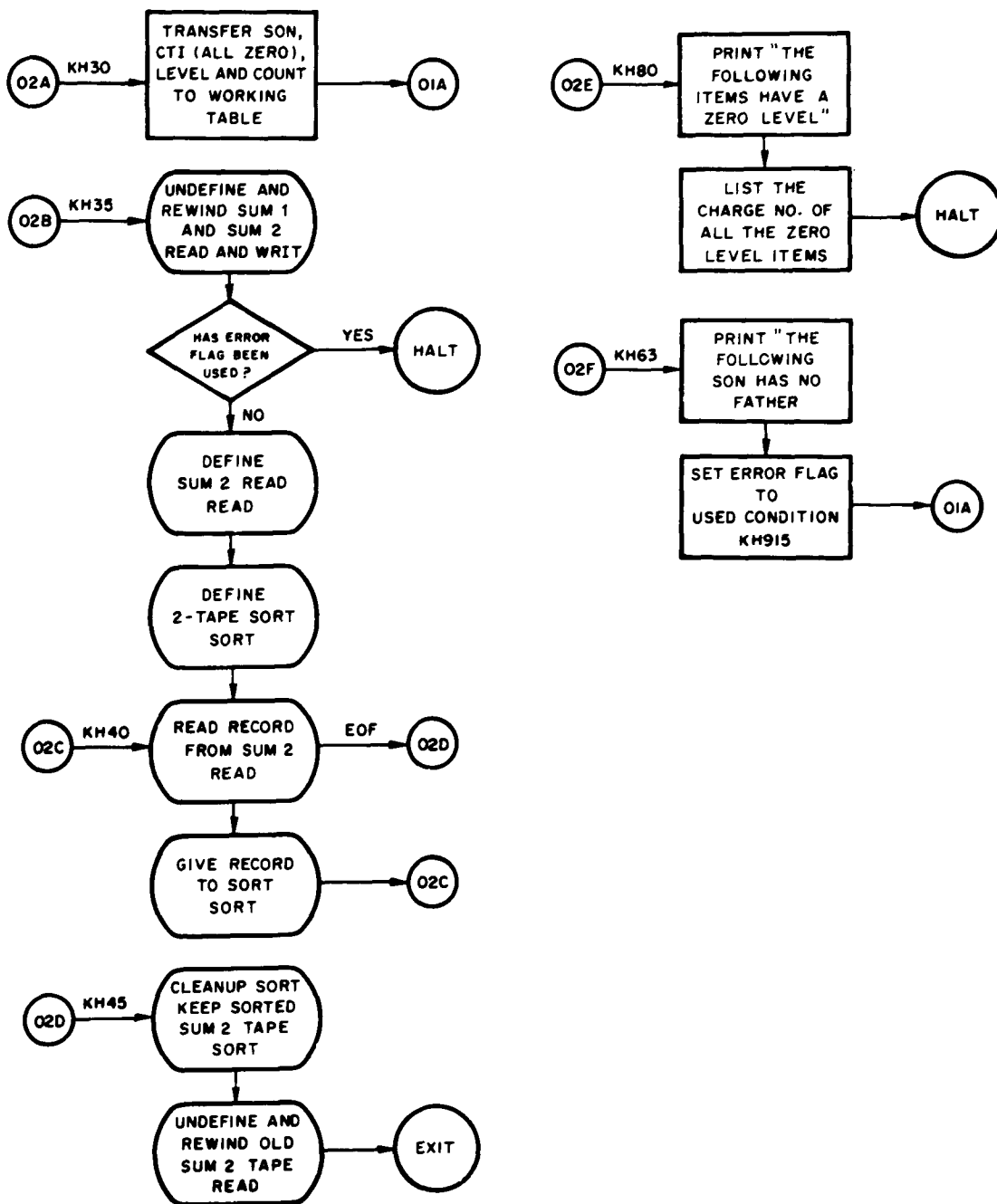
EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION KH00



REGION KH00



RECORD FORMAT

PAGE _____

PROGRAM NUMBER PERT COST

NAME OF RECORD PSEUDO TIME RECORD

	WORD 1	2	3	4	5	6
DESCRIPTION	CHARGE NUMBER			WORK PACKAGE START EVENT		WORK PACKAGE END EVENT
CHARACTER LOCATION	(16H)			(9H)		(9H)
WORD 7	8	9	10	11	12	
DESCRIPTION	WORK PACKAGE EXPECTED START DATE	WORK PACKAGE EXPECTED COMPL. DATE	WORK PACKAGE LATEST COMPL. DATE	SLACK	CRITICAL START EVENT	
CHARACTER LOCATION	D D M M Y Y	D D M M Y Y	D D M M Y Y	W K 1 0 @ B 3 5	9 H	
WORD 13	14	15	16	17	18	
DESCRIPTION	CRITICAL START EVENT (CONT.)		CRITICAL EXPECTED COMPL. DATE	CRITICAL LATEST COMPL. DATE	SCHED/ACTUAL COMPL. DATE	
CHARACTER LOCATION	(9H)		D D M M Y Y	D D M M Y Y	D D M M Y Y	
WORD 19	20	21	22	23	24	
DESCRIPTION	SCHED/ACTUAL INDICATOR	NETWORK DESCRIPTION				
CHARACTER LOCATION	(1H)		(36H)			
WORD 25	26	27	28	29	30	
DESCRIPTION	NET. DESCR (CONT.)					
CHARACTER LOCATION						

Fig. III-I-3 Tape Format of Working Table

Region KL00

EXPLANATION OF REGION:

To insert the Christmas Tree Indicator from SUM 2 tape into the corresponding record of the FILE 1 tape and create the REPORT INFO. TAPE.

CALLING SEQUENCE:

L TSX KL00, 4
L + 1 Normal return

INPUT:

SUM 2 tape
FILE 1 tape

OUTPUT:

REPORT INFO. TAPE

STORAGE USED:

Not applicable

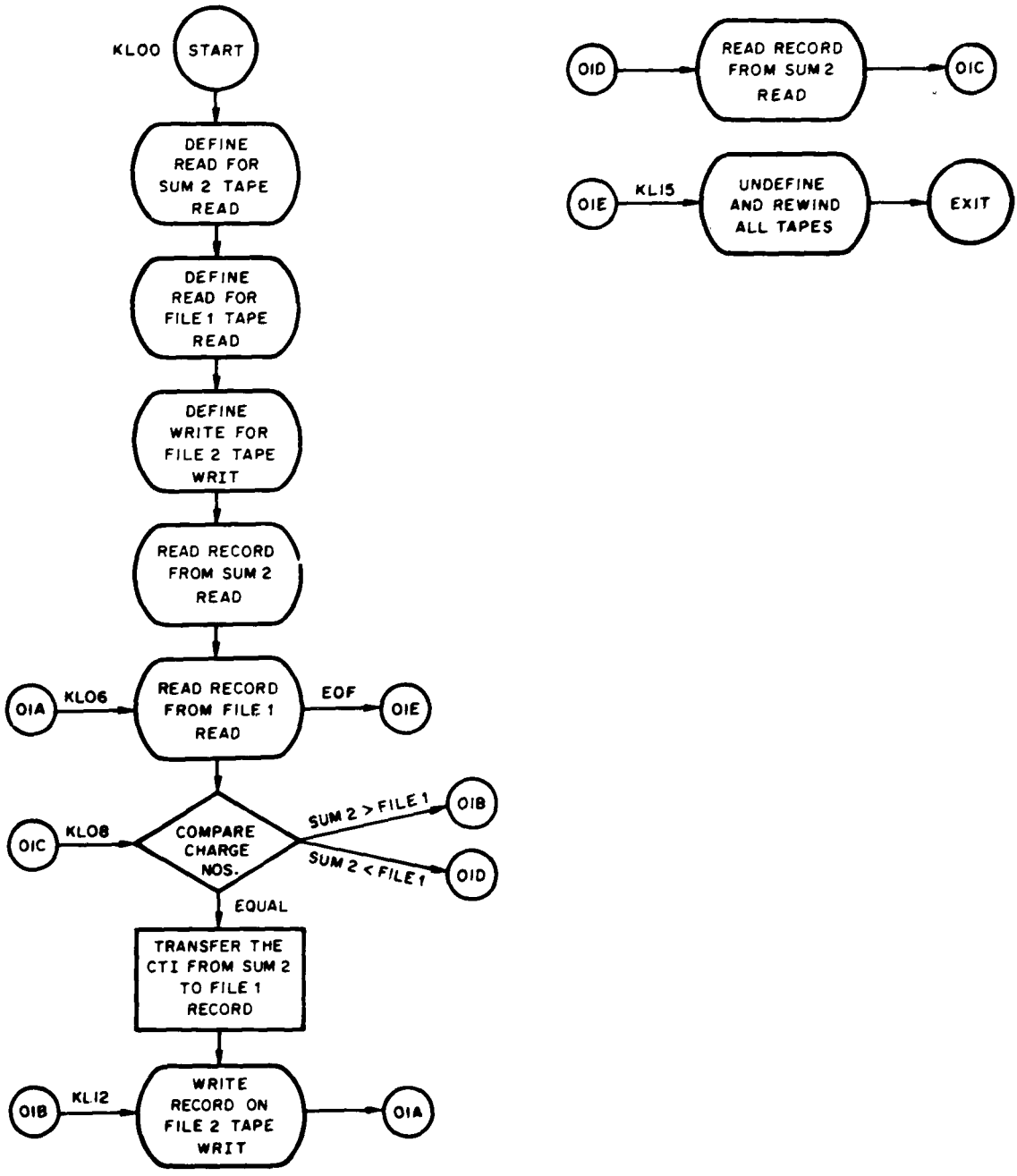
SUBREGIONS AND SUBROUTINES USED:

READ YCOMP
WRIT

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION KLOO



RECORD FORMAT

PAGE _____

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT INFO RECORD

	WORD 1	2	3	4	5	6
DESCRIPTION	PREDECESSOR EVENT	SUCCESSOR EVENT	SUCCESSOR EVENT	SUCCESSOR EVENT	WORK PACKAGE START DATE	WORK PACKAGE END DATE
CHARACTER LOCATION	(9H)	(9H)	(9H)	(9H)	D D M M Y Y	D D M M Y Y
	WORD 7	8	9	10	11	12
DESCRIPTION	WORK PACKAGE LATEST DATE	SLACK	CRITICAL PREDECESSOR EVENT	CRITICAL PREDECESSOR EVENT	CRITICAL SUCCESSOR EVENT	CRITICAL SUCCESSOR EVENT
CHARACTER LOCATION	D D M M Y Y	W K 1 0 @ B 3 5	(9H)	(9H)	(9H)	(9H)
	WORD 13	14	15	16	17	18
DESCRIPTION	CRIT EXP COMPL DATE	CRIT LATEST COMPL DATE	SCHED/ACTUAL COMPL DATE	TS/TA INDICATOR	NETWORK DESCRIPTOR	NETWORK DESCRIPTOR
CHARACTER LOCATION	D D M M Y Y	D D M M Y Y	D D M M Y Y	(1H)	(36H)	(36H)
	WORD 19	20	21	22	23	24
DESCRIPTION	NETWORK DESCRIPTOR (CONT.)					
CHARACTER LOCATION	CHARGE NUMBER					
	WORD 25	26	27	28	29	30
DESCRIPTION	CHARGE NO. (CONT.)	CHARGE NUMBER DESCRIPTOR				(8H)
CHARACTER LOCATION	(36H)					(36H)

Fig. III-1-5. Tape Format of Report Information Record

RECORD FORMAT

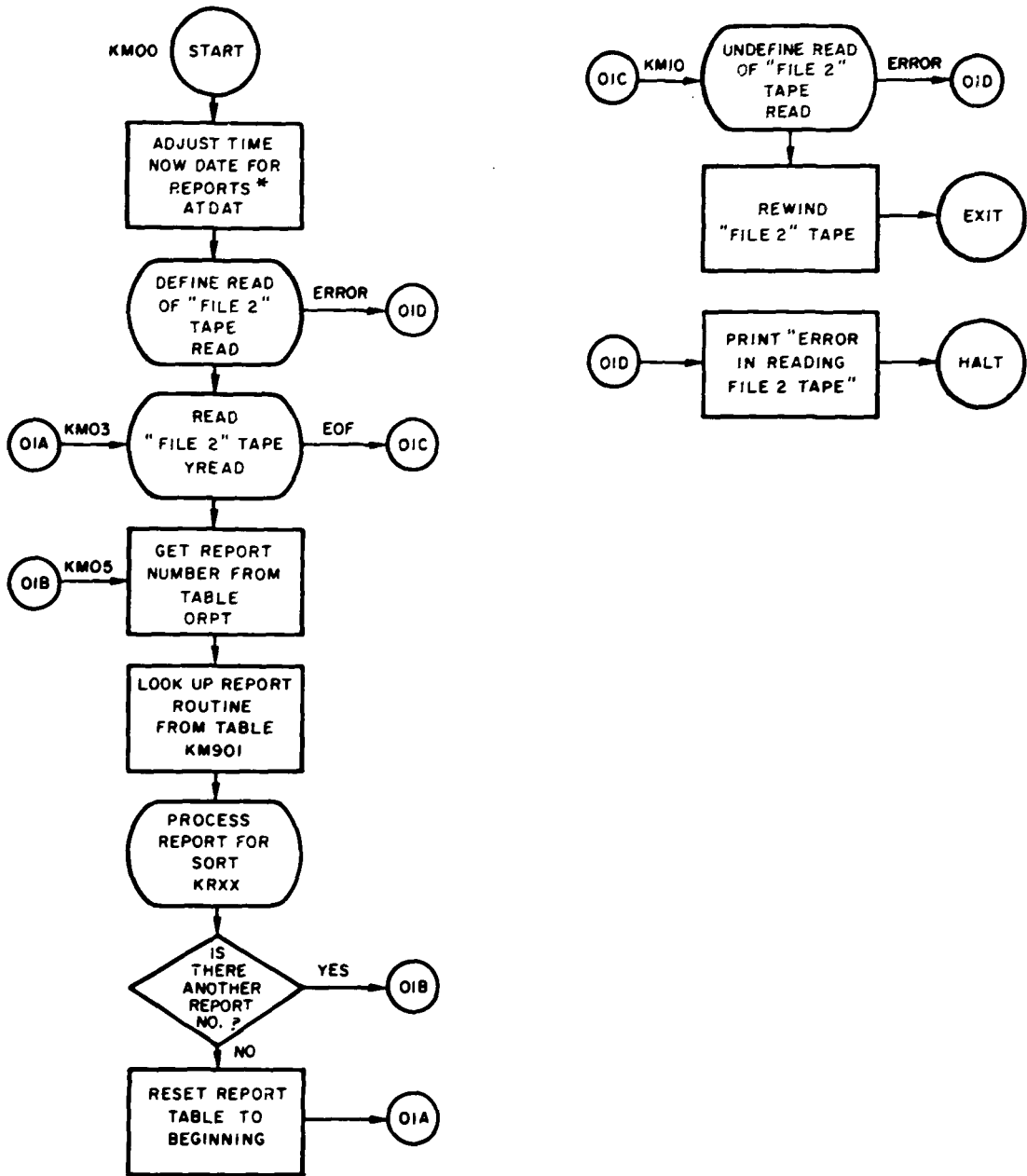
PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT INFO. RECORD (CONT.)

WORD	61	62	63	64	65	N
DESCRIPTION	COST CAT. (CONT.)	RESOURCE CODE	HOURS COUNTS (ACT) (BUD) (EST) (TOT.) ACT BUD EST	COUNTS (ACT) (BUD) (EST) (TOT.) ACT BUD EST	ACTUAL START DATE	COST DATA
CHARACTER LOCATION	(4H)	(2H)	(1H)(1H)(1H)(1H)	(1H)(1H)(1H)(1H)	Y Y M	
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig. III-I-5. Tape Format of Report Information Record (Continued)

REGION KMOO



* IF TIME NOW "DAY" ≤ 10, ADJUST TO PREVIOUS MONTH
 IF TIME NOW "DAY" > 10, USE PRESENT MONTH

Region KM00

EXPLANATION OF REGION:

To set up initial sort for Cost Reports.

CALLING SEQUENCE:

L TSX KM00, 4

L+1 Normal return

INPUT:

REPORT INFORMATION TAPE containing PERT Cost data records.

OUTPUT:

Reporting tape with Report breakdown.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

YREAD

KRxx - Report routines

READ

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

Region KN00

EXPLANATION OF REGION:

To total the cost information for actuals, budgets, and estimates, by hours, direct dollars, and total dollars, and to calculate the overrun/underrun.

CALLING SEQUENCE:

L TSX KN00, 4
L+1 Normal return

INPUT:

XR1 = Location of start of data record (complemented).
Z+10 thru Z+21 cleared to zero.

OUTPUT:

Z+10 = act. hrs to date	Z+16 = latest rev. est. (dir. \$)
Z+11 = contract est. (hrs)	Z+17 = (over) underrun (dir. \$)
Z+12 = latest rev. est. (hrs)	Z+18 = act. total \$ to date
Z+13 = (overrun) underrun (hrs)	Z+19 = contract est. (total \$)
Z+14 = act. dir. \$ to date	Z+20 = latest rev. est (total \$)
Z+15 = contract est. (dir. \$)	Z+21 = (over) underrun (total \$)

STORAGE USED:

Z+10 thru Z+21
Z, Z+1

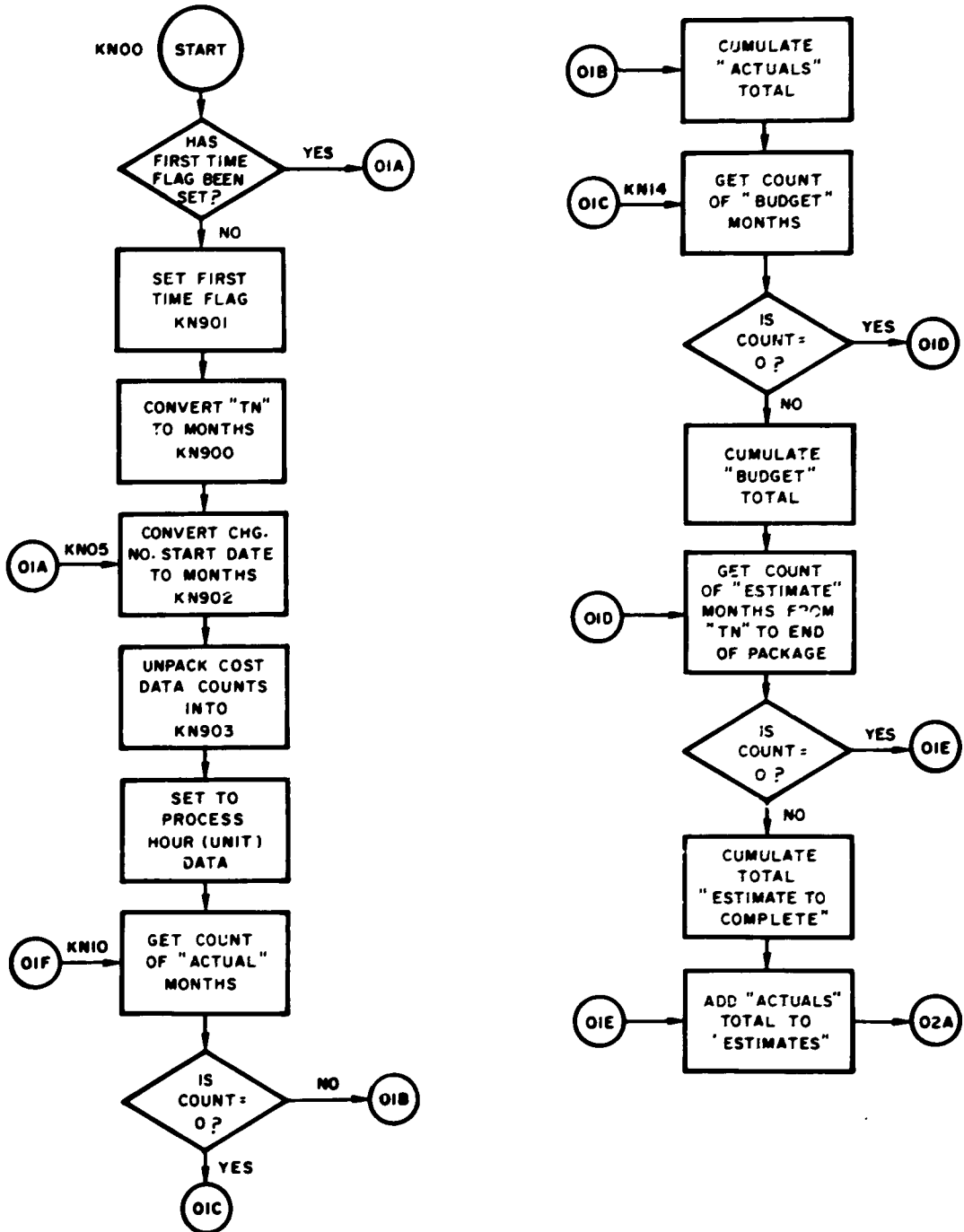
SUBREGIONS AND SUBROUTINES USED:

FIXPT UPCK

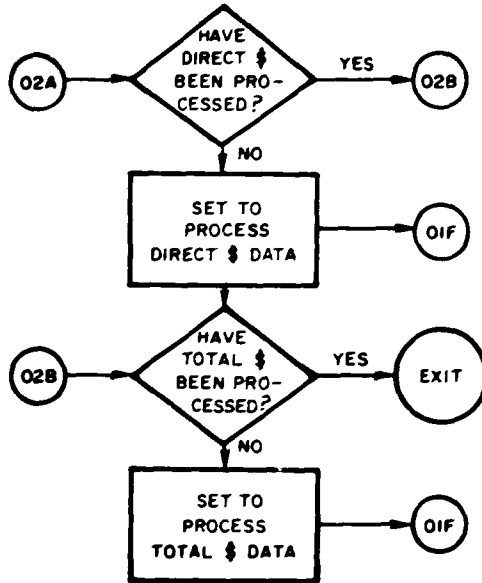
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KNOO



REGION KNOO



Region KN50

EXPLANATION OF REGION:

To adjust dollar amounts to nearest thousands.

CALLING SEQUENCE:

L TSX KN50, 4

L+1 Normal return

INPUT:

Dollar amounts in Z storage block.

OUTPUT:

Adjusted dollar amounts in Z storage block.

STORAGE USED:

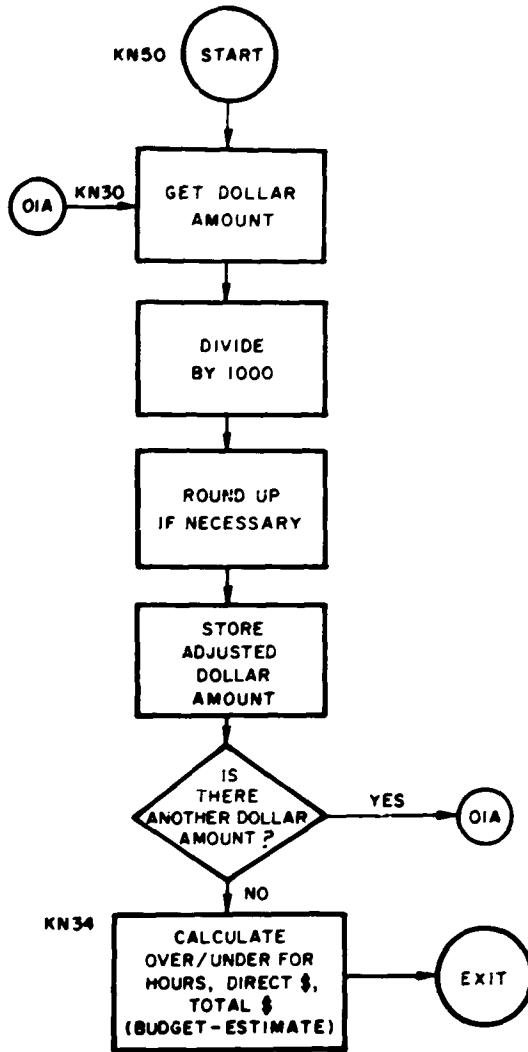
Z+14 thru Z+21.

SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



Region KN100

EXPLANATION OF REGION:

To compute planned work to date for hours, direct dollars, and total dollars.

CALLING SEQUENCE:

L TSX KN100, 4
L+1 Normal return

INPUT:

XR1 = location of PERT Cost data record (complemented).

OUTPUT:

KN909 = Planned hours to date
KN909+1 = Planned direct dollars to date
KN909+2 = Planned total dollars to date

STORAGE USED:

Not applicable.

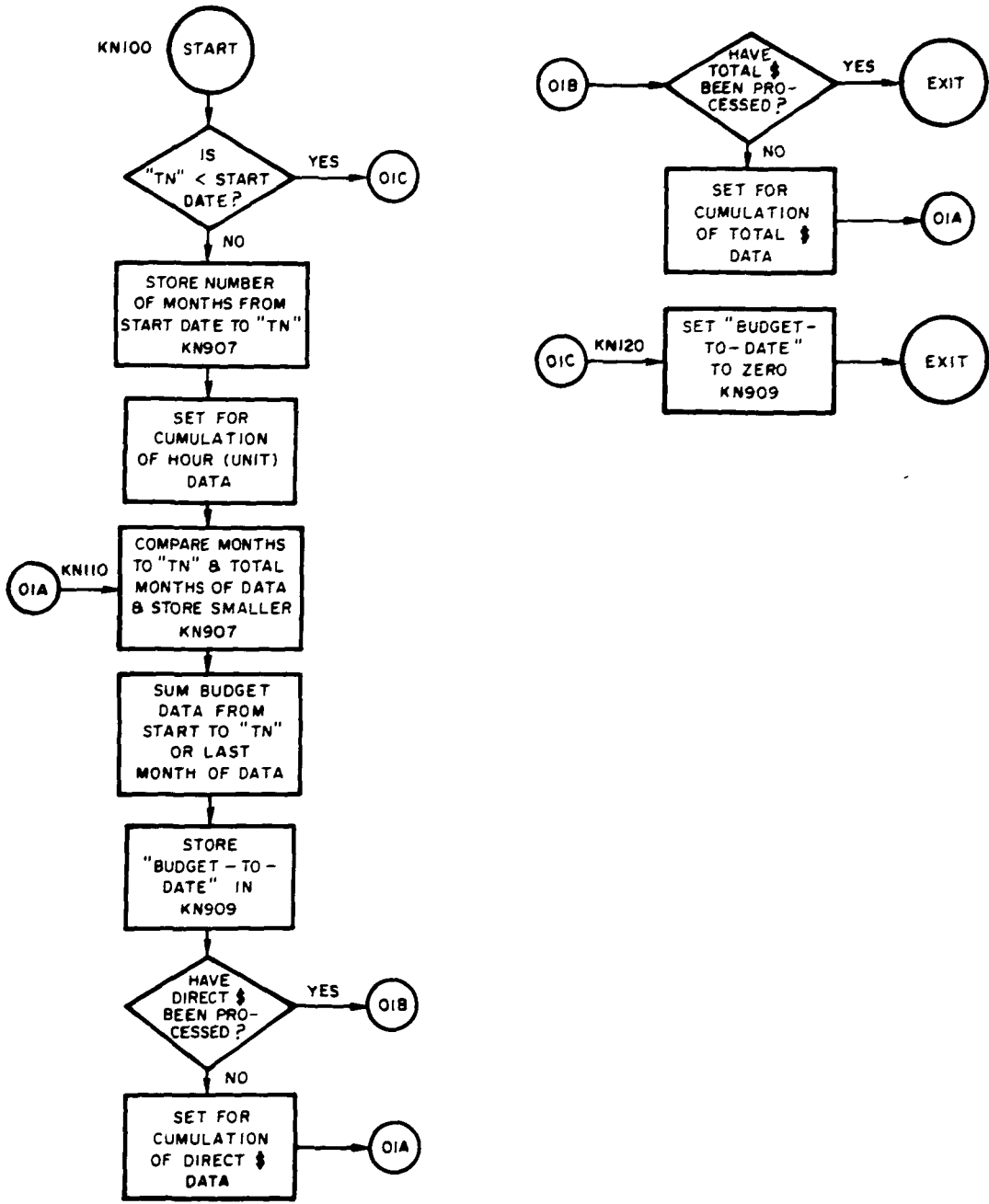
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KN100



Region KP00

EXPLANATION OF REGION:

To format "Organization Status Report" data and give to sort routine.

CALLING SEQUENCE:

L TSX KP00, 4
L+1 PZE N
L+2 Normal return

INPUT:

PERT Cost data record.

OUTPUT:

"Organization Status Report" data records.

STORAGE USED:

Not applicable.

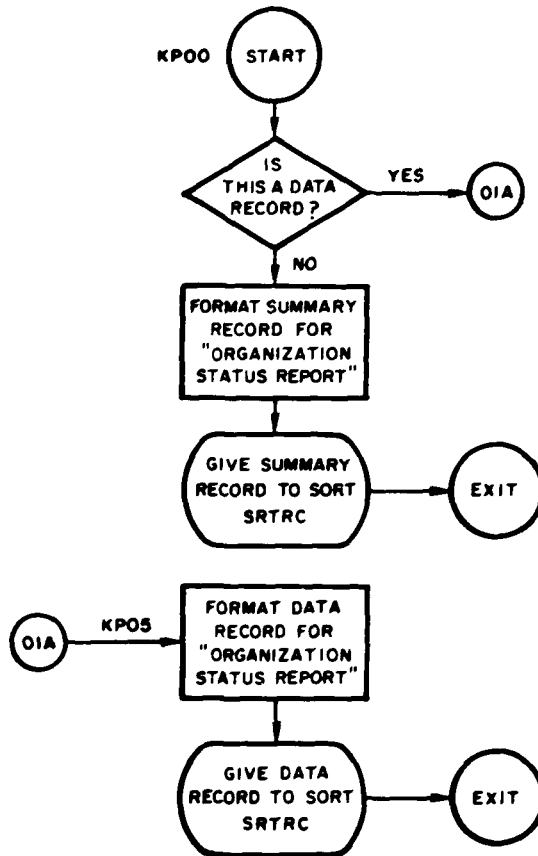
SUBREGIONS AND SUBROUTINES USED:

XSORT

EXPLANATION OF CALLING SEQUENCE:

N: 0 = summary record to be formatted
1 = data record to be formatted

REGION KPOO



Region KP10

EXPLANATION OF REGION:

To determine acceptability of data record for Reports 10 and 20.

CALLING SEQUENCE:

L TSX KP10, 4

L+1 Normal return

INPUT:

PERT Cost data record.

OUTPUT:

Reports 10 and 20 data records.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

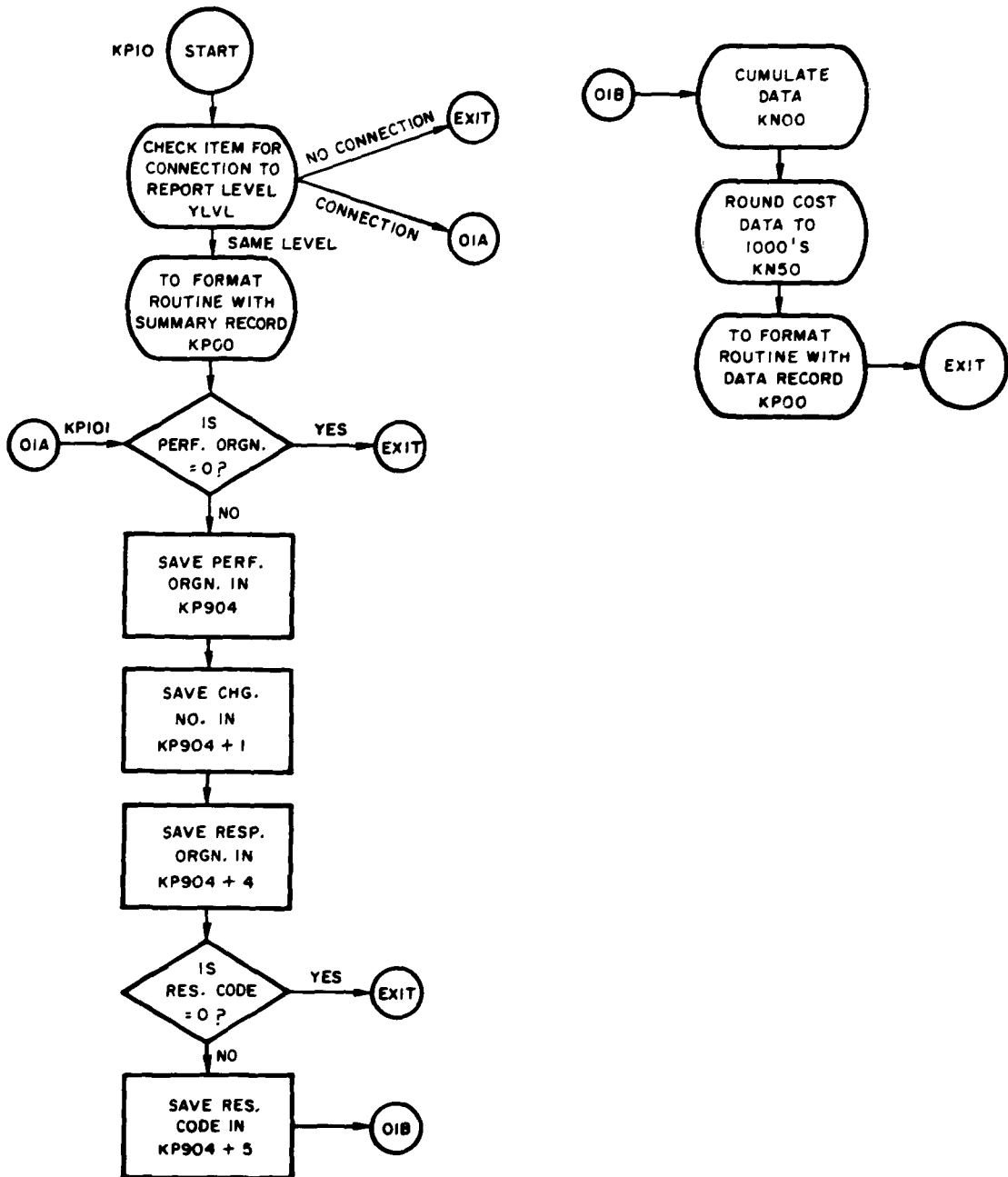
YLVL KP00 (see Subsec. 3. 8. 5. 14)

KN00 (see Subsec. 3. 8. 5. 11) KN50 (see Subsec. 3. 8. 5. 12)

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION-KPIO



Region KP11

EXPLANATION OF REGION:

To determine acceptability of data record for Reports 11 and 21.

CALLING SEQUENCE:

L TSX KP11, 4

L+1 Normal return

INPUT:

PERT Cost data record.

OUTPUT:

Reports 11 and 21 data records.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

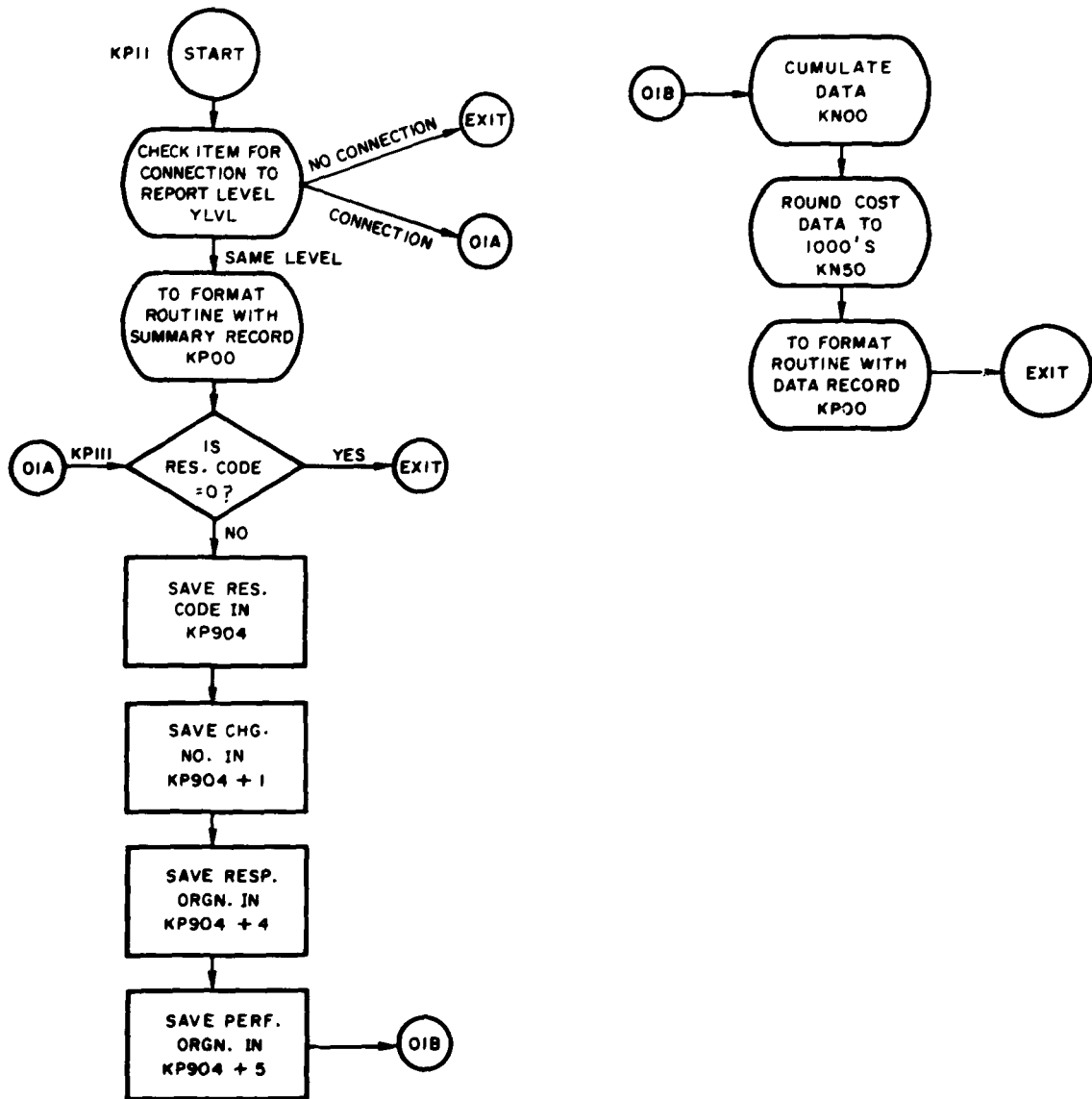
YLVL KP00

KN00 KN50

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KP11



Region KP12

EXPLANATION OF REGION:

To determine acceptability of data record for Reports 12 and 22.

CALLING SEQUENCE:

L TSX KP12, 4

L+1 Normal return

INPUT:

PERT Cost data record.

OUTPUT:

Reports 12 and 22 data records.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

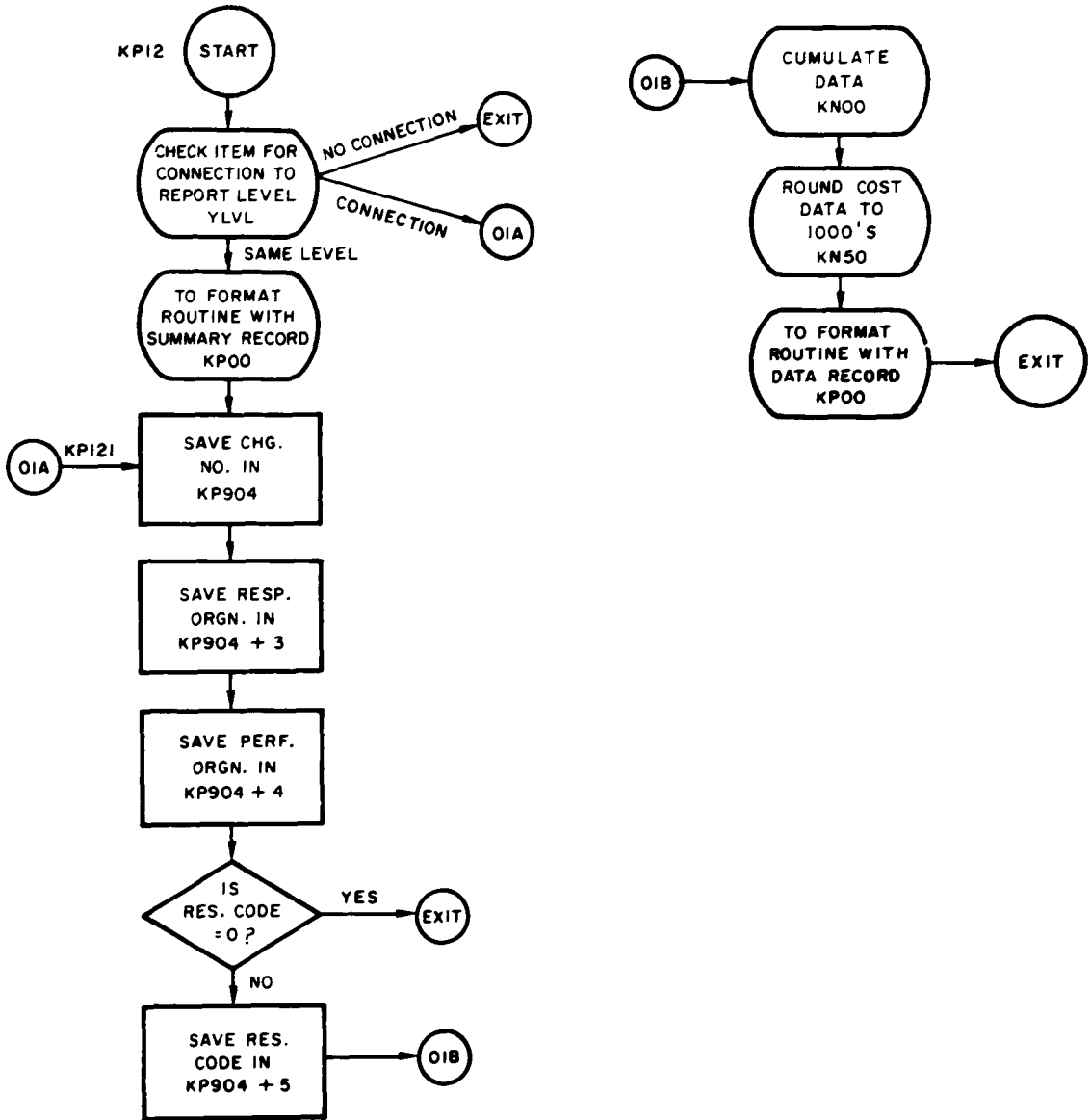
YLVL KP00

KN00 KN50

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KPI2



Region KP13

EXPLANATION OF REGION:

To determine acceptability of data record for Reports 13 and 23.

CALLING SEQUENCE:

L TSX KP13, 4

L+1 Normal return

INPUT:

PERT Cost data record.

OUTPUT:

Reports 13 and 23 data records.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

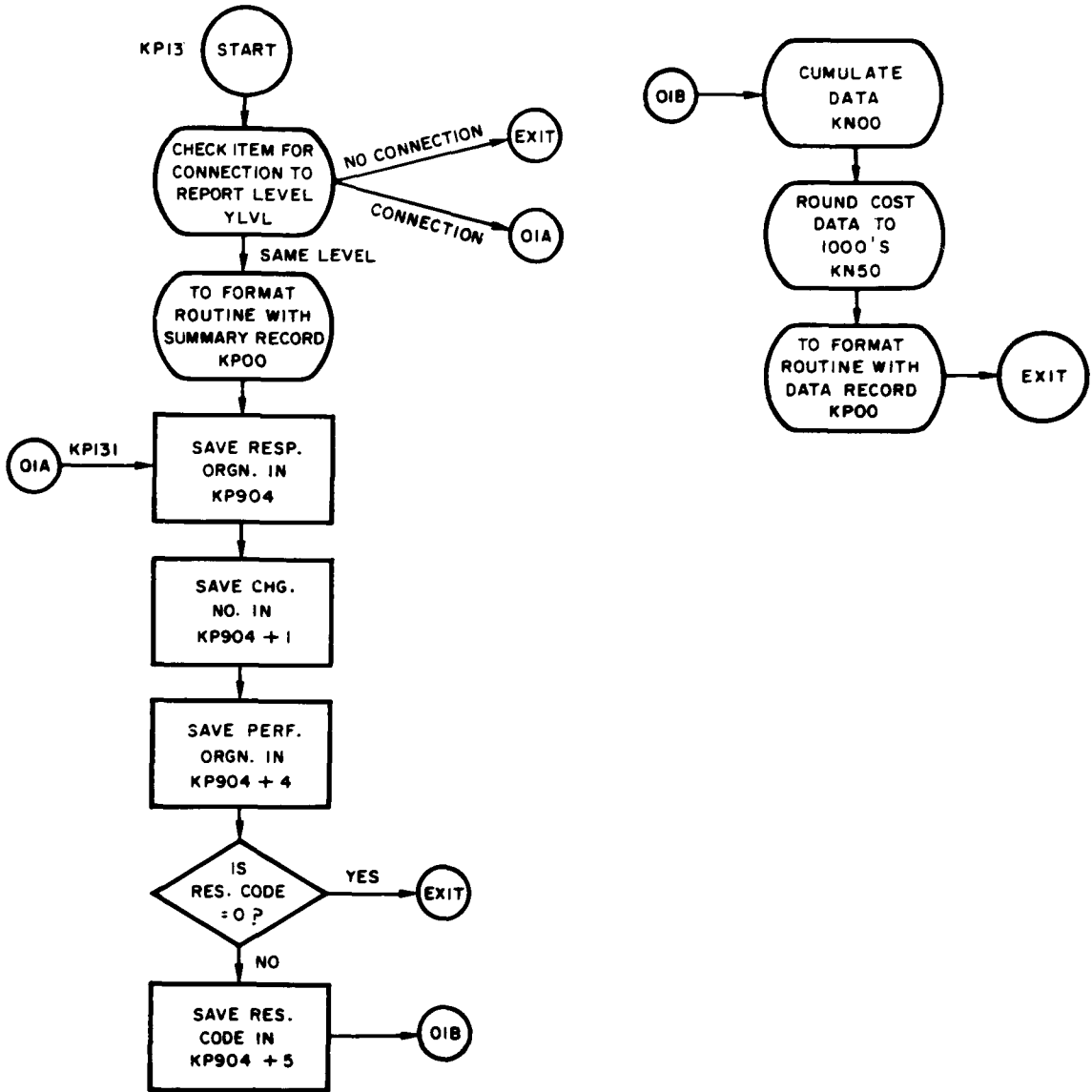
YLVL KP00

KN00 KN50

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KP13



Region KR10

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by performing organization, charge number, responsible organization, resource code. (Report 10)

CALLING SEQUENCE:

L TSX KR10, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report no.
YCNT: Location of PERT Cost data record.

OUTPUT:

Data record for Report 10.

STORAGE USED:

Not applicable.

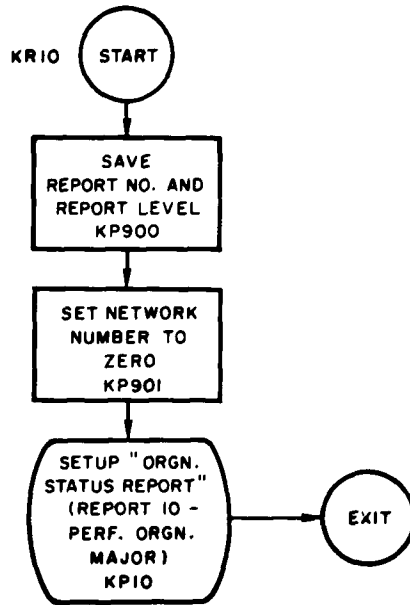
SUBREGIONS AND SUBROUTINES USED:

KP10 (see Subsec. 3.8.5.15)

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KRIO



RECORD FORMAT

PROGRAM NUMBER		PERT COST		PAGE			
NAME OF RECORD		REPORT 10 (SUMMARY)					
DESCRIPTION	WORD	1	2	3	4	5	6
REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG		NETWORK NUMBER	
CHARACTER LOCATION	WORD	7	8	9	10	11	12
		@B17	@B35	(8H)		0 @B35	(6H)
DESCRIPTION	WORD	CHARGE NUMBER		CHARGE NUMBER DESCRIPTOR			
CHARACTER LOCATION	WORD	13	14	15	16		
		(8H)				(36H)	
DESCRIPTION	WORD	CHARGE NUMBER DESCRIPTOR (CONT.)		LEVEL CODE			
CHARACTER LOCATION	WORD			@B35			
DESCRIPTION	WORD						
CHARACTER LOCATION	WORD						
DESCRIPTION	WORD						
CHARACTER LOCATION	WORD						

Fig III-I-6. Tape Format of Report 10, Summary

RECORD FORMAT

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT ID (DATA)

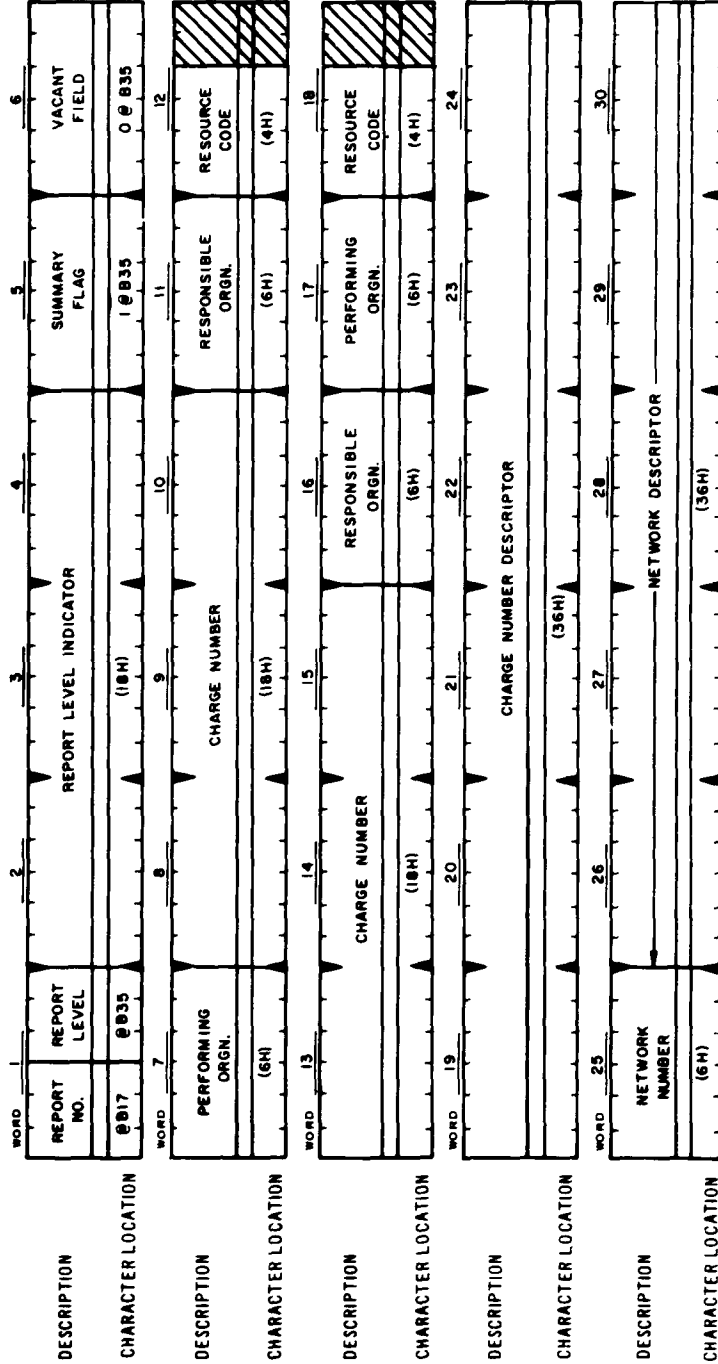


Fig. III-I-7. Tape Format of Report 10, Data

RECORD FORMAT

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 10 (DATA (CONT))

	WORD 31		WORD 32		WORD 33	WORD 34	WORD 35	WORD 36
DESCRIPTION	NETWORK DESCR (CONT)	CONTRACTOR	SCHED/ACTUAL COMPL. DATA	I _s /I _a INDICATOR	SLACK	ACTUAL HOURS TO DATA		
CHARACTER LOCATION	(4H)	D D M M Y Y (UH)			WK x 10 @ B35	@ B35		
	WORD 37	WORD 38	WORD 39	WORD 40	WORD 41	WORD 42		
DESCRIPTION	ESTIMATE HOURS	BUDGET HOURS	OVER/UNDER HOURS	ACTUAL DIRECT \$	ESTIMATE DIRECT \$	BUDGET DIRECT \$		
CHARACTER LOCATION	@ B 35	@ B35	@ B35	@ B35	@ B35	@ B35		
	WORD 43							
DESCRIPTION	OVER/UNDER DIRECT \$							
CHARACTER LOCATION	@ B35							
	WORD							
DESCRIPTION								
CHARACTER LOCATION								
	WORD							
DESCRIPTION								
CHARACTER LOCATION								

Fig. III-I-7. Tape Format of Report 10, Data (Continued)

Region KR11

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by resource code, charge number, responsible organization, performing organization (Report 11).

CALLING SEQUENCE:

L TSX KR11, 4
L+1 Normal return

INPUT:

Accumulator: Report level,, Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 11 data record.

STORAGE USED:

Not applicable.

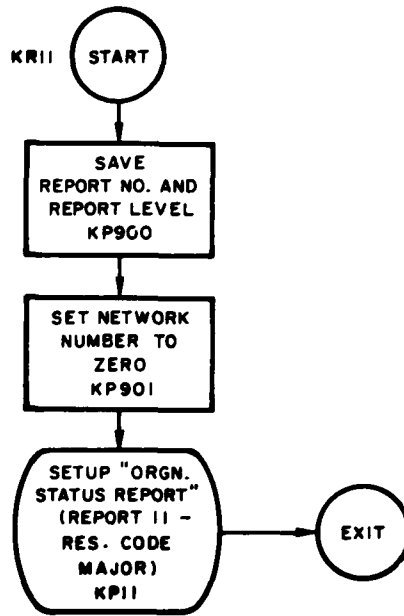
SUBREGIONS AND SUBROUTINES USED:

KP11

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KRII



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE _____

NAME OF RECORD REPORT 11 (DATA)

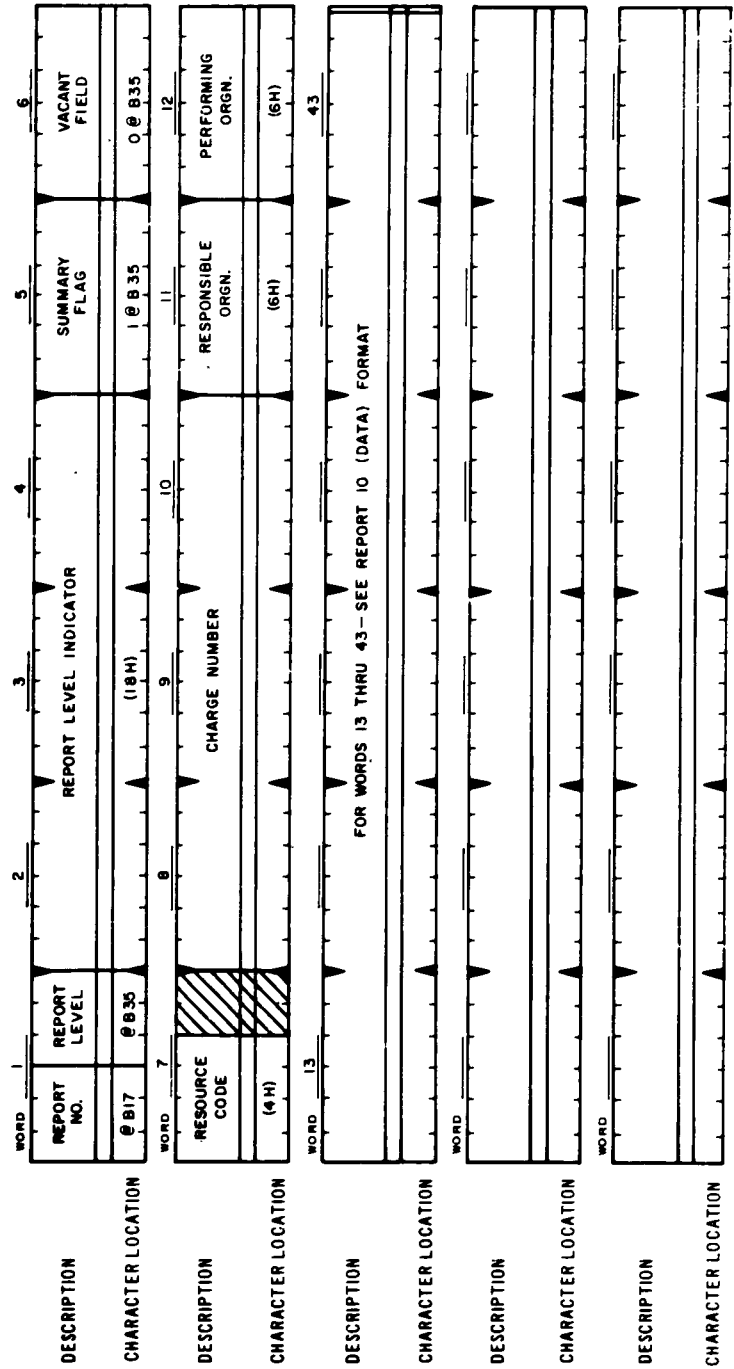


Fig. III-1-8. Tape Format of Report 11, Data

Region KR12

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by charge number, responsible organization, performing organization, resource code (Report 12).

CALLING SEQUENCE:

L TSX KR12, 4
L+1 Normal return

INPUT:

Accumulator: Report level,, Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 12 data record.

STORAGE USED:

Not applicable.

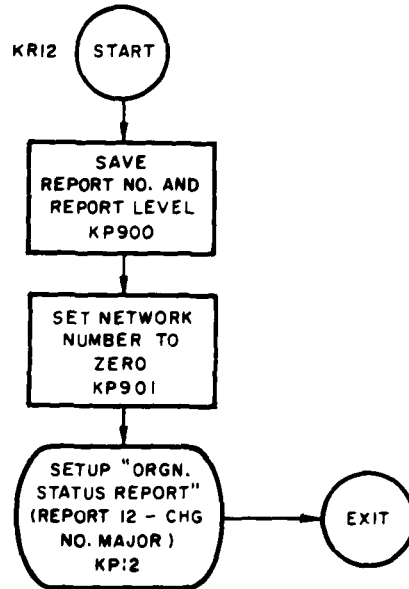
SUBREGIONS AND SUBROUTINES USED:

KP12

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KRI2



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE _____

NAME OF RECORD REPORT 12 (DATA)

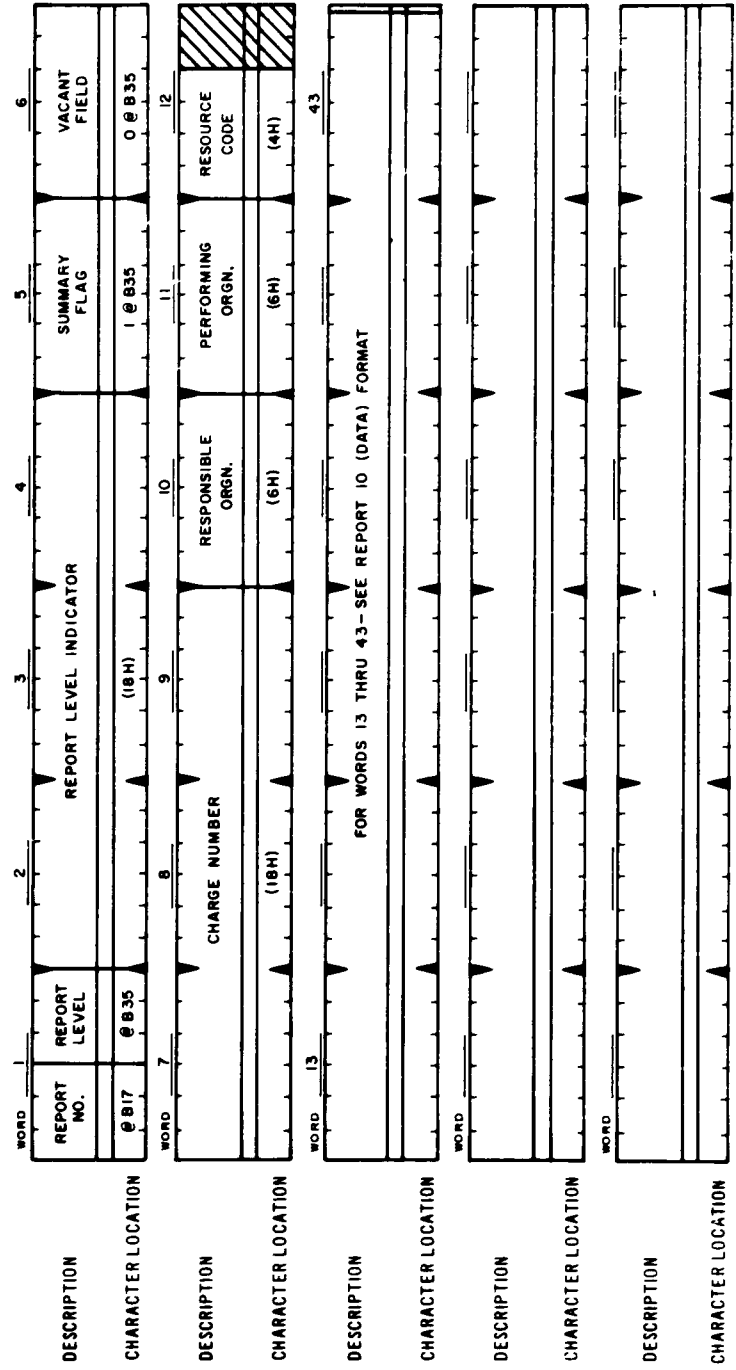


Fig III-I-9. Tape Format of Report 12, Data

Region KR13

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by responsible organization, charge number, performing organization, resource code (Report 13).

CALLING SEQUENCE:

L TSX KR13, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 13 data record.

STORAGE USED:

Not applicable.

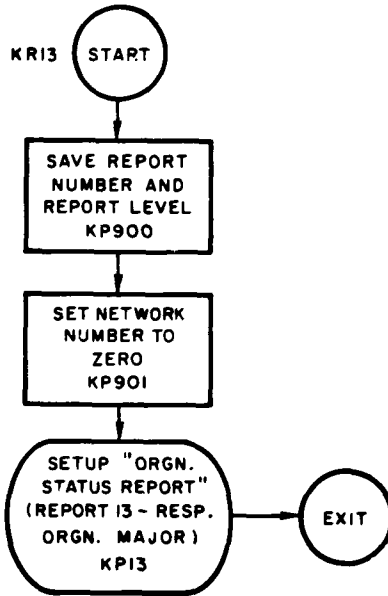
SUBREGIONS AND SUBROUTINES USED:

KP13

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR13



RECORD FORMAT

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 13 (DATA)

	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR	SUMMARY FLAG	VACANT FIELD	
CHARACTER LOCATION	0917	0935	(18H)	10B35	0 @ B35	
DESCRIPTION	RESPONSIBLE ORGN.	CHARGE NUMBER	PERFORMING ORGN.	RESOURCE CODE		
CHARACTER LOCATION	(6H)	(18H)	(6H)	4H		
DESCRIPTION	FOR WORDS 13 THRU 43-SEE REPORT 10 (DATA) FORMAT					
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig III-I-10. Tape Format of Report 13, Data

Region KR20

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by network number, performing organization, charge number, responsible organization, resource code (Report 20).

CALLING SEQUENCE:

L TSX KR20, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 20 data record.

STORAGE USED:

Not applicable.

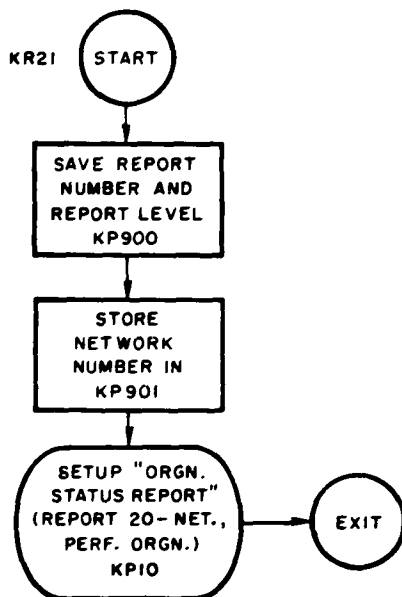
SUBREGIONS AND SUBROUTINES USED:

KP10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR20



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 20 (DATA)

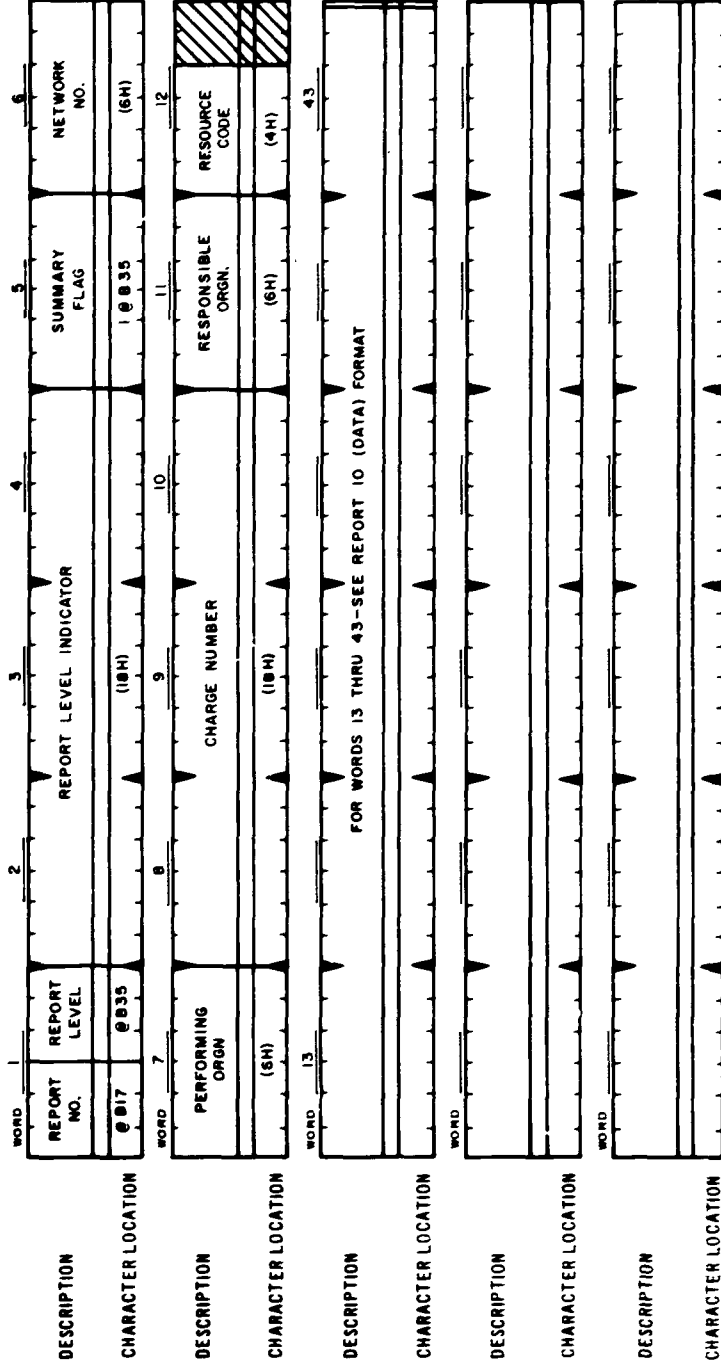


Fig. III-I-11. Tape Format of Report 20, Data

Region KR21

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by network number, resource code, charge number, responsible organization, performing organization (Report 21).

CALLING SEQUENCE:

L TSX KR21, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 21 data record.

STORAGE USED:

Not applicable.

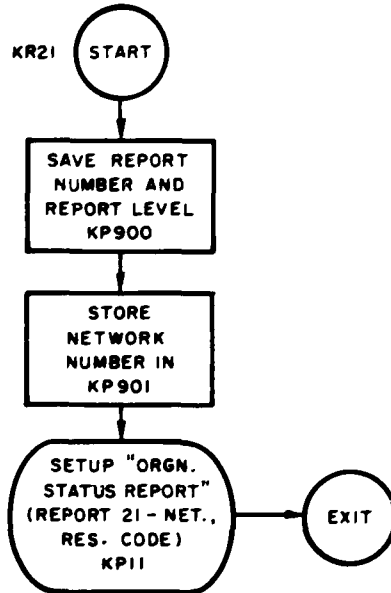
SUBREGIONS AND SUBROUTINES USED:

KP11

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR21



RECORD FORMAT

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 21 (DATA)

	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	NETWORK NO.
CHARACTER LOCATION	0817	0835	(18H)		10835	(6H)
DESCRIPTION	RESOURCE CODE		CHARGE NUMBER		RESPONSIBLE ORGN.	PERFORMING ORGN.
CHARACTER LOCATION	(4H)		(18H)		(6H)	(6H)
DESCRIPTION	FOR WORDS 13 THRU 43-SEE REPORT 10 (DATA) FORMAT					
CHARACTER LOCATION	43					
DESCRIPTION	WORD					
CHARACTER LOCATION	WORD					
DESCRIPTION	WORD					
CHARACTER LOCATION	WORD					
DESCRIPTION	WORD					
CHARACTER LOCATION	WORD					

Fig. III-I-12. Tape Format of Report 21, Data

Region KR22

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by network number, charge number, responsible organization, performing organization, resource code (Report 22).

CALLING SEQUENCE:

L TSX KR22, 4
L+1 Normal return

INPUT:

Accumulator: Report level,, Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 22 data record.

STORAGE USED:

Not applicable.

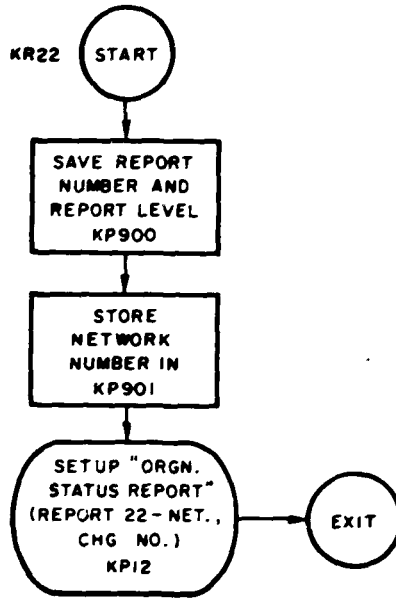
SUBREGIONS AND SUBROUTINES USED:

KP12

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR22



RECORD FORMAT

PAGE 1

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 22 (DATA)

WORD 1	2	3	4	5	6
REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR	SUMMARY FLAG	NETWORK NO.	NETWORK NO.
0 B17	0 B35	(18H)	1 0 B35	(6H)	(6H)

DESCRIPTION

CHARACTER LOCATION

WORD 7	8	9	10	11	12
CHARGE NUMBER	RESPONSIBLE ORGN.	PERFORMING ORGN.	RESOURCE CODE	RESOURCE CODE	RESOURCE CODE
(18H)	(6H)	(6H)	(4H)	(4H)	(4H)

DESCRIPTION

CHARACTER LOCATION

WORD 13	14	15	16	17	18
FOR WORDS 13 THRU 43-SEE REPORT 10 (DATA) FORMAT					

DESCRIPTION

CHARACTER LOCATION

WORD 19	20	21	22	23	24

DESCRIPTION

CHARACTER LOCATION

WORD 25	26	27	28	29	30

DESCRIPTION

CHARACTER LOCATION

Fig. III-I-13. Tape Format of Report 22, Data

Region KR23

EXPLANATION OF REGION:

To select and set up sequence for sorting "Organization Status Report" by network number, responsible organization, charge number, performing organization, resource code (Report 23).

CALLING SEQUENCE:

L TSX KR23, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 23 data record.

STORAGE USED:

Not applicable.

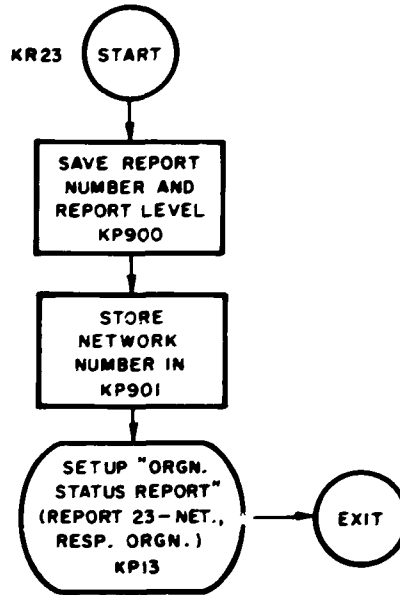
SUBREGIONS AND SUBROUTINES USED:

KP13

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR23



RECORD FORMAT

PAGE 1

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 23 (DATA)

	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	NETWORK NO.
CHARACTER LOCATION	0B17	0B35	(18H)		1 0 B35	(6H)
DESCRIPTION	WORD 7	WORD 8	WORD 9	WORD 10	WORD 11	WORD 12
CHARACTER LOCATION	RESPONSIBLE ORGN. (6H)	CHARGE NUMBER (8H)			PERFORMING ORGN. (6H)	RESOURCE CODE (4H)
DESCRIPTION	WORD 13	FOR WORDS 13 THRU 43--SEE REPORT 10 (DATA) FORMAT				
CHARACTER LOCATION						
DESCRIPTION	WORD					
CHARACTER LOCATION						
DESCRIPTION	WORD					
CHARACTER LOCATION						

Fig. III-I-14. Tape Format of Report 23, Data

Region KR30

EXPLANATION OF REGION:

To select and set up information for the initial sort of the "Management Summary Report" (Report 30).

CALLING SEQUENCE:

L TSX KR30, 4

L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.

YCNT: Location of PERT Cost data record.

OUTPUT:

Report 30 data record.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

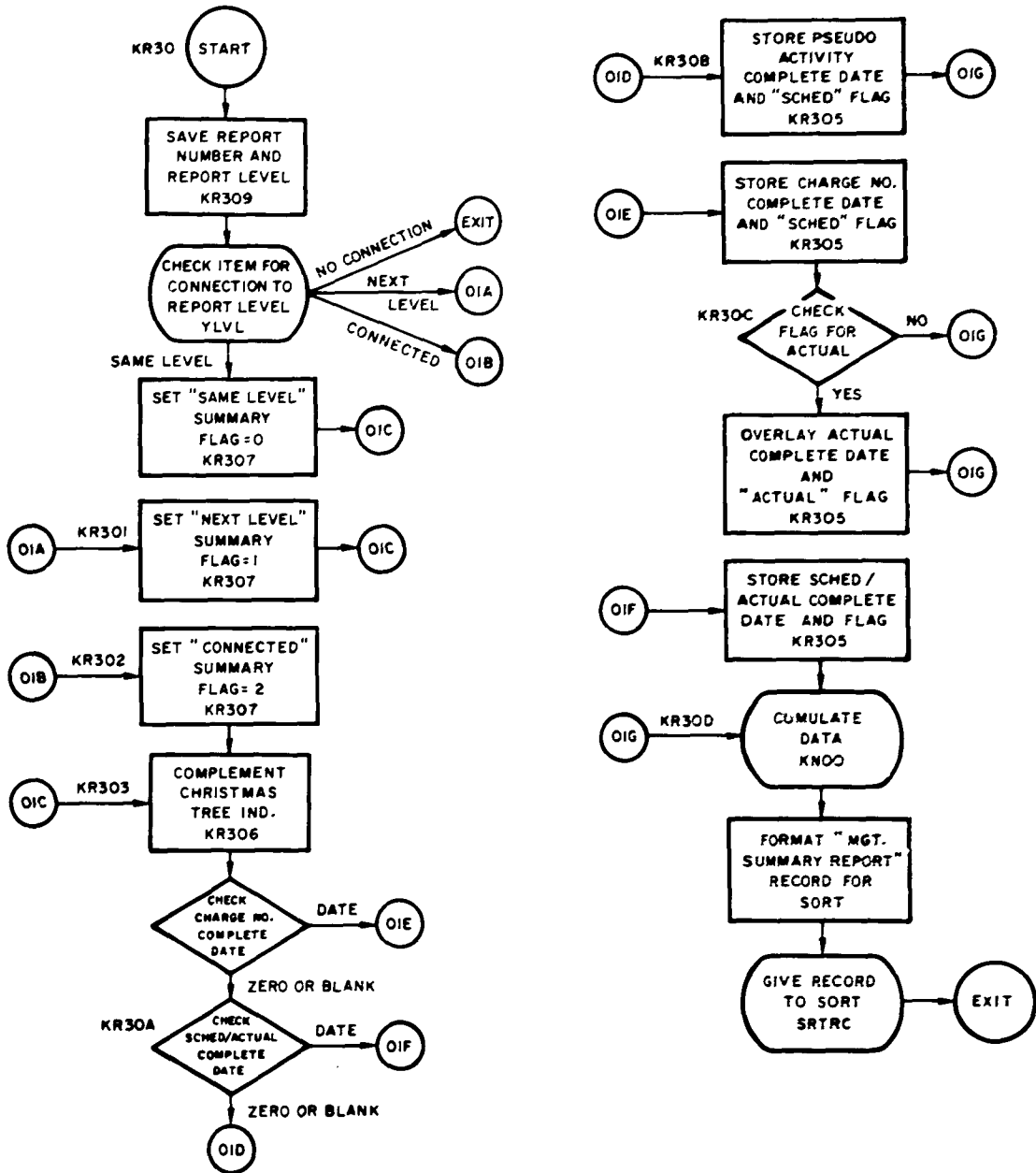
YLVL KN00

XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR30



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 30

DESCRIPTION	WORD	1	2	3	4	5	6
CHARACTER LOCATION	REPORT NO.		REPORT LEVEL	REPORT LEVEL INDICATOR		CHRISTMAS TREE INDICATOR (COMP.)	
	@B17	@B35	(1BH)			(1BH)	
DESCRIPTION	WORD	7	8	9	10	11	12
CHARACTER LOCATION	C. T. I (CONT.)		SUMMARY FLAG	LEVEL		CHARGE NUMBER	
		@B35	@B35	@B35		(1BH)	
DESCRIPTION	WORD	13	14	15	16	17	18
CHARACTER LOCATION				CHARGE NUMBER DESCRIPTOR			
				(36H)			
DESCRIPTION	WORD	19	20	21	22	23	24
CHARACTER LOCATION	CONTRACTOR		SLACK	CRITICAL S _L	CRITICAL S _L	T _S /T _A	T _S /T _A INDICATOR
	(4H)		WK, R 10 @B35	D D M M Y Y	D D M M Y Y	D D M M Y Y	(UM)
DESCRIPTION	WORD	25	26	27	28		
CHARACTER LOCATION	ACTUAL TOTAL DOLLARS		BUDGET TOTAL DOLLARS	ESTIMATE TOTAL DOLLARS	OVER/UNDER TOTAL DOLLARS		
	@B35	@B35	@B35	@B35	@B35		

Fig III-I-15. Tape Format of Report 30

Region KR35

EXPLANATION OF REGION:

To select and set up information for the initial sort of the "Program Project Status Report" (Report 35).

CALLING SEQUENCE:

L TSX KR35, 4

L+1 Normal return

INPUT:

Accumulator: Report level,, Report number.

YCNT: Location of PERT Cost data record.

OUTPUT:

Report 35 data record.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

YLVL

KN00

XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

Region KR35

EXPLANATION OF REGION:

To select and set up information for the initial sort of the "Program Project Status Report" (Report 35).

CALLING SEQUENCE:

L TSX KR35, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 35 data record.

STORAGE USED:

Not applicable.

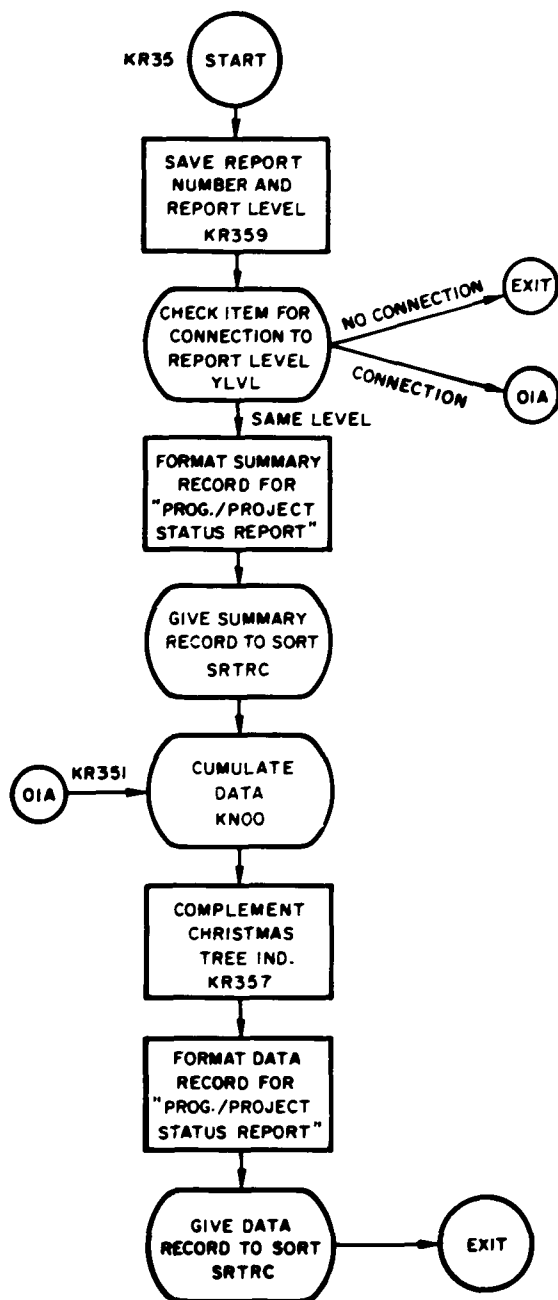
SUBREGIONS AND SUBROUTINES USED:

YLVL KN00
XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR35



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 35 (SUMMARY)

	1	2	3	4	5	6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	LEVEL
CHARACTER LOCATION	0017	0035	(8H)		0 0035	0035
DESCRIPTION		CHARGE NUMBER		CHARGE NUMBER DESCRIPTOR		
CHARACTER LOCATION		(8H)		(36H)		
DESCRIPTION		CHARGE NUMBER DESCRIPTOR (CONT.)	CONTRACTOR			
CHARACTER LOCATION		(4H)				
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig. III-I-16. Tape Format of Report 35, Summary

RECORD FORMAT

PAGE 1

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 35 (DATA)

DESCRIPTION	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
CHARACTER LOCATION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	C.T.I.
	0817	0835	(18H)		1 0835	(18H)
DESCRIPTION	WORD 7	WORD 8	WORD 9	WORD 10	WORD 11	WORD 12
		C.T.I. (CONT.)	LEVEL		CHARGE NUMBER	
CHARACTER LOCATION	WORD 13	WORD 14	WORD 15	WORD 16	WORD 17	WORD 18
			0835	(18H)		
DESCRIPTION	WORD 19	WORD 20	WORD 21	WORD 22	WORD 23	WORD 24
		CHARGE NUMBER DESCRIPTOR	(36H)			
CHARACTER LOCATION	WORD 25	WORD 26	WORD 27	WORD 28	WORD 29	WORD 30
	PREDECESSOR EVENT		SUCCESSOR EVENT		CRITICAL SUCC. EVENT	
	(9H)		(9H)		(9H)	
DESCRIPTION	SCHED EXP. COMPL DATE	SCHED LATEST COMPL DATE	SCHED EXP. START DATE	T _s /T _a	T _s /T _a INDICATOR	SLACK
CHARACTER LOCATION	DDMMYY	DDMMYY	DDMMYY	DDMMYY	DDMMYY	WK * 10 0835

Fig. III-I-17. Tape Format of Report 35, Data

RECORD FORMAT

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 35 (DATA) (CONT.)

	WORD <u>31</u>	WORD <u>32</u>	WORD <u>33</u>
DESCRIPTION	ACTUAL TOTAL DOLLARS	BUDGET TOTAL DOLLARS	ESTIMATE TOTAL DOLLARS
CHARACTER LOCATION	0035	0035	0035
DESCRIPTION			
CHARACTER LOCATION			
DESCRIPTION			
CHARACTER LOCATION			
DESCRIPTION			
CHARACTER LOCATION			
DESCRIPTION			
CHARACTER LOCATION			

Fig III-I-17. Tape Format of Report 35, Data (Continued)

Region KR40

EXPLANATION OF REGION:

To select and set up information for sorting the "Financial Plan and Status Report" (Reports 40 and 41).

CALLING SEQUENCE:

L TSX KR40, 4

L+1 Normal return

INPUT:

Accumulator: Report level, Report number.

YCNT: Location of PERT Cost data record.

OUTPUT:

Report 40 data record (by month, charge number).

Report 41 data record (by month).

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

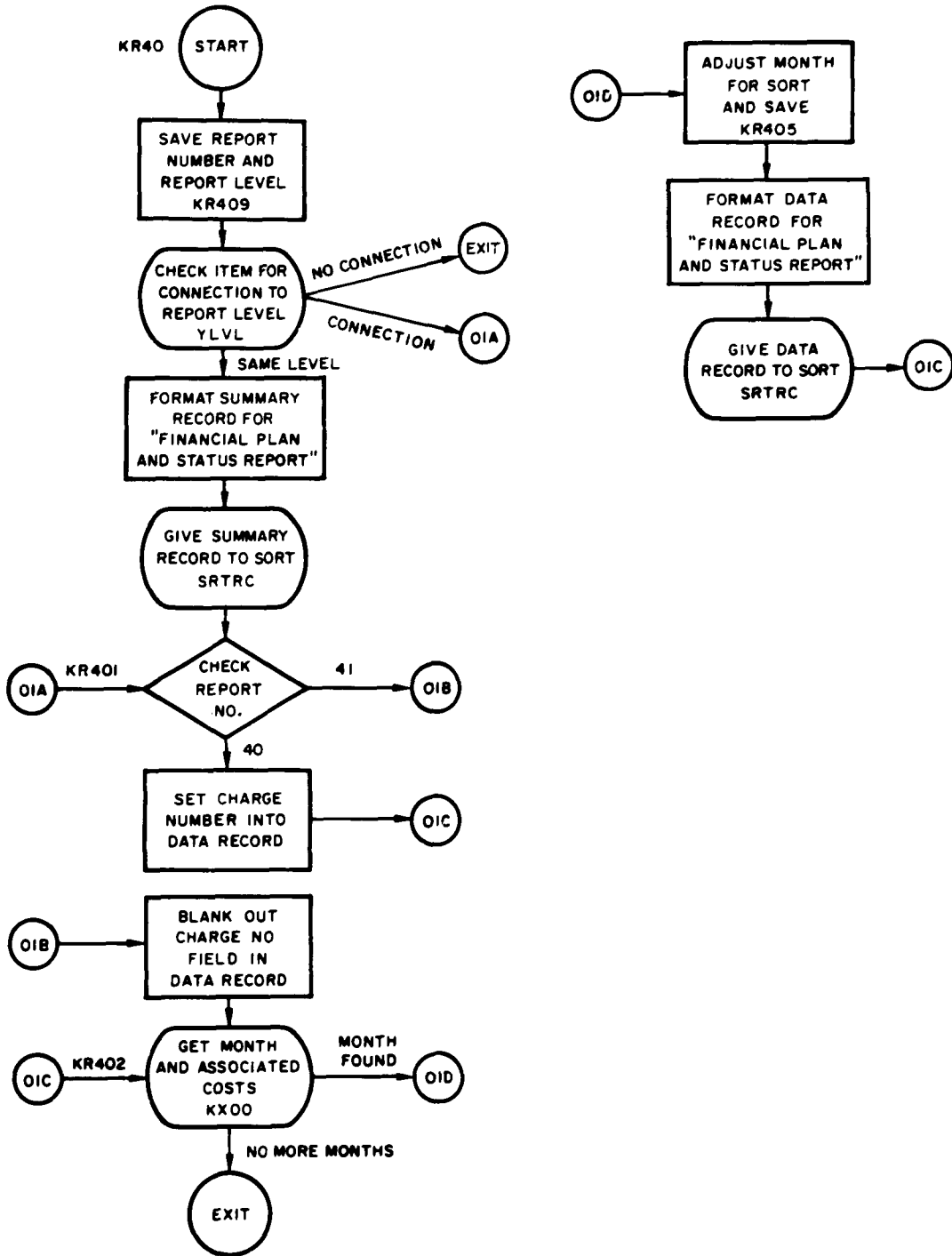
YLVL KX00

XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR40



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 40 B 41 (SUMMARY)

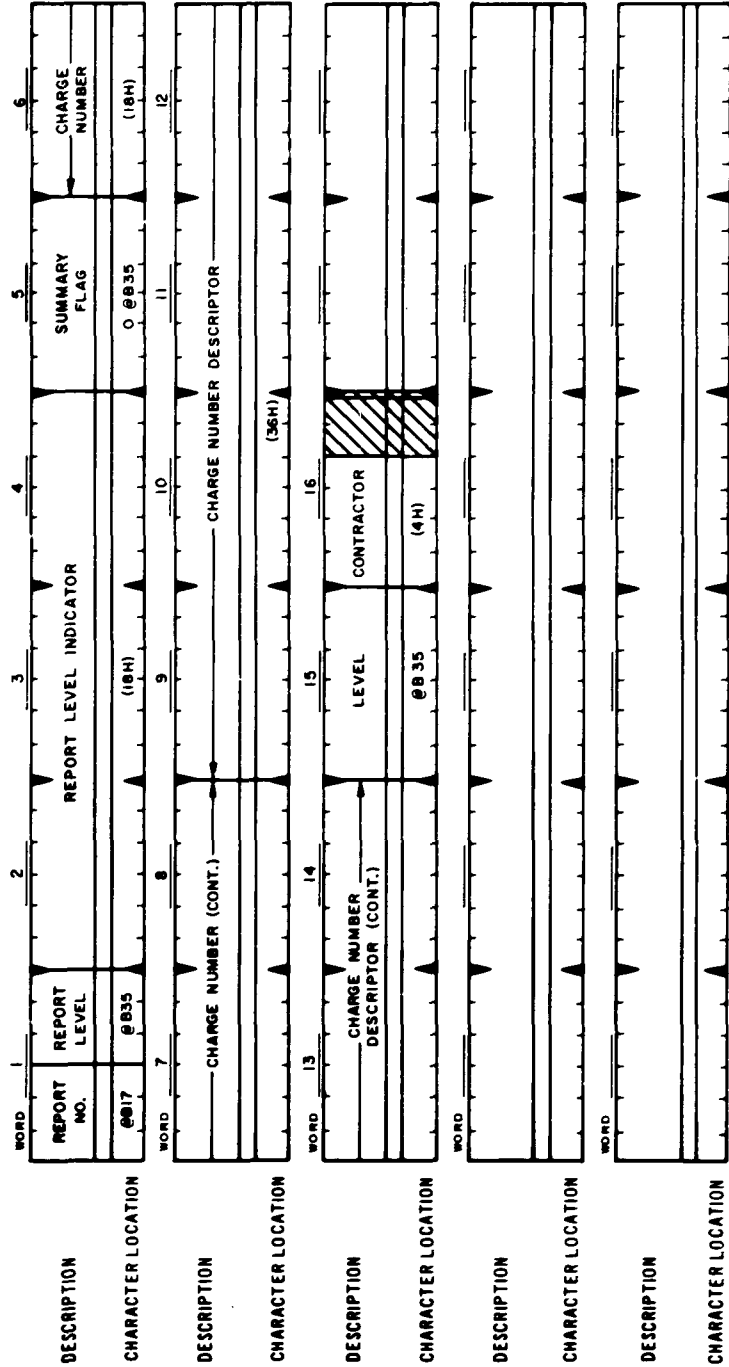


Fig. III-I-18. Tape Format of Reports 40 and 41, Summary

RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 40 & 41 (SUMMARY)

	1	2	3	4	5	6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	CHARGE NUMBER
CHARACTER LOCATION	7	8	9	10	11	12
	@017	@B35	(18H)		0 @B35	(18H)
DESCRIPTION	CHARGE NUMBER (CONT.)		CHARGE NUMBER DESCRIPTOR			
CHARACTER LOCATION	13		16 (36H)			
DESCRIPTION	CHARGE NUMBER DESCRIPTOR (CONT.)	LEVEL	CONTRACTOR			
CHARACTER LOCATION	14	15	16			
		@B35	(4H)			
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig. III-I-18. Tape Format of Reports 40 and 41, Summary

RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 40 & 41 (DATA)

DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR	SUMMARY FLAG	CHARGE MONTH
CHARACTER LOCATION	1	2	3	4	5
	0817	0835	(18H)	1 0835	Y Y M M
DESCRIPTION	CHARGE NUMBER	ACT. DIR. (INCR.)	BUD. DIR. (INCR.)	EST. DIR. (INCR.)	
CHARACTER LOCATION	7	8	9	10	11
	(18H)	0835	0835	0835	0835
DESCRIPTION	ACT. TOT. (CUM.)	BUD. TOT. (CUM.)	EST. TOT. (CUM.)		
CHARACTER LOCATION	13	14	15		
	0836	0835	0835		
DESCRIPTION					
CHARACTER LOCATION					
DESCRIPTION					
CHARACTER LOCATION					

Fig. III-I-19. Tape Format of Reports 40 and 41, Data

Region KR50

EXPLANATION OF REGION:

To select and set up information for sorting the "Manpower Loading Report" (Reports 50 and 51).

CALLING SEQUENCE:

L TSX KR50, 4

L+1 Normal return

INPUT:

Accumulator: Report level,, Report number.

YCNT: Location of PERT Cost data record.

OUTPUT:

Report 50 data record (by resource code, month, perf. org. , charge no.)

Report 51 data record (by resource code, month)

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

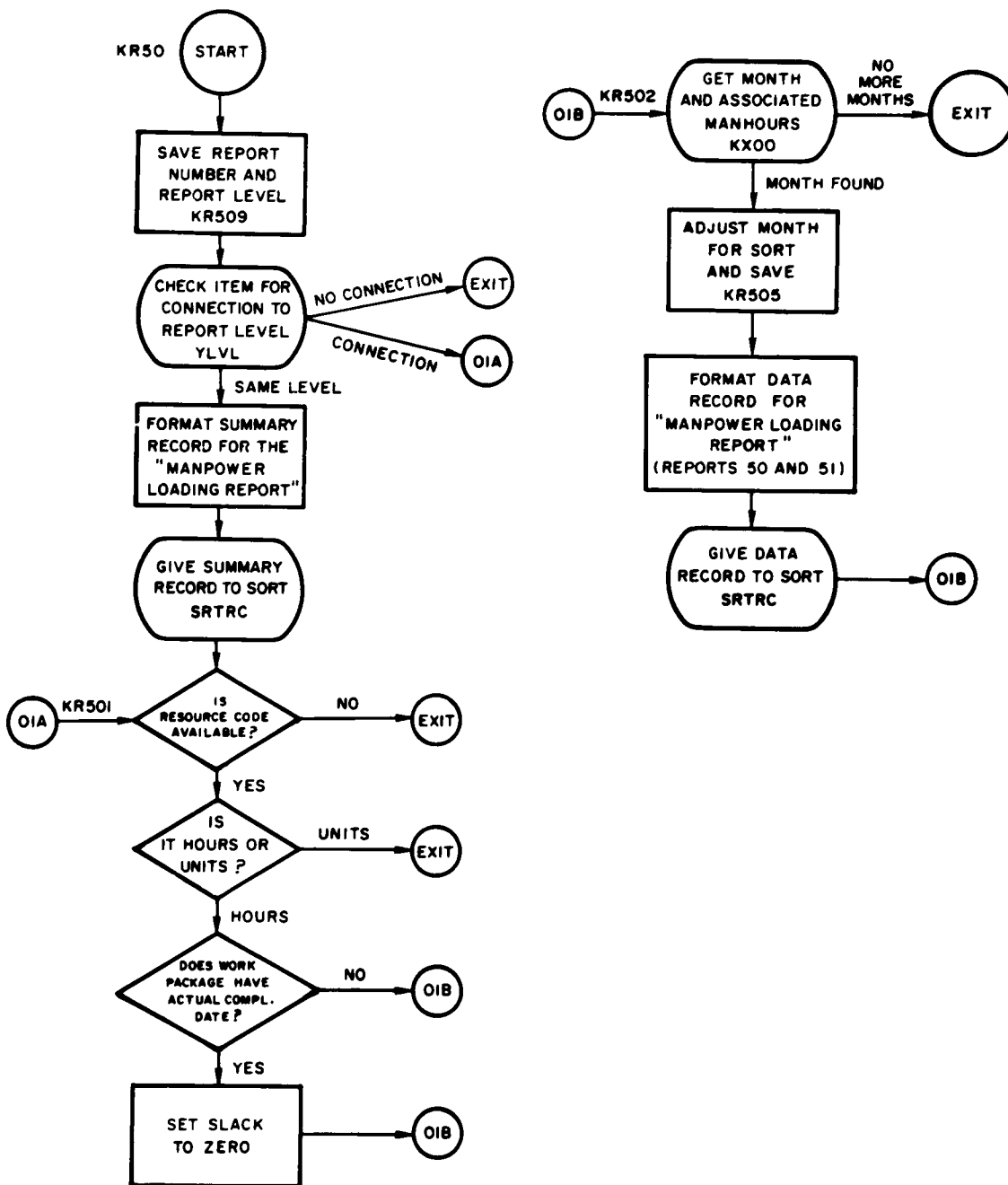
YLVL KX00

XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR50



RECORD FORMAT

PAGE 1

PROGRAM NUMBER PERT COST

NAME OF RECORD REPORT 50 & 51

	WORD	1	2	3	4	5	6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR			SUMMARY FLAG	RESOURCE CODE
CHARACTER LOCATION	0817	0835	(18H)			1 0835	(4H)
DESCRIPTION	CHARGE MONTH	PERFORMING ORGN.		CHARGE NUMBER			SLACK
CHARACTER LOCATION	Y Y	M M	(6H)	(18H)			WK x 10 0835
DESCRIPTION	ACTUAL HOURS	BUDGET HOURS	ESTIMATE HOURS				
CHARACTER LOCATION	0835	0835	0835				
DESCRIPTION							
CHARACTER LOCATION							
DESCRIPTION							
CHARACTER LOCATION							

Fig. III-I-20. Tape Format of Reports 50 and 51, Data

Region KR52

EXPLANATION OF REGION:

To select and set up information for sorting the "Manpower Loading Report" by performing organization, month, resource code (Report 52).

CALLING SEQUENCE:

L TSX KR52, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 52 data record.

STORAGE USED:

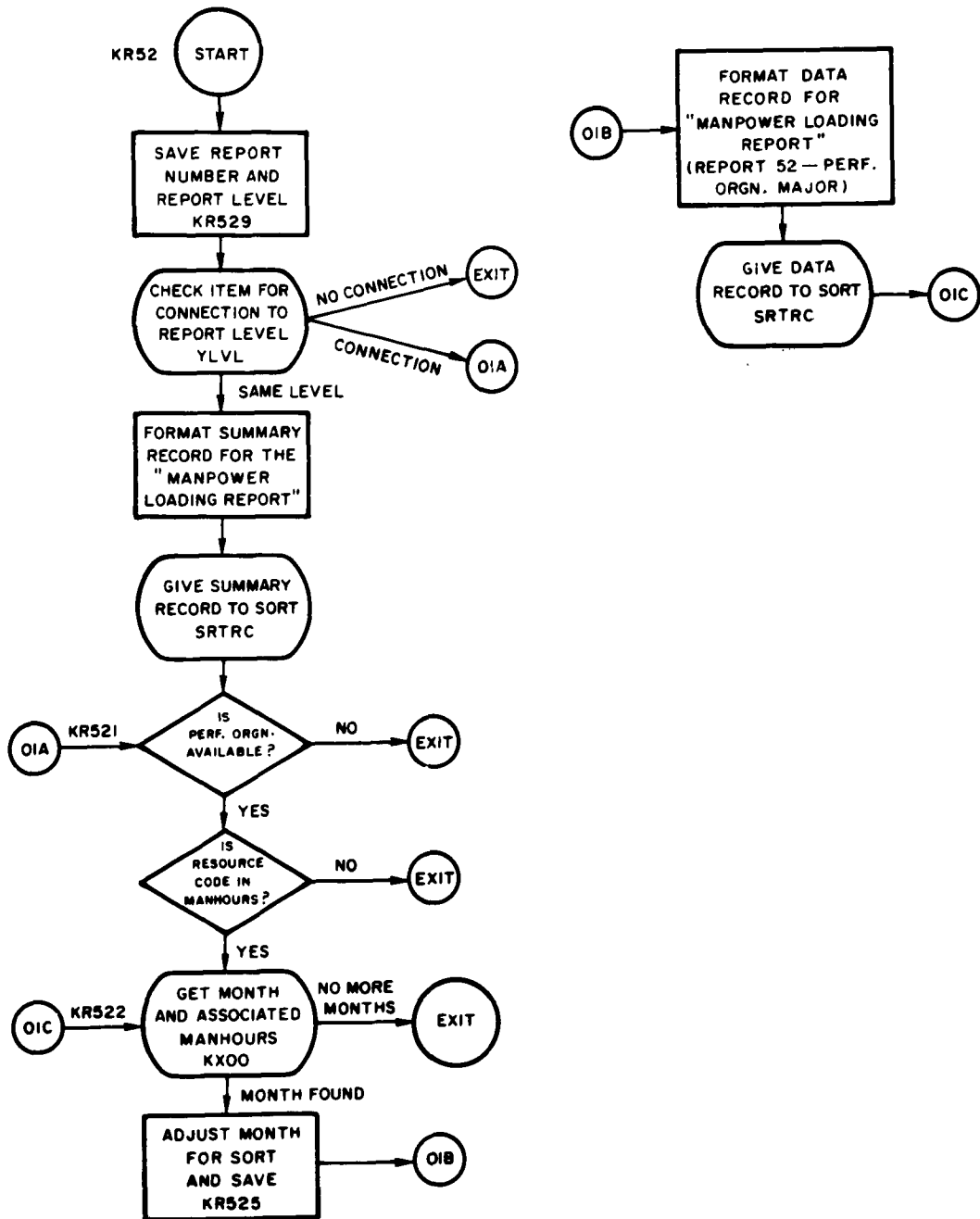
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

YLVL KX00
XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



RECORD FORMAT

PROGRAM NUMBER PERT_COST PAGE 1

NAME OF RECORD REPORT 52 (DATA)

	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	PERFORMING ORGN.
CHARACTER LOCATION	@B17	@B35	(18H)		1 @B35	(6H)
DESCRIPTION	CHARGE MONTH	RESOURCE CODE	ACTUAL HOURS	BUDGET HOURS	ESTIMATE HOURS	
CHARACTER LOCATION	Y Y M M (4H)		@B35	@B35	@B35	
DESCRIPTION	WORD					
CHARACTER LOCATION	WORD					
DESCRIPTION	WORD					
CHARACTER LOCATION	WORD					
DESCRIPTION	WORD					
CHARACTER LOCATION	WORD					

Fig. III-I-21. Tape Format of Report 52, Data

Region KR55

EXPLANATION OF REGION:

To select and set up information for sorting the "Rainbow Category Report" (Report 55).

CALLING SEQUENCE:

L TSX KR55, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 55 data record.

STORAGE USED:

Not applicable.

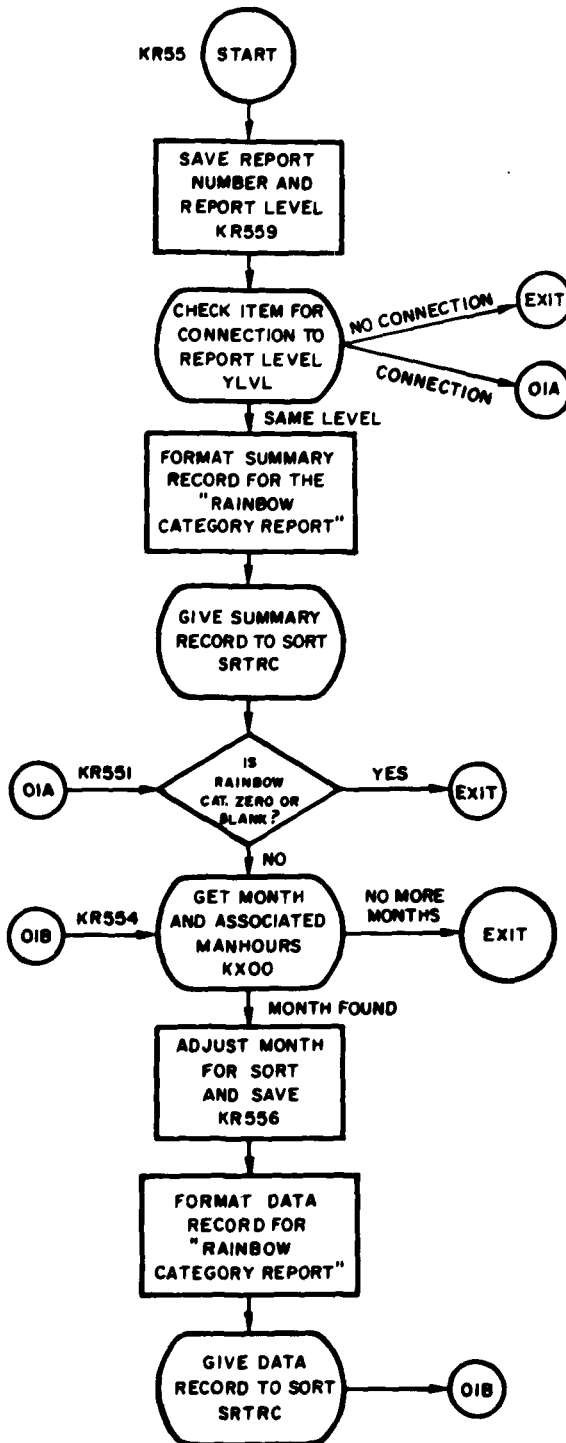
SUBREGIONS AND SUBROUTINES USED:

YLVL KX00
XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR55



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1
 NAME OF RECORD REPORT 55 (DATA)

	1	2	3	4	5	6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	RAINBOW CATEGORY
CHARACTER LOCATION	0017	0035	(18H)		0036	(24H)
DESCRIPTION		RAINBOW CATEGORY (CONT.)		CHARGE MONTH	ACTUAL HOURS	BUDGET HOURS
CHARACTER LOCATION				Y Y M M	0035	0035
DESCRIPTION	ESTIMATE HOURS					
CHARACTER LOCATION	0036					
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig. III-I-22. Tape Format of Report 55, Data

Region KR60

EXPLANATION OF REGION:

To select and set up information for sorting the "Cost Category Status Report" (Report 60).

CALLING SEQUENCE:

L TSX KR60, 4
L+1 Normal return

INPUT:

Accumulator: Report level, Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 60 data record.

STORAGE USED:

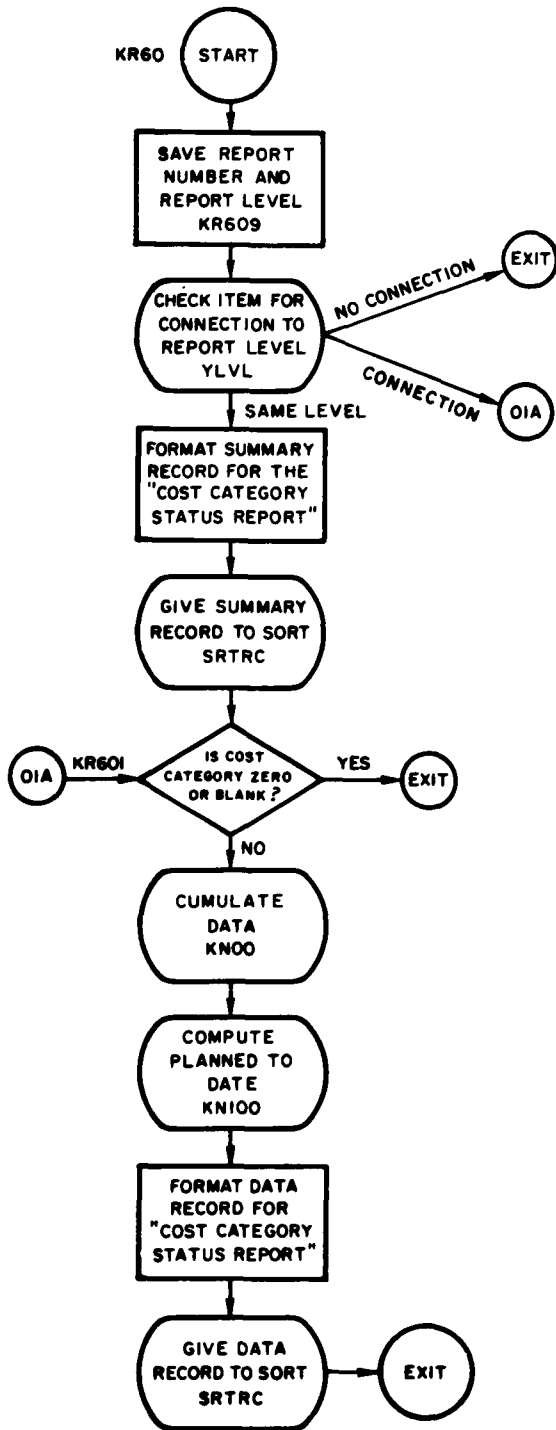
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

YLVL	KN00
KN100	XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



RECORD FORMAT

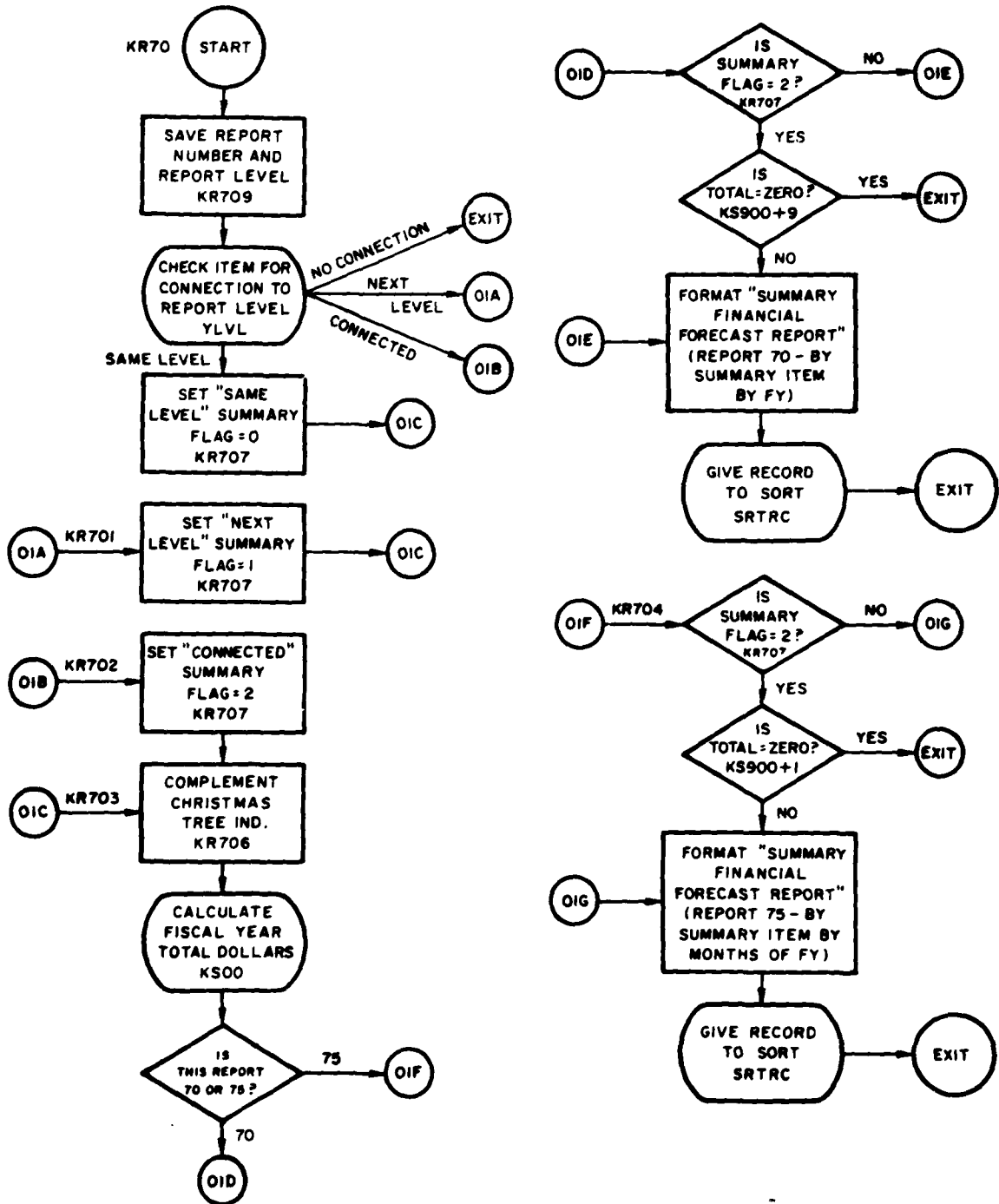
PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 60 (DATA)

DESCRIPTION	WORD 1	REPORT NO.	WORD 2	REPORT LEVEL	WORD 3	REPORT LEVEL INDICATOR	WORD 4	SUMMARY FLAG	WORD 5	COST CATEGORY	WORD 6
CHARACTER LOCATION	@B17	@B35	(18H)	@B35	(18H)	@B35	@B35	@B35	(18H)	@B35	
DESCRIPTION	WORD 7	COST CATEGORY (CONT.)	WORD 8	ACTUAL HOURS	WORD 9	BUDGET HOURS	WORD 10	ESTIMATE HOURS	WORD 11	PLAN HOURS TO DATE	WORD 12
CHARACTER LOCATION	@B35	@B35	@B35	@B35	@B35	@B35	@B35	@B35	@B35	@B35	@B35
DESCRIPTION	WORD 13	ACTUAL TOTAL \$	WORD 14	BUDGET TOTAL \$	WORD 15	ESTIMATE TOTAL \$	WORD 16	PLAN TOT. \$ TO DATE			
CHARACTER LOCATION	@B35	@B35	@B35	@B35	@B35	@B35	@B35	@B35			
DESCRIPTION	WORD										
CHARACTER LOCATION											
DESCRIPTION	WORD										
CHARACTER LOCATION											

Fig III-I-23. Tape Format of Report 60, Data

REGION KR70



RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 70

DESCRIPTION	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		CHRISTMAS TREE INDICATOR	
CHARACTER LOCATION	WORD 7	WORD 8	WORD 9	WORD 10	WORD 11	WORD 12
	@B17	@B35	(18H)		(18H)	
DESCRIPTION	WORD 13	WORD 14	WORD 15	WORD 16	WORD 17	WORD 18
	C. T. I. (CONT.)	SUMMARY FLAG	LEVEL		CHARGE NUMBER	
CHARACTER LOCATION	WORD 19	WORD 20	WORD 21	WORD 22	WORD 23	WORD 24
	@B35	@B35	(18H)		(18H)	
DESCRIPTION	WORD 19	WORD 20	WORD 21	WORD 22	WORD 23	WORD 24
		CHARGE NUMBER DESCRIPTOR	(36H)			
CHARACTER LOCATION	WORD 25	WORD 26	WORD 27	WORD 28	WORD 29	
	CONTRACTOR	PRIOR FYS	CURRENT FY	CURRENT FY+1	CURRENT FY+2	CURRENT FY+3
CHARACTER LOCATION	WORD 25	WORD 26	WORD 27	WORD 28	WORD 29	
	(4H)	@B35	@B35	@B35	@B35	@B35
DESCRIPTION	WORD 25	WORD 26	WORD 27	WORD 28	WORD 29	
	CURRENT FY+4	CURRENT FY+5	CURRENT FY+6	TOTALS TO COMPLETE	TOTAL	
CHARACTER LOCATION	WORD 25	WORD 26	WORD 27	WORD 28	WORD 29	
	@B35	@B35	@B35	@B35	@B35	@B35

Fig. III-I-24. Tape Format of Report 70

RECORD FORMAT

PROGRAM NUMBER PERT COST

PAGE 1

NAME OF RECORD REPORT 75

DESCRIPTION	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		CHRISTMAS TREE INDICATOR	
CHARACTER LOCATION	7	8	9	10	11	12
	0B17	0B36	(10H)		(10H)	
DESCRIPTION	WORD 8	WORD 9	WORD 10	WORD 11	WORD 12	WORD 13
	C.T.I. (CONT.)	SUMMARY FLAG	LEVEL	CHARGE NUMBER		
CHARACTER LOCATION	13	14	15	16	17	18
	0B35	0B35	0B35	(10H)		
DESCRIPTION	WORD 19	WORD 20	WORD 21	WORD 22	WORD 23	WORD 24
	CONTRACTOR	CURRENT FY	MONTHS OF FISCAL YEAR	CHARGE NUMBER DESCRIPTOR		
CHARACTER LOCATION	25	26	27	28	29	30
	(4H)	0B35		(36H)		32
DESCRIPTION	WORD 31	WORD 32	WORD 33	WORD 34	WORD 35	WORD 36
CHARACTER LOCATION	37	38	39	40	41	42

Fig. III-I-25. Tape Format of Report 75

Region KR71

EXPLANATION OF REGION:

To select and set up information for sorting the "Summary Financial Forecast" by cost category (Reports 71 and 76).

CALLING SEQUENCE:

L TSX KR71, 4
L+1 Normal return

INPUT:

Accumulator: Report level, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 71 data record (by cost category, fiscal year).
Report 76 data record (by cost category, months of current fiscal year).

STORAGE USED:

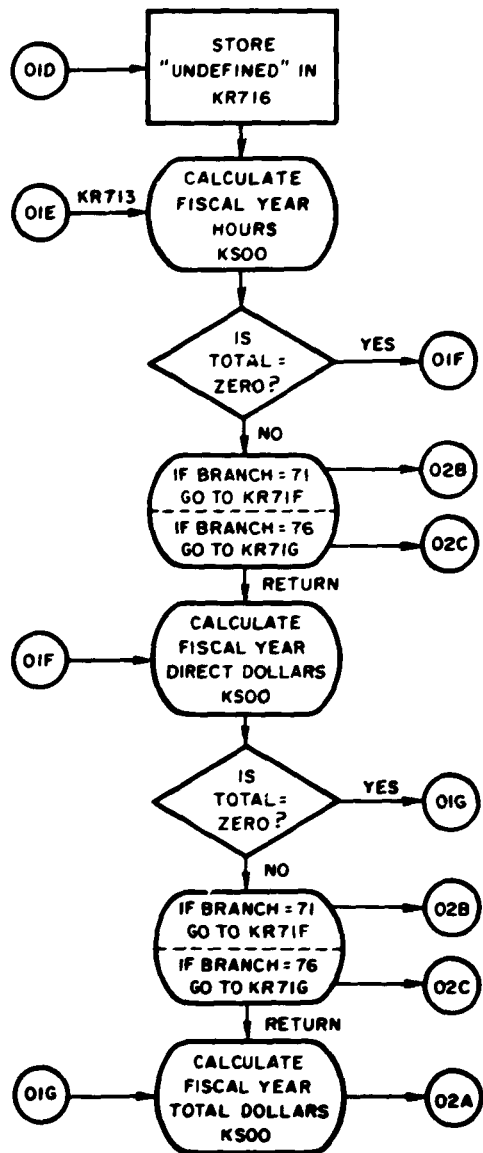
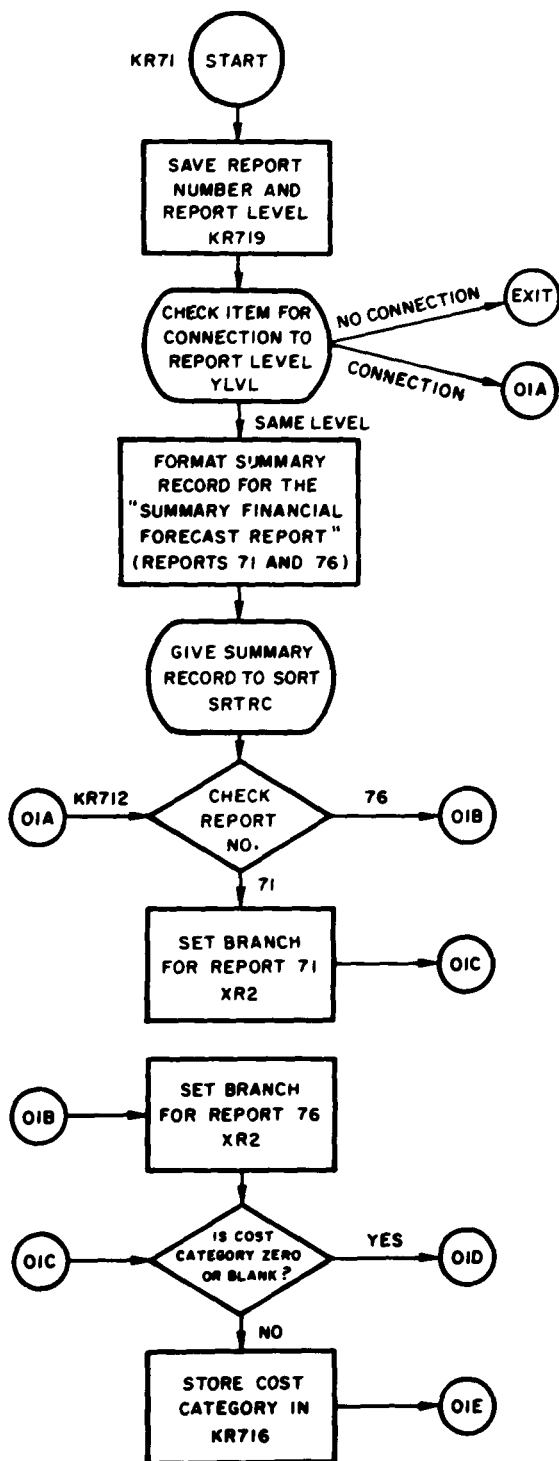
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

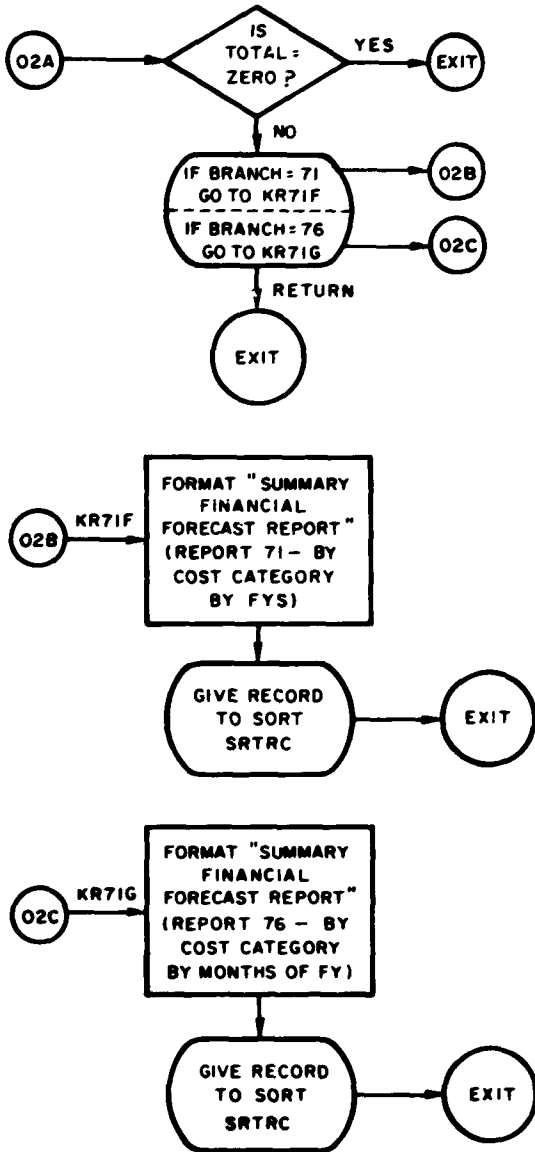
YLVL KS00
XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



REGION KR7I



RECORD FORMAT

PROGRAM NUMBER PERT COST

PAGE 1

NAME OF RECORD REPORT 71 & 76 (SUMMARY)

DESCRIPTION	1	2	3	4	5	6
CHARACTER LOCATION	REPORT NO	REPORT LEVEL	REPORT LEVEL INDICATOR	SUMMARY FLAG	LEVEL	
	0817	0835	(18H)	0 0835	0835	
DESCRIPTION	7	8	9	10	11	12
		CHARGE NUMBER		CHARGE NUMBER DESCRIPTOR		
CHARACTER LOCATION	13	14	15	16		
		(18H)		CONTRACTOR	(36H)	
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig. III-I-26. Tape Format of Reports 71 and 76, Summary

RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 71 (DATA)

DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR	SUMMARY FLAG	COST CATEGORY
CHARACTER LOCATION	0817	0835	(08H)	1 0835	(08H)
DESCRIPTION	COST CATEGORY (CONT.)	COST CAT. CODE	PRIOR FYS	CURRENT FY	CURRENT FY+1
CHARACTER LOCATION		(08H)	0835	0835	0835
DESCRIPTION	CURRENT FY+2	CURRENT FY+3	CURRENT FY+4	CURRENT FY+5	TOTALS TO COMPLETE
CHARACTER LOCATION	0835	0835	0835	0835	0835
DESCRIPTION	TOTAL				
CHARACTER LOCATION	0835				
DESCRIPTION					
CHARACTER LOCATION					

Fig. III-I-27. Tape Format of Report 71, Data

RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1
 NAME OF RECORD REPORT 76 (DATA)

	1	2	3	4	5	6
DESCRIPTION	REPORT NO.	REPORT LEVEL	REPORT LEVEL INDICATOR		SUMMARY FLAG	COST CATEGORY
CHARACTER LOCATION	@B17	@B35	(18H)		I @B35	
	WORD	7	8	9	10	11
DESCRIPTION	COST CATEGORY (CONT.)		COST. CAT. CODE	CURRENT FY		MONTHS OF FISCAL YEAR
CHARACTER LOCATION			(6H)	@B35		22
	WORD					
DESCRIPTION						
CHARACTER LOCATION						
	WORD					
DESCRIPTION						
CHARACTER LOCATION						
	WORD					
DESCRIPTION						
CHARACTER LOCATION						
	WORD					

Fig. III-I-28. Tape Format of Report 76, Data

Region KR80

EXPLANATION OF REGION:

To select and set up information for sorting the "Budget Authorization and Updating Form" (Report 80) and "Cost Estimating and Updating Form" (Report 85).

CALLING SEQUENCE:

L TSX KR80, 4
L+1 Normal return

INPUT:

Accumulator: 0, , Report number.
YCNT: Location of PERT Cost data record.

OUTPUT:

Report 80 data record.
Report 85 data record.

STORAGE USED:

Not applicable.

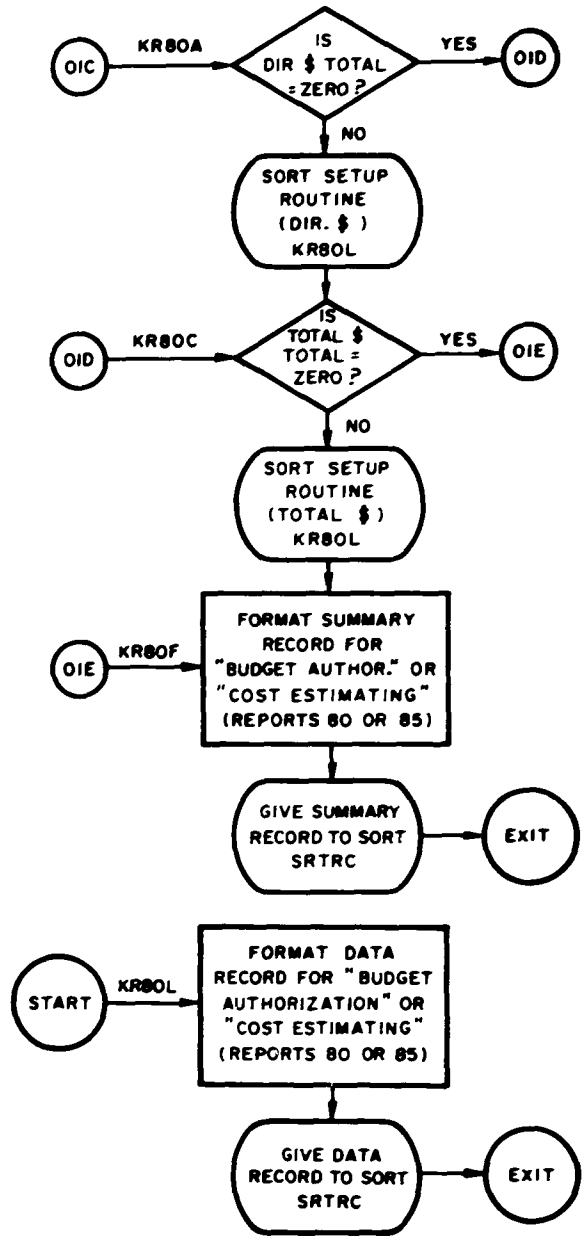
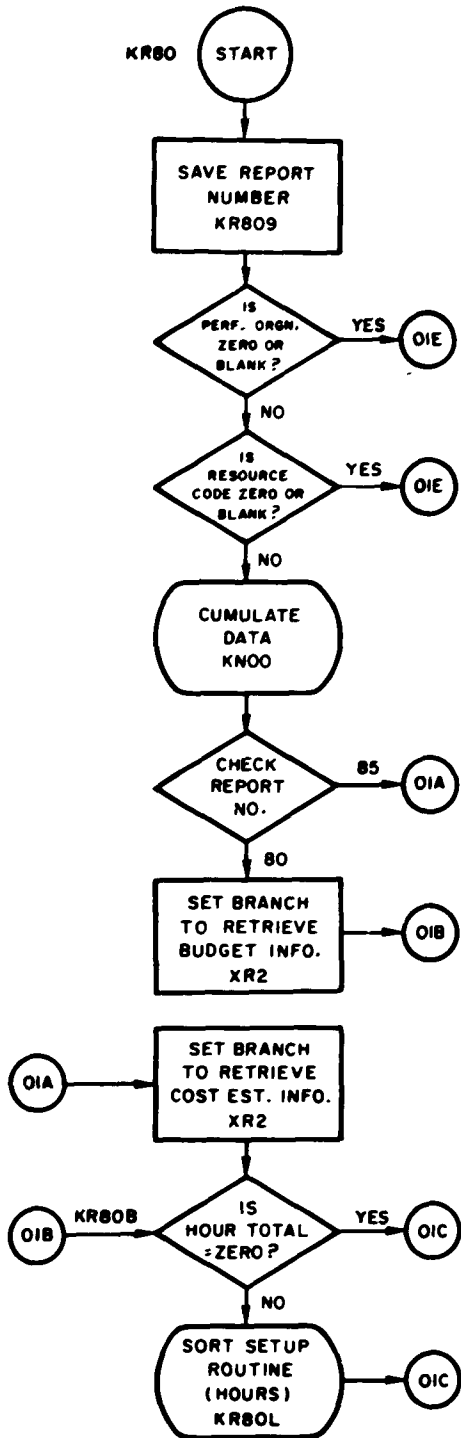
SUBREGIONS AND SUBROUTINES USED:

KN00 XSORT

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION KR80



RECORD FORMAT

PROGRAM NUMBER		PERT COST		PAGE		
NAME OF RECORD <u>REPORT 80 & 85 (SUMMARY)</u>						
DESCRIPTION	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
	REPORT NO.	RESPONSIBLE ORGN.		CHARGE NUMBER		SUMMARY FLAG
CHARACTER LOCATION	7	8	9	10	11	12
	@B17	(6H)		(18H)		0 @B35
DESCRIPTION	WORD 7	CHARGE NUMBER DESCRIPTOR				
CHARACTER LOCATION	13	14	15	16	17	18
	LEVEL			(36H)		
DESCRIPTION	WORD 13	WORD 14	WORD 15	WORD 16	WORD 17	WORD 18
	CHG. NO. DESCR. (CONT.)	CONTRACTOR		CONTRACT NUMBER		NETWORK DESCR.
CHARACTER LOCATION	19	20	21	22	23	24
		(4H)		(18H)		(36H)
DESCRIPTION	WORD 19	WORD 20	WORD 21	WORD 22	WORD 23	WORD 24
				NETWORK DESCRIPTOR (CONT.)		N.H.R.
CHARACTER LOCATION	25	26	27	28	29	30
						(18H)
DESCRIPTION	WORD 25	NEXT HIGHER RELATION DESCRIPTOR				
CHARACTER LOCATION	31	32	33	34	35	36
						(36H)

Fig. III-1-29. Tape Format of Reports 80 and 85, Summary

RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 2

NAME OF RECORD REPORT 80 & 85 (SUMMARY) (CONT.)

WORD	31	32	33	34	35	36
	N.M.R. DESCR. (CONT.)	CHARGE NO. START DATE	CHARGE NO. START DATE	CHARGE NO. COMPL DATE	WORK PACKAGE START DATE	
	D D M M Y Y	D D M M Y Y	D D M M Y Y	D D M M Y Y	D D M M Y Y	
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig. III-I-29. Tape Format of Reports 80 and 85, Summary (Continued)

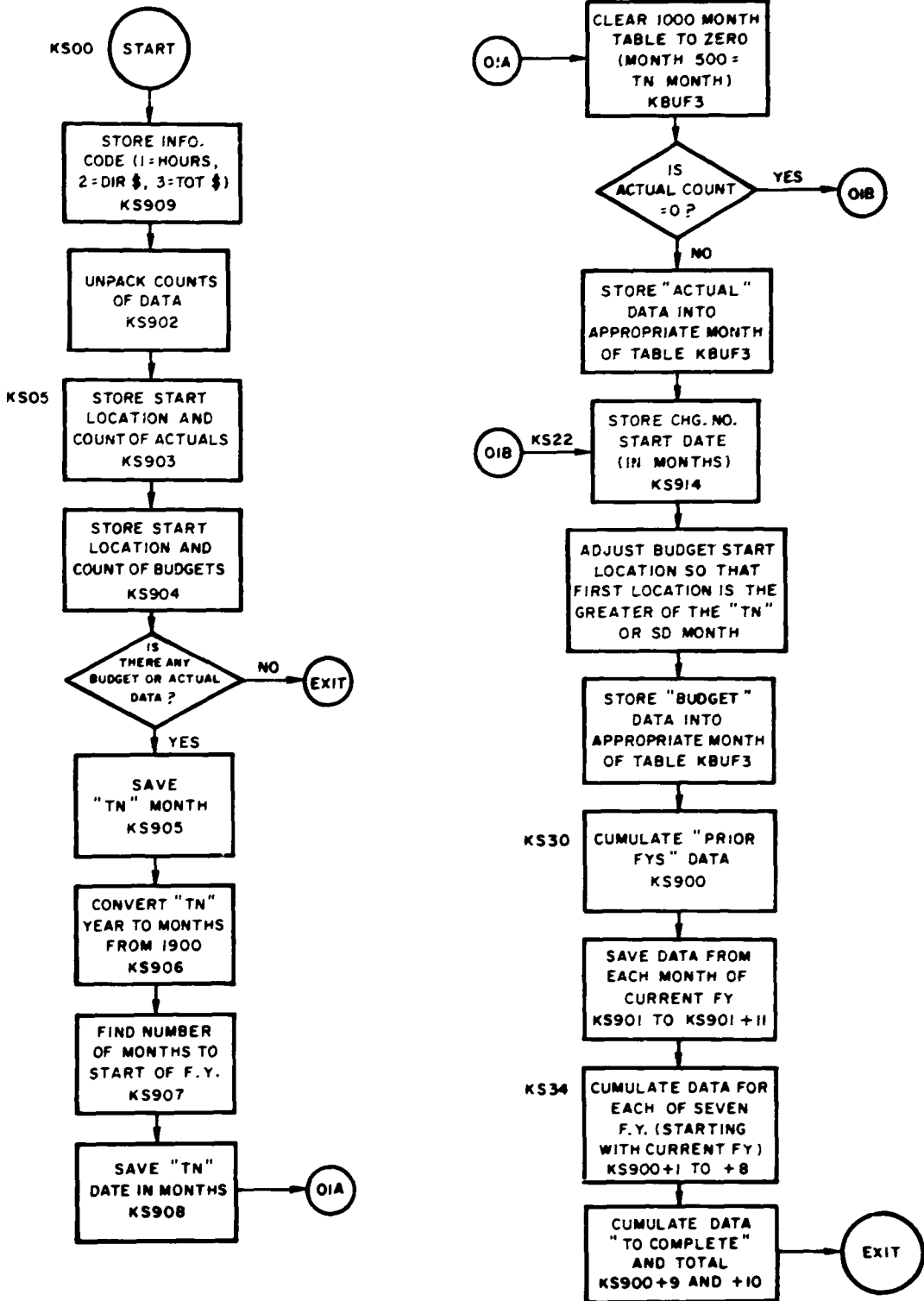
RECORD FORMAT

PROGRAM NUMBER PERT COST PAGE 1

NAME OF RECORD REPORT 80 & 85 (DATA)

DESCRIPTION	WORD 1	WORD 2	WORD 3	WORD 4	WORD 5	WORD 6
CHARACTER LOCATION	REPORT NO.	RESPONSIBLE ORGN.	CHARGE NUMBER			SUMMARY FLAG
DESCRIPTION	WORD 7	WORD 8	WORD 9	WORD 10	WORD 11	WORD N
CHARACTER LOCATION	PERFORMING ORGN.	RESOURCE CODE	COST TYPE	COUNT	TOTAL COST	COST ITEMS BY MONTH
DESCRIPTION	(8H)	(4H)	(3H)	0835	0835	
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						
DESCRIPTION						
CHARACTER LOCATION						

Fig III-I-30. Tape Format of Reports 80 and 85, Data



Region KX00

EXPLANATION OF REGION:

To locate actuals, budgets, and estimates for an individual month.

CALLING SEQUENCE:

L TSX KX00, 4

L+1 Normal return

INPUT:

XRI = Location of PERT Cost data record (complemented).

OUTPUT:

KX902 = date

KX905 = estimate

KX903 = actual

KX906 = overrun/underrun

KX904 = budget

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

FIXPT

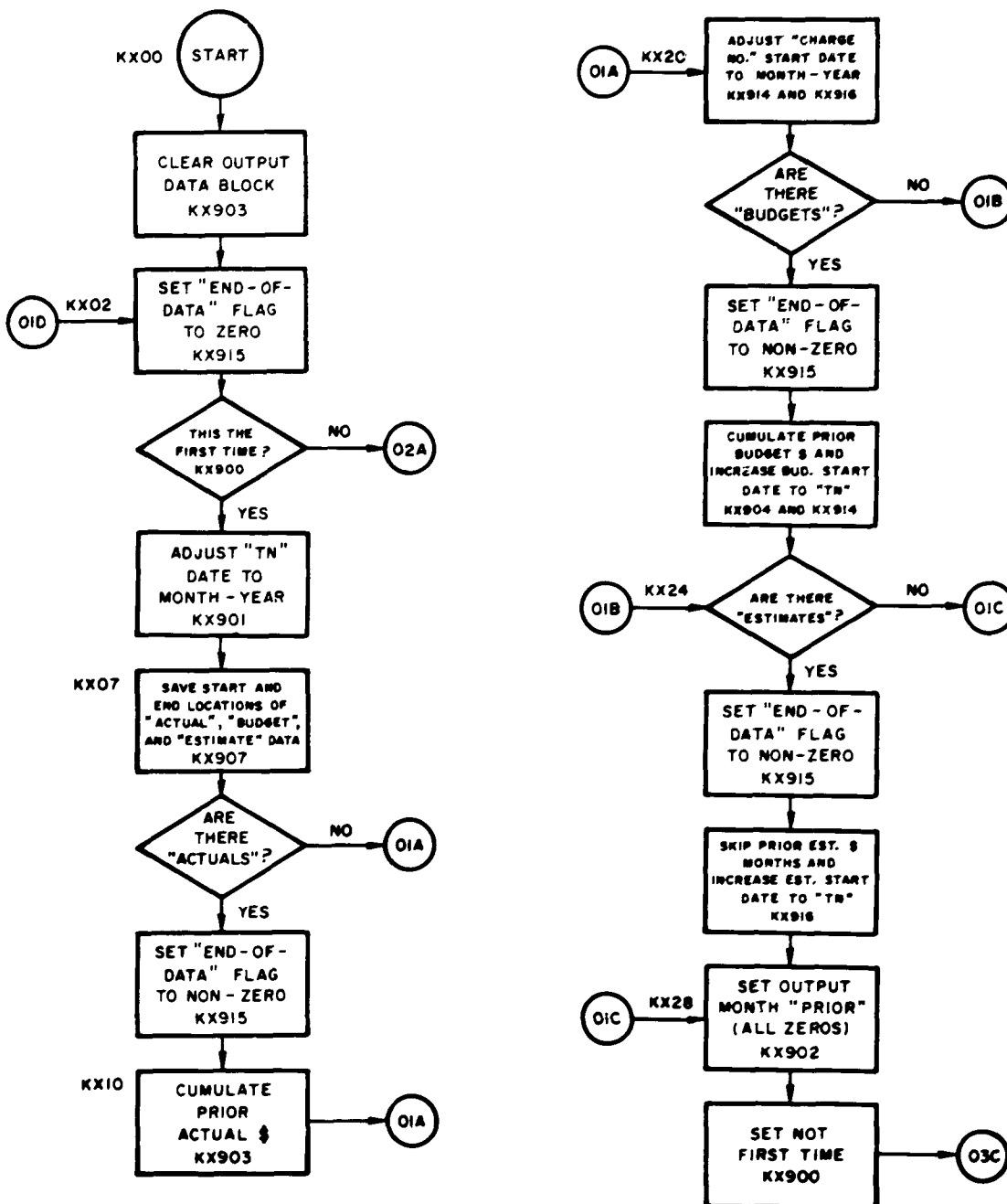
UPCK

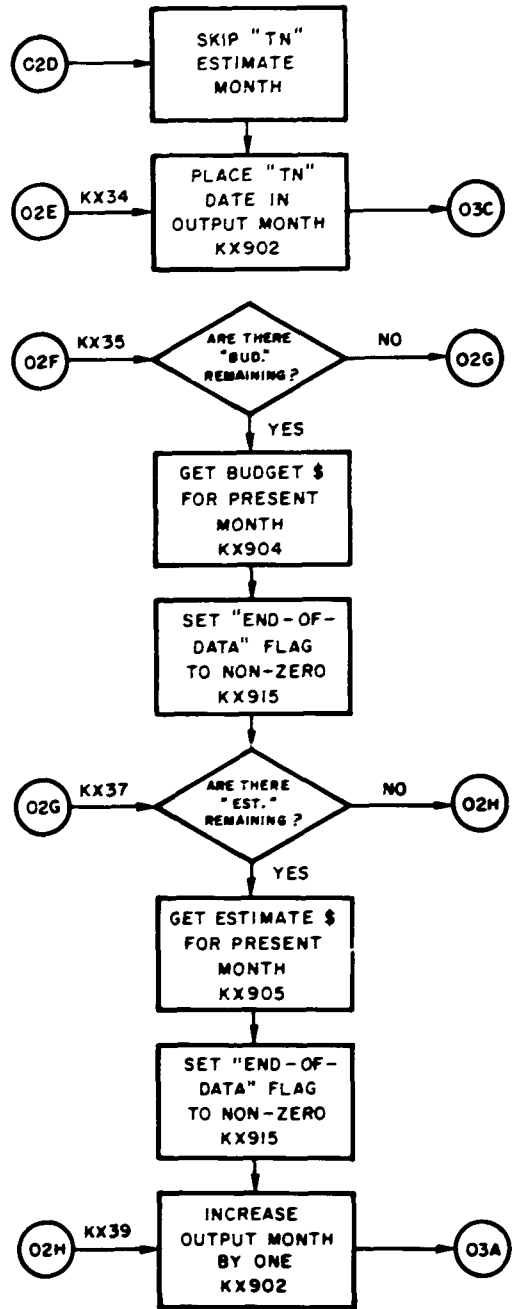
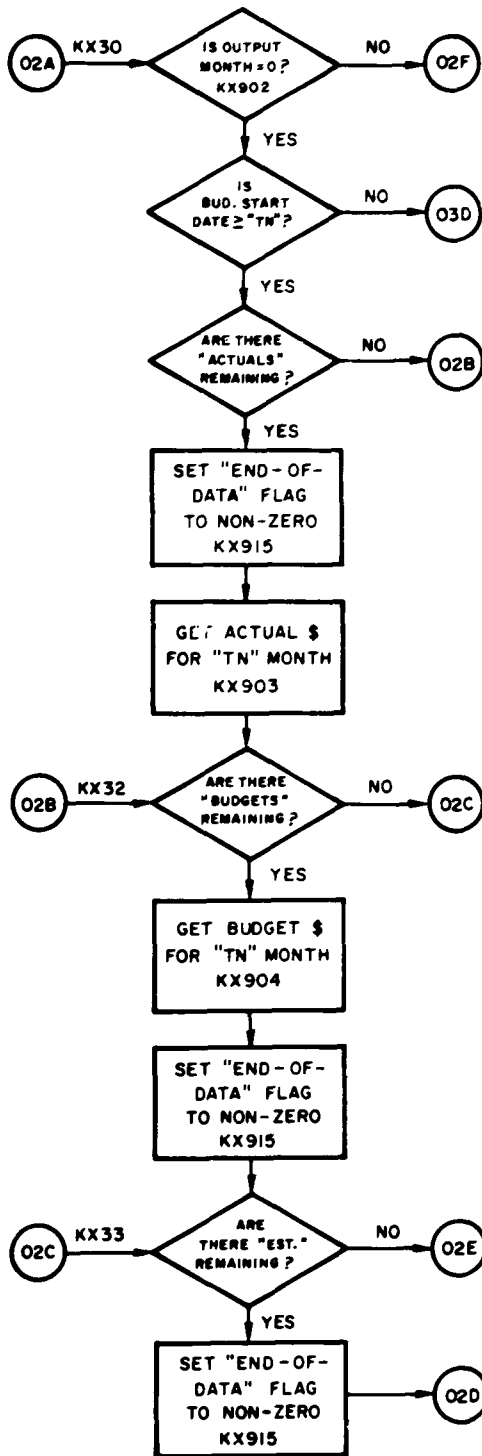
PACK

EXPLANATION OF CALLING SEQUENCE:

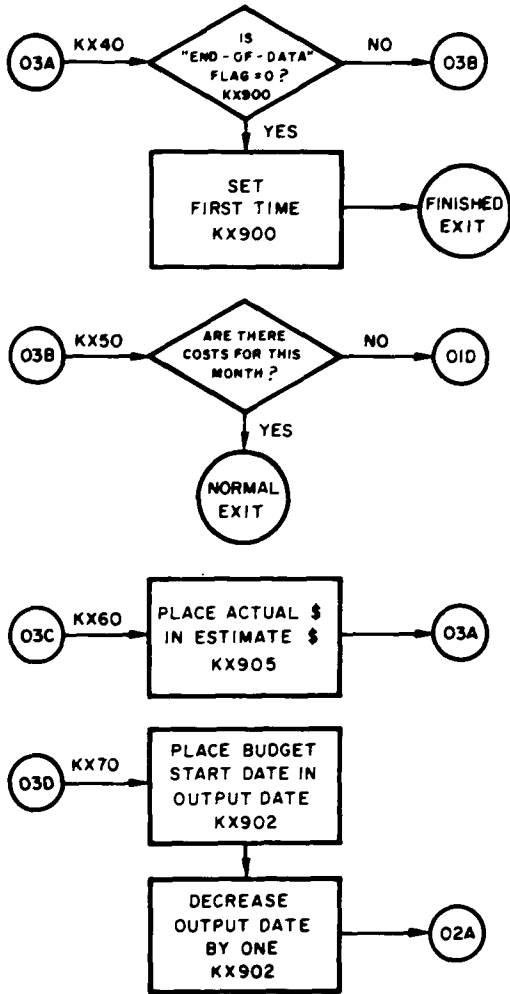
Not applicable.

REGION KX00





REGION KX00



III-J FINAL REPORTING PHASE

In the final reporting phase the reports are generated from the cost and time information and set onto the Output Print tape.

Input

The tapes from the XSORT sorting routine (prior to the final merge pass) will be used as input into this phase. These tapes will contain all the information necessary for producing the requested reports and will be sequenced by report number major and report level minor. Each report will contain all the information necessary for producing that individual report.

Procedure

Each report is operated upon separately and in report number order. The bulk of the computations necessary to produce a given report is done at this time. These computations may involve cumulating cost data or summarizing time data up the work breakdown structure, calculating "value" or "percent overrun/underrun," or totaling cost information for an individual cost category. After the computations are completed, it is sometimes necessary to perform an additional sort in order to put the data into the sequence required by the report. The data is then put into the specified report format and placed on the output report tape.

List of Reports Produced

<u>Report No.</u>	<u>Level Report?</u>	<u>Report Title</u>	<u>Sort Sequence</u>
10	yes	Organization Status Report	Perf. Orgn., Charge No., Resp. Orgn., Res. Code
11	yes	Organization Status Report	Res. Code, Charge No., Resp. Orgn., Perf. Orgn.

List of Reports Produced (Continued)

<u>Report No.</u>	<u>Level Report?</u>	<u>Report Title</u>	<u>Sort Sequence</u>
12	yes	Organization Status Report	Charge No., Resp. Orgn., Perf. Orgn., Res. Code
13	yes	Organization Status Report	Resp. Orgn., Charge No., Perf. Orgn., Res. Code
20	yes	Organization Status Report	Net No., Perf. Orgn., Charge No., Resp. Orgn., Res. Code
21	yes	Organization Status Report	Net No., Res. Code Charge No., Resp. Orgn., Perf. Orgn.
22	yes	Organization Status Report	Net No., Charge No., Resp. Orgn., Perf. Orgn., Res. Code
23	yes	Organization Status Report	Net No., Resp. Orgn., Charge No., Perf. Orgn., Res. Code
30	yes	Management Summary Report	
35	yes	Program/Project Status Report	
40	yes	Financial Plan and Status Report	Month, Charge No.
41	yes	Financial Plan and Status Report	Month
50	yes	Manpower Loading Report	Res. Code, Month, Perf. Orgn., Charge No.
51	yes	Manpower Loading Report	Res. Code, Month

List of Reports Produced (Continued)

<u>Report No.</u>	<u>Level Report?</u>	<u>Report Title</u>	<u>Sort Sequence</u>
52	yes	Manpower Loading Report	Perf. Orgn., Month, Res. Code
55	yes	Rainbow Category Report	
60	yes	Cost Category Status Report	
70	yes	Summary Financial Forecast	Summary, Year
71	yes	Summary Financial Forecast	Cost Cat., Year
75	yes	Summary Financial Forecast	Summary, Month
76	yes	Summary Financial Forecast	Cost Cat., Month
80	no	Budget Authorization and Updating Form	
85	no	Cost Estimating and Updating Form	

Final Reporting Phase Region Descriptions

The major subroutines in this phase are described below. A flow diagram of the master control region for this phase is given as Fig III-J-1.

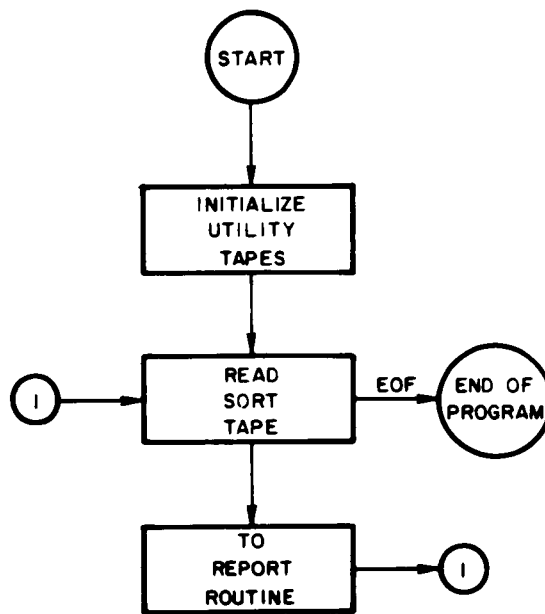


Fig III-J-1. Flow Diagram of Final Report Phase

Region LA00

EXPLANATION OF REGION:

Master control region for final reporting phase. Initializes tapes and communicates with report routines.

CALLING SEQUENCE:

L TRA LA00

INPUT:

Sorted tape from XSORT routine.

OUTPUT:

Report tape for printing.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

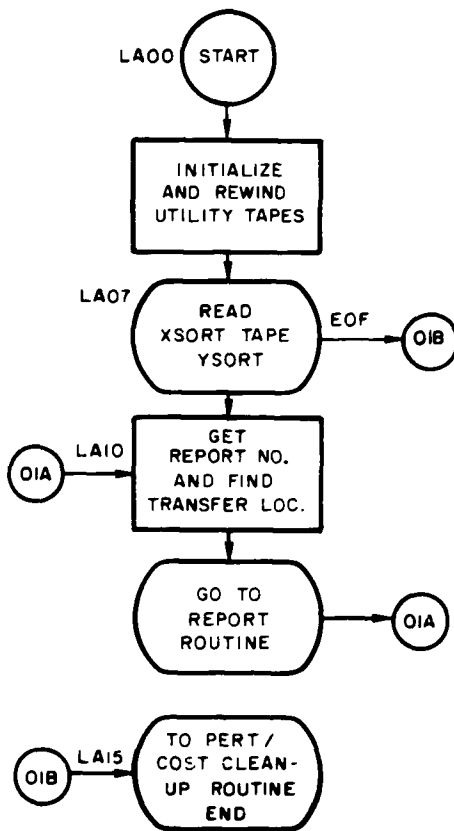
YREAD

Report regions

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LA00



Region LA100

EXPLANATION OF REGION:

To print bottom titles (security number and page number).

CALLING SEQUENCE:

L TSX LA100, 4

L+1 Normal return

INPUT:

ZSEC - security number

ZPAGE - page number

OUTPUT:

Bottom title printed on line 59.

STORAGE USED:

Not applicable.

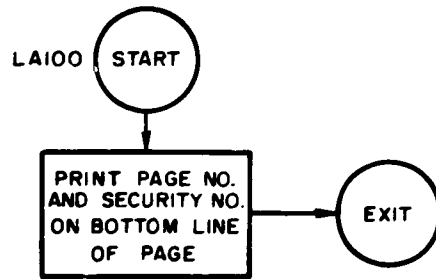
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LA100



Region LB00

EXPLANATION OF REGION:

To cumulate a major and subtotal for the first two items in the sort, and print out the "Organization Status Report."

CALLING SEQUENCE:

L TSX LB00, 4
L+1 PZE 0, 0, R
L+2 PZE H
L+3 PZE T2,, T1
L+4 PZE S1,, S2
L+5 PZE S3,, S4
L+6 Normal return

INPUT:

Information from XSORT routine.

OUTPUT:

Report on output print tape.

STORAGE USED:

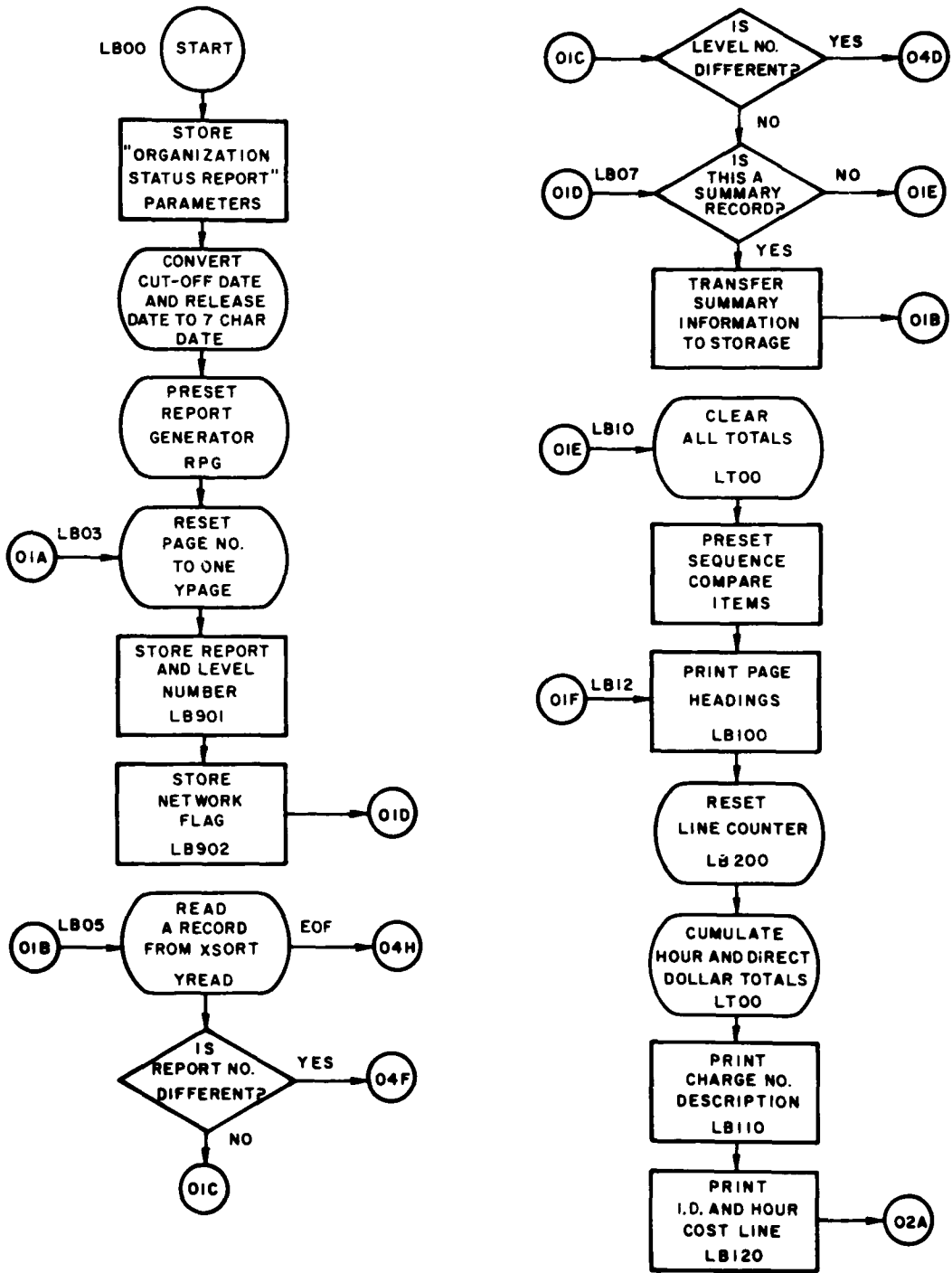
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

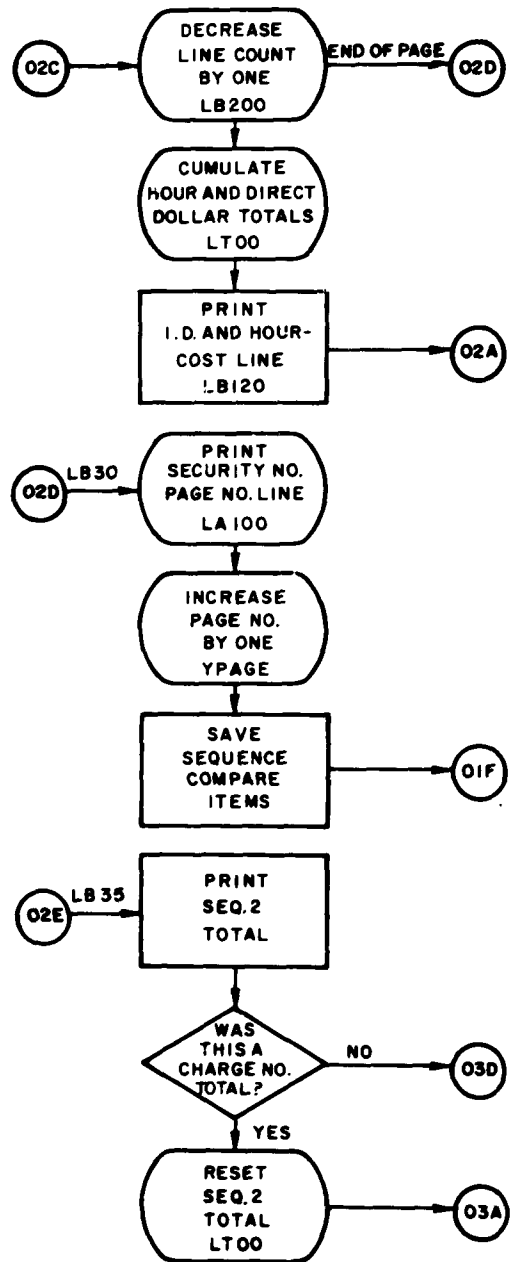
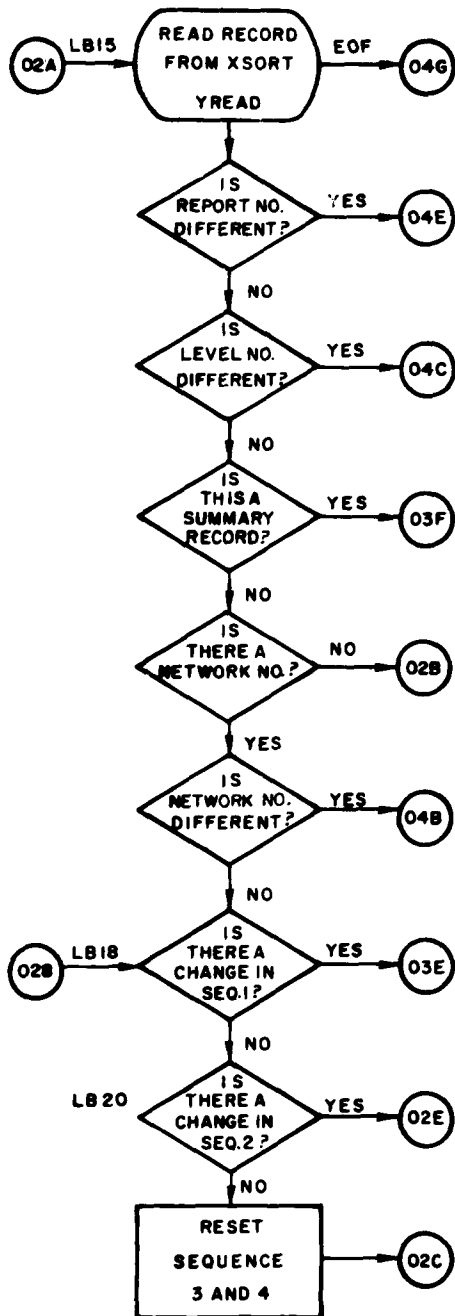
YPAGE YREAD LB200
LT00 LA100 YSEC
YCOMP

EXPLANATION OF CALLING SEQUENCE:

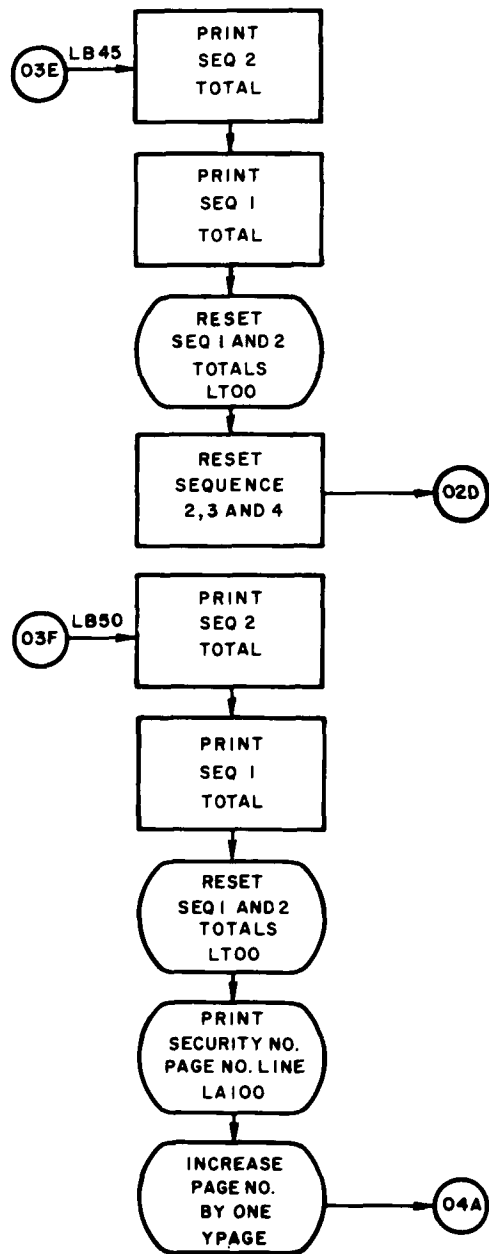
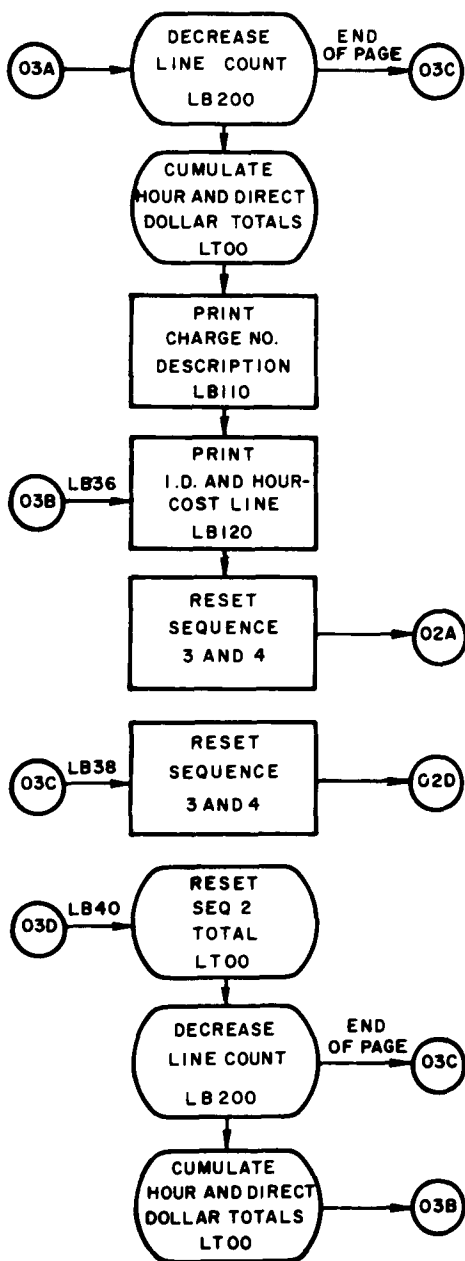
R = report no.	S1 through S4 = sort sequence of report, where:
H = location of sort sequence print routine	1 = charge no.
T1 = location of major total print routine	2 = responsible orgn.
T2 = location of subtotal print routine	3 = performing orgn.
	4 = resource code



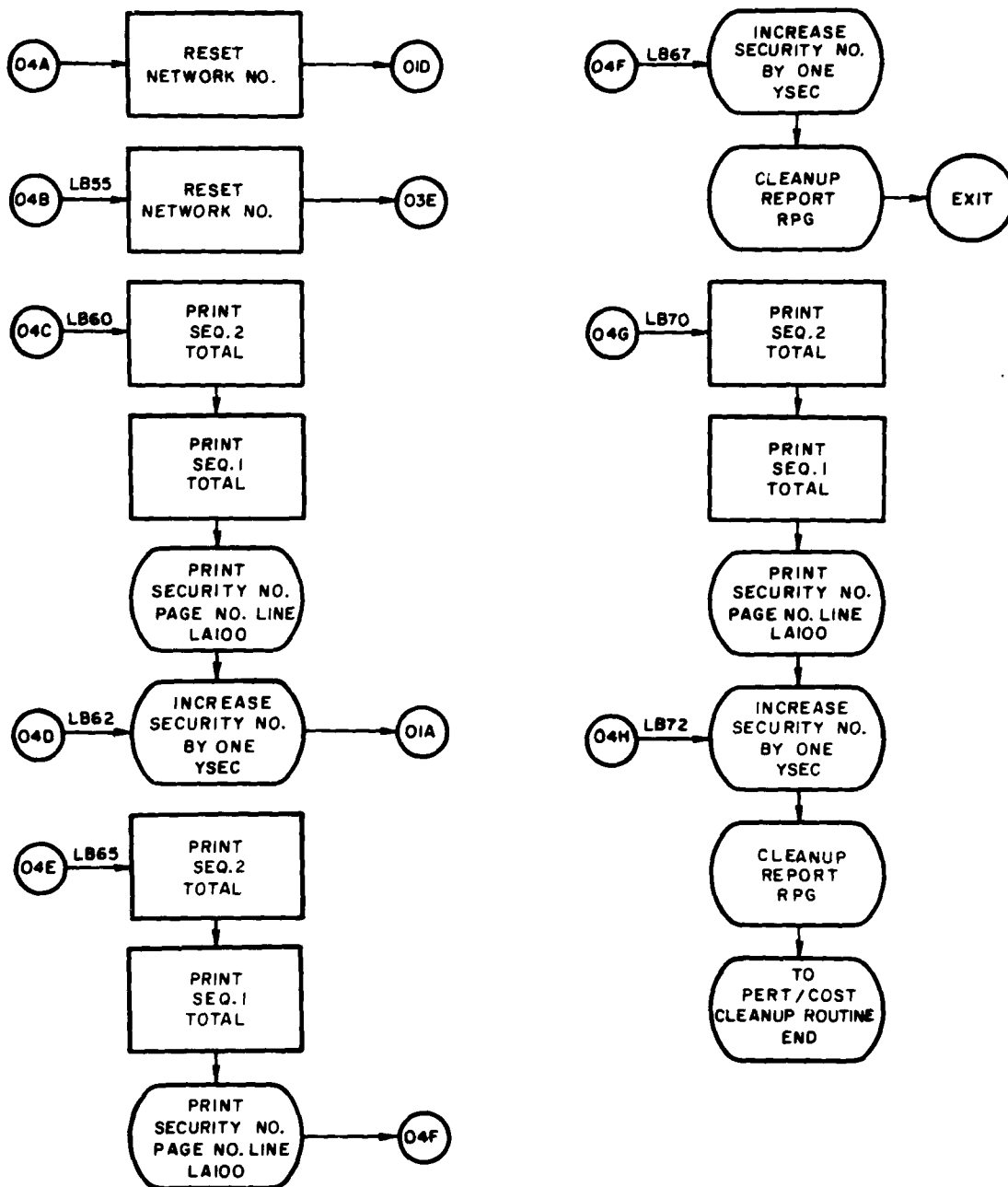
REGION LB00



REGION LB00



REGION LB00



Region LB200

EXPLANATION OF REGION:

To control page spacing and give end-of-page indication.

CALLING SEQUENCE:

L TSX LB200, 4
L+1 PZE A
L+2 End-of-page return
L+3 Normal return

INPUT:

Not applicable.

OUTPUT:

Not applicable.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

Not applicable.

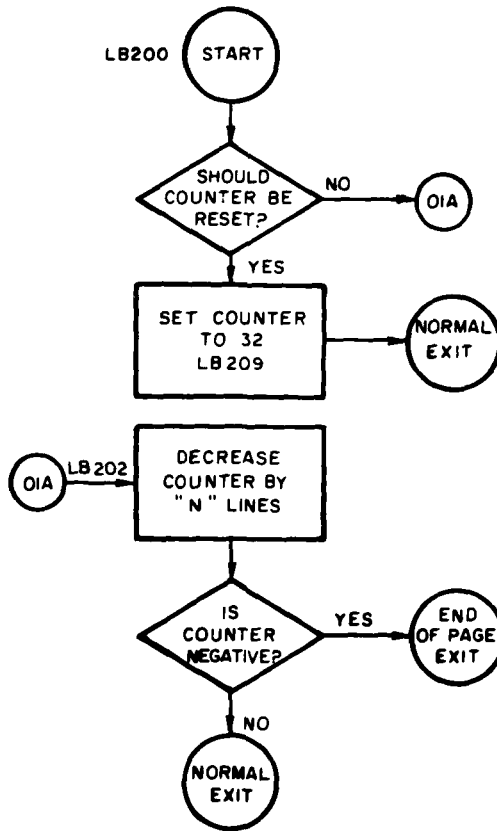
EXPLANATION OF CALLING SEQUENCE:

If $A = 0$, line counter is set to total lines available,

If $A = N$ (where N is non-zero) the line counter is decreased by N .

When the line counter is negative, the routine will exit at end of page.

REGION LB200



Region LC10

EXPLANATION OF REGION:

Setup region for printing Report 10.

CALLING SEQUENCE:

L TSX LC10, 4

L+1 Normal return

INPUT:

Report 10 information from XSORT.

OUTPUT:

Report 10 on output report tape.

STORAGE USED:

Not applicable.

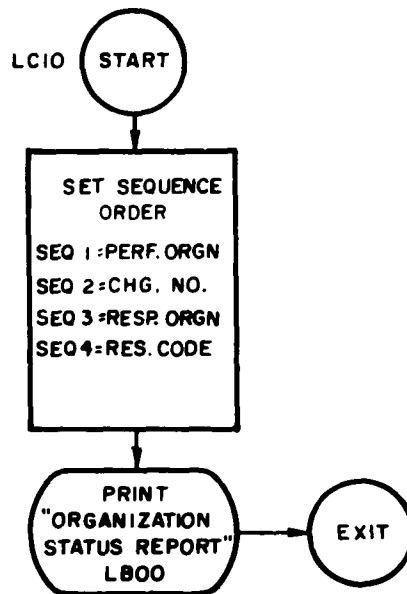
SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LC10



Region LC11

EXPLANATION OF REGION:

Setup region for printing Report 11.

CALLING SEQUENCE:

L TSX LC11, 4

L+1 Normal return

INPUT:

Report 11 information from XSORT.

OUTPUT:

Report 11 on output report tape.

STORAGE USED:

Not Applicable.

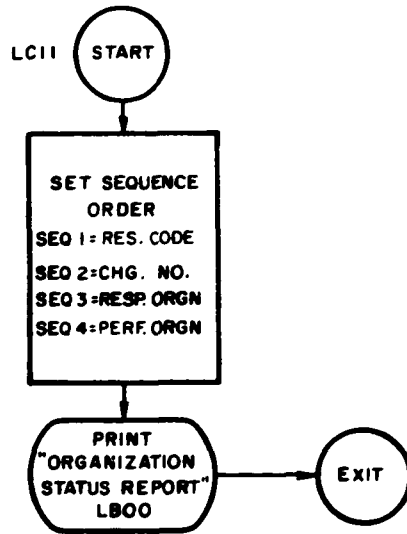
SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LC11



Region LC12

EXPLANATION OF REGION:

Setup region for printing Report 12.

CALLING SEQUENCE:

L TSX LC12, 4

L+1 Normal return

INPUT:

Report 12 information from XSORT.

OUTPUT:

Report 12 on output report tape.

STORAGE USED:

Not applicable.

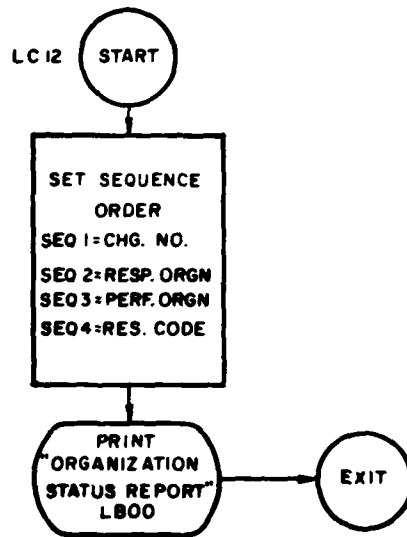
SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LC12



Region LC13

EXPLANATION OF REGION:

Setup region for printing Report 13.

CALLING SEQUENCE:

L TSX LC13, 4

L+1 Normal return

INPUT:

Report 13 information from XSORT.

OUTPUT:

Report 13 on output report tape.

STORAGE USED:

Not applicable.

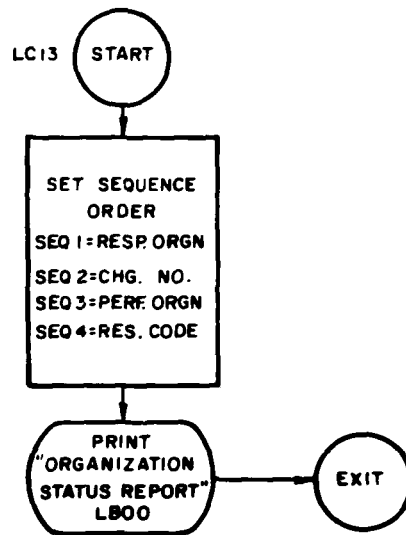
SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LC13



Region LC20

EXPLANATION OF REGION:

Setup region for printing Report 20.

CALLING SEQUENCE:

L TSX LC20, 4

L+1 Normal return

INPUT:

Report 20 information from XSORT.

OUTPUT:

Report 20 on output report tape.

STORAGE USED:

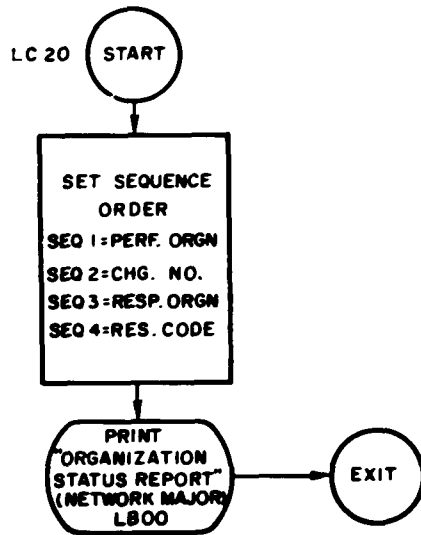
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



Region LC21

EXPLANATION OF REGION:

Setup region for printing report 21.

CALLING SEQUENCE:

L TSX LC21, 4

L+1 Normal return

INPUT:

Report 21 information from XSORT.

OUTPUT:

Report 21 on output report tape.

STORAGE USED:

Not applicable.

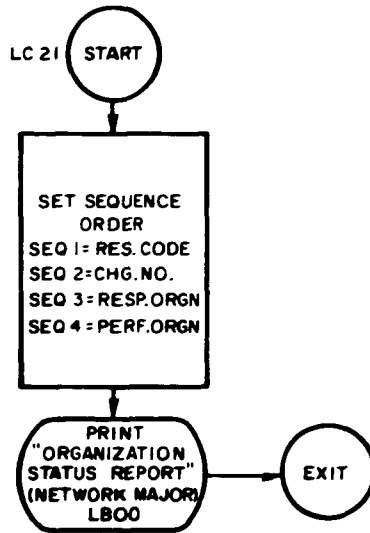
SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LC21



Region LC22

EXPLANATION OF REGION:

Setup region for printing Report 22.

CALLING SEQUENCE:

L TSX LC22, 4

L+1 Normal return

INPUT:

Report 22 information from XSORT.

OUTPUT:

Report 22 on output Report tape.

STORAGE USED:

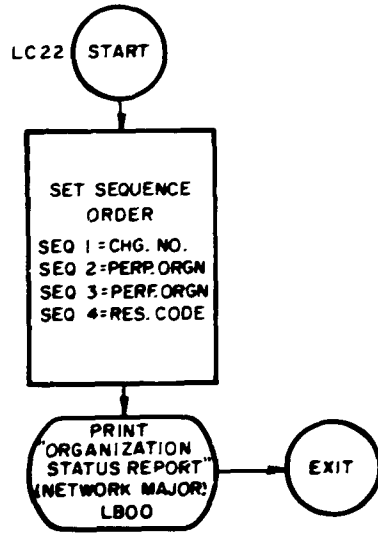
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



Region LC23

EXPLANATION OF REGION:

Setup region for printing Report 23.

CALLING SEQUENCE:

L TSX LC23, 4

L+1 Normal return

INPUT:

Report 23 information from XSORT.

OUTPUT:

Report 23 on output report tape.

STORAGE USED:

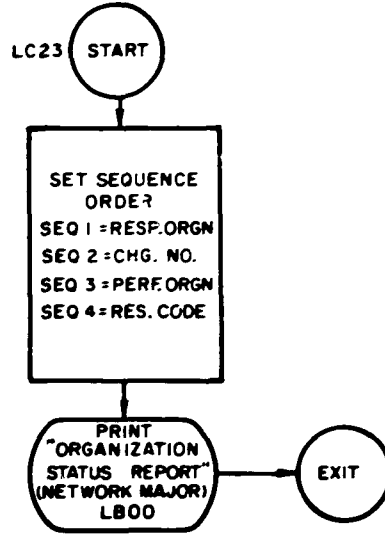
Not applicable.

SUBREGIONS AND SUBROUTINES USED:

LB00

EXPLANATION OF CALLING SEQUENCE:

Not applicable.



Region LD00

EXPLANATION OF REGION:

To cumulate cost data and summarize time data up the work breakdown structure and print Report 30 (only items at the requested level and the next lower level connected to the item).

CALLING SEQUENCE:

L TSX LD00, 4
L+1 Normal return

INPUT:

Report 30 information from XSORT.

OUTPUT:

Report 30 on output report tape.

STORAGE USED:

Not applicable.

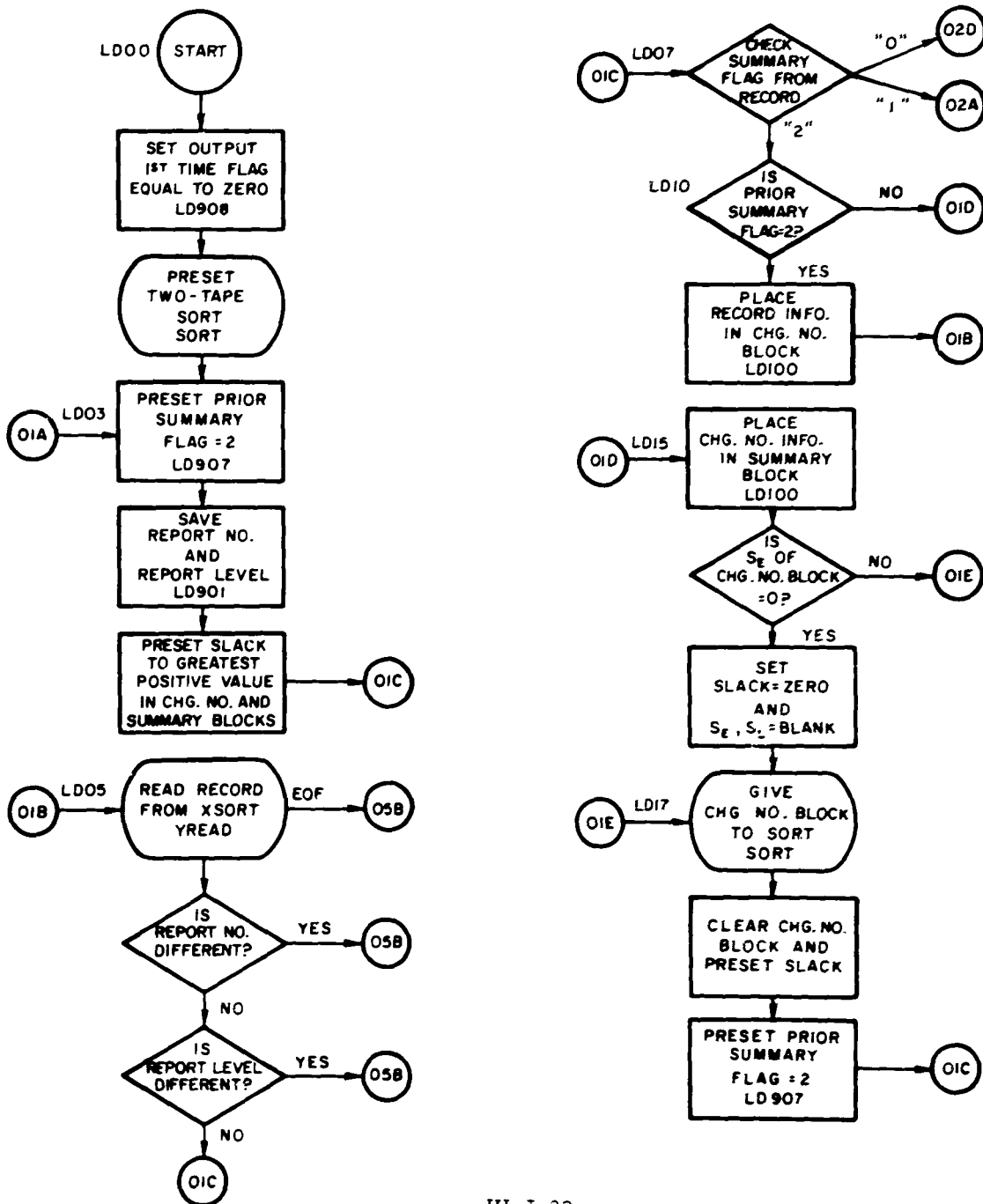
SUBREGIONS AND SUBROUTINES USED:

SORT	YREAD	YCOMP
READ	YPAGE	UPCK
PACK	LA100	YSEC
LX00		

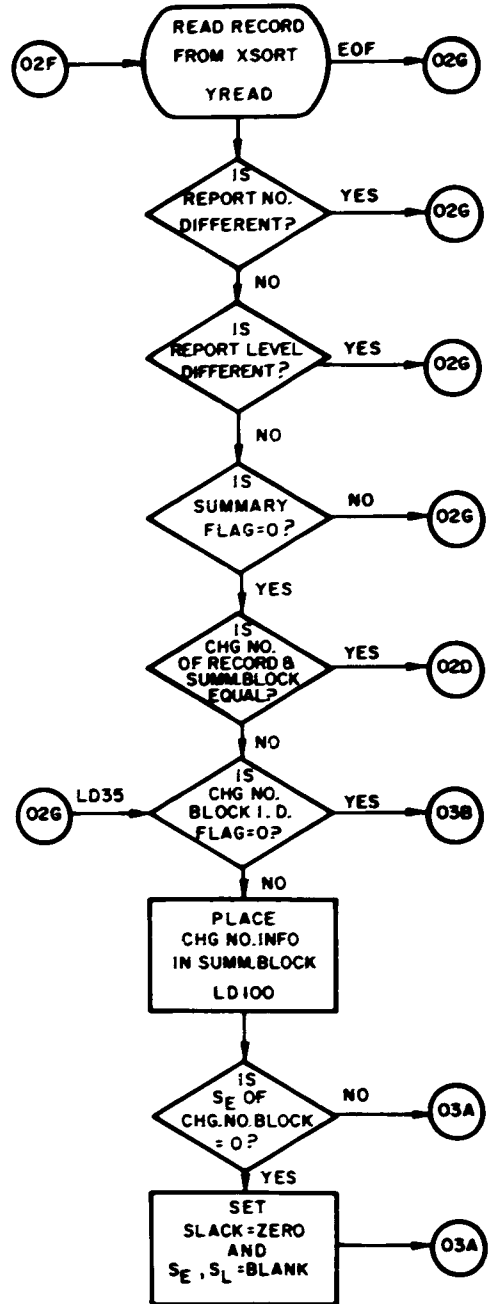
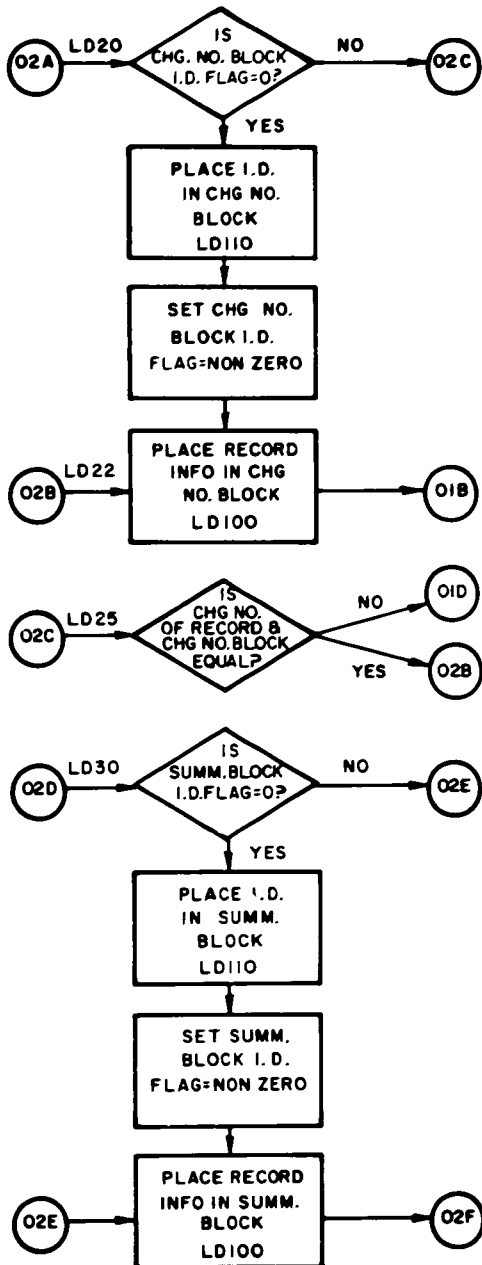
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

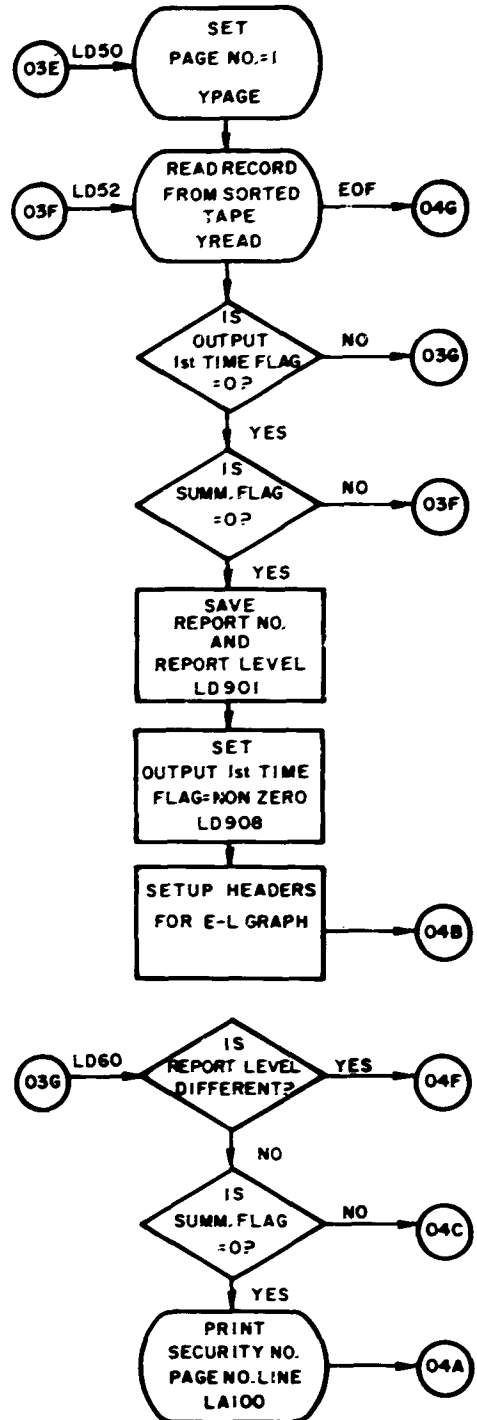
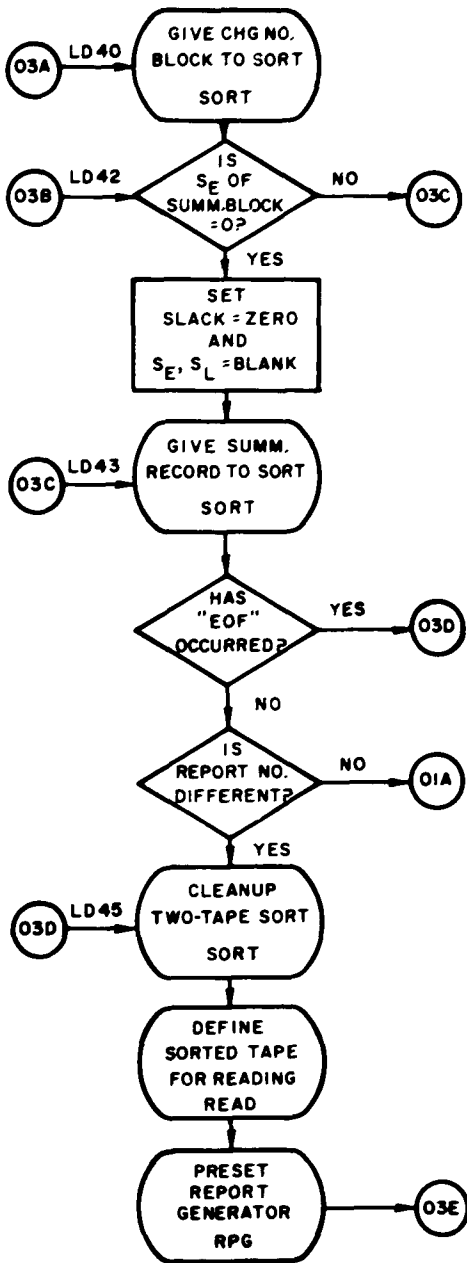
REGION LD00



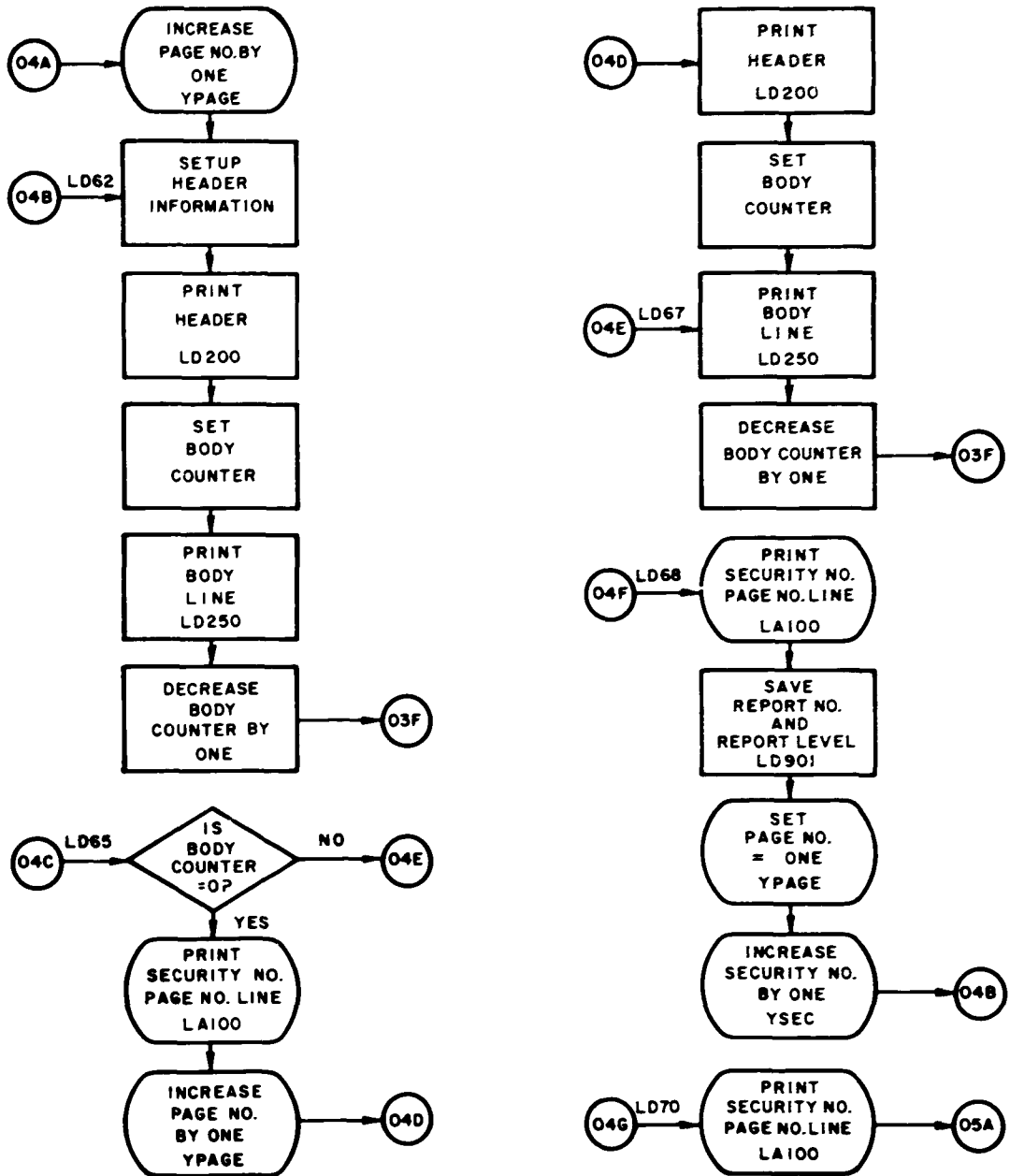
REGION L000

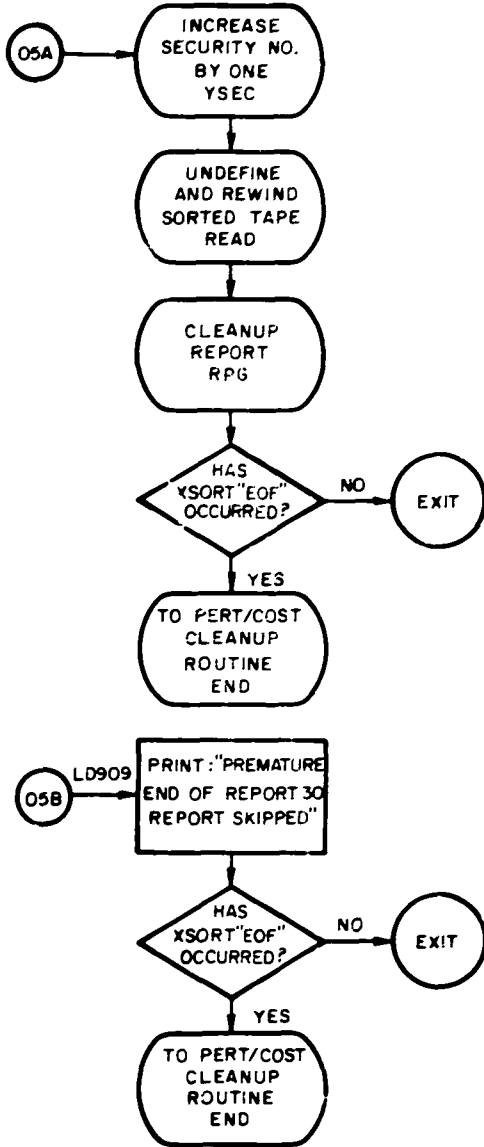


REGION L000



REGION L000





Region LE00

EXPLANATION OF REGION:

Setup region for printing Report 40.

CALLING SEQUENCE:

L TSX LE00, 4

L+1 Normal return

INPUT:

Report 40 information from XSORT.

OUTPUT:

Report 40 on output report tape.

STORAGE USED:

Not applicable.

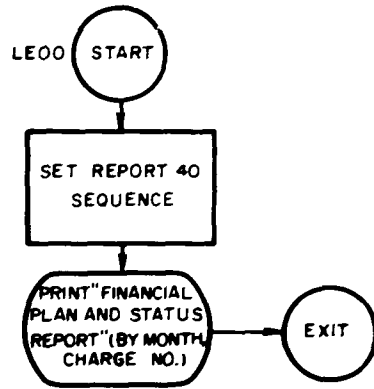
SUBREGIONS AND SUBROUTINES USED:

LE10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LEOO



Region LE05

EXPLANATION OF REGION:

Setup region for printing Report 40.

CALLING SEQUENCE:

L TSX LE05, 4

L+1 Normal return

INPUT:

Report 41 information from XSORT.

OUTPUT:

Report 41 on output report tape.

STORAGE USED:

Not applicable.

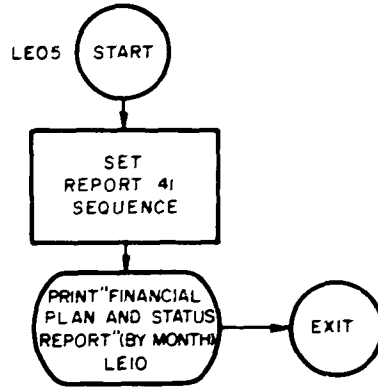
SUBREGIONS AND SUBROUTINES USED:

LE10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LEOS



Region LE10

EXPLANATION OF REGION:

To cumulate cost information and print out "Financial Plan and Status Report."

CALLING SEQUENCE:

L TSX LE10, 4
L+1 PZE 0, 0, R
L+2 PZE A,, B
L+3 Normal return

INPUT:

Information from XSORT routine.

OUTPUT:

Report on output print tape.

STORAGE USED:

Not applicable.

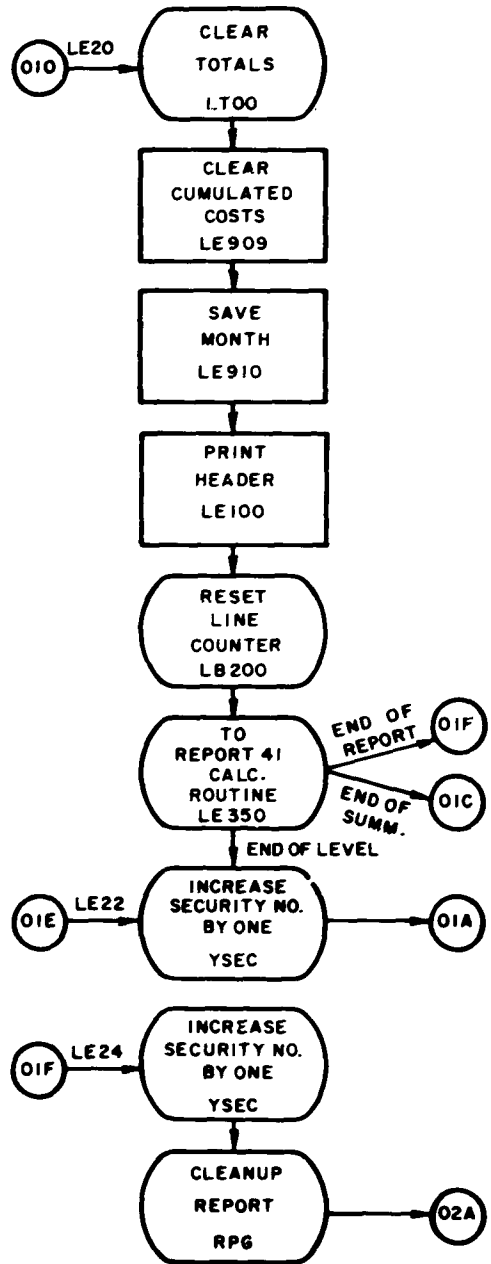
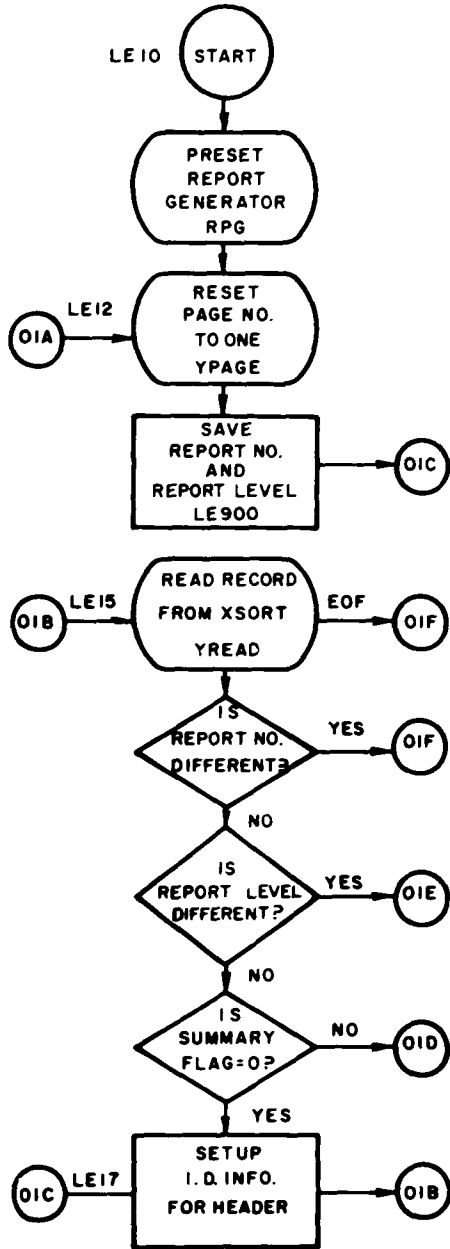
SUBREGIONS AND SUBROUTINES USED:

YPAGE	YREAD	LT00
LB200	YSEC	LX00
DATE	YCOMP	LA100

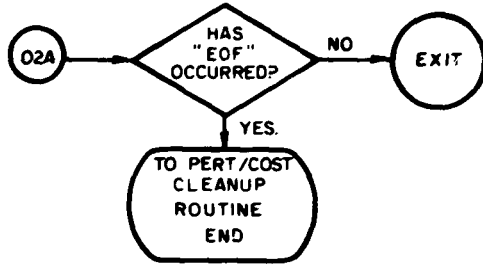
EXPLANATION OF CALLING SEQUENCE:

R = report number
A = location of calculation
B = location of sort sequence title

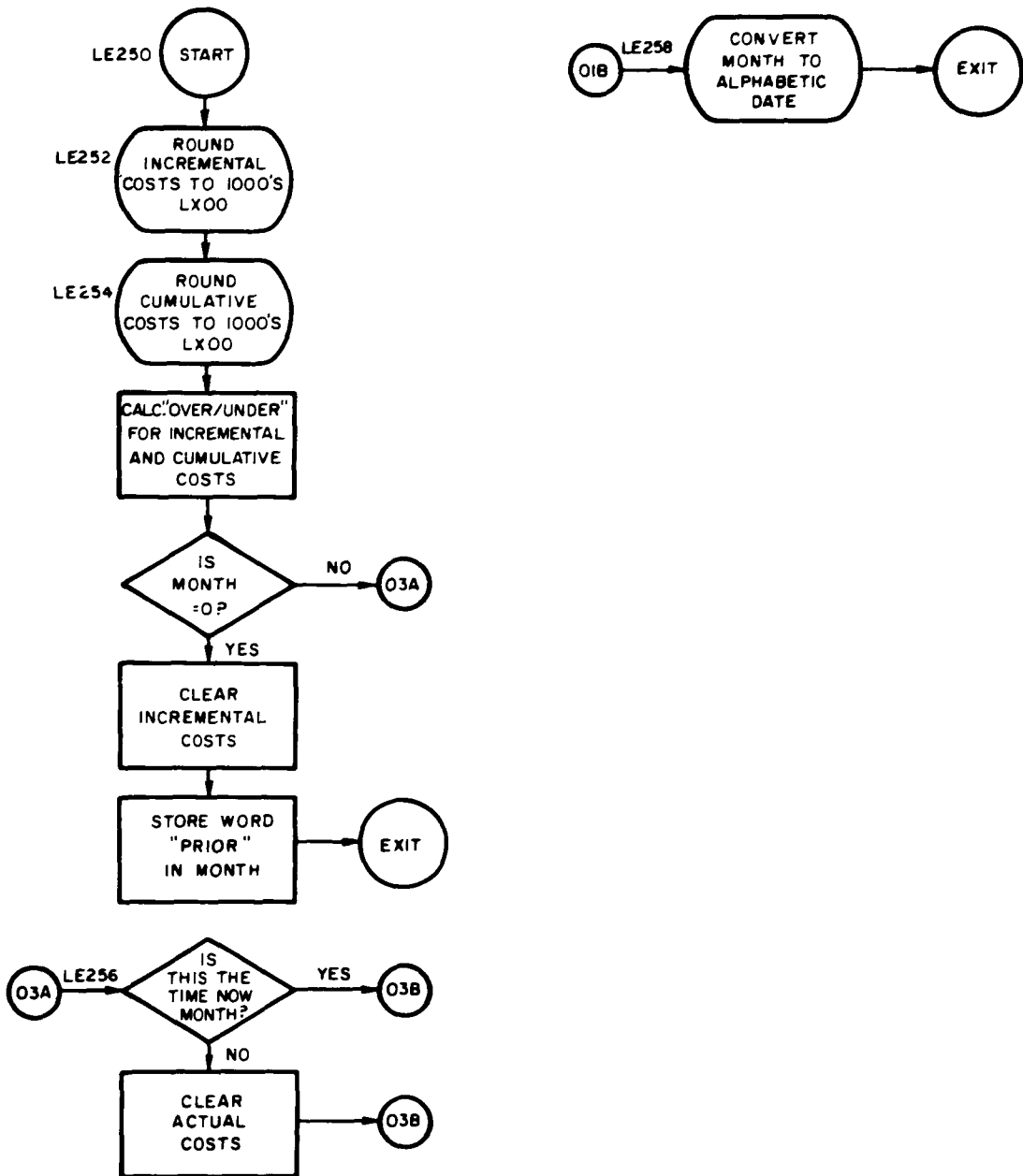
REGION LE10



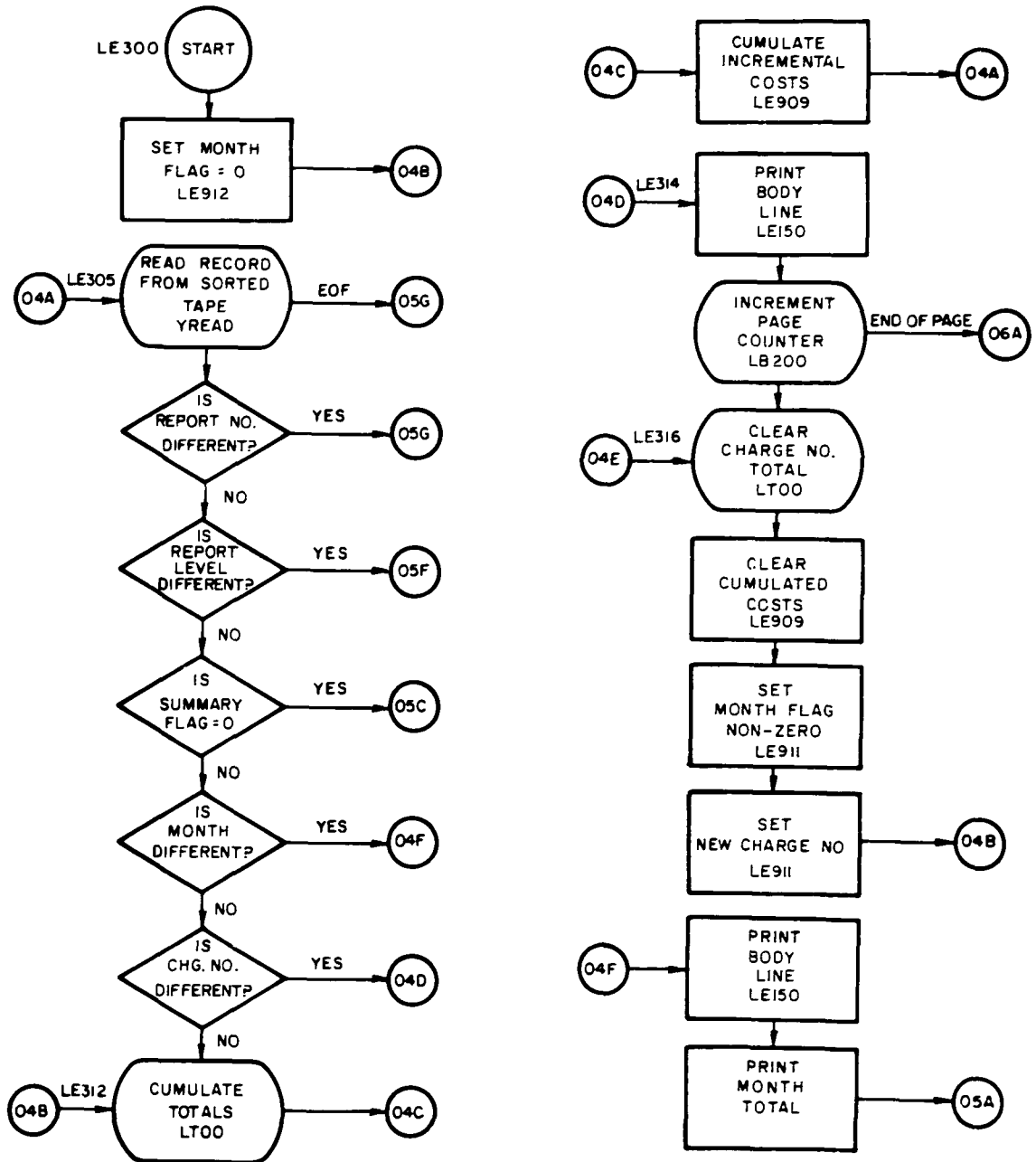
REGION LE10



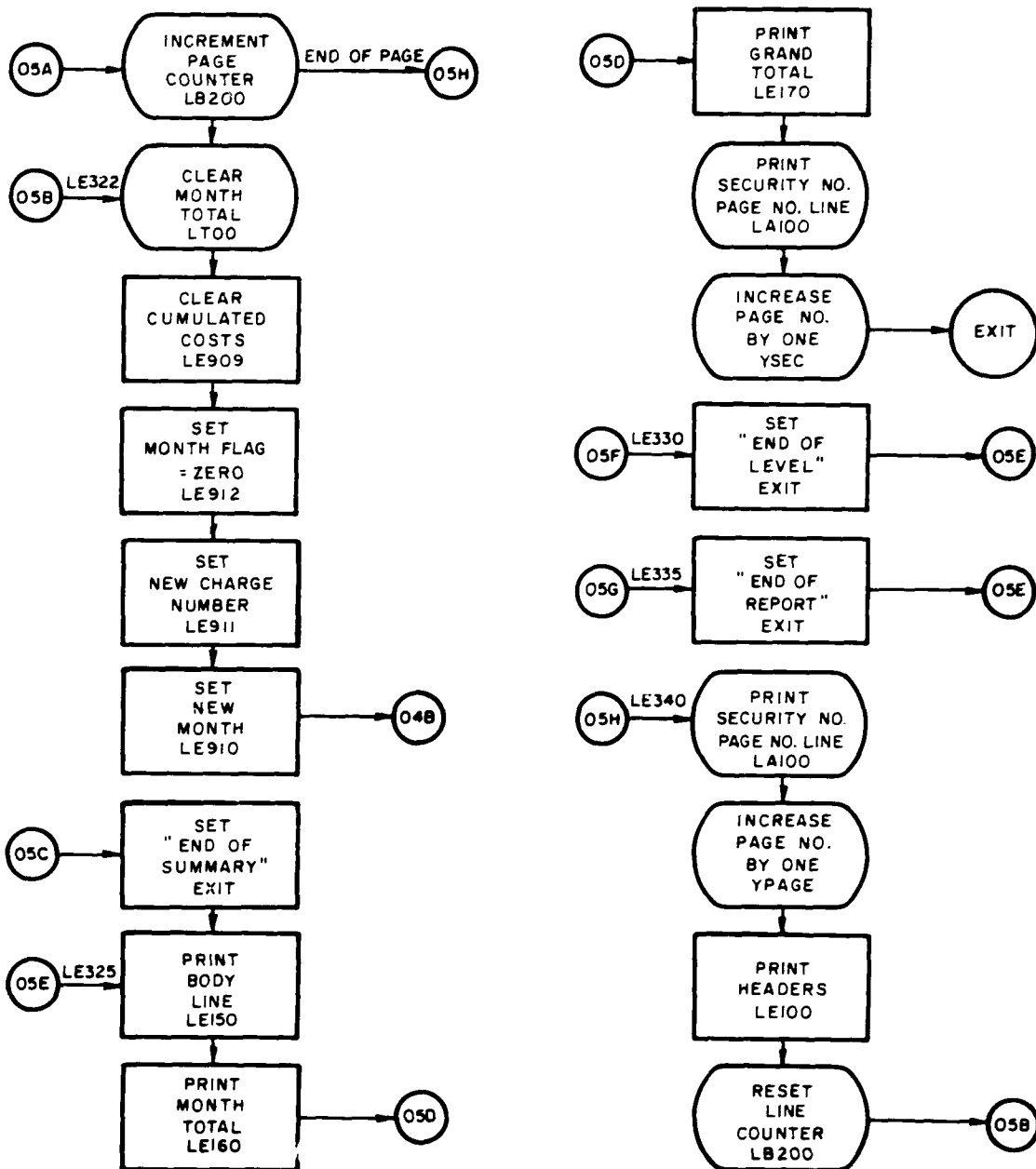
REGION LE10
SUBREGION LE250



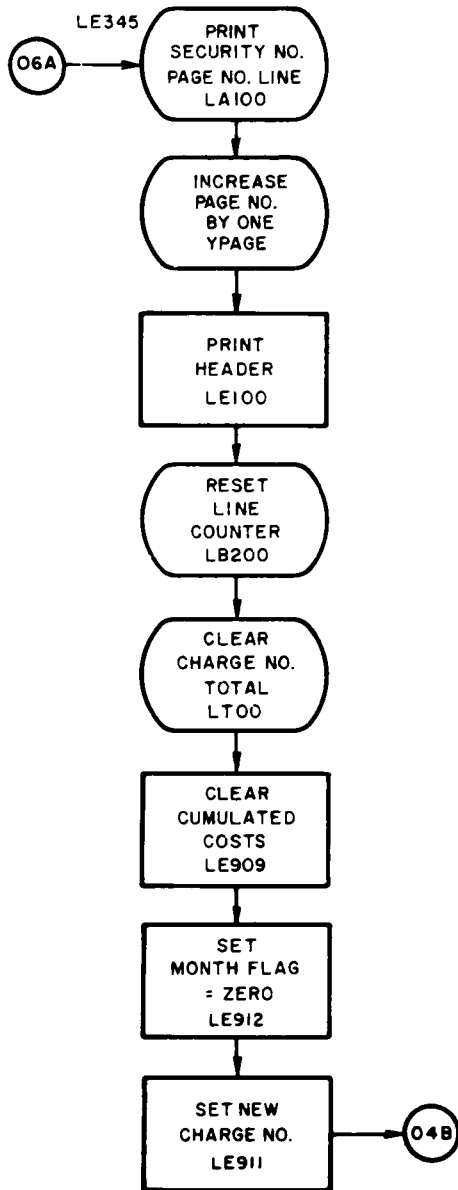
REGION LE10
SUBREGION LE300



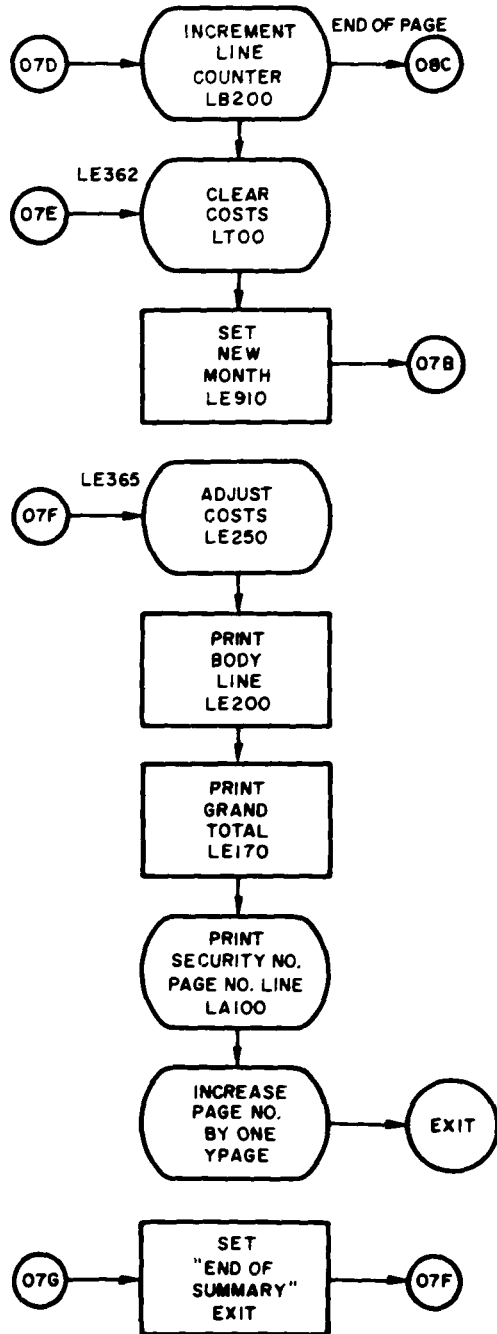
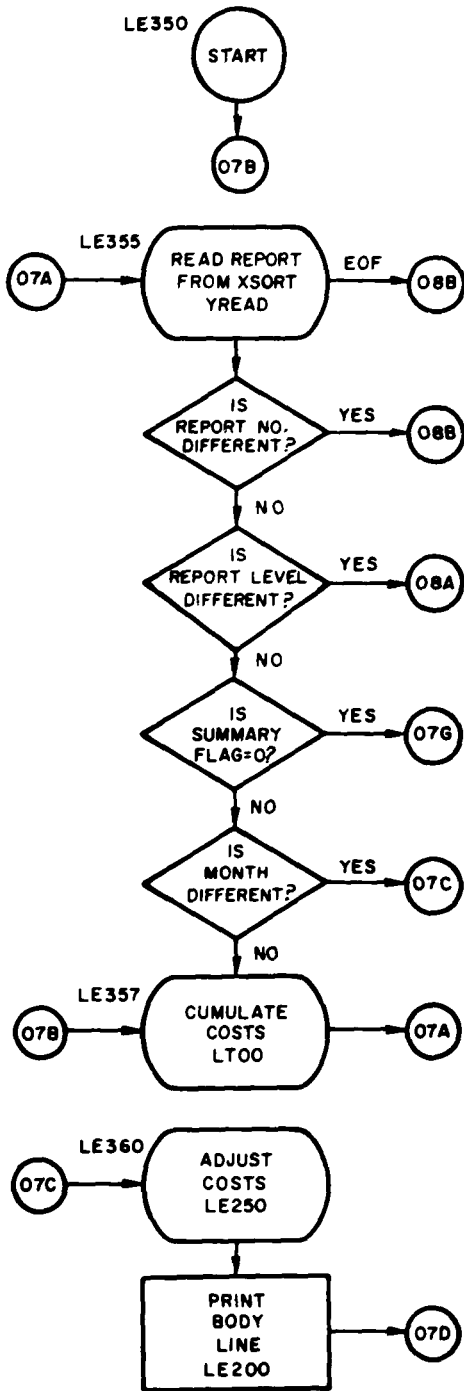
REGION LE10
SUBREGION LE300



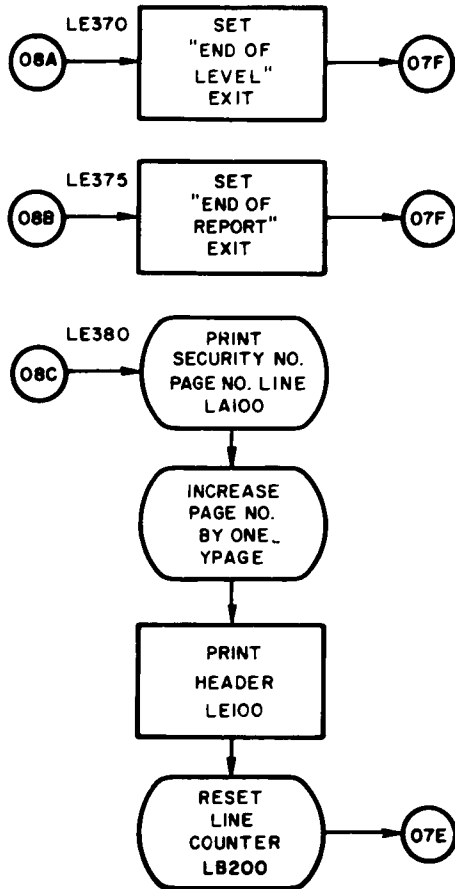
REGION LE10
SUBREGION LE300



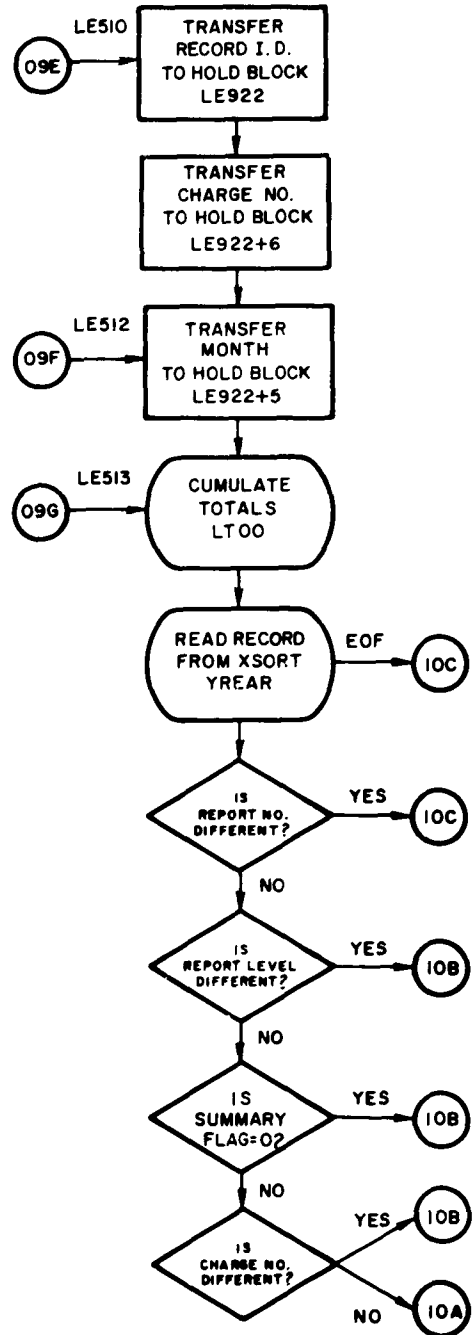
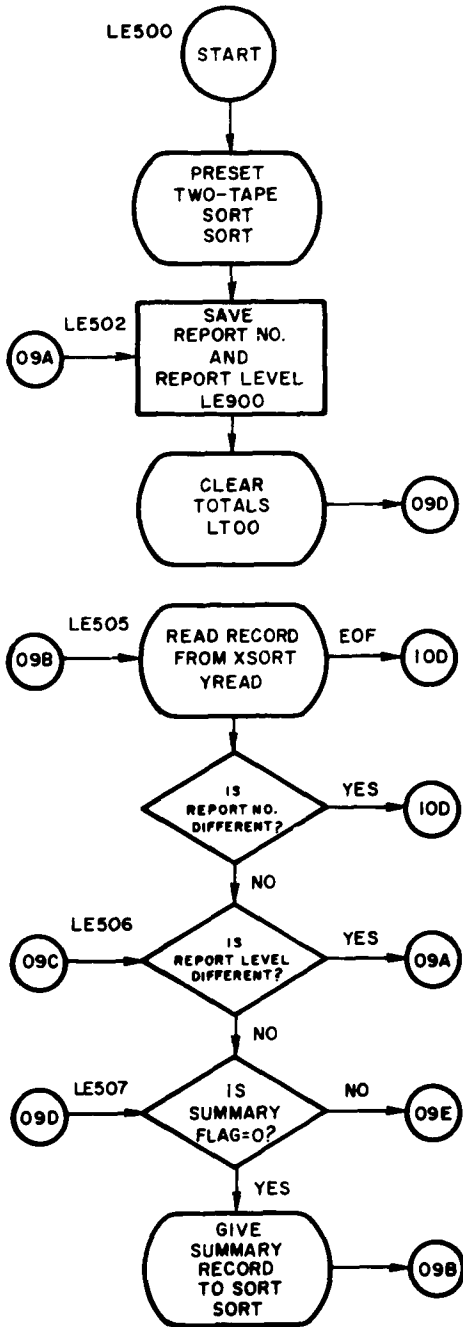
REGION LE10
SUBREGION LE350



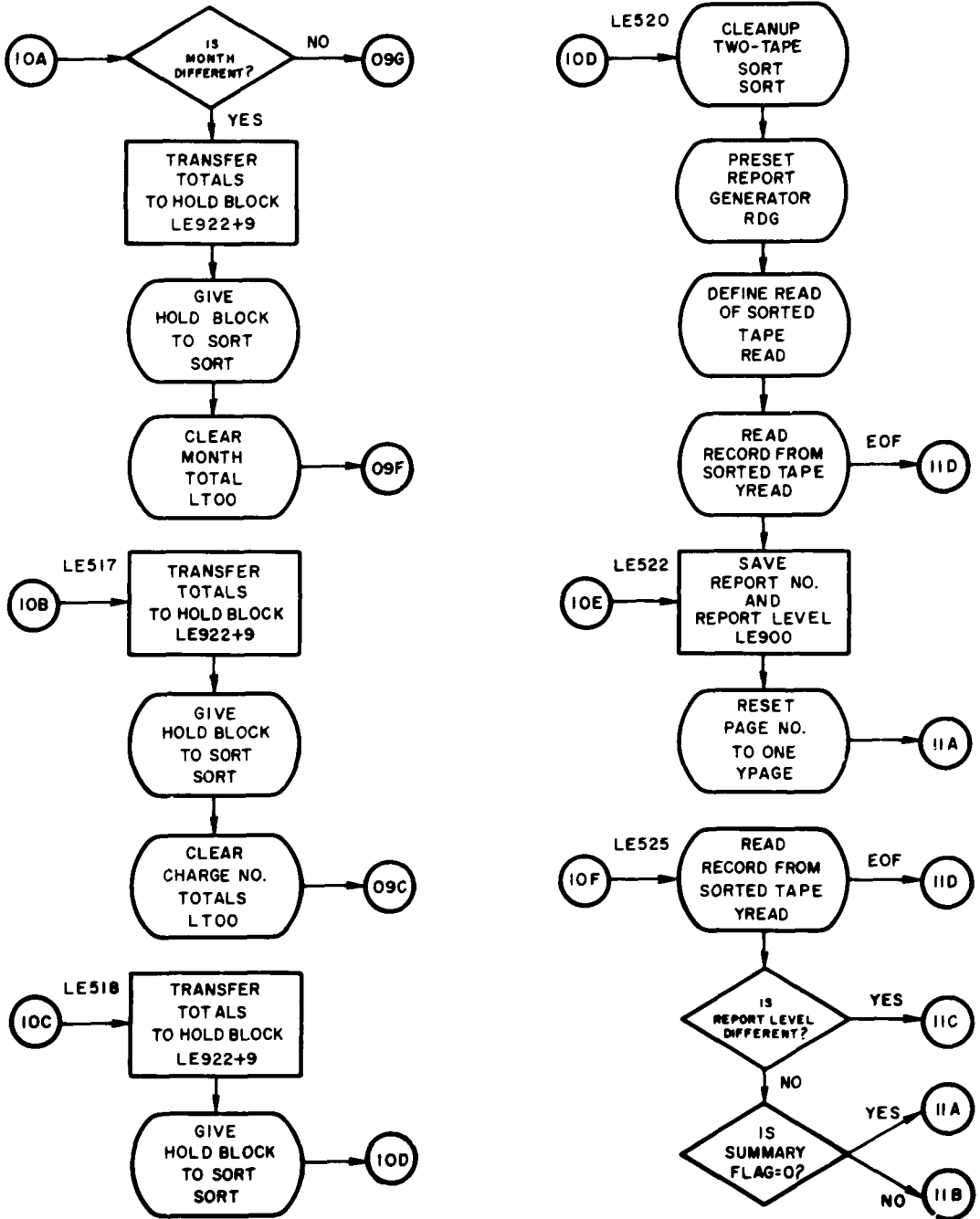
REGION LE10
SUBREGION LE350



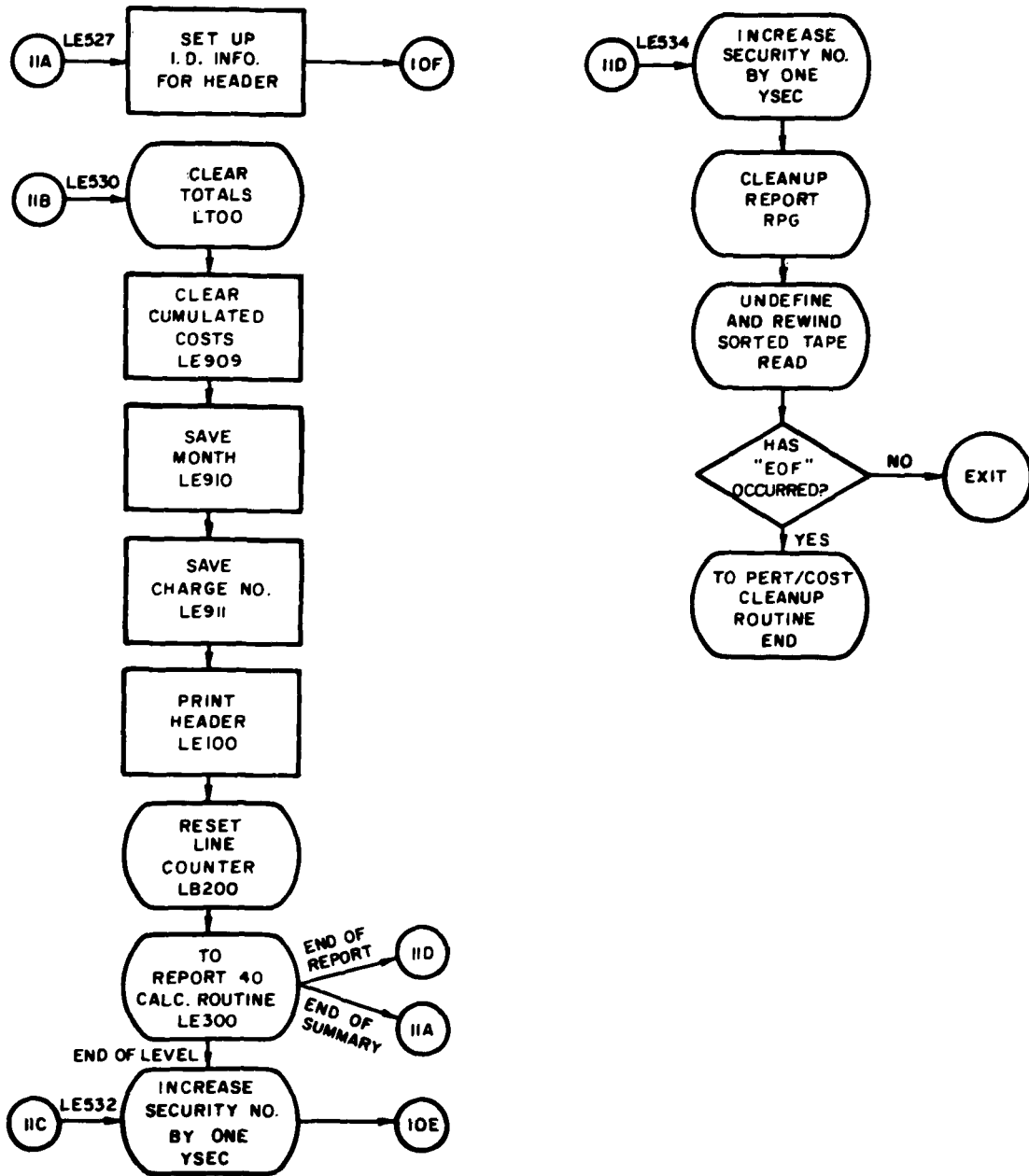
REGION LE10
SUBREGION LE500



REGION LE10
SUBREGION LE500



REGION LE10
SUBREGION LE500



Region LF00

EXPLANATION OF REGION:

To cumulate cost information up the work breakdown structure and print report 35.

CALLING SEQUENCE:

L TSX LF00, 4
L+1 Normal return

INPUT:

Report 35 information from XSORT.

OUTPUT:

Report 35 on output report tape.

STORAGE USED:

Not applicable.

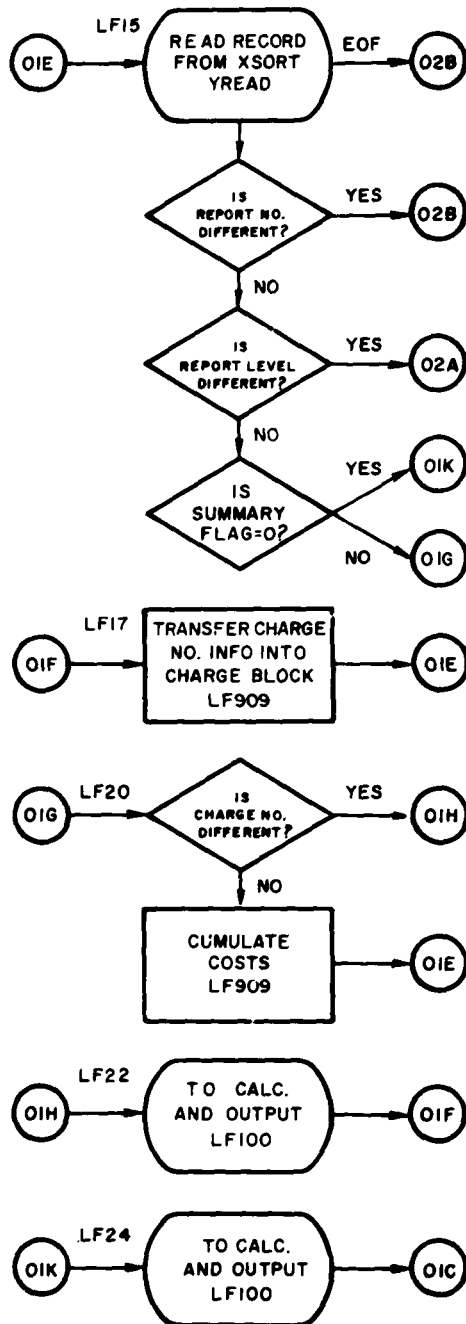
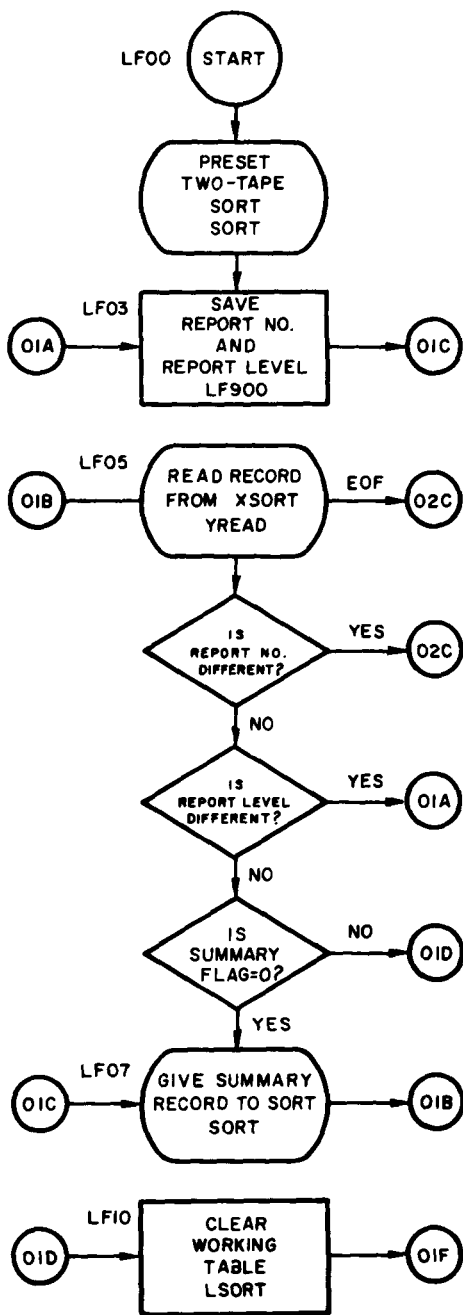
SUBREGIONS AND SUBROUTINES USED:

SORT	YREAD	YCOMP
READ	YPAGE	LA100
YSEC	LX00	UPCK

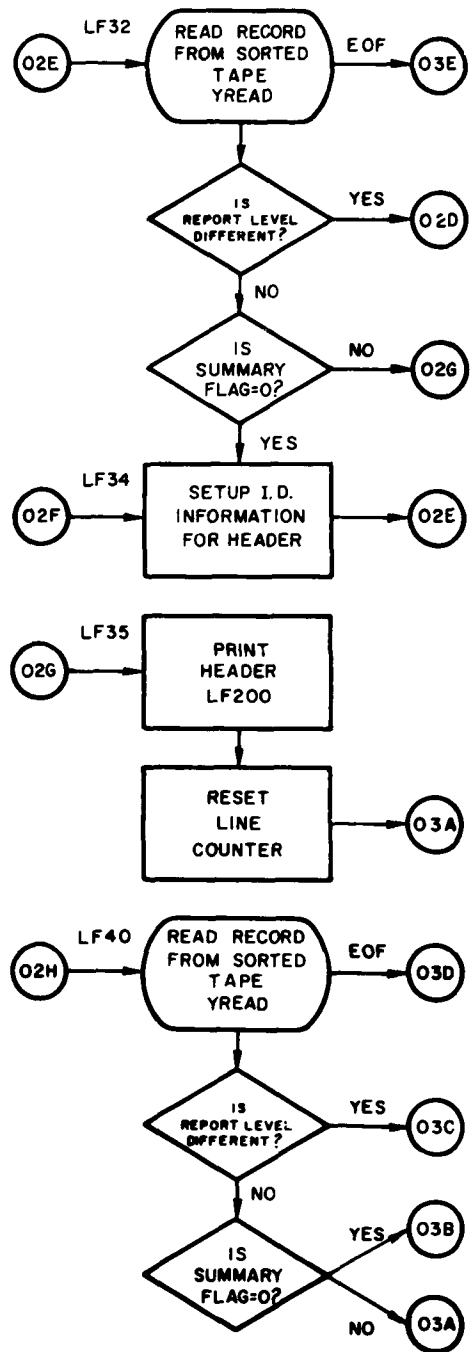
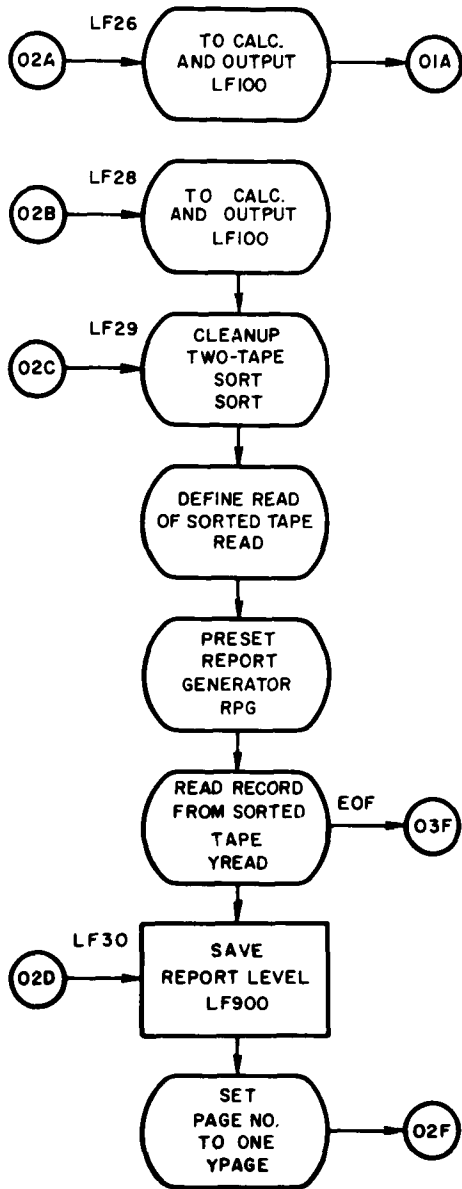
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

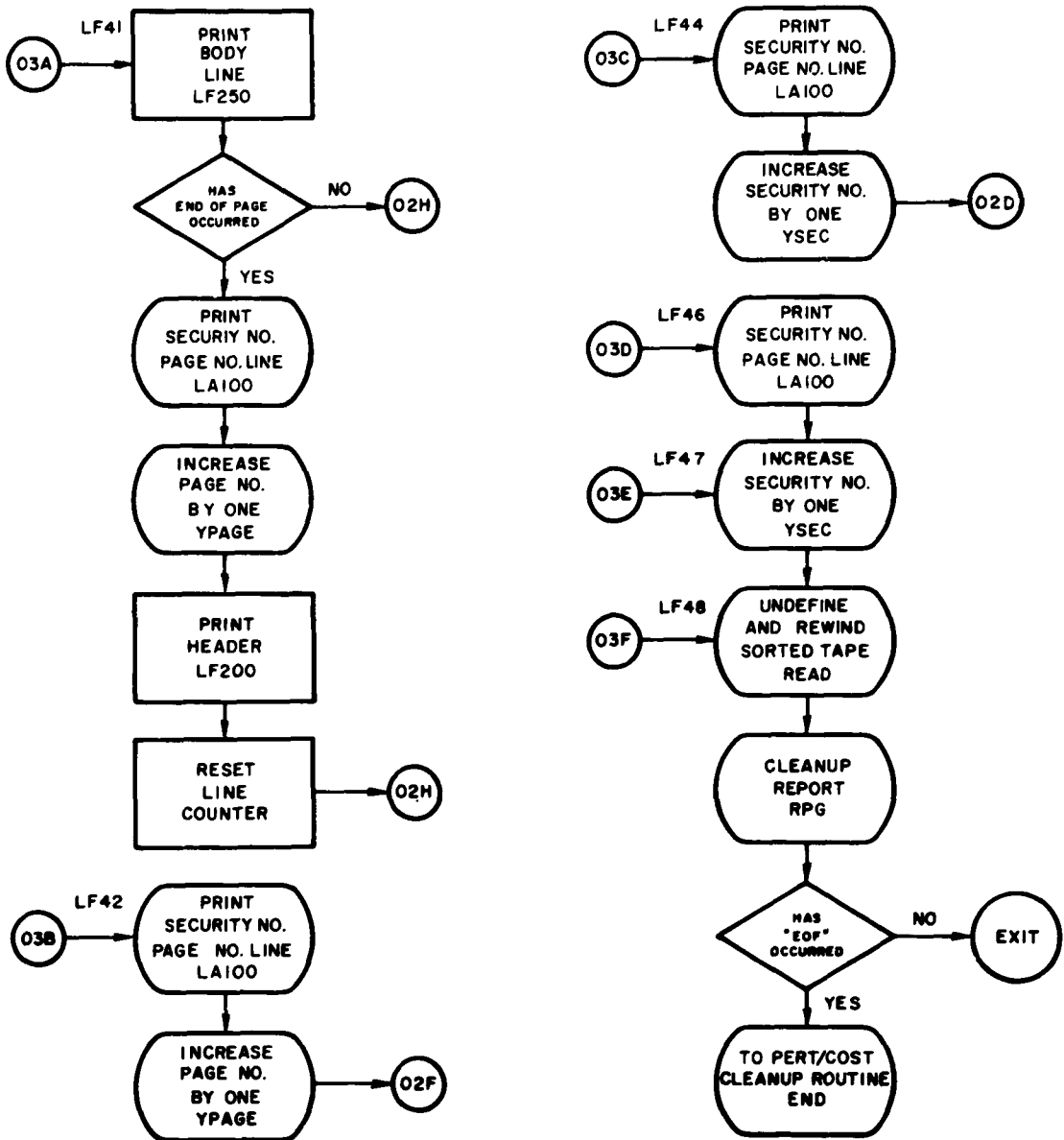
REGION LFOO



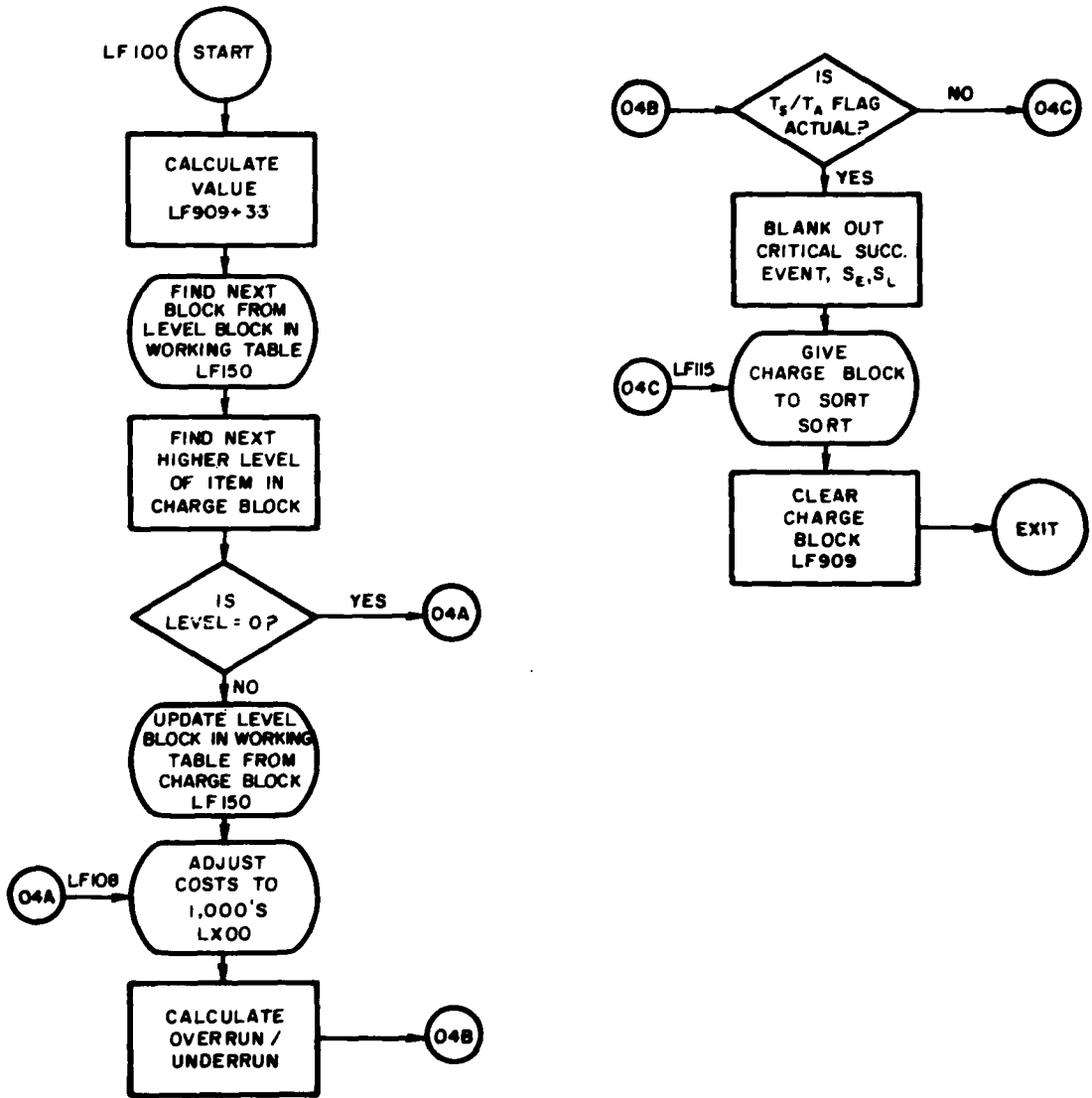
REGION LFOO



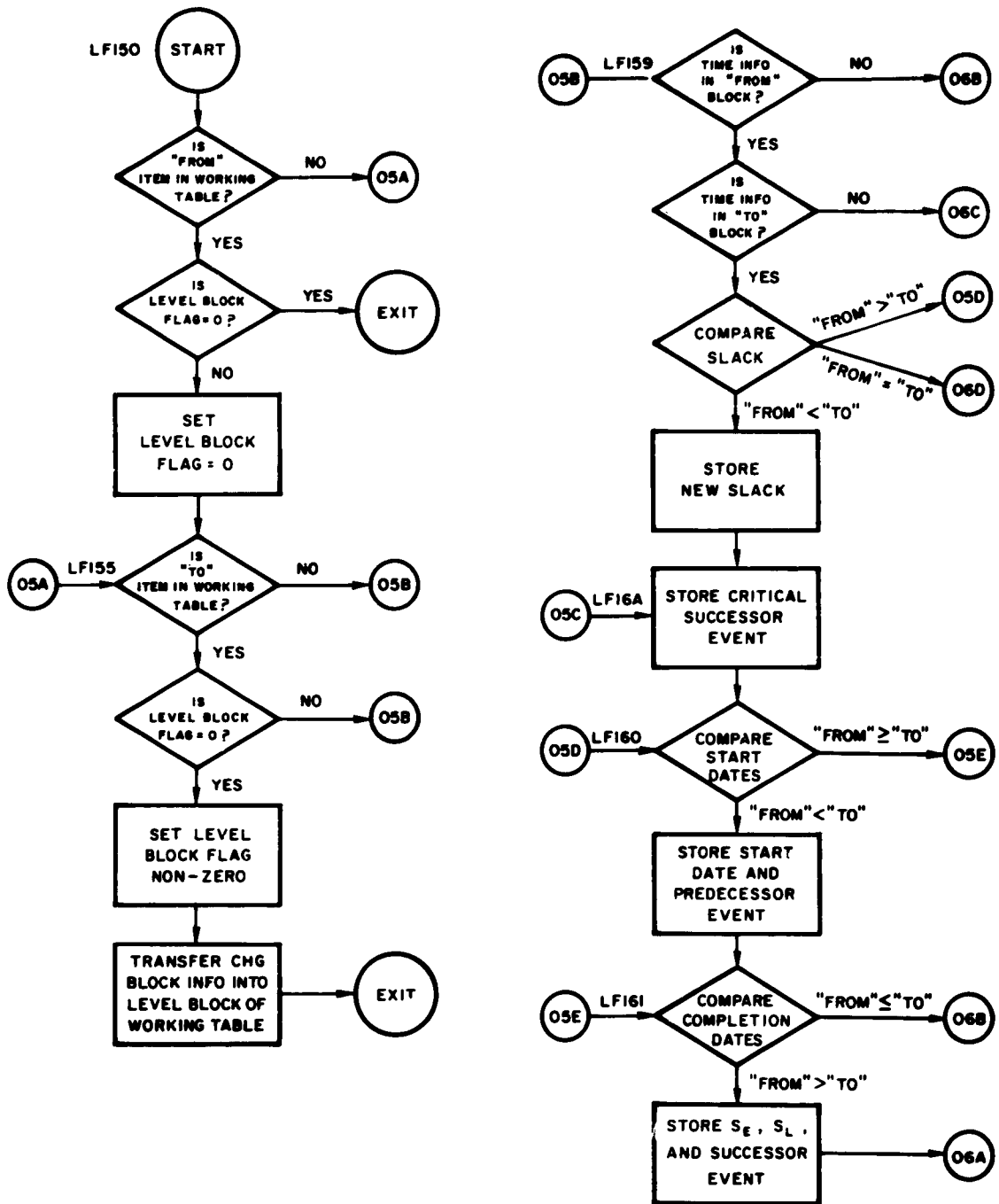
REGION LFOO



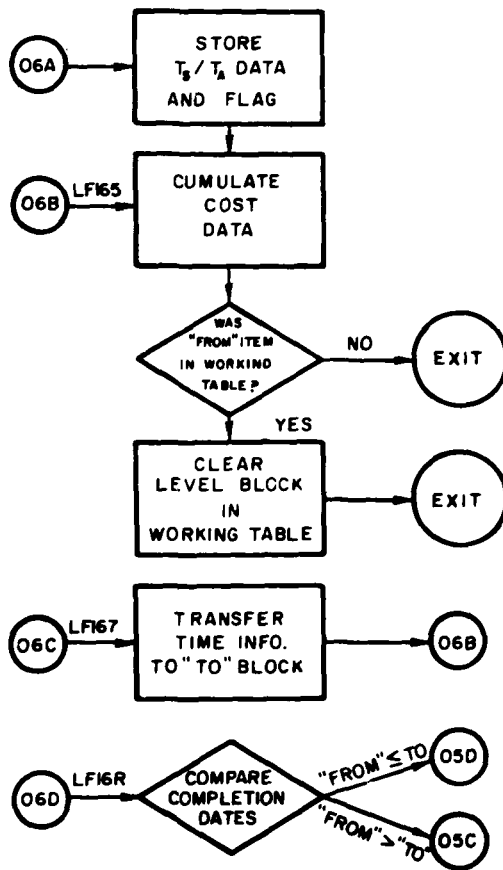
REGION LFOO
SUBREGION LF100



REGION LFOO
SUBREGION LF150



REGION LFOO
SUBREGION LF150



Region LG00

EXPLANATION OF REGION:

Setup region for printing Report 50.

CALLING SEQUENCE:

L TSX LG00, 4

L+1 Normal return

INPUT:

Report 50 information from XSORT.

OUTPUT:

Report 50 on output report tape.

STORAGE USED:

Not applicable.

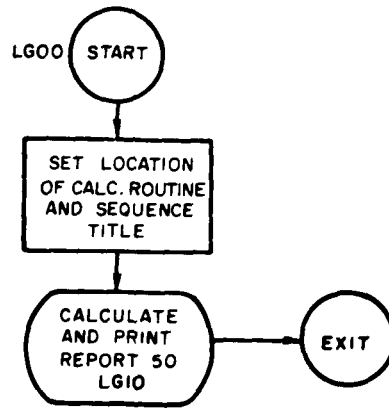
SUBREGIONS AND SUBROUTINES USED:

LG10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LG00



Region LG05

EXPLANATION OF REGION:

Setup region for printing Report 51.

CALLING SEQUENCE:

L TSX LG05, 4

L+1 Normal return

INPUT:

Report 51 information from XSORT.

OUTPUT:

Report 51 on output report tape.

STORAGE USED:

Not applicable.

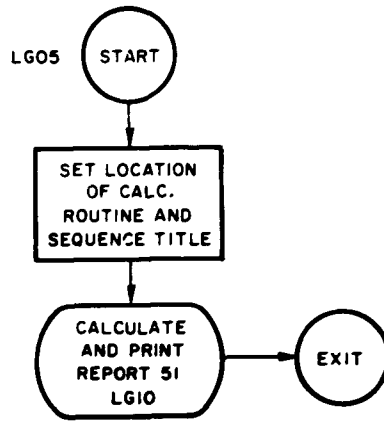
SUBREGIONS AND SUBROUTINES USED:

LG10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LG05



Region LG07

EXPLANATION OF REGION:

Setup region for Report 52.

CALLING SEQUENCE:

L TSX LG07, 4

L+1 Normal return

INPUT:

Report 52 information from XSORT.

OUTPUT:

Report 52 on output report tape.

STORAGE USED:

Not applicable.

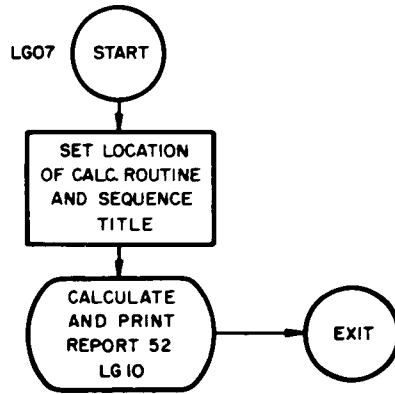
SUBREGIONS AND SUBROUTINES USED:

LG10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LG07



Region LG10

EXPLANATION OF REGION:

To cumulate data and print "Manpower Loading Report."

CALLING SEQUENCE:

L TSX LG10, 4
L+1 PZE 0, 0, R
L+2 PZE A,, B
L+3 Normal return

INPUT:

Information from XSORT routine.

OUTPUT:

Report on output report tape.

STORAGE USED:

Not applicable.

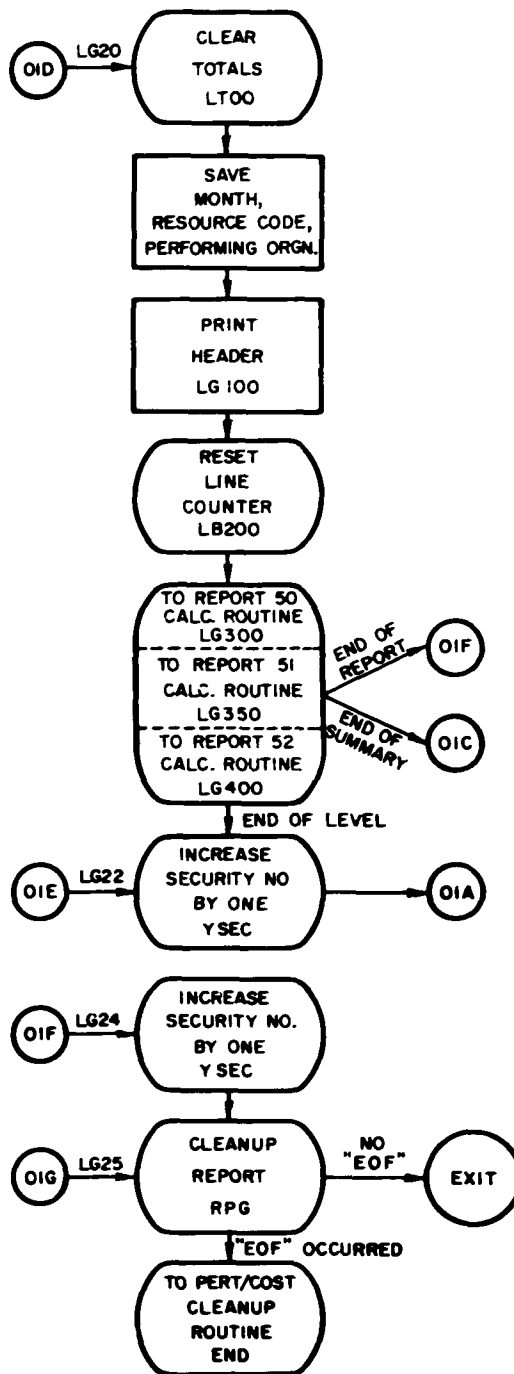
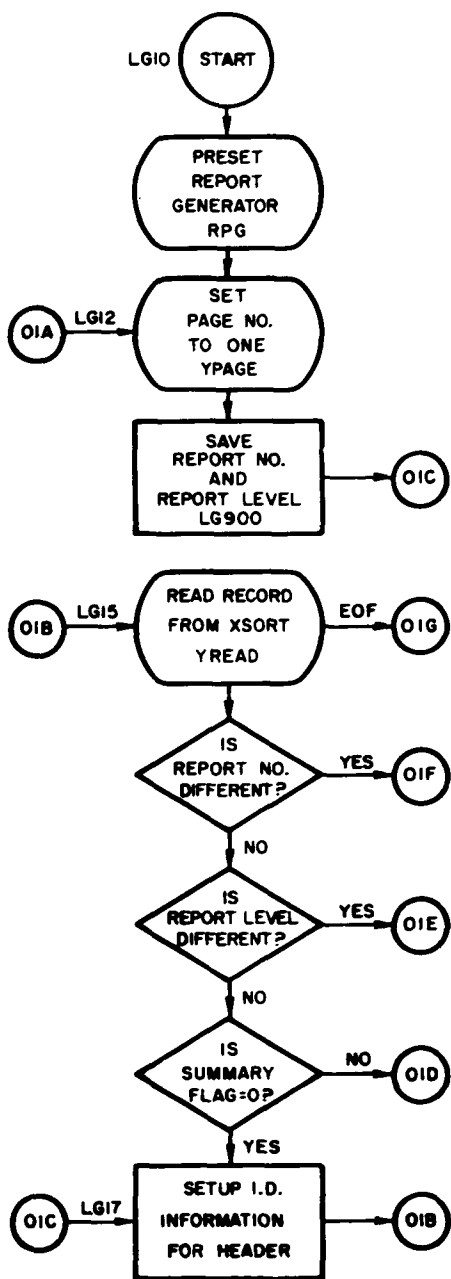
SUBREGIONS AND SUBROUTINES USED:

YPAGE YREAD LT00
LB200 YSEC DATE
LA100

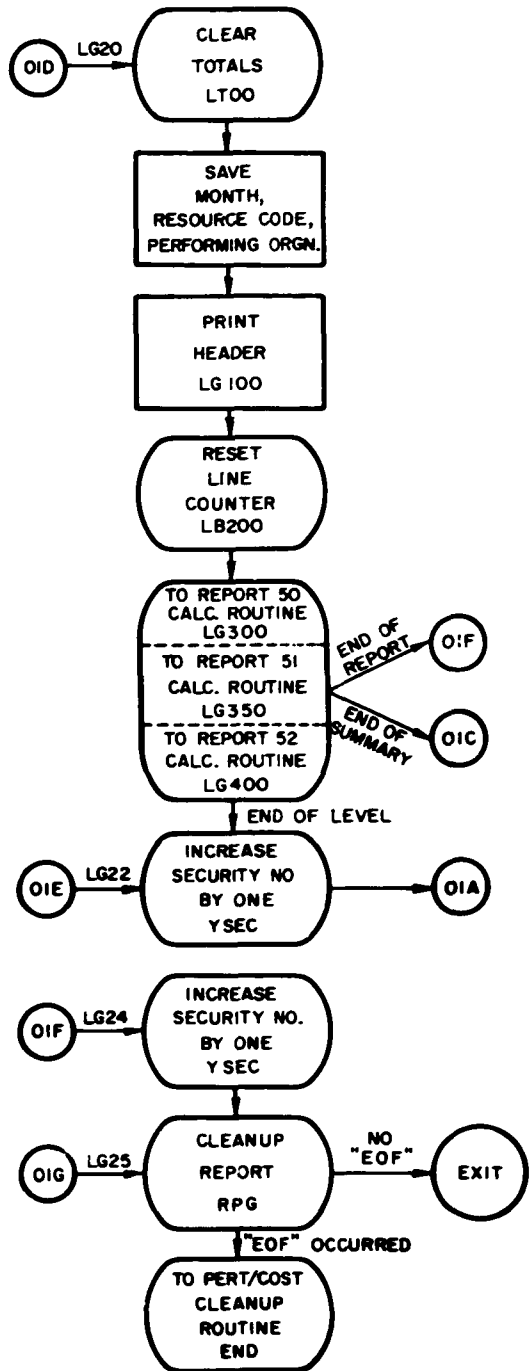
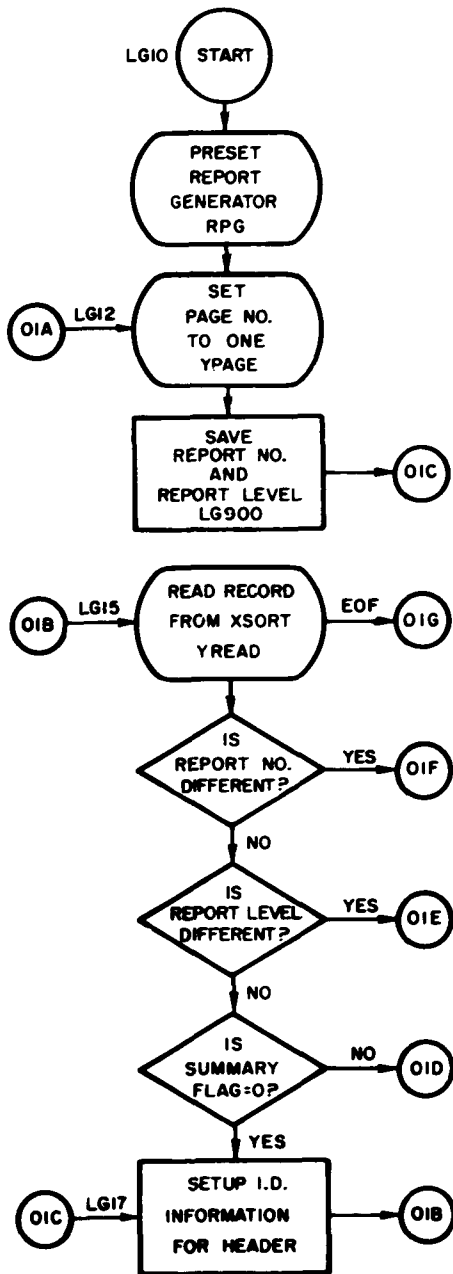
EXPLANATION OF CALLING SEQUENCE:

R = report number
A = location of calculation routine
B = location of sort sequence title

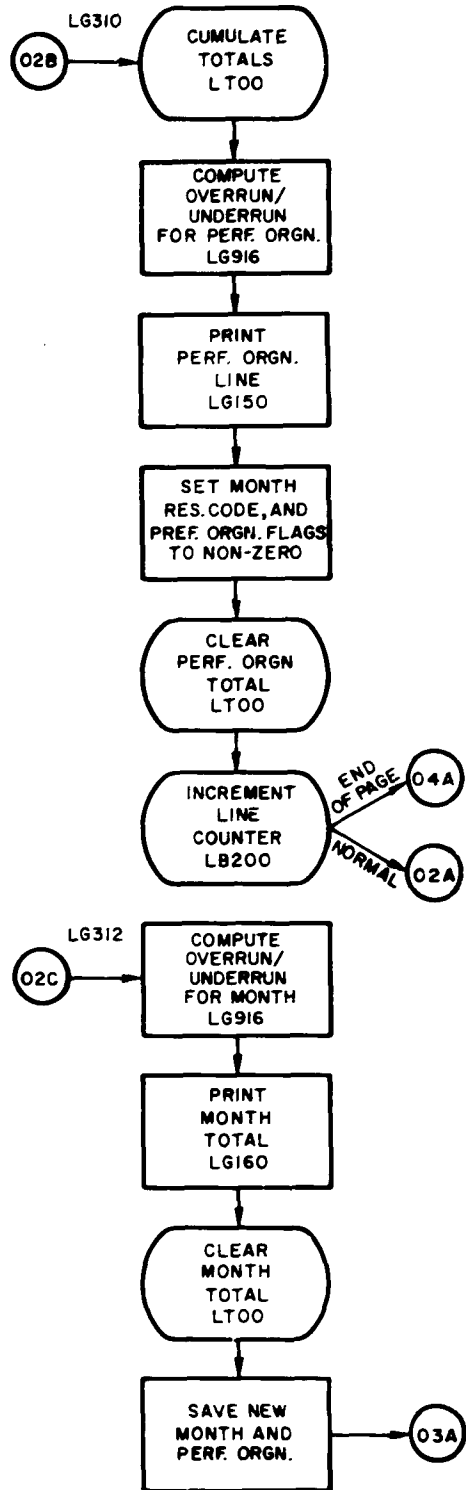
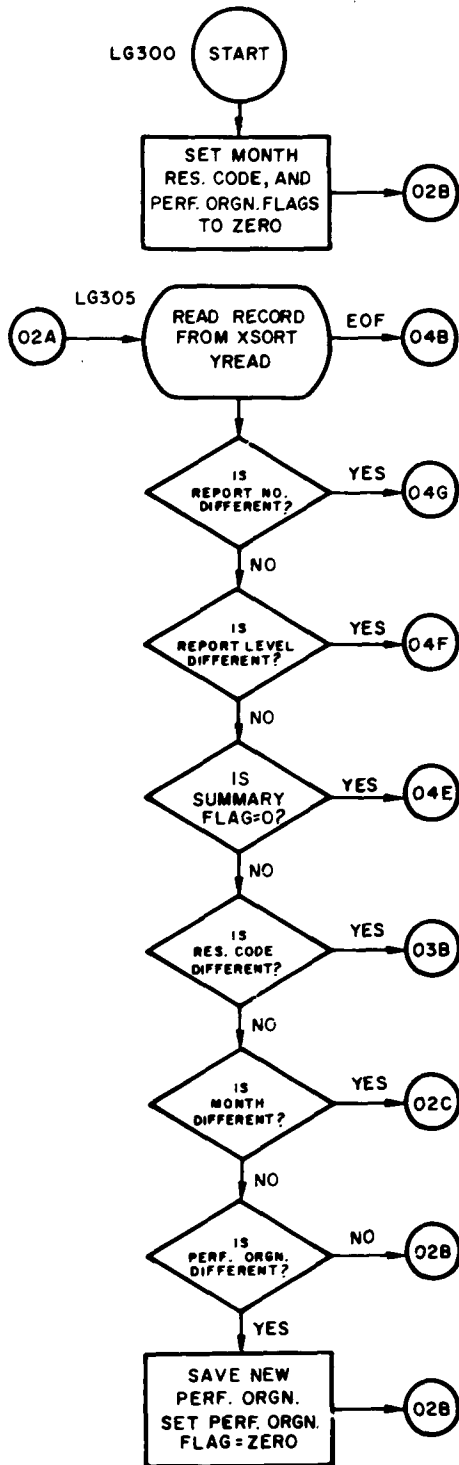
REGION LG10



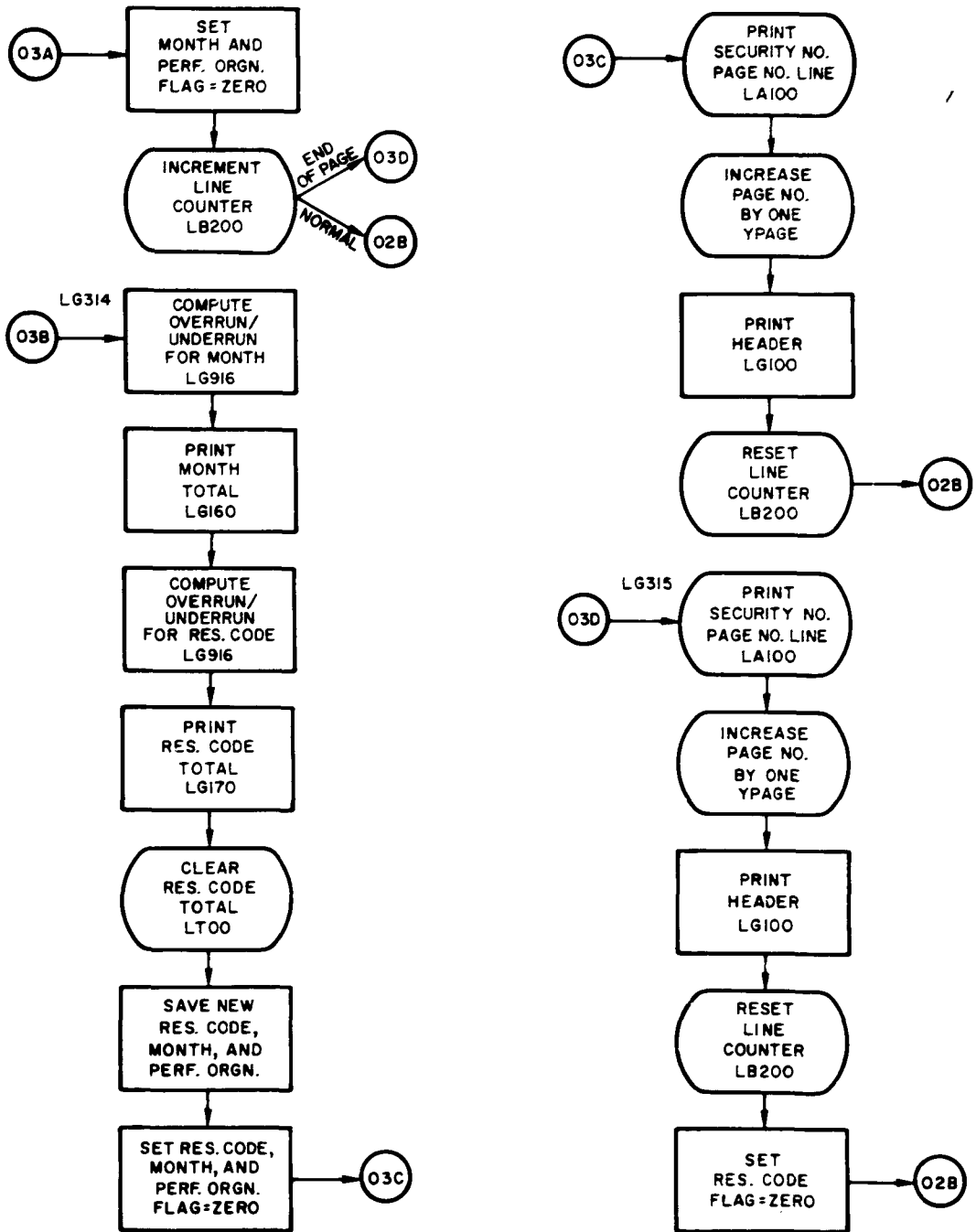
REGION LG10



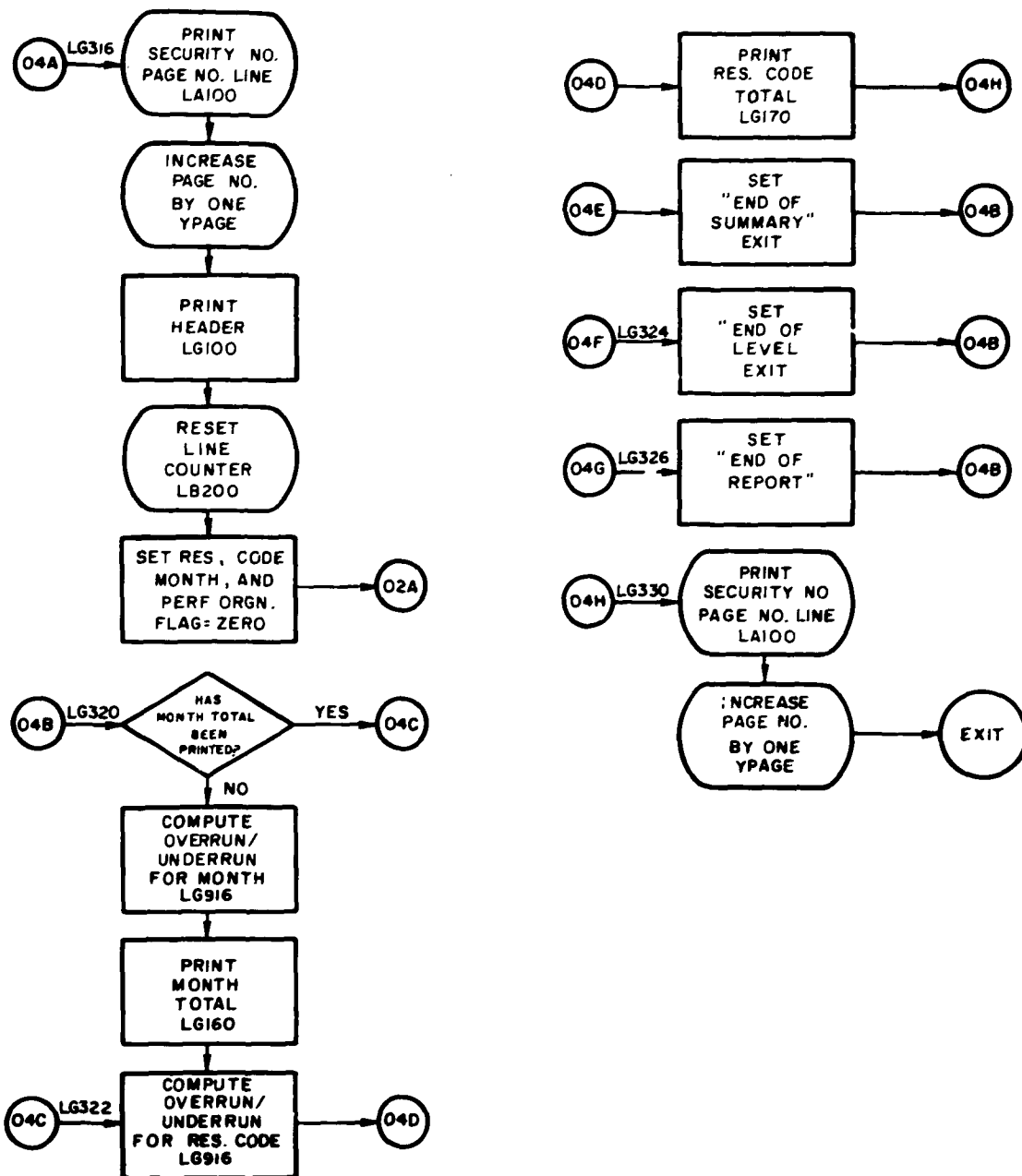
REGION LG10
SUBREGION LG300



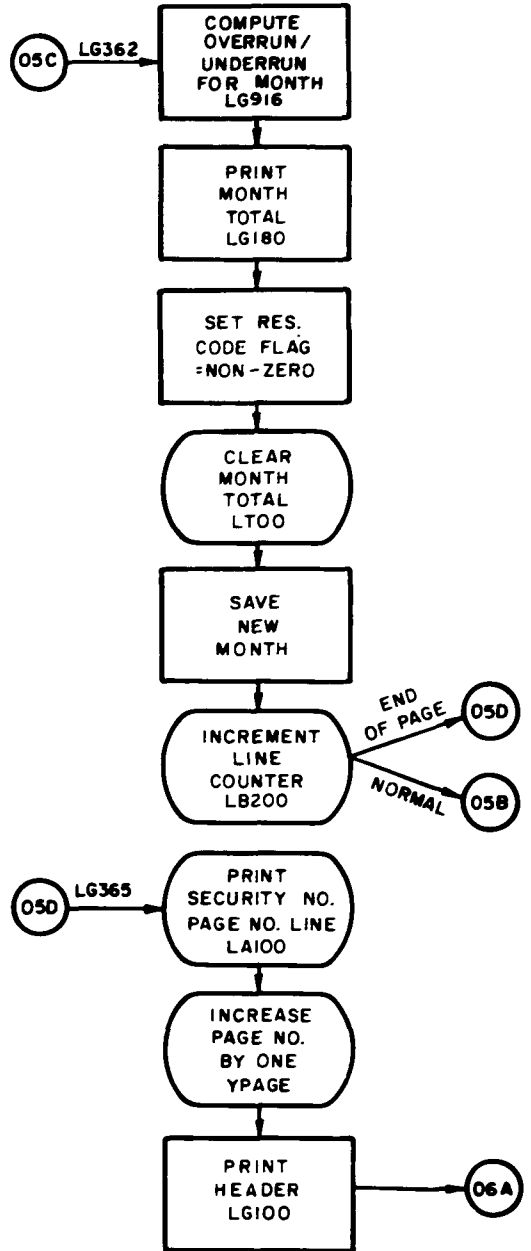
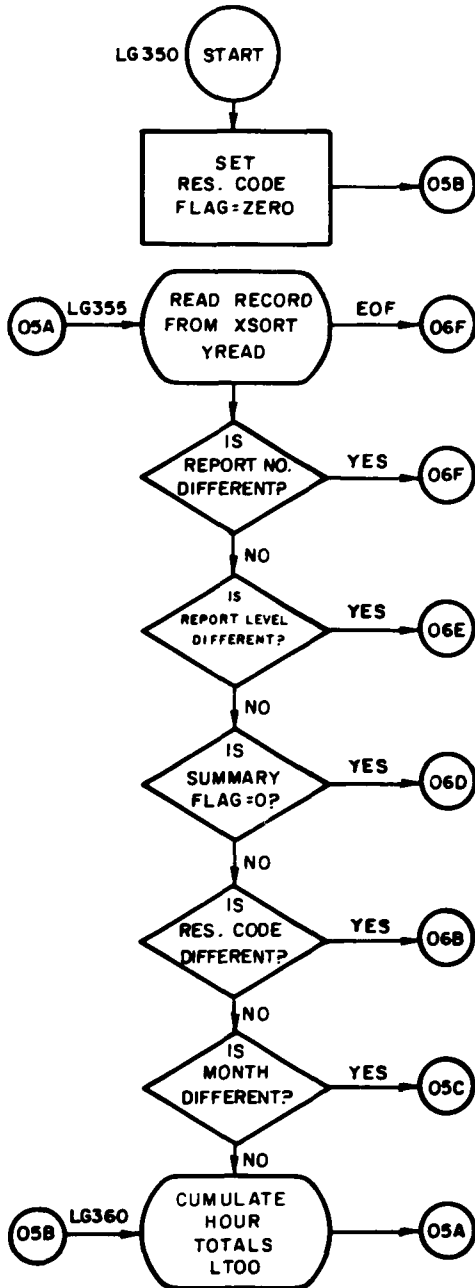
REGION LG10
SUBREGION LG300



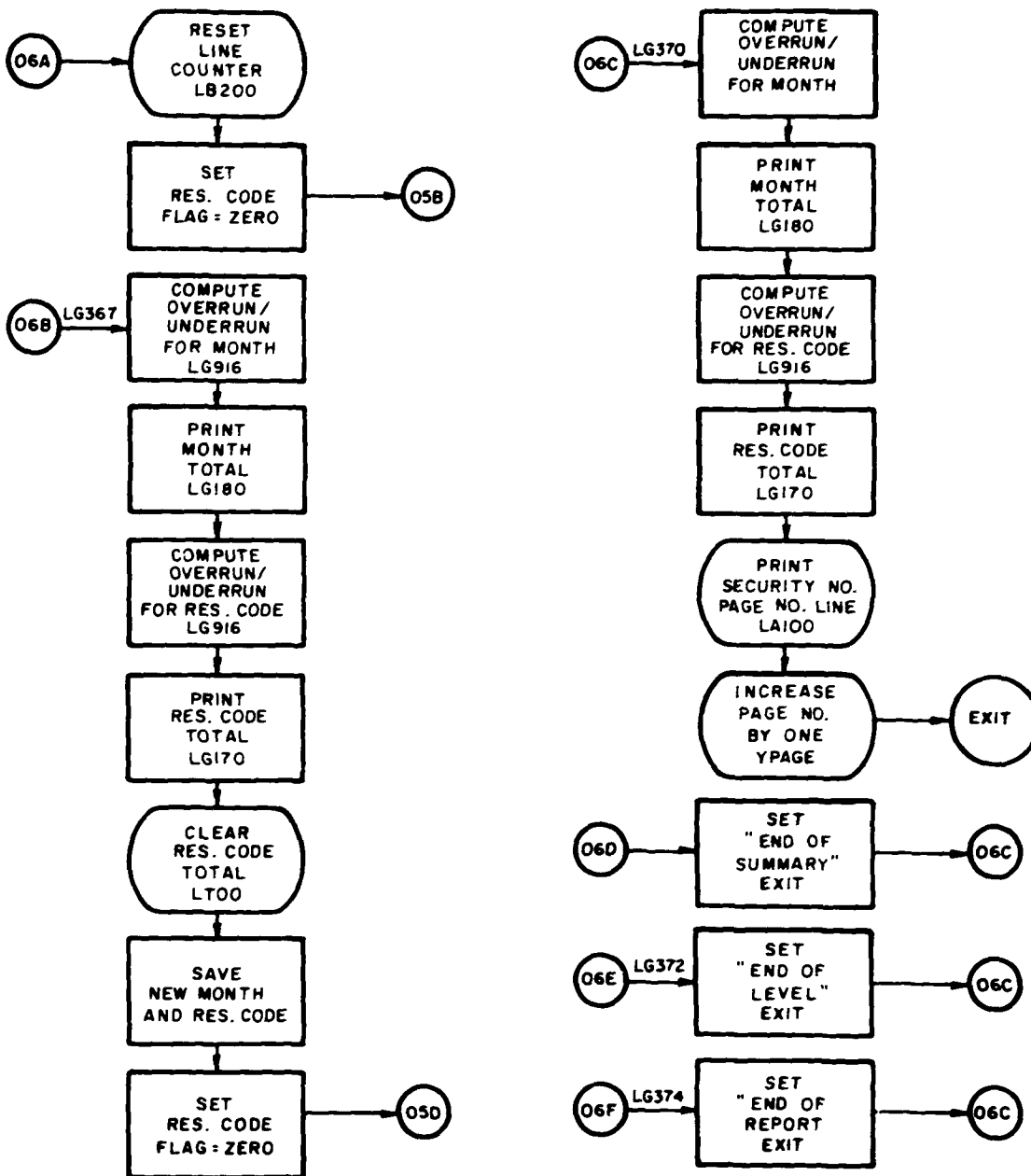
REGION LG10
SUBREGION LG300



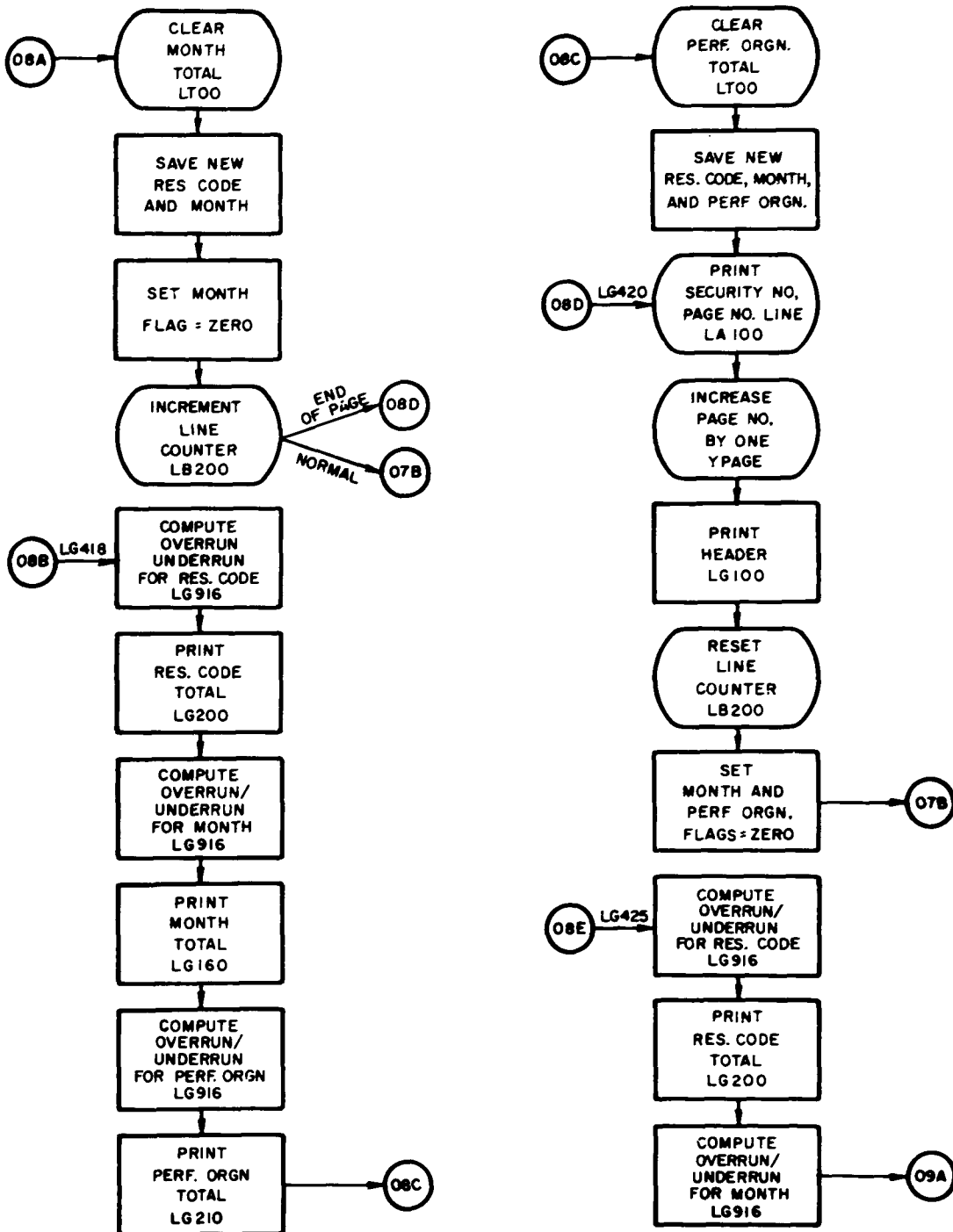
REGION LG10
SUBREGION LG350



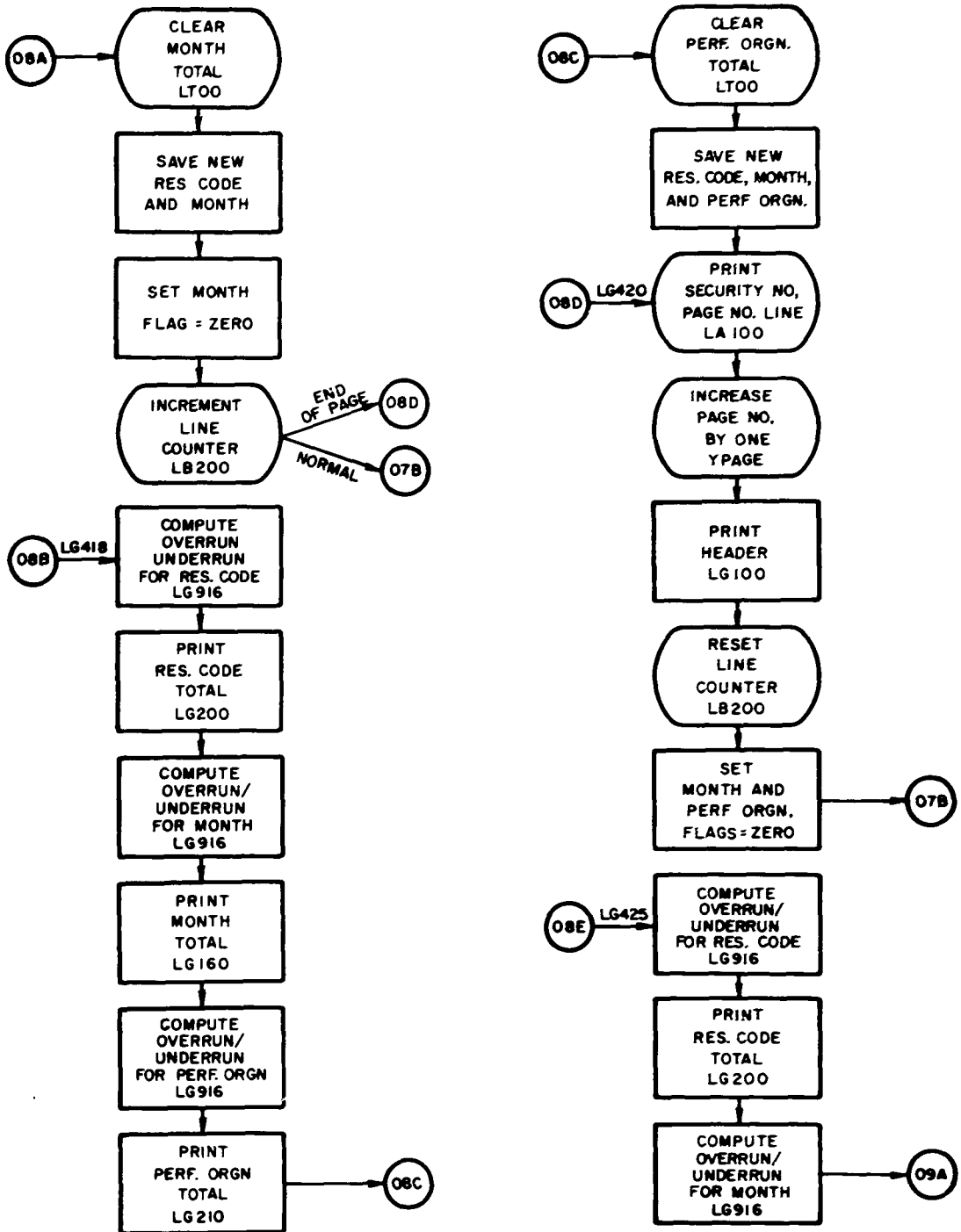
REGION LG10
SUBREGION LG550



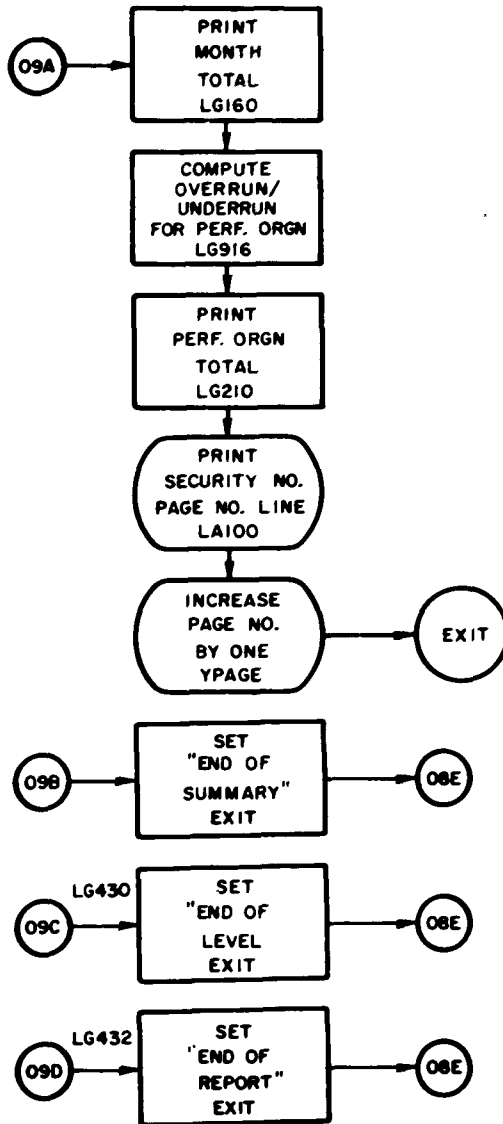
REGION LG10
SUBREGION LG400



REGION LG10
SUBREGION LG400



REGION LG10
SUBREGION LG400



Region LH00

EXPLANATION OF REGION:

To cumulate data and print Report 55.

CALLING SEQUENCE:

L TSX LH00, 4

L+1 Normal return

INPUT:

Report 55 information from XSORT.

OUTPUT:

Report 55 on output print tape.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

YPAGE YREAD LT00

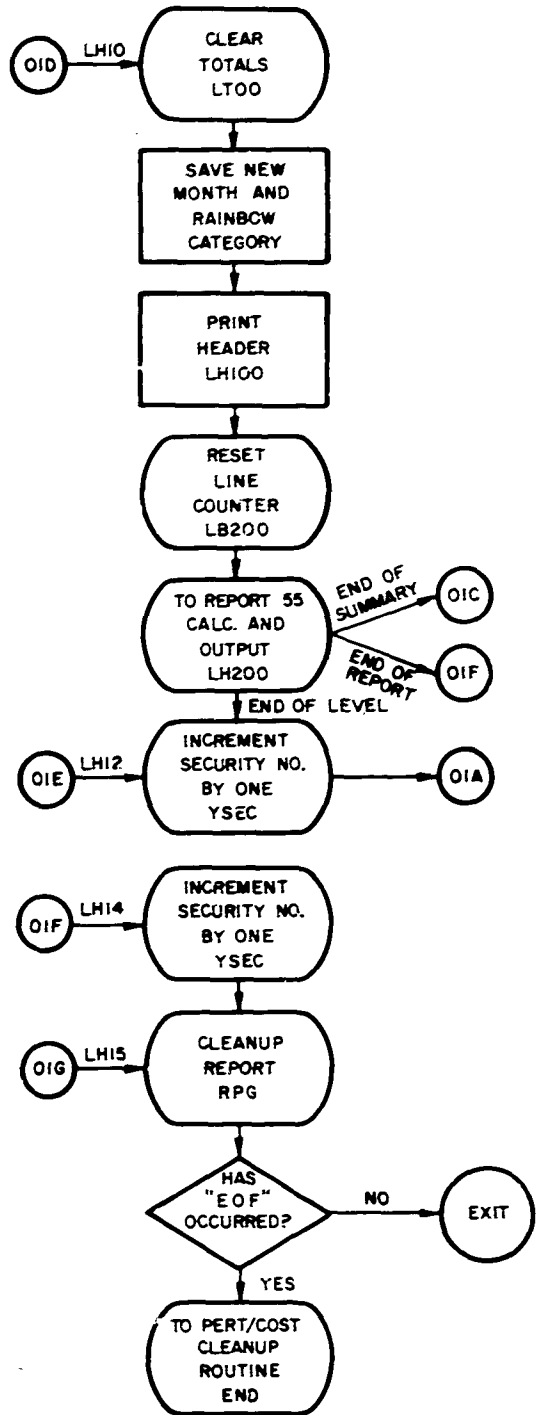
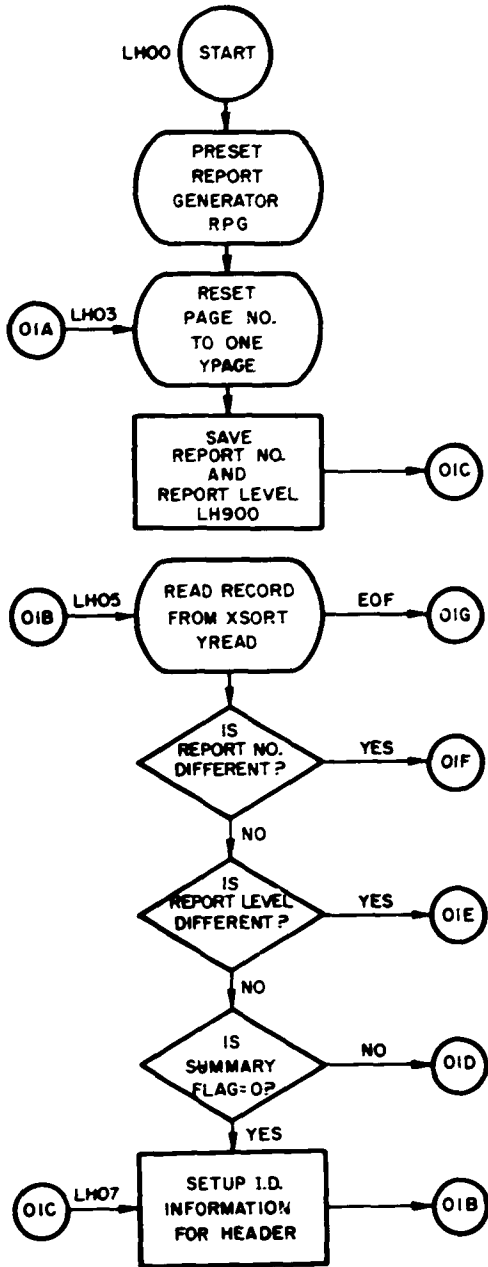
LB200 YSEC DATE

LA100

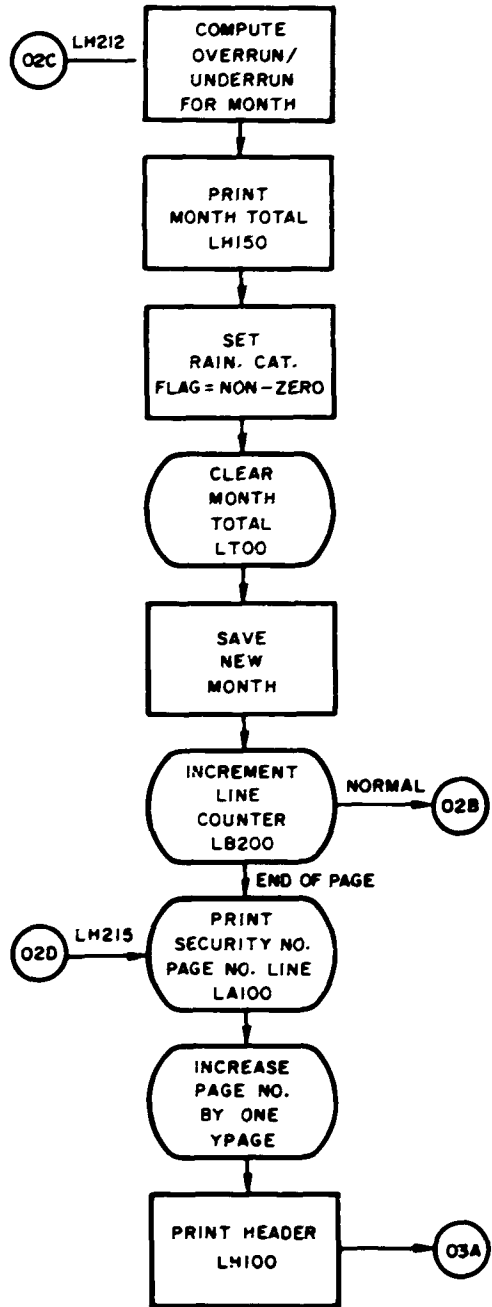
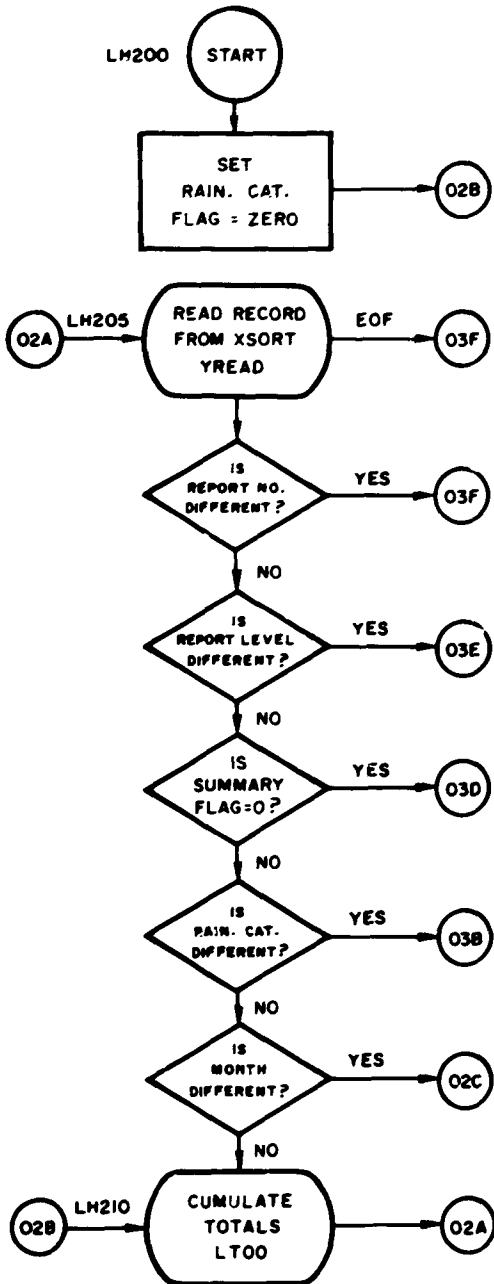
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

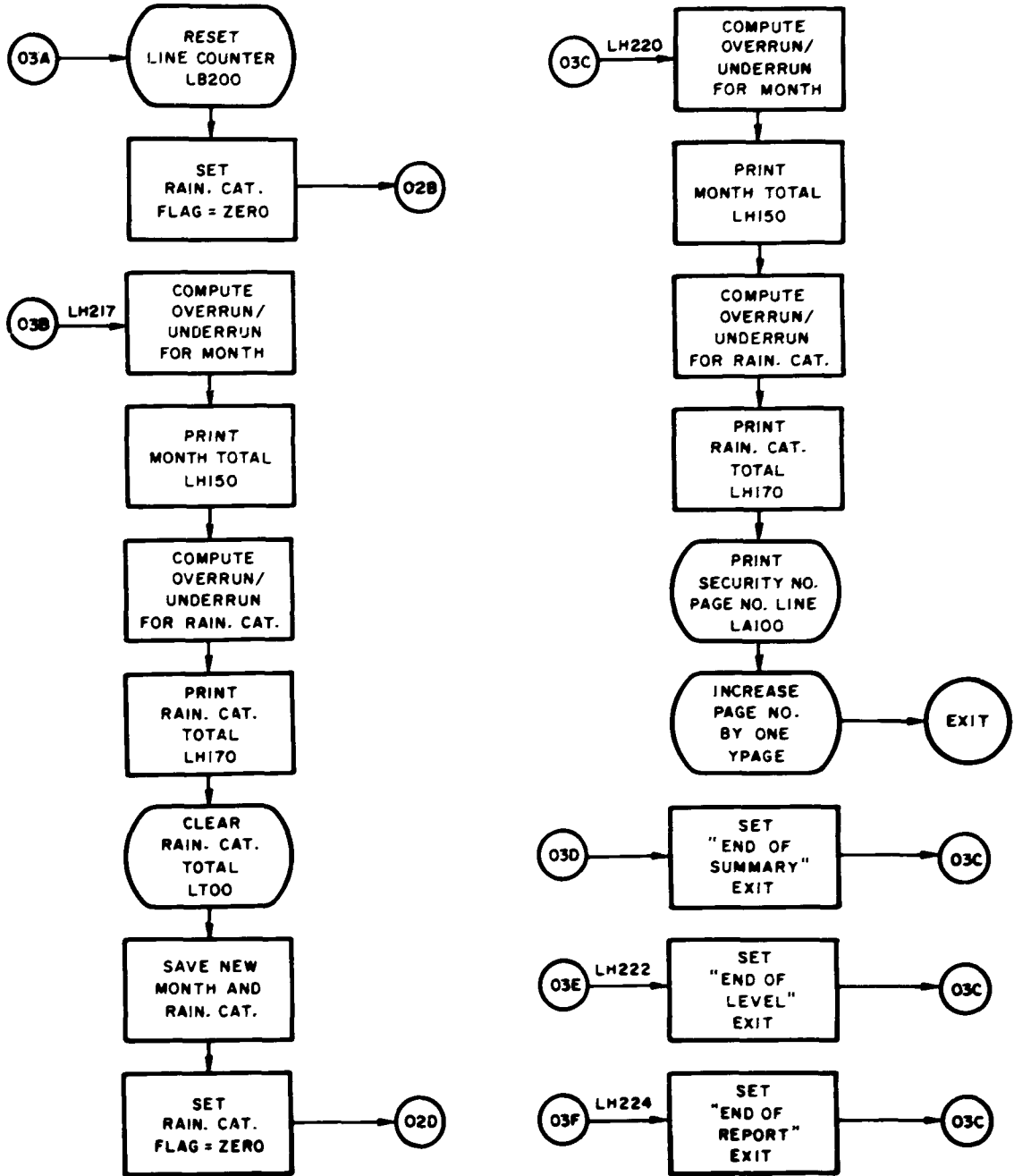
REGION LH00



REGION LH00
SUBREGION LH200



REGION LH00
SUBREGION LH200



Region LK00

EXPLANATION OF REGION:

To cumulate data and print Report 60.

CALLING SEQUENCE:

L TSX LK00, 4

L+1 Normal return

INPUT:

Report 60 information from XSORT.

OUTPUT:

Report 60 on output print tape.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

YPAGE YREAD LT00

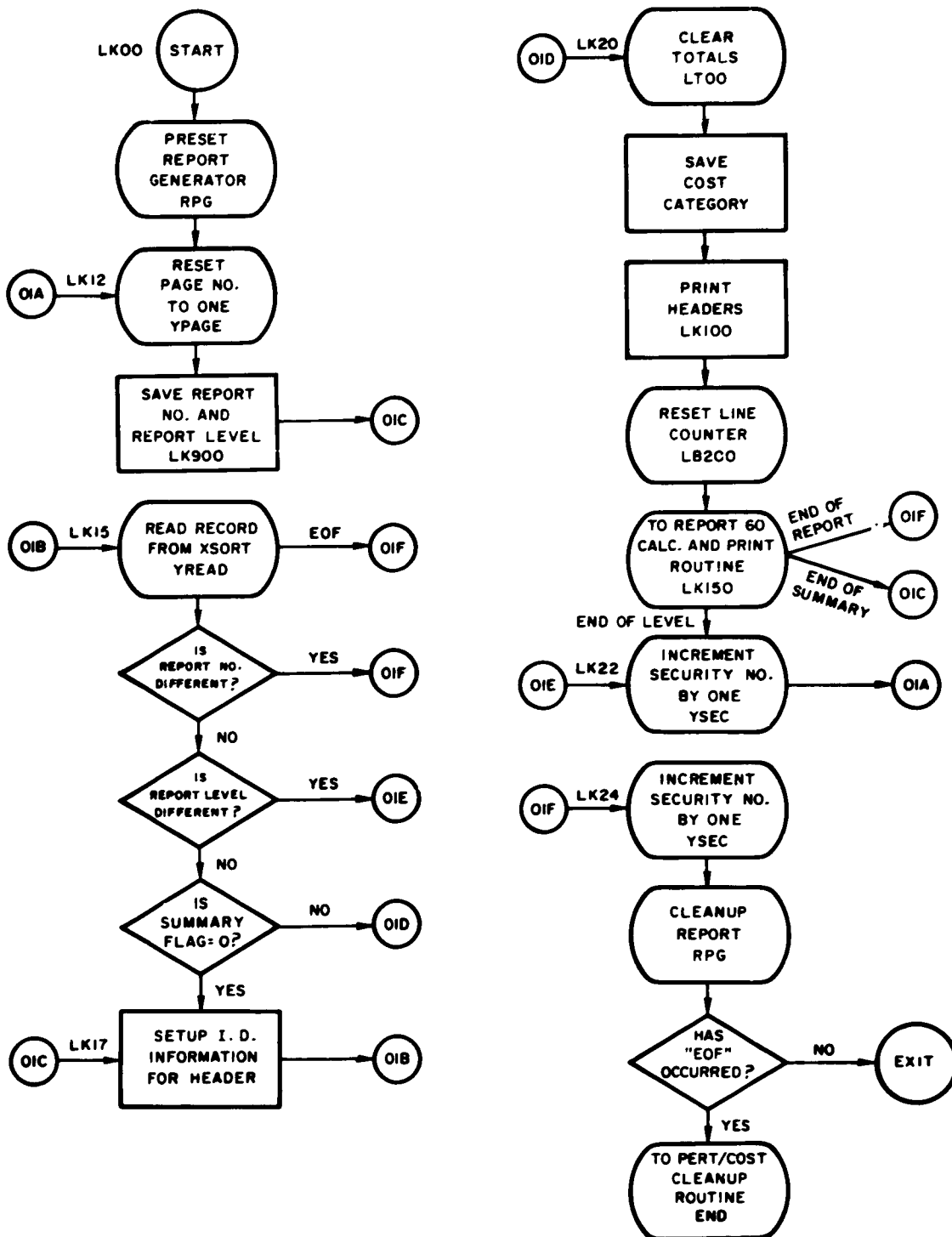
LB200 YSEC LA100

LX00

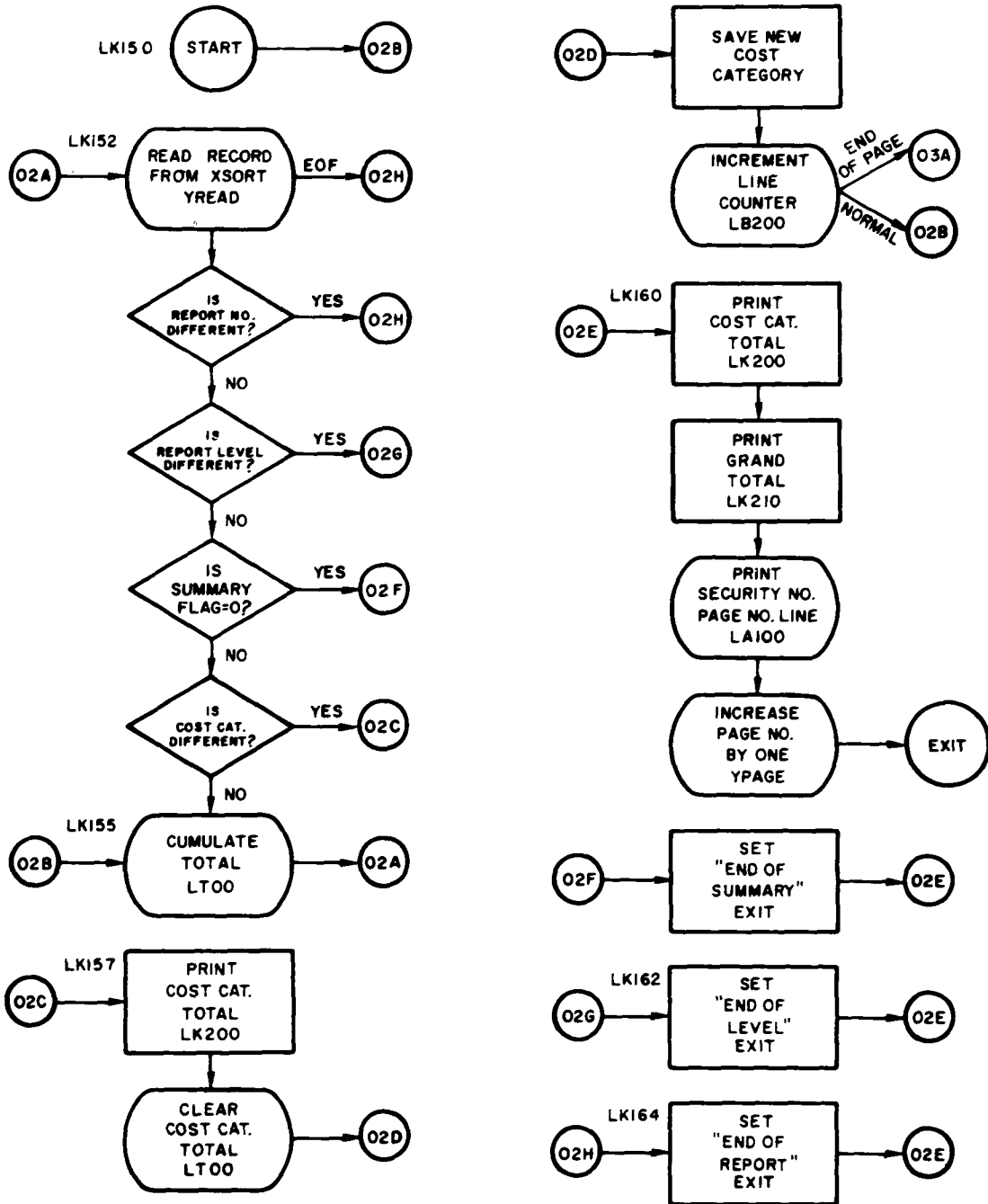
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

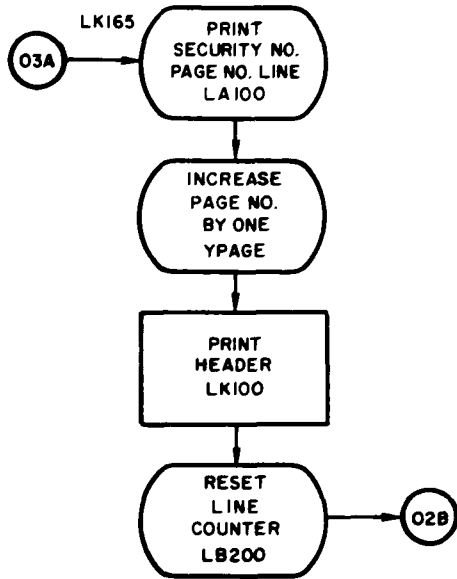
REGION LK00



REGION LK00
SUBREGION LK150



REGION LK00
SUBREGION LK150



Region LM00

EXPLANATION OF REGION:

Setup region for printing Report 80.

CALLING SEQUENCE:

L BX LM00, 4

L+1 Normal return

INPUT:

Report 80 information from XSORT.

OUTPUT:

Report 80 on output report tape.

STORAGE USED:

Not applicable.

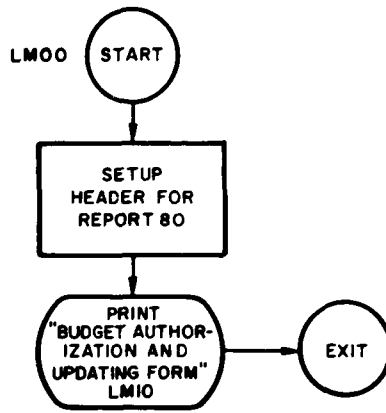
SUBREGIONS AND SUBROUTINES USED:

LM10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LMOO



Region LM05

EXPLANATION OF REGION:

Setup region for printing Report 85.

CALLING SEQUENCE:

L TSX LM05, 4

L+1 Normal return

INPUT:

Report 85 information from XSORT.

OUTPUT:

Report 85 on output report tape.

STORAGE USED:

Not applicable.

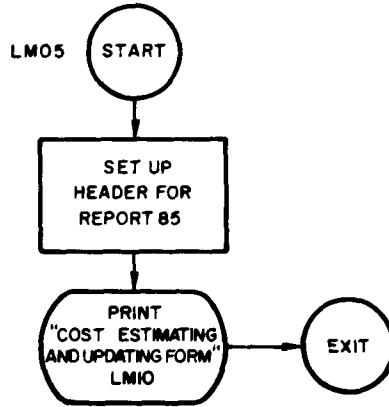
SUBREGIONS AND SUBROUTINES USED:

LM10

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

REGION LM05



Region LM10

EXPLANATION OF REGION:

To print "Budget Authorization and Updating Form" or "Cost Estimating and Updating Form."

CALLING SEQUENCE:

L TSX LM10, 4
L+1 PZE 0, 0, R
L+2 PZE A,, B
L+3 Normal return

INPUT:

Information from XSORT routine.

OUTPUT:

Report on output print tape.

STORAGE USED:

Not applicable.

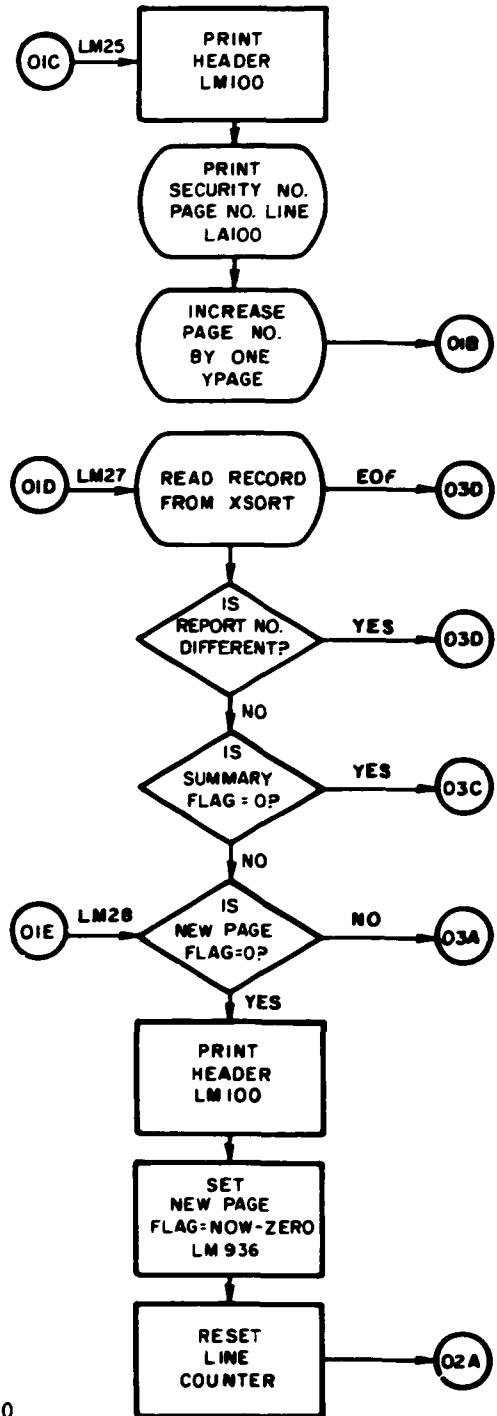
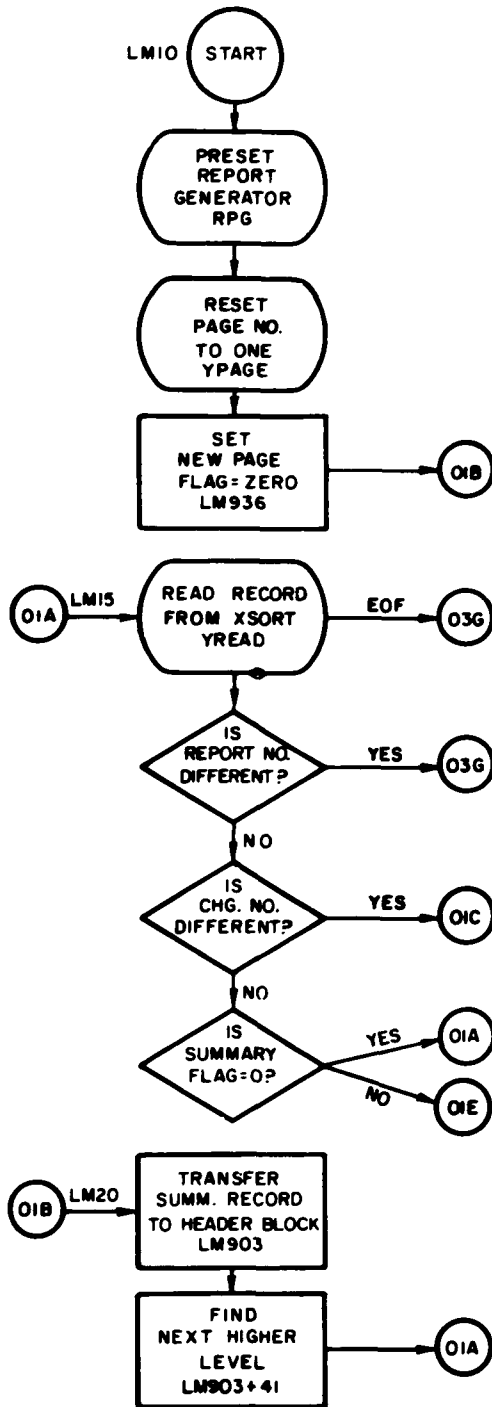
SUBREGIONS AND SUBROUTINES USED:

YPAGE YREAD YCOMP
UPCK LA100 YSEC

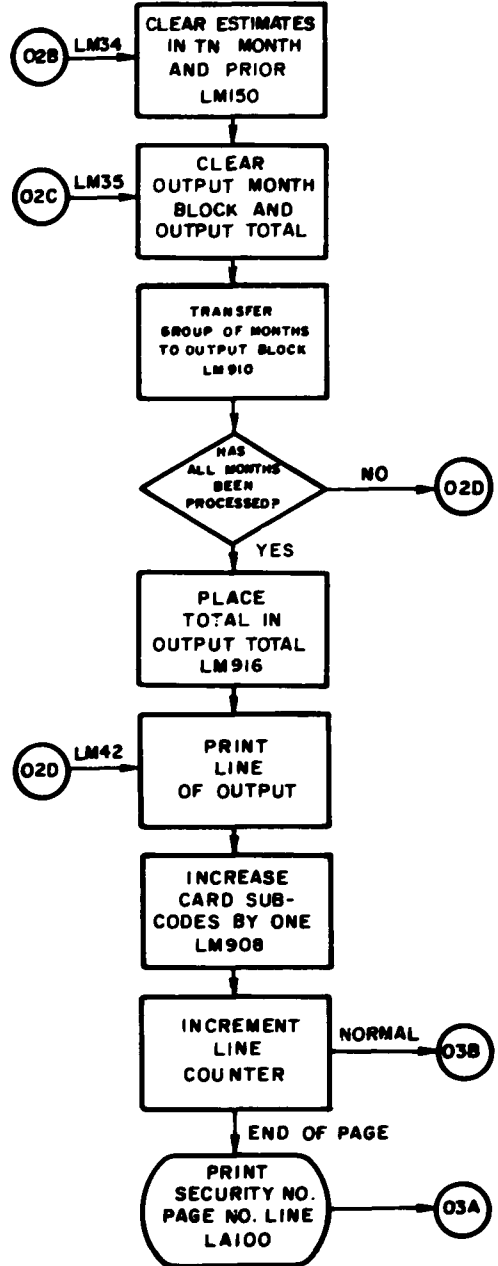
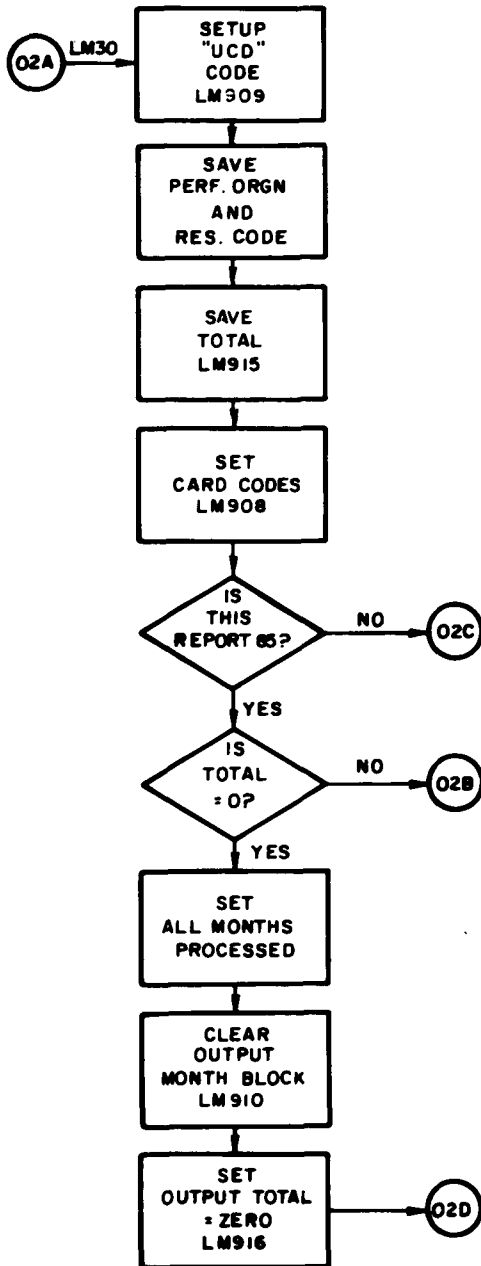
EXPLANATION OF CALLING SEQUENCE:

R = report number
A = location of report name
B = location of report heading information

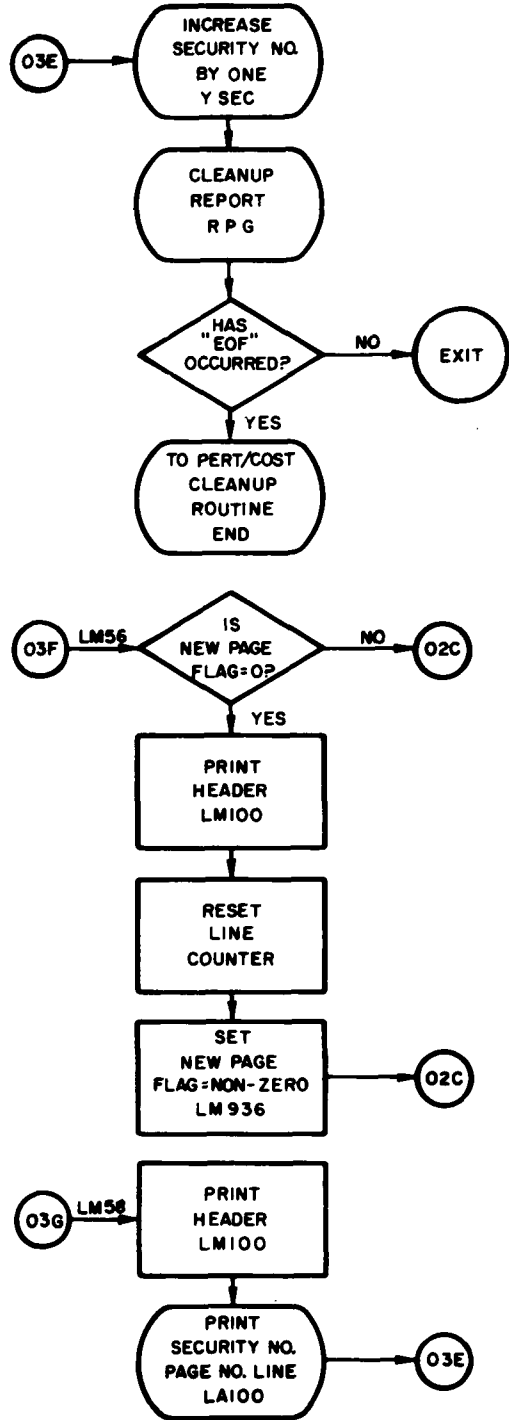
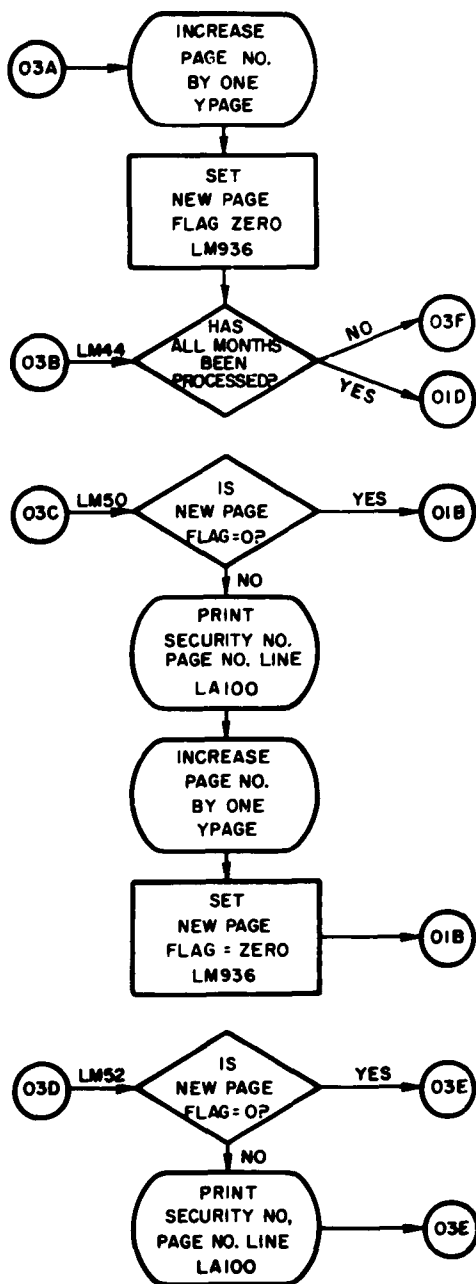
REGION LM10



REGION LM10



REGION LM10



Region LN00

EXPLANATION OF REGION:

To cumulate cost information up work breakdown structure and print Reports 70 and 75.

CALLING SEQUENCE:

L TSX LN00, 4

L+1 Normal return

INPUT:

Report 70 or 75 information from XSORT.

OUTPUT:

Report 70 or 75 on output reporting tape.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

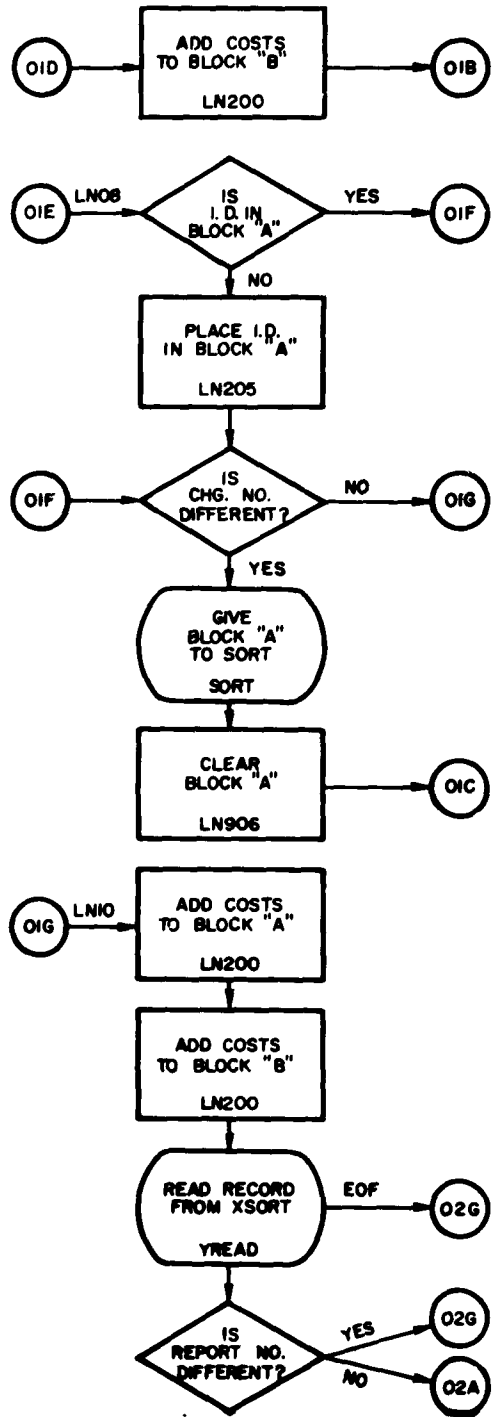
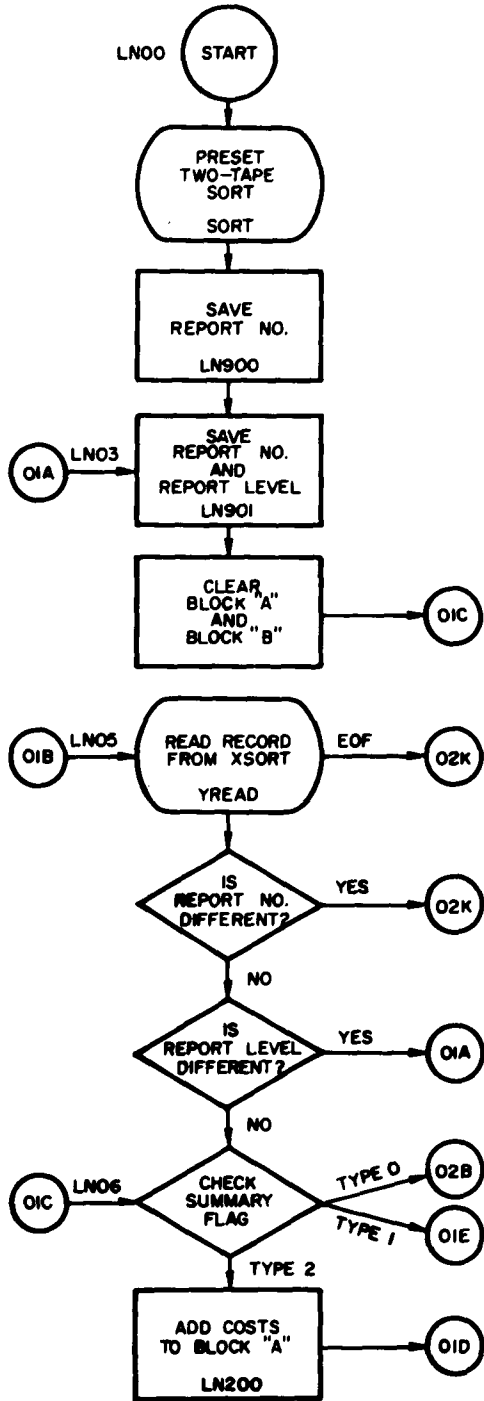
SORT YREAD YCOMP

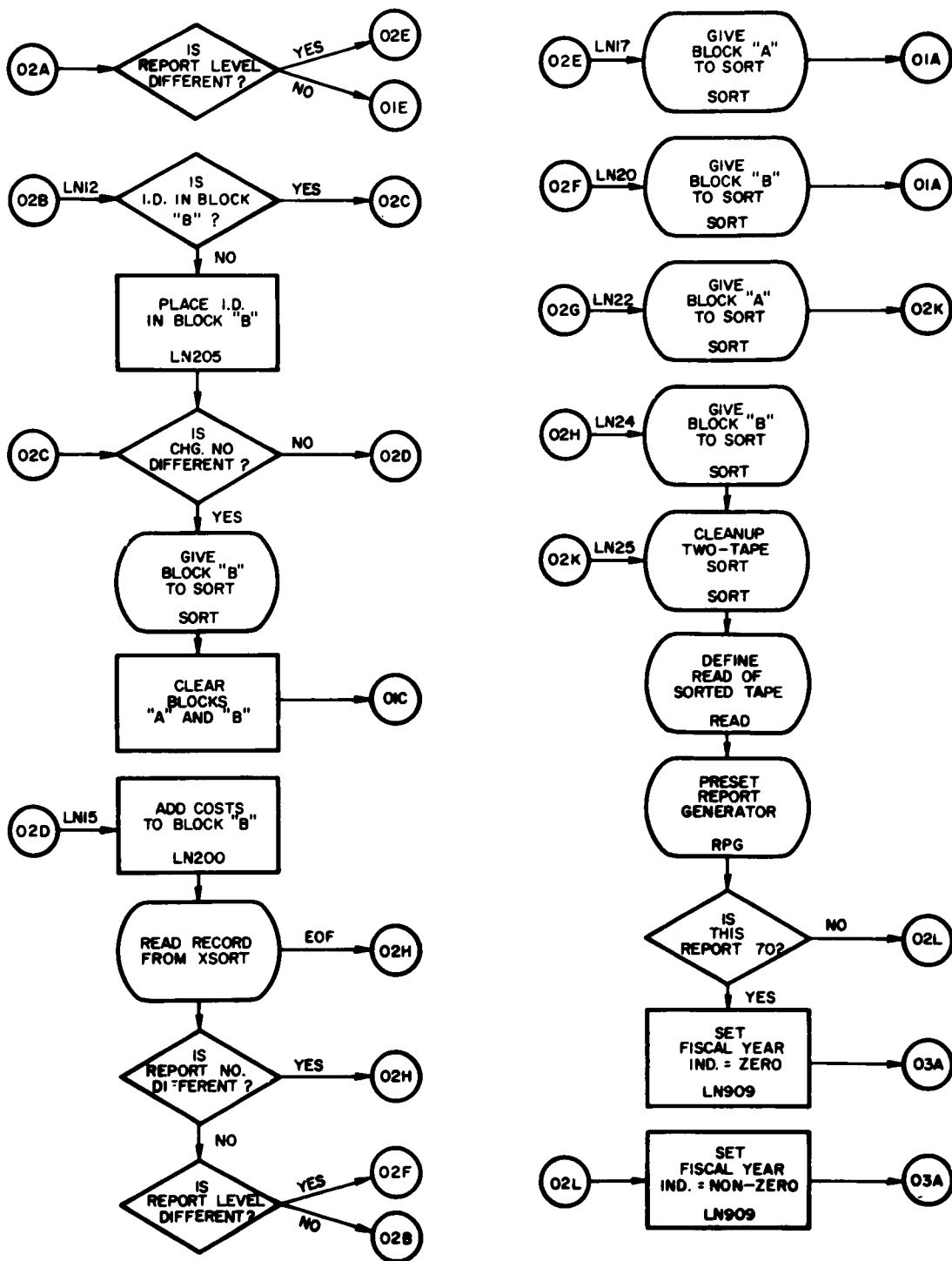
READ YPAGE LB200

YSEC LA100 LX00

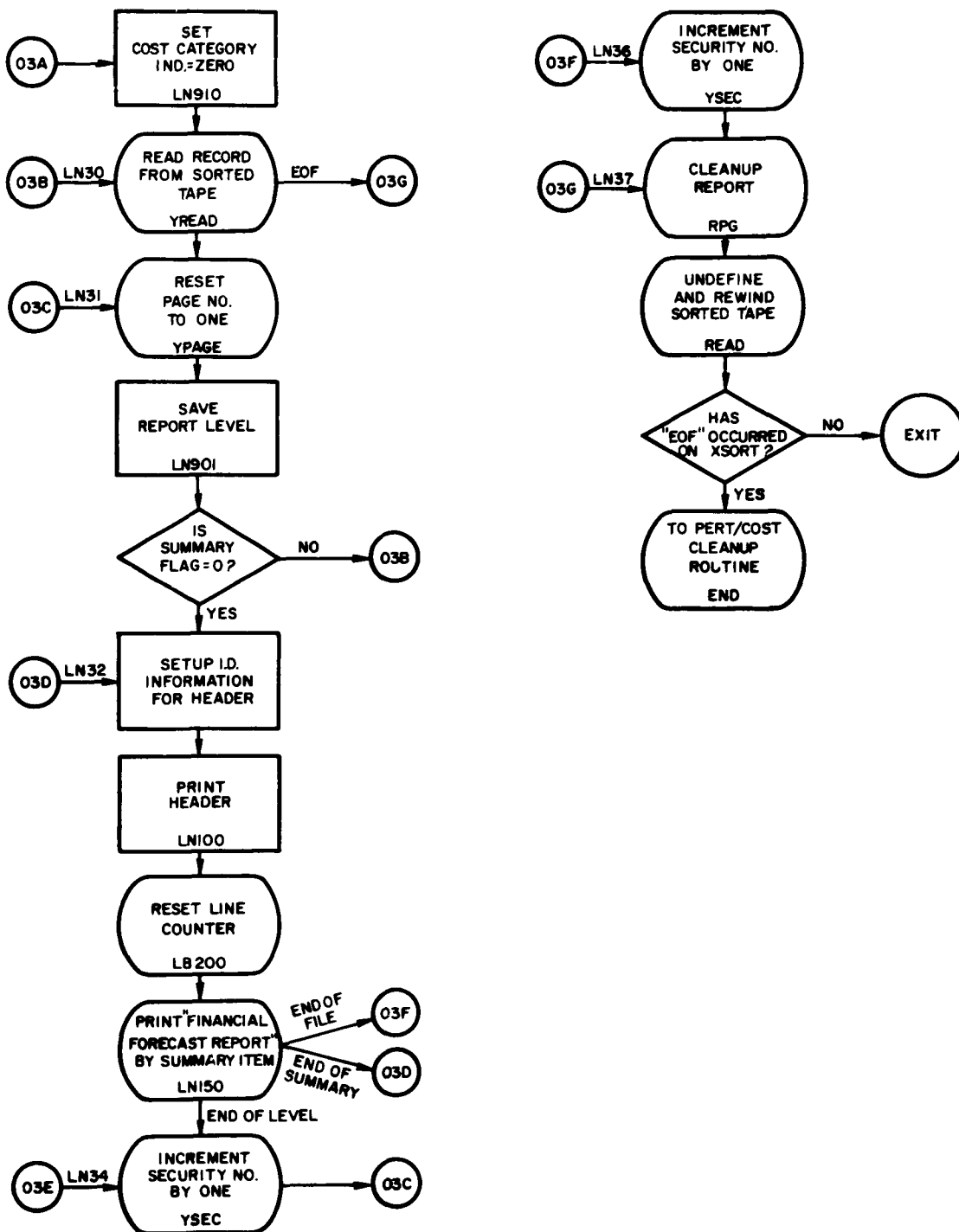
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

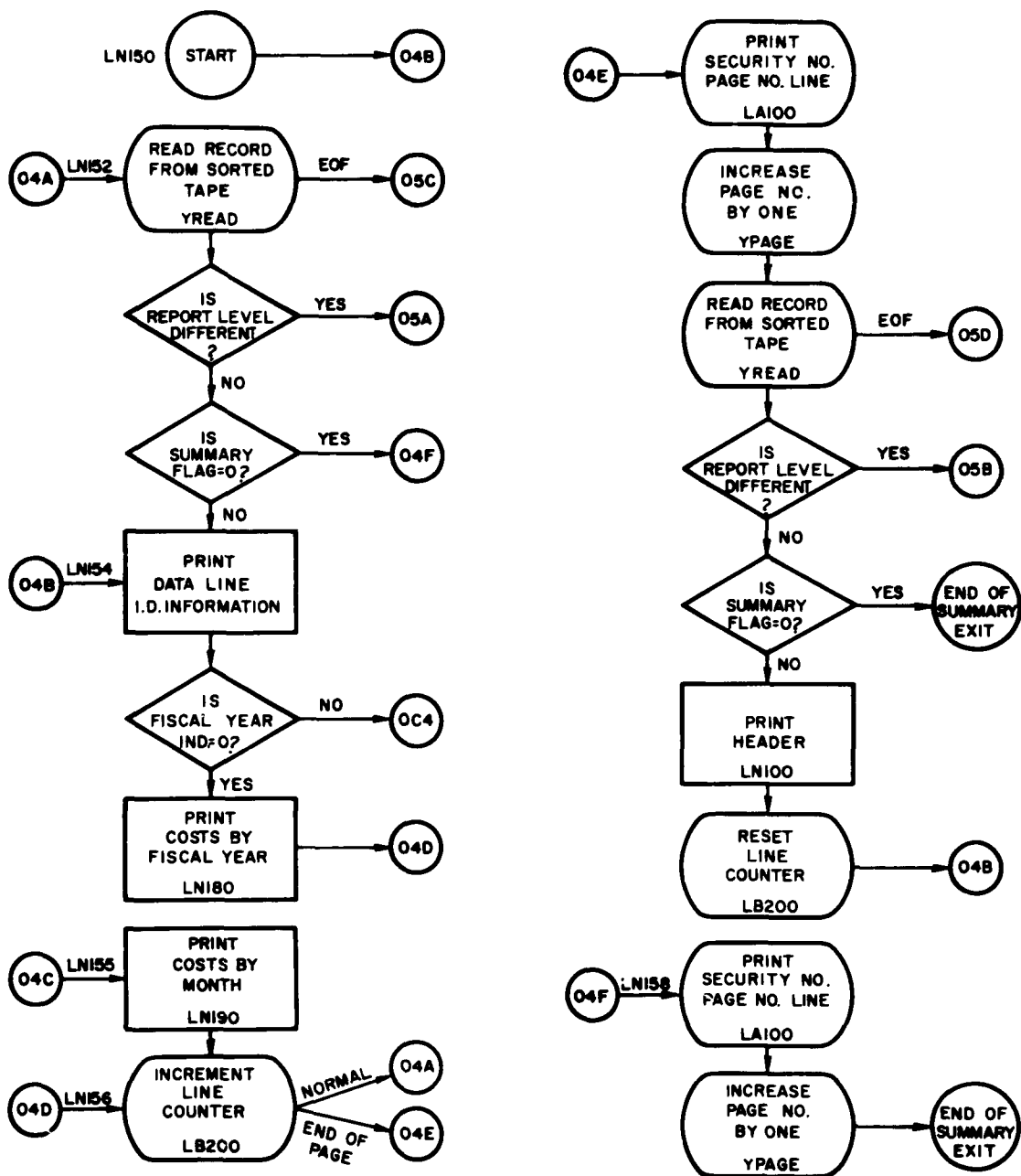




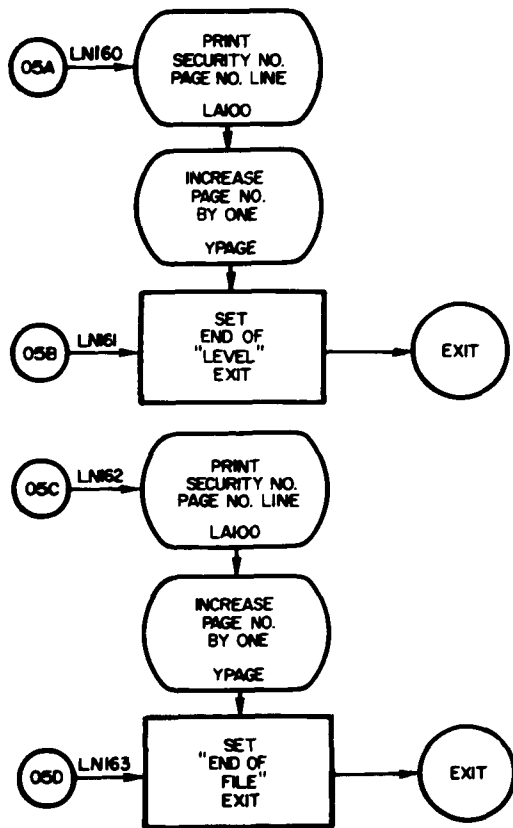
REGION LN00



REGION LN00
SUBREGION LN150



REGION LN00
SUBREGION LN150



Region LP00

EXPLANATION OF REGION:

To cumulate cost information by cost category and print Reports 71 and 76.

CALLING SEQUENCE:

L TSX LP00, 4
L+1 Normal return

INPUT:

Report 71 or 76 information from XSORT.

OUTPUT:

Report 71 or 76 on output reporting tape.

STORAGE USED:

Not applicable.

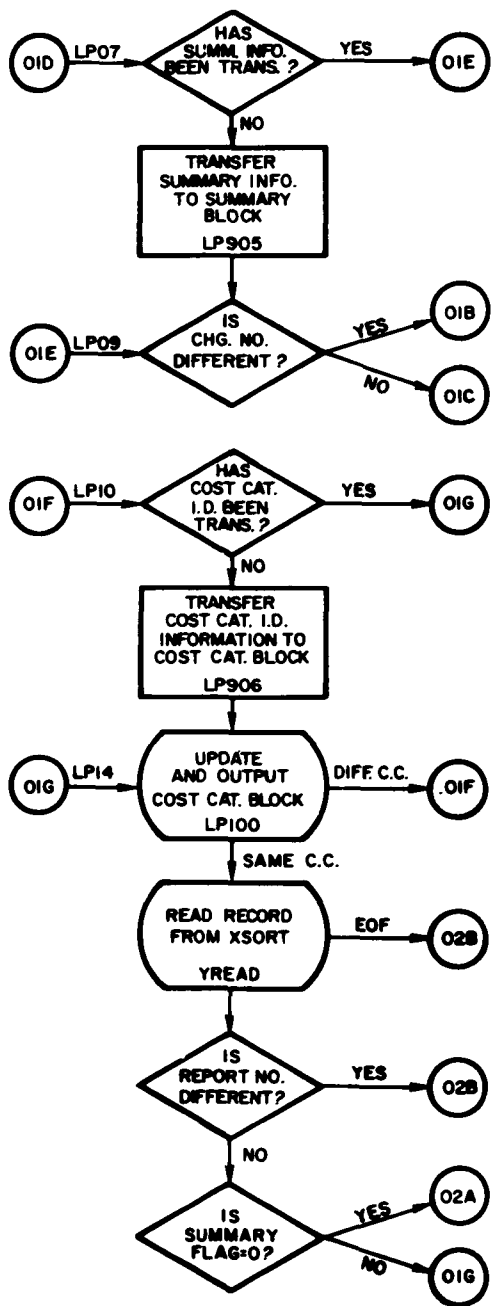
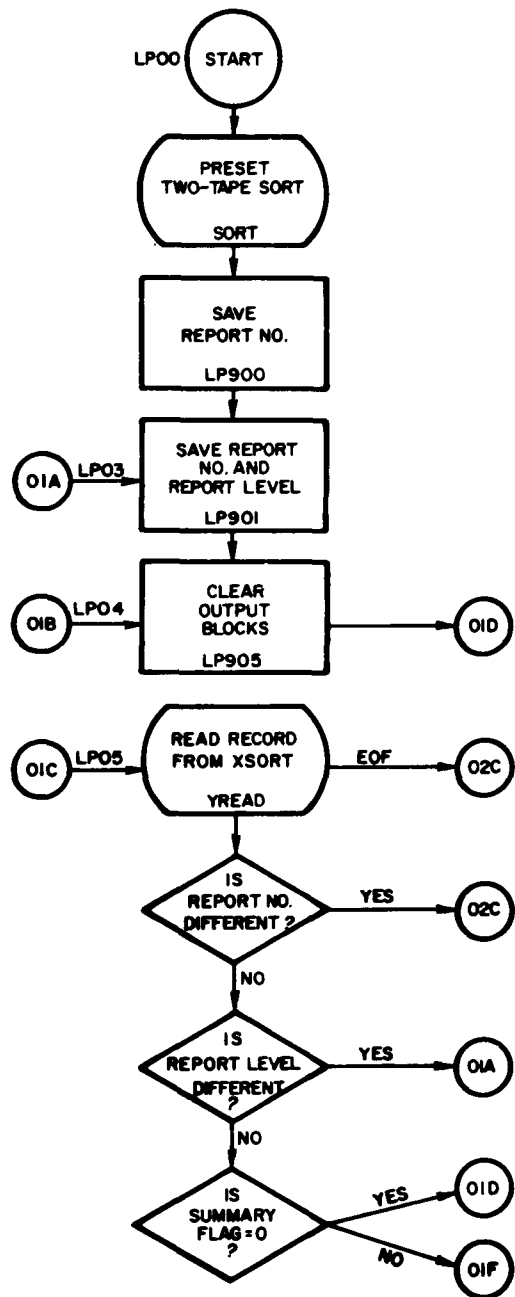
SUBREGIONS AND SUBROUTINES USED:

SORT	YREAD	YCOMP
READ	LB200	YSEC
YPAGE	LA100	

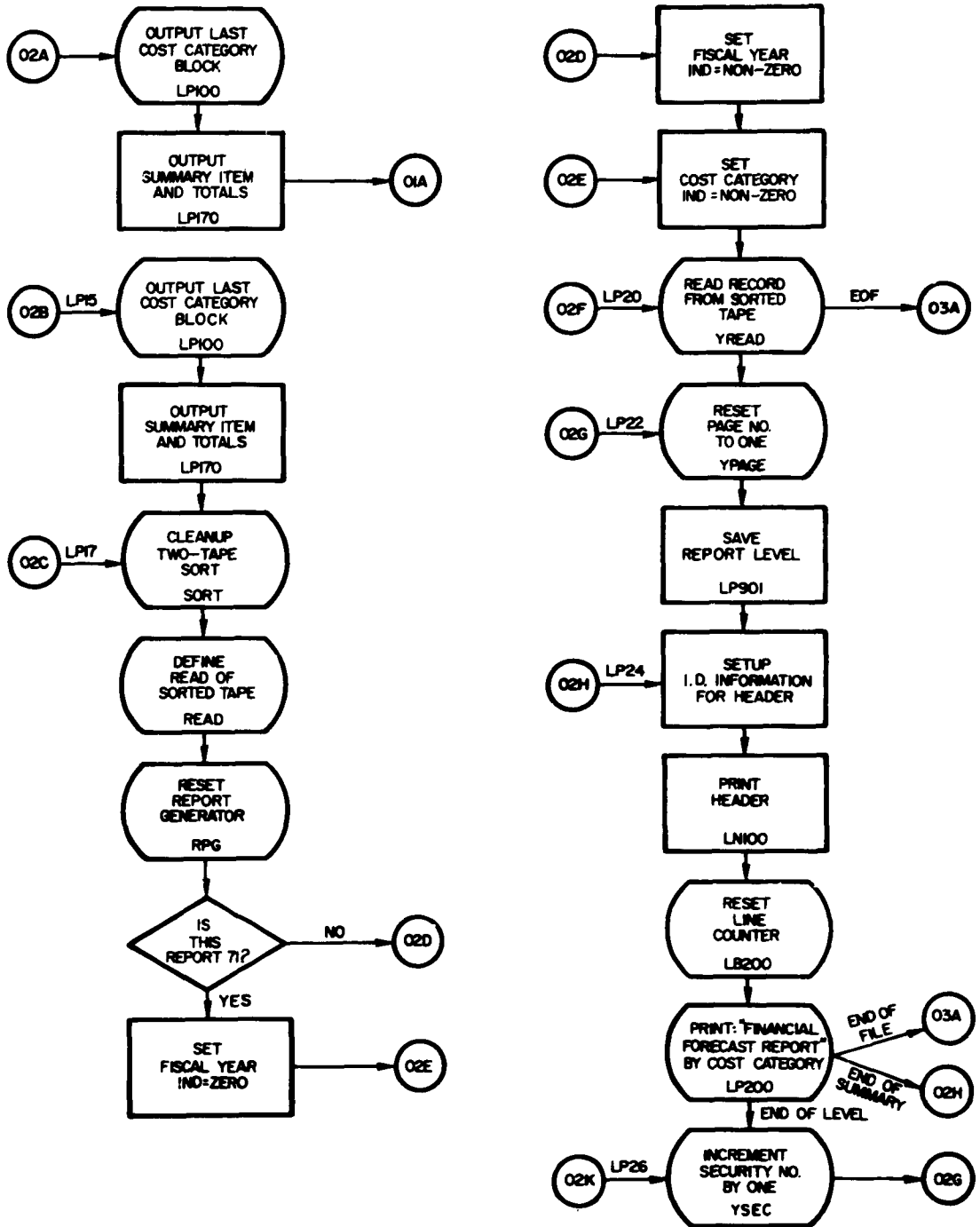
EXPLANATION OF CALLING SEQUENCE:

Not applicable.

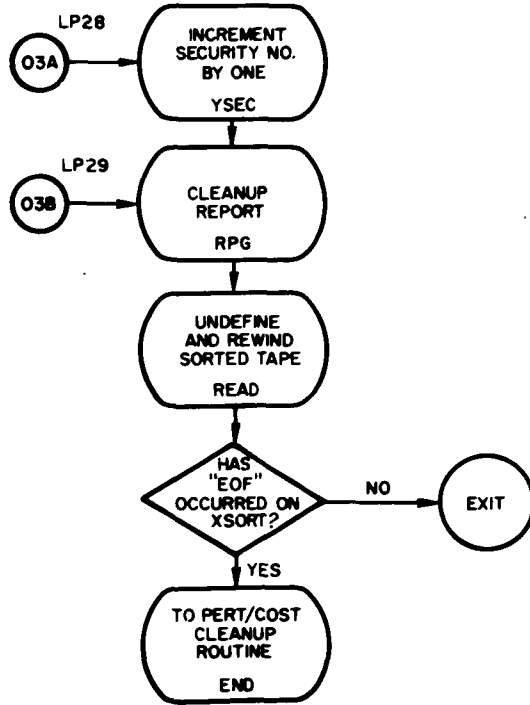
REGION LPOO



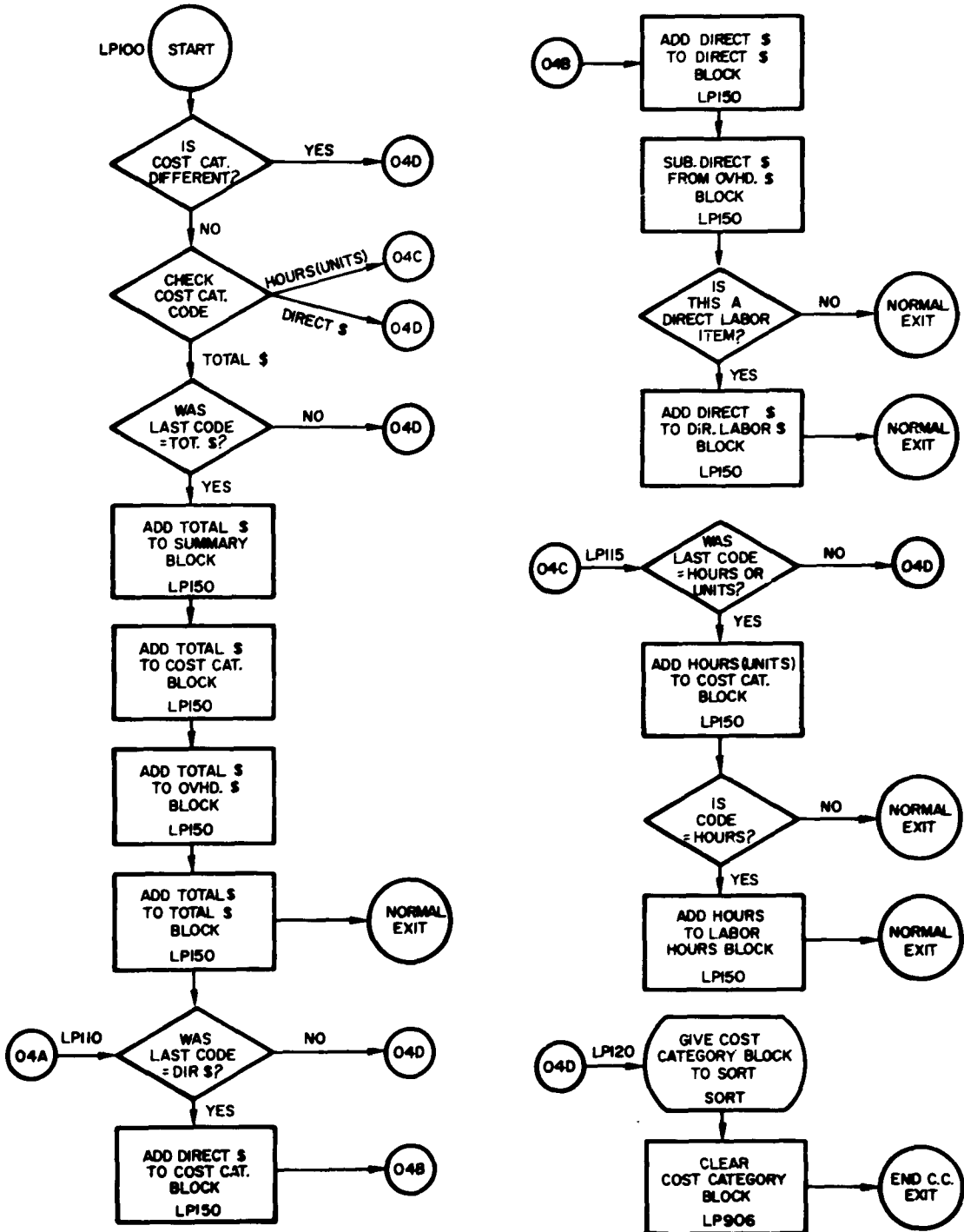
REGION LPOO



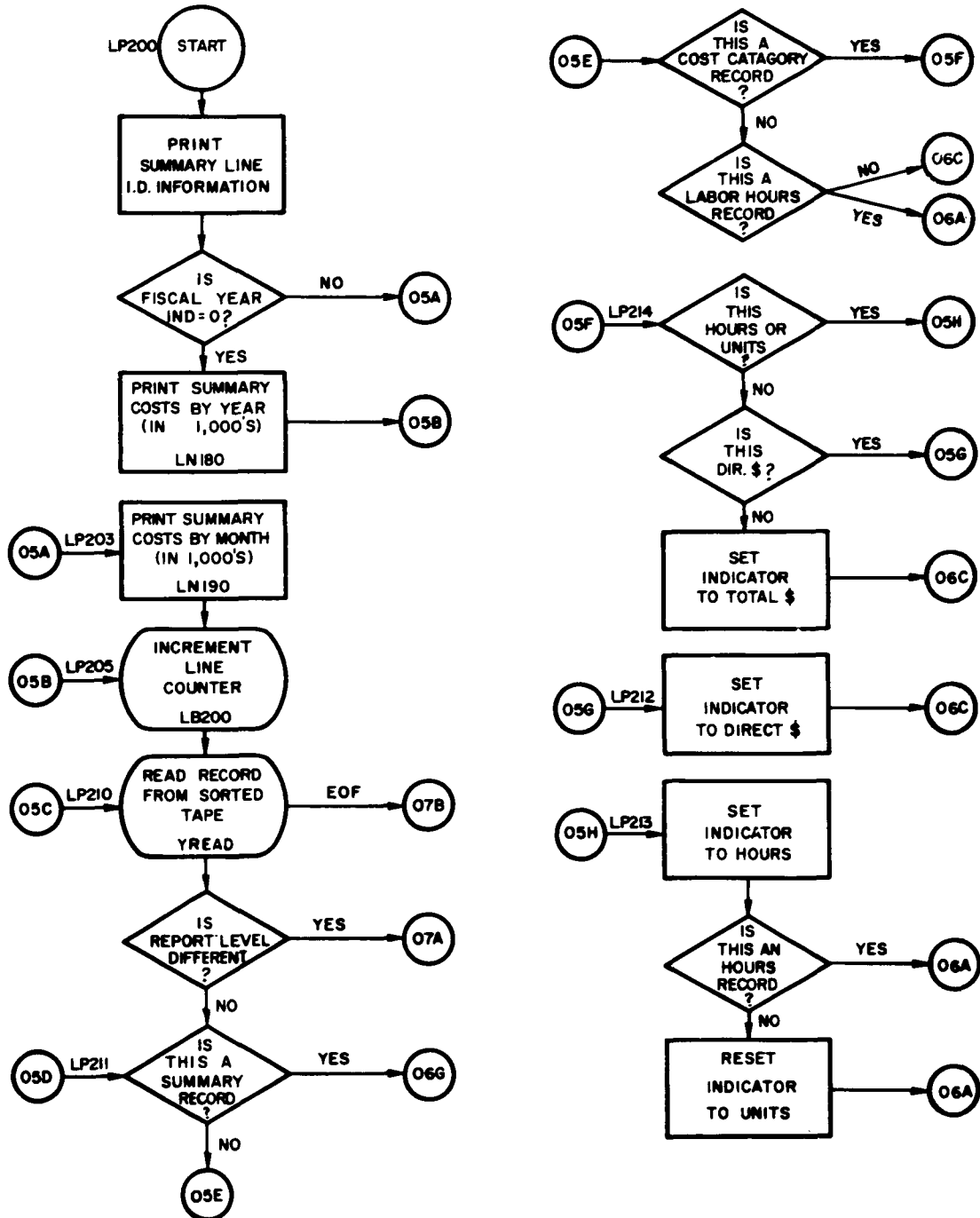
REGION LPOO



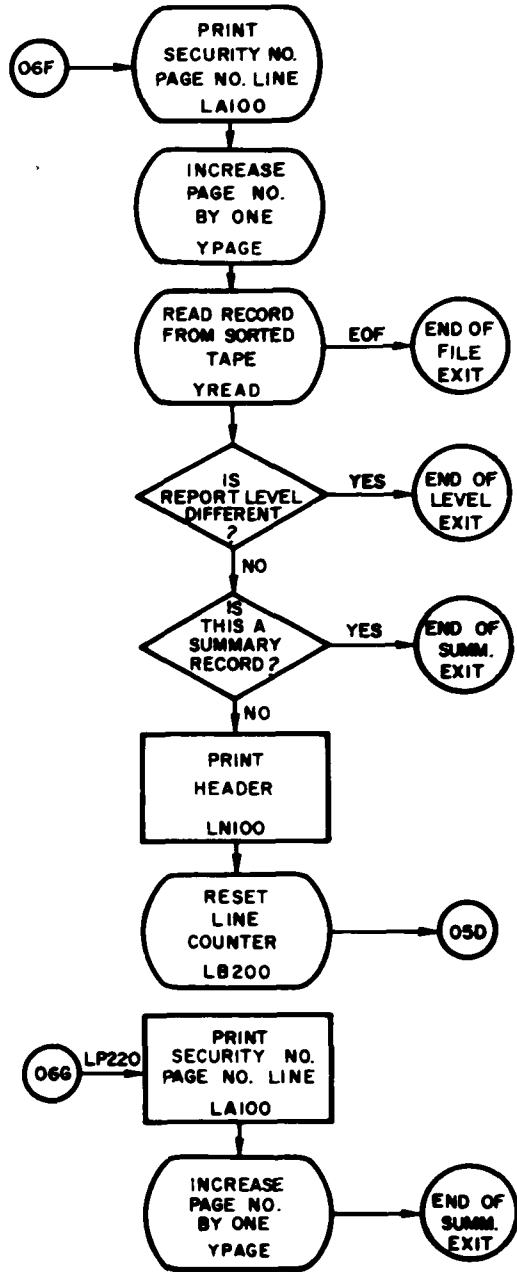
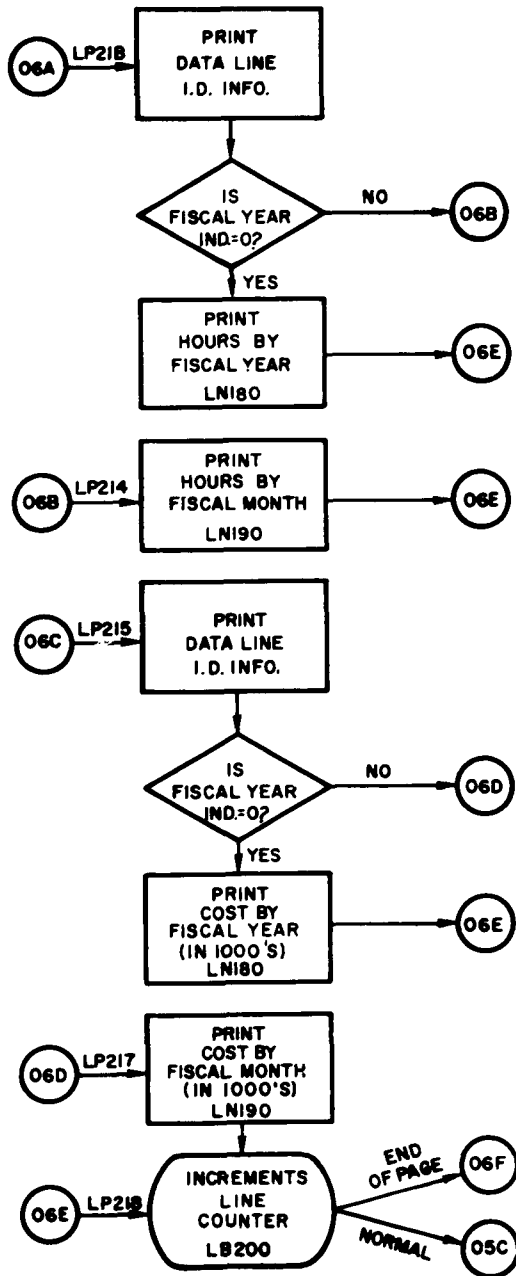
REGION LPOO
SUBREGION LP100



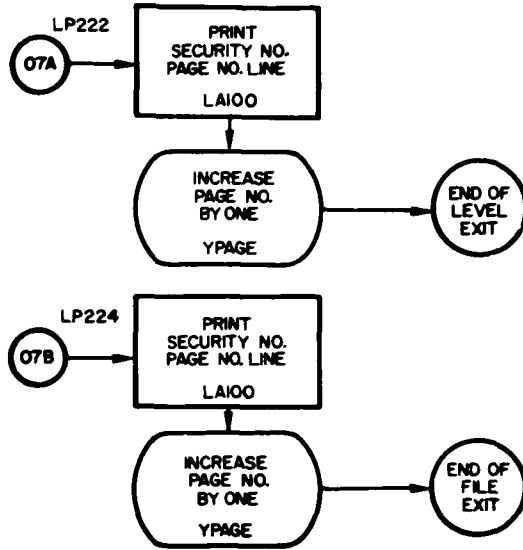
REGION LP00
SUBREGION LP200



REGION LP00
SUBREGION LP200



REGION - LPOO
SUBREGION LP200



Region LT00

EXPLANATION OF REGION:

To cumulate four levels of totals.

CALLING SEQUENCE:

L TSX LT00, 4
L+1 PZE A, 1, N (or MZE L)
L+2 Normal return

INPUT:

Not applicable.

OUTPUT:

Level 1 totals start in LT901
Level 2 totals start in LT902
Level 3 totals start in LT903
Level 4 totals start in LT904

STORAGE USED:

Not applicable.

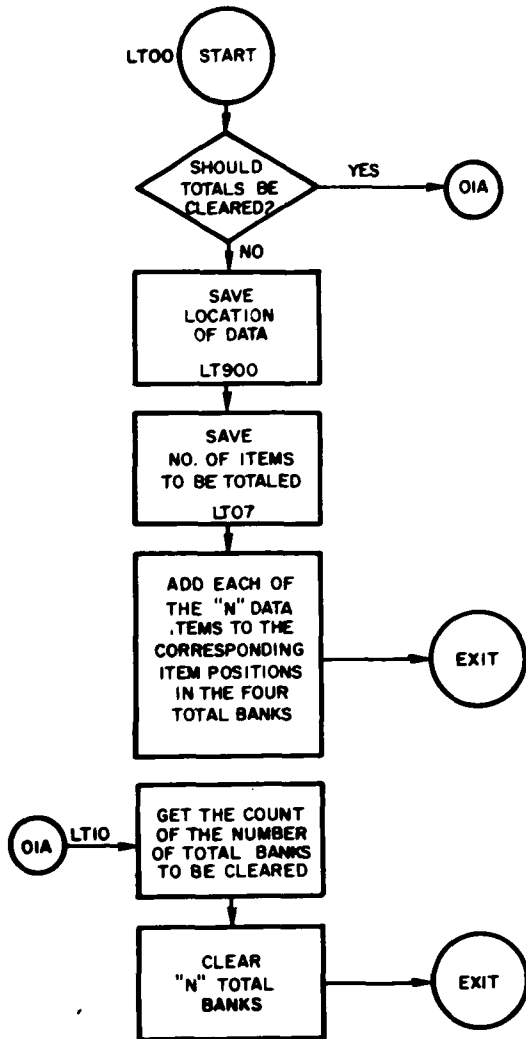
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

PZE A, 1, N = cumulate totals for N items starting in A, 1
MZE L = reset totals on levels 1 thru L to zero

REGION LTOO



Region LX00

EXPLANATION OF REGION:

To adjust a dollar amount to the nearest thousands of dollars.

CALLING SEQUENCE:

L TSX LX00, 4

L+1 Normal return

INPUT:

MQ = dollar amount to be adjusted.

OUTPUT:

Accumulator = dollar amount adjusted to the nearest thousands of dollars.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not applicable.

CHAPTER IV

SUBROUTINES

CHAPTER IV

SUBROUTINES

IV-A INTRODUCTION

This section will explain the subroutines that are used in the PERT Cost Program. These subroutines can be used in any one of the four program phases, or in all of them. The topical subsections are listed below with the corresponding page references.

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IV-B REPORT GENERATOR

Purpose

This subroutine sets up and controls the printing of the output for a report generating program.

Description

The subroutine, by means of macro-instructions, enables the programmer to handle all the print output associated with any amount of information processing. Specifically, it facilitates the setting up of print fields, lines or paragraphs for specific reports and, if desired, provides for automatic paging and titling. Also, if page dimensions are specified, the printing may be done on any non-standard page and/or in any desired format.

Usage

(a) Initialization Macros

These macros provide for initial definitions and need only be given once for all the reports that are to be considered.

BUCKET L1, L2

This macro makes available to the subroutine the block of storage from L1 to L2 inclusive. If n reports are to be processed, the number of words per block should be at least

$$\sum_{i=1}^n M_i \left(N_i + \frac{2}{3} \right) \quad (i=1, 2, \dots, n)$$

where M_i = no. lines per page for report i

N_i = no. words per line for report i

The use of this macro is mandatory.

FILDEF $T_{11}, T_{12}, T_{21}, \dots, T_{62}$

This macro defines the symbolic tapes that constitute a logical file. The tapes T_{ij} are defined as the symbolic address of the IOEX tape address. Two tapes T_{i1}, T_{i2} may be attached to a given file i and as many as six files may be defined. The first two parameters in the macro define file number 1, the second two define file 2, etc. The use of this macro is mandatory.

ATTACH K, F

This macro assigns report number K to file number F :
 $1 \leq K \leq 20, 1 \leq F \leq 6$. Any number of reports may be attached to one file. The use of this macro is mandatory, but it may be given at any time prior to the use of any page description or line generating macros. The FILDEF macro defining file F must be given prior to the ATTACH macro.

(b) Page Description Macros

These macros specify the page dimensions, title lines and basic information associated with a particular report.

PAGDEF P, N, L_0, L, K

This macro defines the page dimensions for a particular report K and need only be given once for each report.

$0 \leq P \leq 131$ = no. of blank characters to the left of each line.

$1 \leq N \leq 132$ = no. of characters per line.

$0 \leq L_0 \leq 59$ = no. of blank lines before line 1.

$1 \leq L \leq 60$ = no. of lines per page.

The page dimensions are with respect to a standard page of 60 lines with 120 characters per line (13 1/2 inch \times 11 inch sheet). If PAGDEF is not given, the standard page will be assumed; i. e., $P = 0, N = 120, L_0 = 0, L = 60$.

In the later descriptions of DATPAG, TITLES, LINE, FIELD, EDIT and PARAG, the references to print position and line number will take into account P and L_0 ; i. e.,

A specified print position P_i will correspond to actual print wheel $P_i + P$.

A specified line number L_i will correspond to actual line number $L_i + L_0$.

DATPAG L_d, P_d, K

This macro specifies where on each page of a particular report K the date and page number will be printed:

L_d = line ($L_d = 0$, indicates first line; $L_d \neq 0$, indicates last line)

P_d = print position

The date and page consists of 24 characters, as in the following example:

M	A	Y	2	7	,	1	9	6	0	P	A	G	E	K	K	-	X	X	X
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

where KK = report number, XXX = page number.

If DATPAG is not given, no date and page line will be printed.

TITLES Y, T, N_t, K

This macro establishes a set of titles to be printed at the beginning of each page of a particular report K . N_t words from (Y, T) will be stored in the appropriate print images beginning with print position 1 of line 1 as defined by PAGDEF and continuing for as many lines as are implied by N_t words. If DATPAG has also been given for line 1, the titles will begin on line 2. Each succeeding line in the titles will be single space. This macro need only be given once but may be given at any time for the purpose of changing titles. However, since the subroutine does not save the titles, they must remain intact at (Y, T) for the duration of the report.

(c) The Report Identification Macro

REPORT K, T

This macro must be given at the beginning of any sequence of line-generating macros. If $T = 0$, K represents the report number to be associated with the printing described by the succeeding macros.

If $T \neq 0$, the report number is in the address portion of the word in (K, T).

If the report number is zero, the printing will be associated with the most recently specified report.

(d) Line-Generating Macros

These macros set up any field, line, or paragraph associated with a particular report. Any sequence of line-generating macros must be immediately preceded by a REPORT macro and terminated by an ENDFLD macro. No other coding may be interspersed in the sequence.

SPACER N

This macro indicates that a new line or part of a line is to start. N specifies the number of line spaces before printing the next line.

N = 0 (or blank) indicates space suppress

= 1 indicates single space

= 2 double space

.

= 60 indicates space 60 lines

See Page IV-B-8 for exceptions. If no SPACER has been given, it will be assumed that subsequent macros refer to the current line.

LINE N

This macro indicates on which line the output specified by subsequent macros is to be printed. N represents the line number ($1 \leq N \leq 60$). See Page IV-B-8 for exceptions.

FIELD Y, T, E, P_f, I_p

This macro picks up E characters, beginning with the Cth character of the word in (L, T), and stores them in the appropriate print image beginning at print position P_f. The word in (Y, T) has the form:

(Y, T) XXX L, T, I_L

where

XXX = C = PZE for 1st character
= PON for 2nd character
= PTW for 3rd character
= PTH for 4th character
= FOR for 5th character
= FVE for 6th character

I_p is the print position incrementer, and I_L is the location incrementer used in conjunction with the REPEAT macro.

PARAG Y, T, N

This macro picks up N words beginning with the word in (L, T) and stores them in as many lines as are implied by N words. The first character will be stored in the first print position of the current line and all succeeding lines of the paragraph will be single space. The word in (Y, T) has the form:

(Y, T) PZE L, T

REPEAT N, M

This macro executes the next N macros M times. No more than two levels of REPEAT are permitted, see Page IV-B-10.

EDIT Y, T, P_f , C, E, B, I_p

This macro "edits" the quantity in L, T and stores it in the appropriate image beginning with print position P_f .

C=0 for signed BCD input (no conversion required)

C=1 for fixed point binary input

C=3 for unsigned BCD input

$0 \leq B \leq 35$; binary point of input (fixed point input)

E = no. of BCD characters in input quantity (including sign if C = 0).

The word in (Y, T) has the form.

(Y, T) PZE L, T, I_L

I_p is the print position incrementer, and I_L is the location incrementer used in conjunction with the REPEAT macro.

For BCD input the sign will appear as a BCD character in the first character position of the word in (L, T); i. e., $+ = 20_8$, $- = 40_8$.

For binary input, one more than the specified number of fractional digits is generated and the quantity is rounded if this digit is greater than 5.

The format of the output is described by a sequence of no more than 24 BCD characters beginning with the first character in (Y, T+1), where each character corresponds to a potential print position (i. e., the first character corresponds to print position P_f), see Page IV-B-11.

ENDFLD

This macro indicates the termination of a series of line generating macros referring to one report.

(e) Report Termination Macro

WRAPUP K

This macro completes all remaining lines for report K. If $K = 0$, all remaining reports are completed.

(f) File Termination Macro

CLOSEF F

This macro closes file F by writing an end-of-file mark and rewinding the tape. If $F = 0$, all open files are closed.

Storage Requirements

The subroutine itself occupies a total of 2000 cells but requires an auxiliary storage capable of retaining at least one page for each report that is to be processed. This storage is assigned by the programmer with the use of the BUCKET macro.

Buffer Pool Concept

The storage assigned by the BUCKET macro is divided into blocks of 103 words each capable of retaining five 132 character lines together with their carriage control characters and record marks. An additional word is reserved for a block-availability indication. The output for a particular report is then accumulated in grouped records containing no more than five

lines. When a block has been filled and a new record is to start, the next available block is called for from the pool and the old block is set to "unavailable." When enough such records have been formed to comprise a page of printing they are put out on the specified tape. After the tape has been checked, the blocks are made available again and released to the pool. Thus priorities for reports are handled automatically and depend only on their frequency of occurrence.

Note: The grouped record procedure assures a saving in tape time but requires the use of a Model 720, 730, or a Model 1403 printer.

Tape Switching

When an end-of-tape has been encountered during writing, an "end-of-file" message and a "rewind and unload" message are given. The following note is then written on-line:

TAPE XXXX MAY NOW BE REMOVED FOR PRINTING
AND REPLACED WITH A BLANK TAPE

where XXXX is the tape address in octal. At this time the alternate tape of the file specified by the FILDEF macro will be rewound and used from then on as the primary output tape of the file. If no alternate tape has been specified, the subroutine will continue using the primary tape unit after a new tape reel has been mounted.

Tape Errors

If an unrecoverable redundancy error has occurred during writing, the following note is written on-line and the program will halt.

TAPE XXXX IS CAUSING REDUNDANCIES DURING WRITE.
CONTROL RETURNED TO SYSTEM.

Programmer Errors

The following errors are detected by the subroutines and corresponding notes printed off-line. Where applicable, the program will halt.

- (a) LOC. XXXXX REPORT XX. LINE MACRO PARAMETER EXCEEDS MAX. LINES PER PAGE. SUBSEQUENT INFORMATION WILL BE PRINTED ON NEXT LINE.
- (b) LOC. XXXXX REPORT XX. NO FILE ASSIGNED. RETURNED TO SYSTEM.
- (c) LOC. XXXXX REPORT XX. NO TAPE ASSIGNED TO FILE. RETURNED TO SYSTEM.
- (d) LOC. XXXXX REPORT XX. ILLEGAL CHARACTER IN EDIT FORMAT. RETURNED TO SYSTEM.
- (e) LOC. XXXXX REPORT XX. NOT ENOUGH BUFFER SPACE ASSIGNED. RETURNED TO SYSTEM.
- (f) LOC. XXXXX REPORT XX. ILLEGAL REPORT NUMBER. RETURNED TO SYSTEM.
- (g) LOC. XXXXX REPORT XX. ILLEGAL MACRO. PROBABLY NO ENDFLD. RETURNED TO SYSTEM.

Paging and Titling

The subroutine maintains a current line count for each page of a report and, if specified, will perform automatic page restoring together with title and page identification printing without programmer interference. This feature will be operative if and only if any of the page description macros have been given; otherwise it will be assumed that paging is under programmer control. The various conditions of spacing and page restoring in the automatic mode are described below where

- L_{max} = specified number of lines per page
- L_{curr} = current line number
- L = LINE macro parameter
- N = SPACER macro parameter

(a) Using LINE Macro

If $L_{max} > L > L_{curr}$ the next line will be printed on line L this page.

If $L \leq L_{curr}$ the next line will be printed on line L next page.

If $L > L_{max}$ the next line will be printed on line $L_{curr} + 1$ this page, but an error condition will be recorded.

(b) Using SPACER Macro

If $L_{curr} + N < L_{max}$ the next line will be printed on line $L_{curr} + N$ this page.

For the conditions $L_{curr} + N \geq L_{max}$, the location of the next line will depend upon whether or not any titles or date-page lines have been specified. The various possibilities under these constraints may be summarized as follows:

DATPAG On 1st Line ?	DATPAG On Last Line ?	Titles ?	Next Line If $L_{curr} + N = L_{max}$	Next Line If $L_{curr} + N > L_{max}$
No	No	No	L_{max} this page	Line 1 next page
No	No	Yes	L_{max} this page	2 lines after last title line next page
No	Yes	No	Line 1 next page	Line 1 next page
No	Yes	Yes	2 lines after last title line next page	2 lines after last title line next page
Yes	No	No	L_{max} this page	Line 2 next page
Yes	No	Yes	L_{max} this page	2 lines after last title line next page

Use of REPEAT Macro

(a) One-Level REPEAT:

```

REPORT
  REPEAT 2, 3
  SPACER 1
  FIELD
  
```

```

[ REPEAT 5, 4
  FIELD
  FIELD
  FIELD
  EDIT
  FIELD
ENDFLD

```

(b) Two-Level REPEAT:

```

REPORT
[ REPEAT 7, 50
  SPACER 1
  FIELD
  [ REPEAT 1, 5
    EDIT
  [ REPEAT 2, 3
    EDIT
    FIELD
ENDFLD

```

For each FIELD or EDIT macro appearing within the range of a REPEAT (either one- or two-level), the base location L, T will be incremented by $I_L(k-1)$ to form a new base location $L, T + I_L(k-1)$ every time the macro is encountered. Here k is the number of times the macro has been encountered and I_L is the location incrementer. Also, the base print position P_f will be incremented by $I_p(k-1)$ to form a new print position $P_f + I_p(k-1)$ every time the macro is encountered. However, at the completion of a REPEAT, the incrementer is reset to zero so that the next time the macro is executed, the print position will be the original P_f .

Editing

The following is a list of characters that are permitted in the output format description:

- Blank (b)** This represents a character in the input quantity which will appear in the corresponding output position except under zero-suppression.
- 0** This is placed in the format description in the rightmost position in which zero-suppression is to occur. If it appears in the first fraction position and if the output fraction is zero, the number will appear as an integer (see examples).
- \$** This will appear unconditionally in the corresponding output position.
- .** This will appear in the corresponding output position unless zero-suppression is in effect.
- ,** This will appear in the corresponding output position unless zero-suppression is in effect.
- S** A "+" or "-" will appear in the corresponding output position if the input quantity is positive or negative, respectively.
- +** A "+" will appear in the corresponding output position if the input quantity is positive. If it is negative a blank will appear.
- A "-" will appear in the corresponding output position if the input quantity is negative. If it is positive, a blank will appear.
- (** A "(" will appear in the corresponding output position if the input quantity is negative.
-)** A ")" will always appear in the corresponding output position if the input quantity is negative.
- If zero suppression is in effect and no "\$" has been specified, the sign or left parenthesis will appear in the position immediately preceding the first non-blank. (If a "trailing sign" is specified it will unconditionally appear in the corresponding output position.) If no sign definition has been made, then the output quantity will be unsigned.
- *** This represents the termination of an output format description sequence.

Macro-Instruction Expansions

REPORT	MACRO STL TXI PZE END	K, T REPLOC REPLOC+1, 0, 0 K, T
SPACER	MACRO PZE END	N N, 0, 1
LINE	MACRO PZE END	L L, 0, 2
FIELD	MACRO PZE VFD END	Y, T, E, P, I Y, T, 3 8/E, 8/P, 8/I, 12/0
PARAG	MACRO PZE PZE END	Y, T, N N, 0, 4 Y, T
REPEAT	MACRO PZE PZE END	N, M N, 0, 5 M
ENDFLD	MACRO PZE END	0, 0, 6
PAGDEF	MACRO STL TXI VFD END	P, N, L, M, K REPLOC REPLOC+1, 0, 7 5/K, 8/N, 8/P, 6/M, 6/L, 3/0
DATPAG	MACRO STL TXI VFD END	L, P, K REPLOC REPLOC+1, 0, 8 8/P, 6/L, 17/0, 5/K

TITLES	MACRO STL TXI VFD END	Y, T, N, K REPLOC REPLOC+1, 0, 9 5/K, 13/N, 3/T, 15/Y
BUCKET	MACRO STL TXI PZE END	L1, L2 REPLOC REPLOC+1, 0, 10 L1, 0, L2
FILDEF	MACRO STL TXI VFD VFD VFD VFD VFD VFD VFD END	T11, T12, T21, T22, T31, T32, T41, T42, T51, T52, T61, T62 REPLOC REPLOC+1, 0, 11 H18/T11, H18/T12 H18/T21, H18/T22 H18/T31, H18/T32 H18/T41, H18/T42 H18/T51, H18/T52 H18/T61, H18/T62
ATTACH	MACRO STL TXI PZE END	K, F REPLOC REPLOC+1, 0, 12 F, 0, K
WRAPUP	MACRO STL TXI PZE END	K REPLOC REPLOC+1, 0, 13 K
CLOSEF	MACRO STL TXI PZE END	F REPLOC REPLOC+1, 0, 14 F
EDIT	MACRO PZE VFD END	Y, T, P, C, E, B, I Y, T, 15 8/E, 8/P, 8/I, 8/B, 4/C

IV-C FOUR-TAPE SORT ROUTINE

Definition

From the programmer's point of view, this routine consists of three basic steps. First, the programmer specifies the form of the records which he wants included in the sort. Second, he indicates that he is through adding to the file which is to be sorted and therefore sorting may commence. Finally, he calls for the sorted items in sequence.

Procedure

Record specification is accomplished by calling sequence:

L	TSX	SRTRC, 4	
L + 1	PZE	A1, A2	
L + 2	YYY1	B1, T1, N1	
.	.	.	.
.	.	.	.
.	.	.	.
L + j + 1	YYYj	Bj, Tj, Nj	(j = 1, 2, . . . , m)
.	.	.	.
.	.	.	.
.	.	.	.
L + m + 1	YYYm	Bm, Tm, Nm	

where

A1 = the number of words required for this sort record.
Where A1 is zero, the sort program immediately returns without taking any action. (Note: A1 should be consistent with the Nj, below.)

A2 = the number of field parameters which follow.

PZE to indicate this parameter refers to whole words.
YYYj = PON thru SIX to indicate this parameter refers to characters, the first of which is to be taken from this character position in the word Bj, Tj.

Bj, Tj = the word in core with which this field begins.

Nj = the number of words (or characters) to be moved to the sort record. Nj = 0 will cause a skip to the next parameter.

The fields specified by calling sequences of this form are moved, in the order called, to a sort record which is built up in a sort buffer. Each entry of the calling sequence generates a record which will be sorted as an integral unit by the program. "Character-specified" fields are "packed" into the sort record. However, "word specified" fields will only be moved beginning with the next whole word available in the sort record. Thus, some character positions preceding such fields may be unused (zeros).

The programmer terminates the sort file and initiates intermediate sort phases by giving:

```
L      TSX  SRTND, 4
L + 1  PZE  R
```

where R is the location to which control is returned on completion of the sort.

In the final phase the programmer may call in the sorted file by giving:

```
L      TSX  SRTFN, 4
L + 1  End-of-file return
L + 2  Sequence error return
L + 3  Normal return
```

which, except for EOF, will return with the address of the first word of successive records in the address portion of the AC and the record size, in words, in the decrement of the AC. Calling a record may result in the loss of that previously called, hence the records which are to be saved should move to a save area when called.

Where the programmer has not given any records to be sorted, an immediate end-of-file return will result.

Parameter Setup

In using the sort program it is necessary to specify the following parameters--all of which must appear consecutively, in order, and immediately preceding the sort program to which they apply:

```
SRTTP  PZE STAPE1
        PZE STAPE2
        .      .
        .      .
        .      .
        PZE STAPEr
MRGTP  PZE MTAPE1
        PZE MTAPE2
        .      .
        .      .
        .      .
        PZE MTAPEs
FINTP  PZE FTAPE1
        PZE FTAPE2
        .      .
        .      .
        .      .
        PZE FTAPEt
SRTKY  EQU L
SXCOR  EQU X
MXCOR  EQU Y
FXCOR  EQU Z
Sort Program
```

STAPE, MTAPE, and FTAPE are the symbolic locations of the BCD select addresses of the tapes (i. e., PZE A1 or PZE B4).

SRTTP specifies r tape units that will be written as the sort buffers are filled with records specified by the programmer. These buffers are sorted prior to writing, so that even though the programmer is externally concerned only with specifying sort records, sorting actually takes place during the entire process.

MRGTP specifies s tape units in addition to SRTTP's which are to be made available to the sort program for whatever merge passes are necessary. Therefore, they are not required until after the SRTND is given and may be used by the programmer prior to that time. Since each input (or output) operation is completed and checked prior to initiating the next, greater efficiency will be realized if MRGTP and SRTTP specify tape units on separate channels. Where the programmer does not wish to assign merge tapes he may give

MRGTP BCI 1, NONE

which implies to the sort program that one merge pass will suffice to put the file into sequence. In this case, exceeding capacity (one sequence block per SRTTP) will result in an error stop.

FINTP specifies t tape units which are to be made available to the programmer after the sort is completed and he is ready to process the sorted file. The program does not make a final merge pass on the file. At the time the programmer calls on the sorted file the records are not actually merged, but are provided one at a time, in sequence, to the programmer. Specification of FINTP's can result in extra passes if it turns out that the most efficient merge would terminate with part of the file on one of the FINTP's. If FINTP's are not to be specified by the programmer he may specify:

FINTP BCI 1, NONE

Beginning in SRTFN+1, the symbolic addresses of those tapes which do not contain any part of the sorted file (and hence are available to the programmer) are listed. The list terminates in a zero word and will, of course, include FINTP's.

All sort records will be sorted into sequence on the first L words, as specified by SRTKY. Fields to be sorted in any other than normal 7090 sequence (e.g., descending sequence, EAM sequence) must be converted by the programmer before moving them into a sort record. There is no restriction on the size of SRTKY except that it must not be less than the length of the records to be sorted.

SXCOR, MXCOR, and FXCOR specify the amount of core available to each of the three sort phases, including buffers. In case the programmer desires to save any part of core until the phase in which the sorted file is to be read, it should be understood that both the merge and final phases with their buffers occupy upper core, i.e., from 32768 - MXCOR and 32768 - FXCOR to 32767.

Since the various program phases are not in core together, the sort routine includes a TCD card following the first phase which returns control to BGN when loading of this phase (which will normally include the programmer's first phase) is completed.

Some of the more likely sources of error in using the sort program have been found to be:

1. Using SRTTP's or MRGTP's in a later phase before they have been released from an earlier phase.
2. Excessive allocations of MXCOR and FXCOR, which result in reading over areas of core which the programmer wishes to reserve.
3. Failing to preserve as many words in the first parameter following TSX SRTRC, 4 as are called out by the field' parameters following.
4. Returning for additional sort records after the sort EOF has been reached.

Exception Messages

Error checking includes I/O parity checks plus checks on word and physical record counts. The exception messages will be printed on-line, as follows:

Sort Phase:

WRITE ERROR OR TAPE END ON OUTPUT TAPE XX
CANNOT WRITE LAST RECORD ON OUTPUT TAPE XX
CANNOT WRITE END-OF-FILE ON OUTPUT TAPE XX
CANNOT WRITE COMMUNICATION RECORD EOF XX
CANNOT WRITE COMMUNICATION RECORD. - TPE XX
OVERFLOW IN INTERNAL SORT.
INCORRECT CORE ALLOCATIONS.
CANNOT LOAD MERGE PHASE.

Merge Phase:

CANNOT READ MERGE PASS INPUT TAPE XX
CANNOT FIND EOF ON INPUT TAPE.
COMMUNICATION RECORD WORD COUNT IN ERROR.
CANNOT FIND COMMUNICATION RECORD EOF.
CANNOT READ COMMUNICATION RECORD XX
NUMBER OF WORDS READ FAILS TO AGREE WITH NO.
WRITTEN.
CANNOT READ INITIAL INPUT RECORDS XX
*CANNOT WRITE END-OF-FILE ON OUTPUT TAPE XX
NUMBER OF PHYSICAL RECORDS READ FAILS TO
AGREE WITH NO. WRITTEN.

*CANNOT WRITE COMMUNICATION RECORD XX

CANNOT LOAD FINAL PHASE.

WRITE ERROR OR EOT ON OUTPUT TAPE XX

Final Phase:

CANNOT READ FINAL PASS INPUT TAPE XX

NO. OF WORDS READ FAILS TO AGREE WITH NO.
WRITTEN.

NO. OF PHYSICAL RECORDS READ FAILS TO AGREE
WITH NO. WRITTEN.

CANNOT FIND EOF ON OUTPUT TAPE.

CANNOT READ COMMUNICATION RECORD XX

COMMUNICATION RECORD WORD COUNT ERROR.

CANNOT FIND COMMUNICATION RECORD EOF.

The errors indicated with an asterisk are under operator control. All other errors will cause the system to stop. The following message will be printed on-line:

RECOVERY POSSIBLE - CHANGE BAD TAPE - HIT START

The recovery routine reruns the merge pass in which the error occurred.

The XX in the above messages refer to tape numbers.

IV-D TWO-TAPE SORT ROUTINE

Definition

This sort routine utilizes two tapes and functions to produce a sorted tape file of logical records (of fixed or of variable length) by repeating the following steps:

1. The SORT region is given one record at a time, which it stores in a table in memory.
2. When the table is full, the records are sorted.
3. The sorted records in memory are merged with a sorted tape file and written on a second tape. The tapes are rewound and the process is repeated, the second tape now being considered the sorted tape file.

Calling Sequence

The sort routine is entered to preset the region, receive a record for setting, or to terminate the sorting process.

(a) Sequence to Preset the Region

L	TSX	SORT, 4
L+1	PZE	TAPE 1, , TAPE 2
L+2	PZE	C, , D
L+3	PZE	E, , F
L+4	PZE	G, , H
L+5		Normal return

TAPE1 and TAPE2 are symbolic locations containing the IOEX select addresses of the two tapes to be used by the region. The tapes must be selected and rewound by the programmer.

C is the address of the first word of the definition table required by the Reader (READ).

D is the address of the first word of the definition table required by the Writer (WRIT).

E is the first address of a table of length F which is used by the region to perform memory sorts. F should be as large as possible.

The key for sorting the records begins in word number G of each record and is H words in length.

(b) Sequence to Give a Record to the Region for Sorting

L TSX SORT, 4
L+1 MZE L, T, M
L+2 Normal return

L, T is the address of the first word of a record in memory.

M is the number of words in the record. M must be given even if the records are of fixed length.

(c) Sequence to Terminate the Sorting Process

L TSX SORT, 4
L+1 PZE 0
L+2 Normal return

At return, the following conditions exist:

The address of the accumulator contains the symbolic location of the IOEX select address of the tape that has the sorted information.

The decrement of the accumulator contains a count of the number of logical records in the sorted file.

Bits 21 through 35 of the MQ contain the count of the number of logical records lost during the sorting process due to tape error. Bits S through 20 of the MQ contain zero.

Both tapes will be in a rewound condition.

Regions Used by the Sort Routine

The sort routine uses both the Reader (READ) and the Writer (WRIT). The define and undefine of these regions are performed by the sort routine.

Restriction

The sorted file must fit on either of the tapes TAPE1 or TAPE2.

Exception Messages

If an error is encountered, the following error message will be printed and the program will halt:

ERROR IN SORT XX

where XX is the error code.

If a program error was encountered in the Reader or Writer, XX will be the code number for the type of error detected (see error codes specified in Subsecs. IV-G and IV-H for the READ and WRIT routines, respectively.)

For errors encountered in the sort routine, the following codes will be used:

<u>Code</u>	<u>Type of Error</u>
1	Error in sorting records in memory
8	Writing failure occurred
9	End of tape has been encountered
10	Error while writing end-of-file or rewinding tapes.

IV-E WICAR CALENDAR ROUTINE

The WICAR calendar routine can compute the number of work days from a base date of January 1, 1945, to any given date, and, alternatively, can convert the number of work days from January 1, 1945, to a calendar date. This routine is based on two premises: that this calendar repeats itself every 28 years, and that every year as well as every month will begin on a predetermined day within the cycle. (Note: Exceptions to the 28-year cycle are the century years that are not leap years—i. e. , are not divisible by 400. The year 2000 is a leap year.) Thus, in developing this program, a table of 28 years has been set up which will suffice for any 28 year period in calendar time.

This table of years, called TLNK, will indicate how many work days have elapsed up to a particular year. The TLNK table will also link into a second set of tables that are set up according to the day that this particular year starts on. If it is not a leap year, one of this set of tables, called TMON-TSUN, will indicate how many work days have elapsed up to a particular month. This table will also indicate the holidays that have occurred up to this particular month, as well as list the holidays that fall in the month. It will allow for up to 3 holidays in any one month. In the TMON-TSUN table there will be a link into the TMWD table by the day the month starts on. The TMWD table will indicate the number of work days up to a particular day. If the particular year is a leap year, the second table is called TLMO-TLSU and will contain two links. The first link is used if the month of the leap year falls prior to March. It will return to the TMON-TSUN table at the same location as if it were not a leap year. The second link is used for March and all subsequent months in the leap year. The days will be modified by a value in the TLMO-TLSU table and then return to the TMON-TSUN table at a location one day later than the day the year starts on.

The same tables are used for both the date-to-workday and workday-to-date conversions. This routine will not put out any dates that fall on Saturday or Sunday. If a Saturday or Sunday date comes into the system, it will be

handled as if it were the previous Friday. This program is presently set up to handle the following six holidays: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving, Christmas. No dates generated by the system will fall on these days.

The following calling sequence will convert the number of work days from the established base to a date expressed as a binary number.

```
CLA  X  A non-zero value should be set in the accumulator
LDQ  Y  The binary number in MQ at B35
TSX  WICAR, 4
Error return
Normal return
```

The error return will indicate that a zero value for work days has been entered into the system. At the normal return the accumulator will contain the date that has been developed in the form of MM-DD-YY.

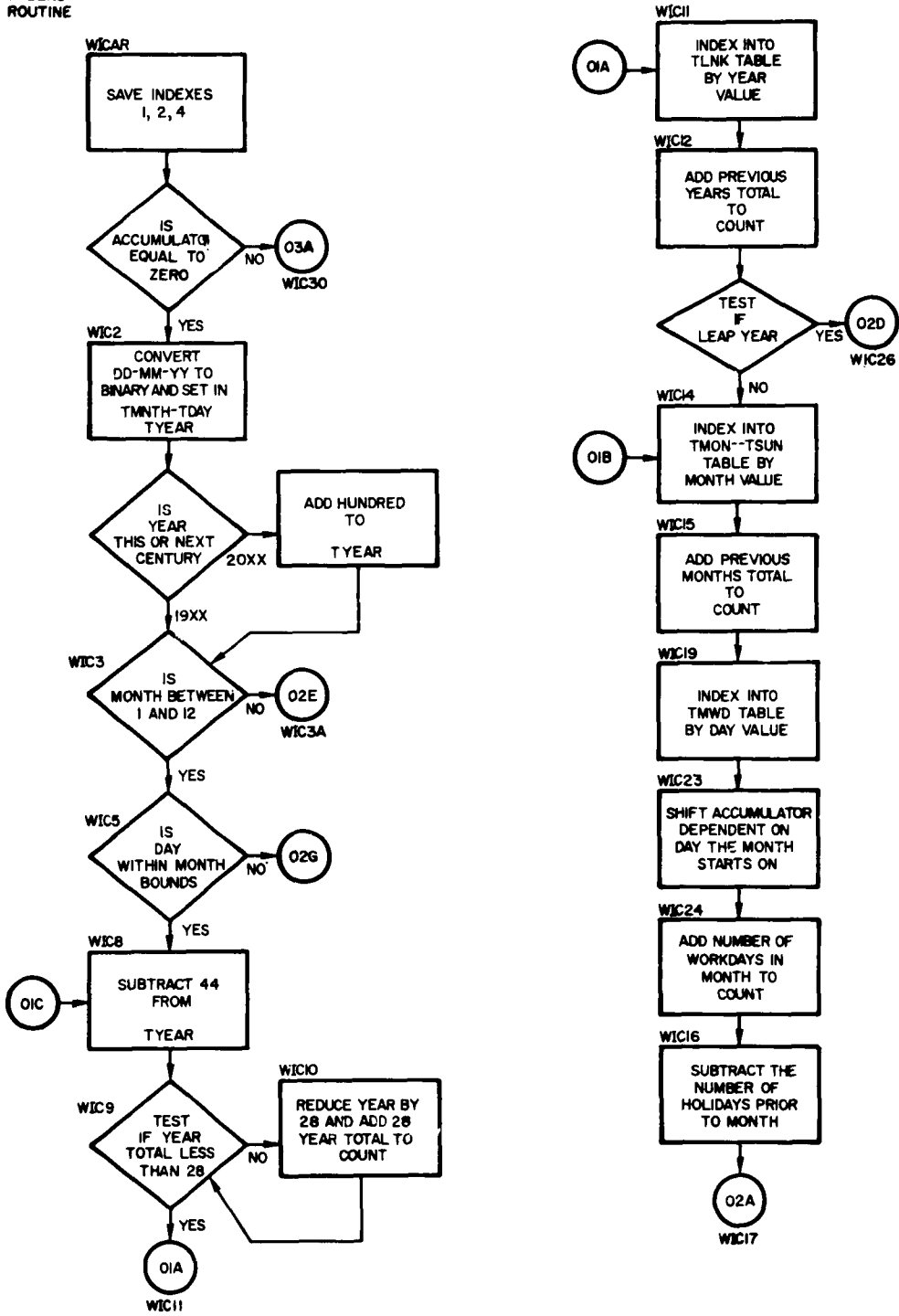
The calling sequence will convert a calendar date to work days in binary from a pre-established base.

```
CLA  X  A zero value should be set in the accumulator
LDQ  Y  The date to be converted in the MQ in the form of MM-DD-YY
TSX  WICAR, 4
Error return
Normal return
```

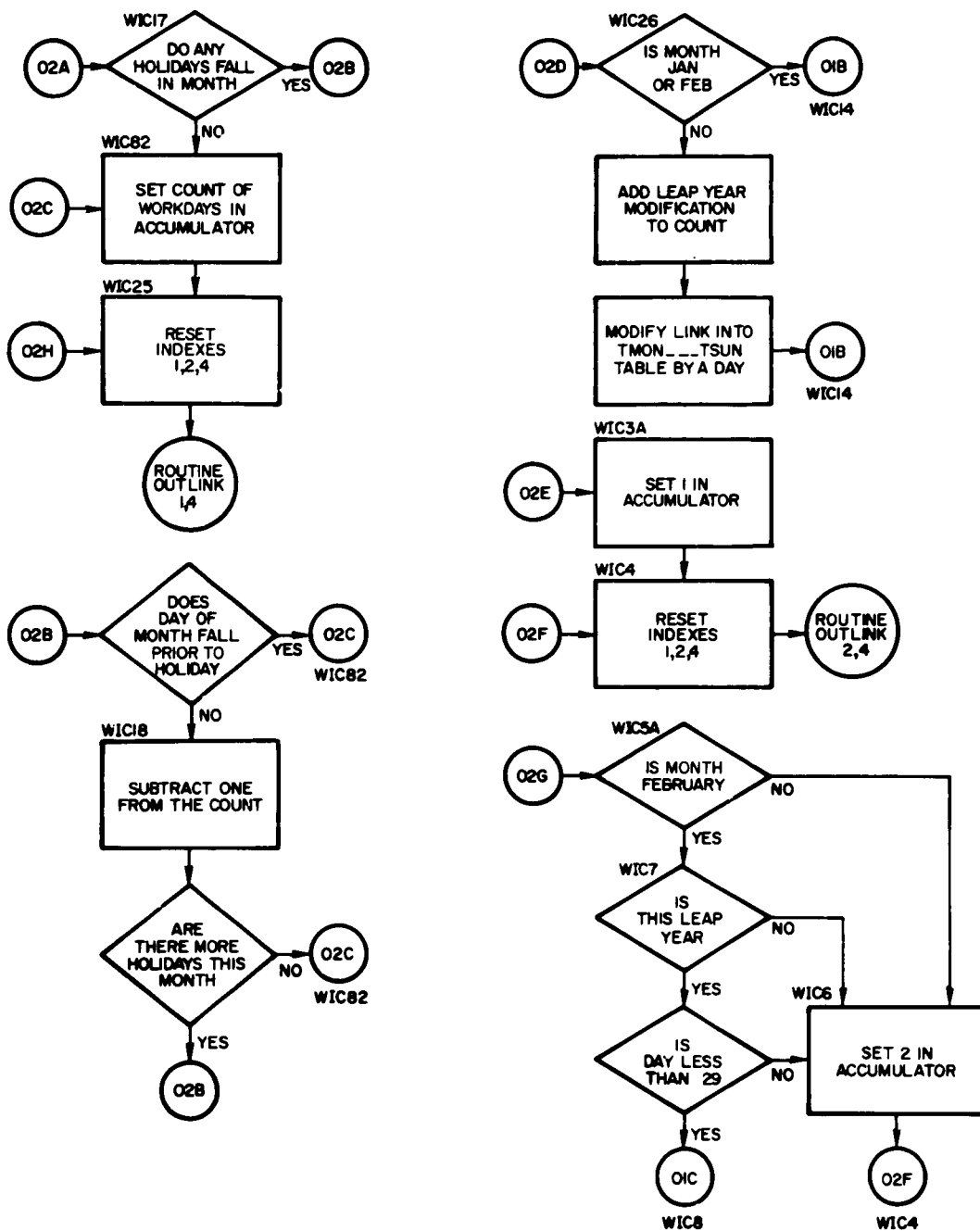
The error return will indicate input problems and contain either a 1 or 2 in the address of the accumulator. These values will indicate the following errors: 1 = the month is not between 1 and 12; 2 = the day of the month is not within prescribed limits. The normal return will contain the binary number in the address of the accumulator.

REGION WICAR

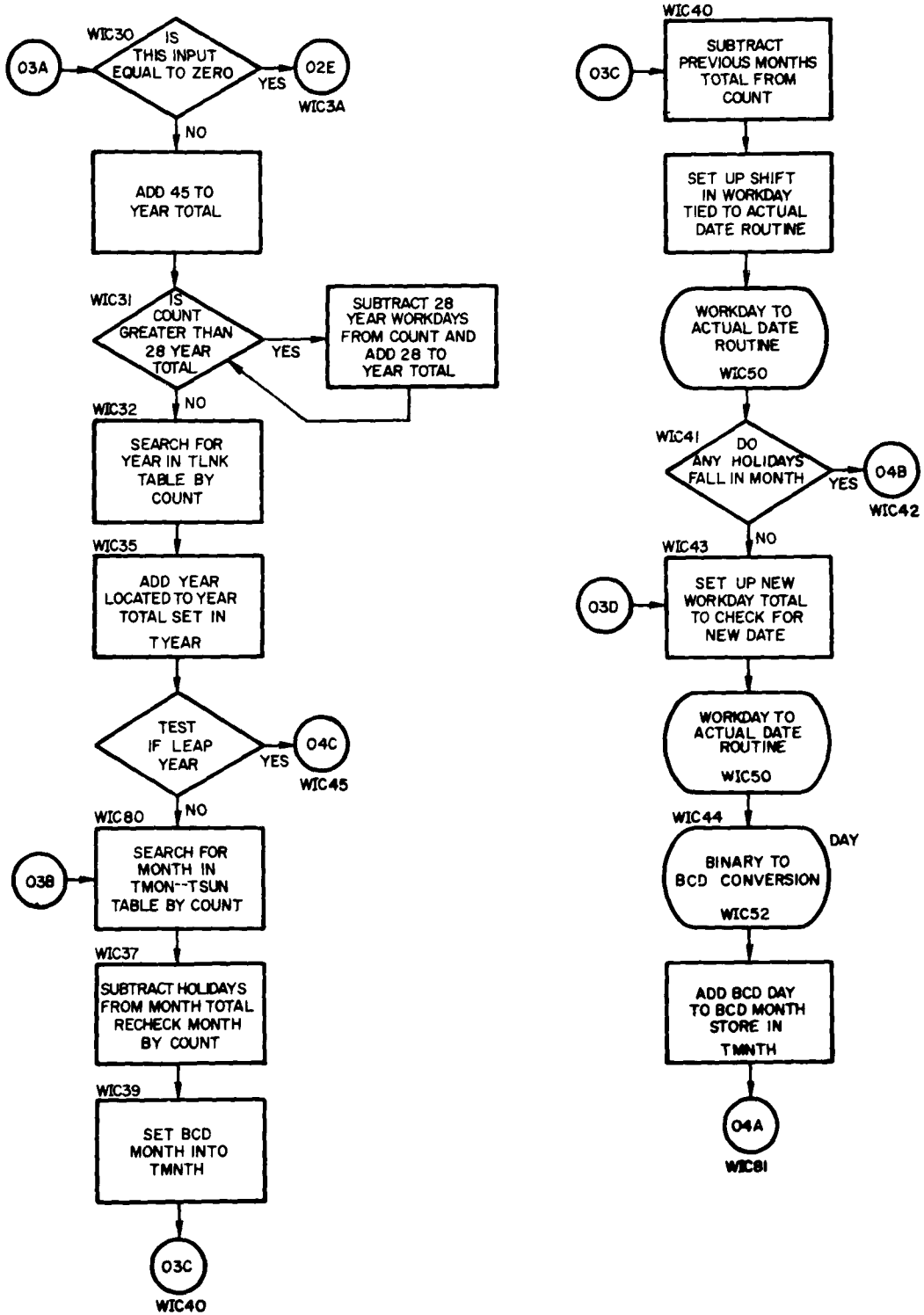
CALENDAR ROUTINE



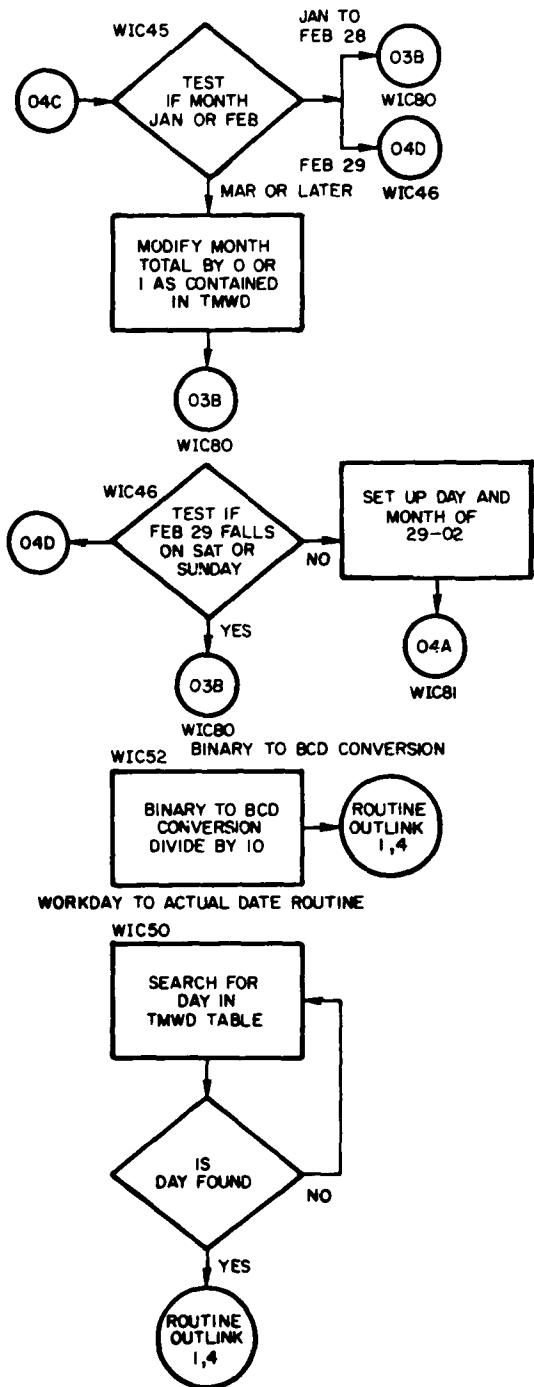
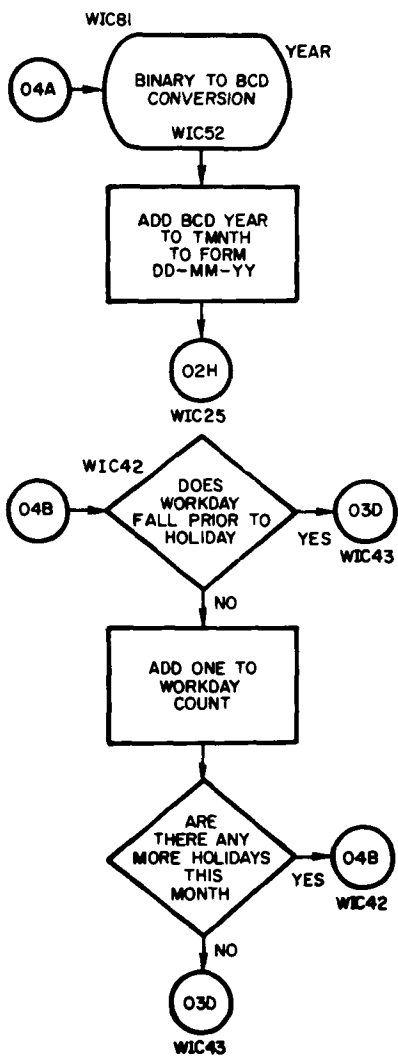
REGION WICAR



REGION WICAR



REGION WICAR



IV-F CONVERSION ROUTINES

The regions for converting alphabetic month descriptions to all number descriptions (and vice versa) and for converting BCD data to fixed-point (and vice versa) are described below.

Date Conversion Routine (DATE)

EXPLANATION OF REGION:

This routine converts a 7-character (alphabetic month) military or standard date to a 6-character all-numeric date, or vice-versa.

CALLING SEQUENCE:

L TSX DATE, 4
L+1 PZE N,, M
L+2 Normal return

INPUT:

Accumulator = first six characters of the date

MQ = seventh character of the date (if necessary) in s, 1, . . . , 5

OUTPUT:

Accumulator = first six characters of the date

MQ = seventh character of the date (if necessary) in s, 1, . . . , 5

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

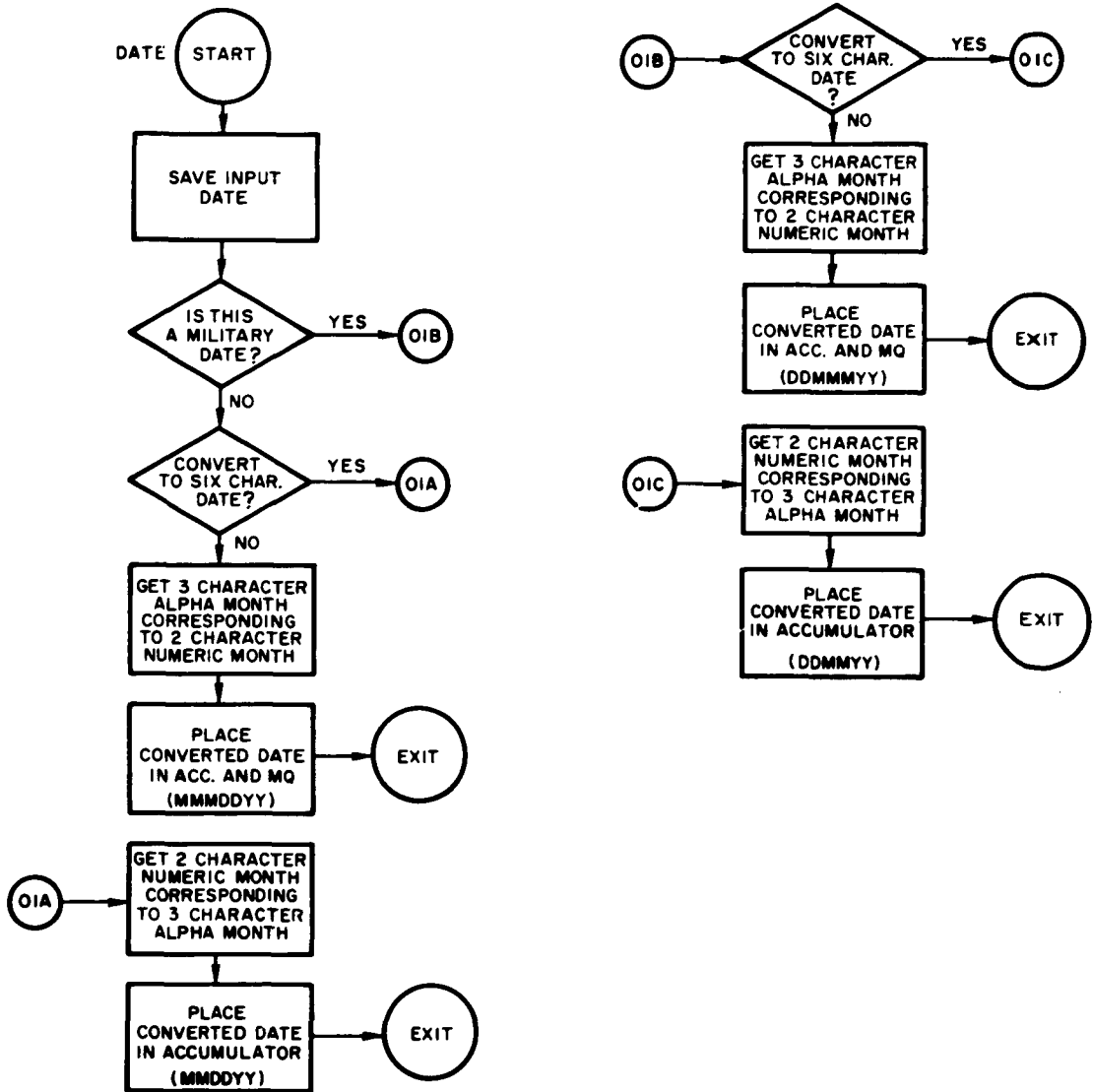
Not applicable.

EXPLANATION OF CALLING SEQUENCE:

N = 0 if military date (DDMMYY or DDMMMYY)
 = 1 if standard date (MMDDYY or MMMDDYY)

M = 0 if converting a 7-character date to a 6-character date
 = 1 if converting a 6-character date to a 7-character date

REGION DATE



BCD to Fixed Point Conversion Routine (FIXPT)

EXPLANATION OF REGION

To convert N BCD numbers to a fixed-point integer.

CALLING SEQUENCE:

L-1 LDQ A, T
L TSX FIXPT, 4
L+1 PZE N
L+2 Normal return

INPUT:

A, T = location of the word to be converted.
N = number of characters to be converted ($N \leq 6$) (characters must be left-justified).

OUTPUT:

Fixed-point integer in Accumulator at B35.

STORAGE USED:

Not applicable.

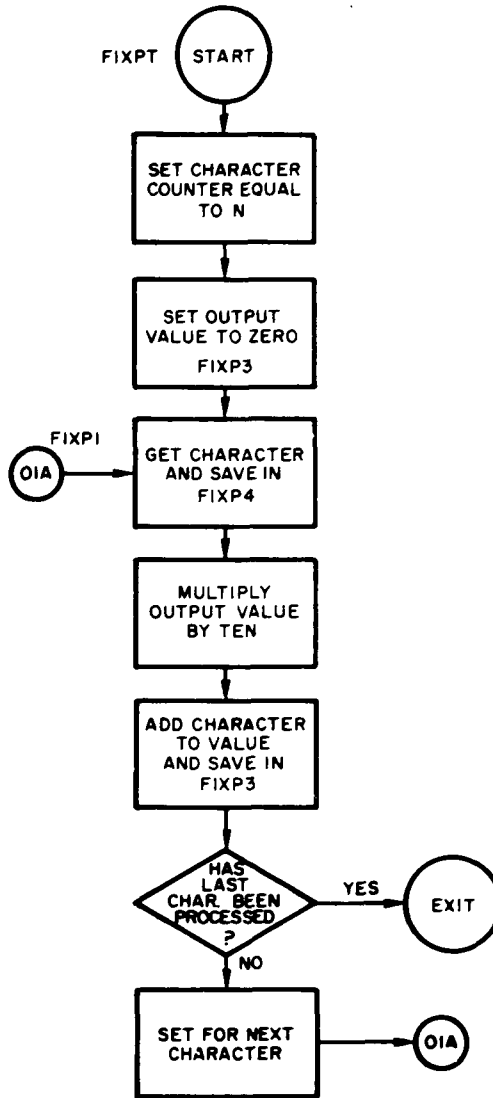
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

Not Applicable.

REGION FIXPT



Fixed Point to BCD Conversion Routine (FTB)

EXPLANATION OF REGION:

To convert a fixed point integer at B35 to BCD number.

CALLING SEQUENCE:

L TSX FTB, 4
L+1 PZE A, , B
L+2 Normal return

INPUT:

Fixed-point integer at B35 in location A.

OUTPUT:

Twelve BCD characters (right-justified) starting in location B
(two words).

STORAGE USED:

Not applicable.

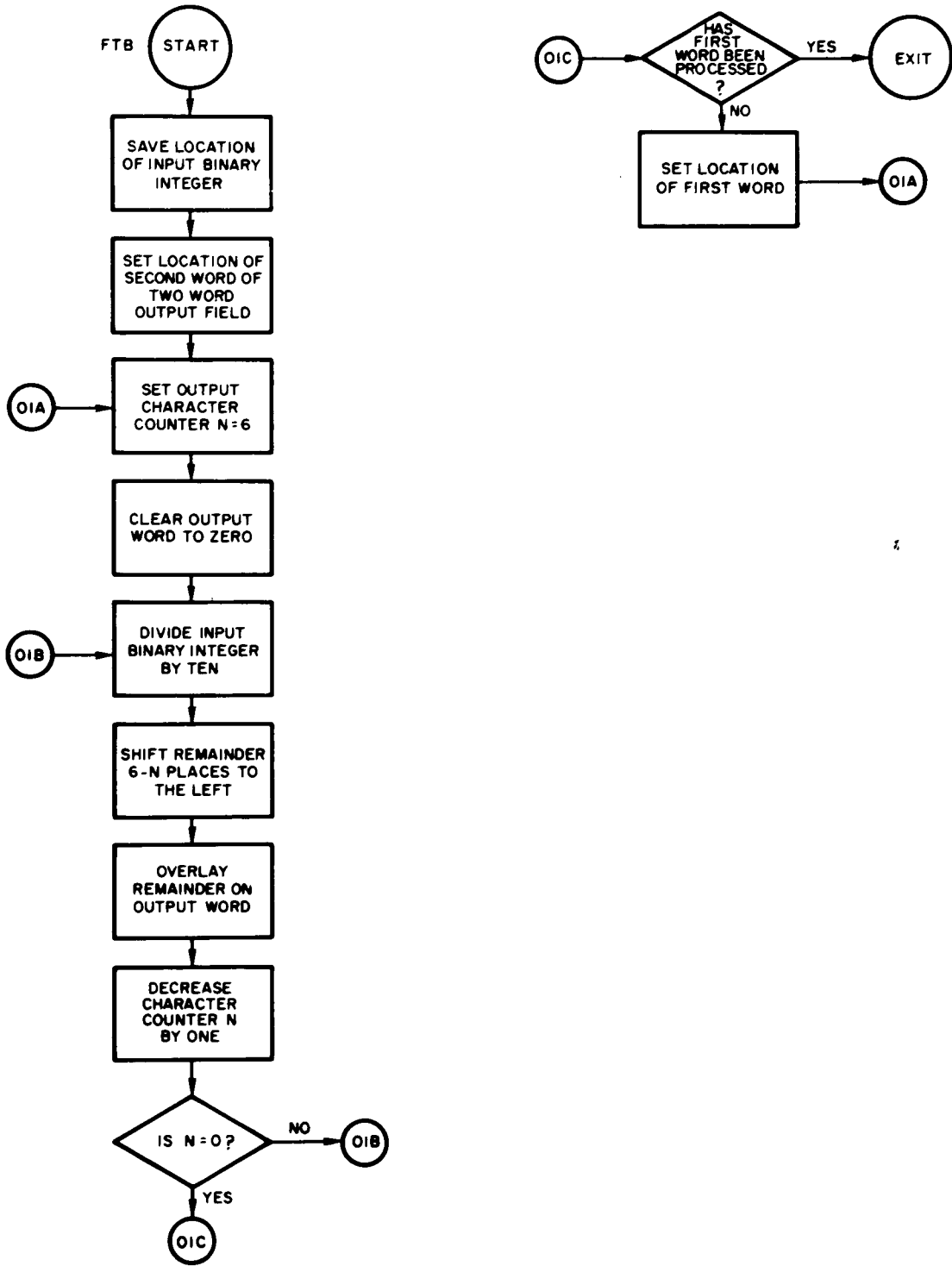
SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

A = location of the fixed point integer.

B = location of the first of two words where the BCD number will
be stored.



IV-G THE WRITER

The following is a description of a routine (WRIT) that will write a logical file on one or more tapes.

Restrictions

1. Tapes written by the Writer will be in one of the following two formats:
 - a) If logical records are not grouped, each physical record will contain one logical record (of fixed or variable length) followed by its checksum. (The checksum is only examined in case of a redundancy error.)
If logical records are grouped, each physical record contains several fixed-length logical records or one or more variable-length records, as follows:
 - (1) Each fixed-length logical record is followed by its checksum.
 - (2) Each variable-length logical record is preceded by the word length of the logical record as an integer at a B-value of 35 and is followed by its checksum.
2. A tape must be selected, positioned, and its logical file defined before it can be written on by the Writer.
3. A logical file must be undefined after the program has finished with it. If it is not, the Writer may fail to write all the information from the buffers onto the tape.
4. If it is desired to write more than one physical file on the same tape, it is necessary to undefine and define that logical file after each physical file is written.
5. If the Writer is re-entered after having exited due to a program error, the program will halt.
6. The Writer will write only complete physical files.
7. The Writer cannot change tapes until an end-of-tape return has been made for the tape it is finishing.

Defining A Logical File

The following calling sequence must be used to define a logical file if the Writer is to be used to write the file. The logical file should not be redefined for each tape written. The calling sequence defines only one logical file; however, the programmer may define as many logical files as he desires with as many calling sequences.

```
L      TSX  WRIT, 4
L+1    PZE  TAPE, 1, K
L+2    Program error
L+3    Normal return
```

The writer will begin writing the logical file on the tape whose IOEX select address is contained in symbolic location "TAPE."

"K" is the address of the appropriate definition table in memory. (See Definition Table below).

The Program Error exit is used by the routine if it detects a program error. (See Page IV-G-4).

Definition Table

```
PZE  A, C, B
PZE  D, 0, F
```

In the above, the symbols represent the following:

A

A represents the address of the first of consecutive locations in memory in which the Writer is to store a physical record to be written on tape. The A-block must be large enough to hold the largest number of words to be written as a physical record.

B

If buffering is desired, B is a block of storage equal to A. The A- and B-blocks must not overlap. B is zero if buffering is not desired.

C

If logical records are not to be grouped by the Writer, C equals zero. If logical records are to be grouped, C is not equal to zero.

D

D is the maximum length of a physical record to be written by the Writer.

F

If logical records are of variable length, F equals zero. If logical records are of fixed length, F equals record length. The record length does not include the checksum. The Writer computes the checksum.

Writing a Logical Record

Each write entry into the Writer prepares one logical record for writing on a tape. A physical record is written each time the A or B storage block is filled. The calling sequence to write is:

Load accumulator with X (if variable length logical records are being written).

L TSX WRIT, 4
L+1 PZE TAPE, , M
L+2 Program error
L+3 Writing failure
L+4 End-of-tape
L+5 Normal return

In the above, the symbols represent the following:

X

X represents the word length (integer, B=35) of the logical record (not used for fixed length records). The word length does not include the checksum. The Writer computes the checksum.

TAPE

This is the symbolic location containing the IOEX select address of the tape to be written.

M

M is the address of the first of consecutive words to be written on tape as a logical record.

Program Error

When the Writer transfers to the program error return, the decrement of the MQ contains a code number from 1 to 8 which specifies the type of error detected by the Writer. If a program transfers to the Writer after a return has been made to a program error exit, the program will halt. The codes are as follows:

1. Tried to write on a tape after an end-of-tape return.
2. Error in calling sequence.
3. Tried to write, change tapes, or undefine a logical file when the logical file mentioned had not been previously defined.
4. Error in Writer.
5. Tried to change tapes before an end-of-tape return has been made from the Writer.
6. (not used)
7. Tried to write on a tape which had not been selected.
8. Tried to undefine a logical file after a return to end-of-tape and before a change tape was given for the appropriate logical file.

Writing Failure

The Writer returns here if a redundancy error occurred when writing a record.

End-of-Tape

The Writer returns here if it encountered an end-of-tape while writing the last physical record. An end-of-file has been written by the Writer. The program must change tapes before the Writer is given another logical record to write on the logical file concerned.

On all returns, the address of the accumulator contains a count of the number of logical records given to the Writer to write on the logical file. The decrement contains a count of the number of logical records already written on the logical file.

Tape Changes

The program may only change tapes after an end-of-tape return from a write entry to the Writer. Before the Writer is instructed to change tapes, the

program must initialize the tape selection for the next tape to be written on.

The calling sequence to change tapes is:

```
L    TSX    WRIT, 4
L+1  PZE    TAPE 2, 2, TAPE 1
L+2  Program error
L+3  Normal return
```

TAPE 2 is the symbolic location containing the IOEX select address of the tape to be written.

TAPE 1 is the symbolic location containing the IOEX select address the writer has just finished writing.

PROGRAM ERROR is the program error return described on Page IV-G-4.

Undefine

A logical file must be undefined after the program is finished with it and before the tape is selected or repositioned. The calling sequence to undefine is:

```
L    TSX    WRIT, 4
L+1  PZE    TAPE, 3, 0
L+2  Program error
L+3  Normal return
```

TAPE is the symbolic location containing the IOEX select address of the tape.

PROGRAM ERROR is as previously described in Subsec. 4.6.4.

When the writer exits to NORMAL RETURN, an end-of-file has been written on the tape described by TAPE. The address of the accumulator contains a count of the number of logical records written on the logical file.

IV-H THE READER

The following is a description of a routine (READ) that will read a logical file from one or more tapes.

Restrictions

1. A tape must be selected, positioned, and its logical file defined before it can be read by the Reader.
2. A logical file must be undefined after the program has finished with it.
3. If it is desired to read more than one physical file in the same logical file on the same tape, it is necessary to undefine and define the logical file after each physical end-of-file before reading the next file.
4. If the reader is re-entered after having exited due to a program error, the program will halt.
5. The reader does not rewind tapes.

Defining a Logical File

The following calling sequence must be used to define a logical file if the Reader is to be used to read the file. The calling sequence defines only one logical file; however, the programmer may define as many logical files as he desires with as many calling sequences.

```
L      TSX  READ, 4
L+1    PZE  TAPE, 1, K
L+2    Program error
L+3    Normal return
```

TAPE is the symbolic location containing the IOEX select address of the tape to be read.

K is the address of the appropriate definition table.

Definition Table

PZE A, C, B

PZE D, E, F

In the above, the symbols represent the following:

A

A represents the address of the first of consecutive locations in memory into which the reader is to read a physical record from tape. The A-block must be long enough to hold the largest number of words to be read into memory from one physical record.

B

If buffering is desired, B is a block of storage equal to A. The A- and B-blocks must not overlap. B is zero if buffering is not desired.

C

If records are not grouped, C equals zero. If records are grouped C is not equal to zero.

D

D is the maximum length of any physical record in the logical file if the programmer desires the Reader to read complete physical records into memory. D is the number of beginning words of the physical record which are to be read into memory if only the first part of the record is desired.

E

E equals zero, if complete physical records are to be read into memory. E is not equal to zero if only the first D words of a physical record are to be read into memory. If logical records are grouped, then complete physical records must be read.

F

F equals zero if logical records are of variable length. F equals the record length, if logical records are of fixed length. The record length is the length of the logical record excluding the checksum.

Reading a Logical Record

Each read entry into the Reader supplies the program with one logical record.

The calling sequence to read a logical record is:

L TSX READ, 4
L+1 PZE TAPE
L+2 Program error
L+3 End-of-file
L+4 Checksum error
L+5 Normal return

In the above, the symbols represent the following:

TAPE

This is the symbolic location containing the IOEX select address of the tape to be read.

PROGRAM ERROR

At this return, the decrement of the MQ contains a code number from 1 to 6 which specifies the type of error detected.

1. Tried to read tape after an EOF return for that tape.
2. Error in calling sequence.
3. Tried to read, change tapes, or undefine a logical file which had not been previously defined.
4. Error in the Reader.
5. (not used)
6. Tried to read a tape which had not been selected.

End-of-File

Return is made to this location if an end-of-file has been read by the Reader. The last logical record has been processed in the previous read entry.

Checksum Error

If a redundancy occurs and the Reader is to read only the first D words of the physical record into memory, transfer is made to the checksum error exit. If the Reader is to read the entire physical record into memory and a redundancy error occurs, the

checksum of the logical record called for is checked. If the checksum is correct, processing of the record continues and transfer is made to the normal return. If it is not, transfer is made to the checksum error return. The checksum return is the same as the normal return in all respects except the location to which it returns. The logical record is set up for use even though it is in error.

Normal Return

The address of the accumulator contains the address of the logical record and the decrement contains a count of the number of words (excluding the checksum) in the logical record.

Tape Changes

The program may change tapes when or before an end-of-file is read by the Reader. Before the Reader is instructed to change tapes, the program must select the next tape to be read by the reader. The calling sequence to change tapes is:

```
L    TSX  READ, 4
L+1  PZE  TAPE 2, 2, TAPE 1
L+2  Program error
L+3  Normal return
```

TAPE 2 is the symbolic location containing the IOEX select address of the tape to be read.

TAPE 1 is the symbolic location containing the IOEX select address of the tape just read.

PROGRAM ERROR is the location to which the routine returns if the program tries to change a tape which has not been defined.

Undefine

A logical file must be undefined after the program is finished reading it. The calling sequence to undefine is:

```
L    TSX  READ, 4
L+1  PZE  TAPE, 3, 0
L+2  Program error
L+3  Normal return
```

TAPE is the symbolic location containing the **IOEX select address** of Tape.

Transfer is made of **PROGRAM ERROR** if the program tried to undefine a tape which had not been defined.

NORMAL RETURN, the address of the **MQ** contains a count of the number of logical records (without checksum error) read from the logical file.

IV-I OUTPUT PHASE READ ROUTINE

Definition

This routine (YREAD) will read one logical record from the JSORT, XSORT, or Tape Reader (READ) subroutines.

Calling Sequence

L TSX YREAD, 4
L+1 PZE T, , K
L+2 End of file return
L+3 Normal return

Explanation of Calling Sequence

(a) Tape Option T

If T equals zero, a logical record will be read from the JSORT sorting routine.

If T equals 1, a logical record will be read from the XSORT sorting routine.

If T equals TX (where TX is the symbolic name of a tape), one logical record will be read from tape TX utilizing the READ subroutine.

(b) Sort Sequence Length K

K is the number of words in the sort key and is expressed as a number from 0 to N.

K is used only when the sort key is to be removed from the logical record for processing. If the sort key contains information necessary for the processing of the logical record, K should be set to zero.

Output from Routine

- (a) Location YCNT contains the location of the first word of the logical record (including the sort key) in the address and a count of the number of words in the logical record (including the sort key) in the decrement. On the end-of-file condition, both the address and the decrement contain zero.

- (b) Index Register 1 contains the location of the first word (complemented) of the logical record (excluding the sort key of length K).

Exception Messages

If the JSORT or XSORT sorting routines are used and a sequence error occurs during the reading of the sort tapes, the following message is printed on-line:

A SEQUENCE ERROR WAS FOUND ON THE SORT TAPE
IN THE REPORTING PHASE

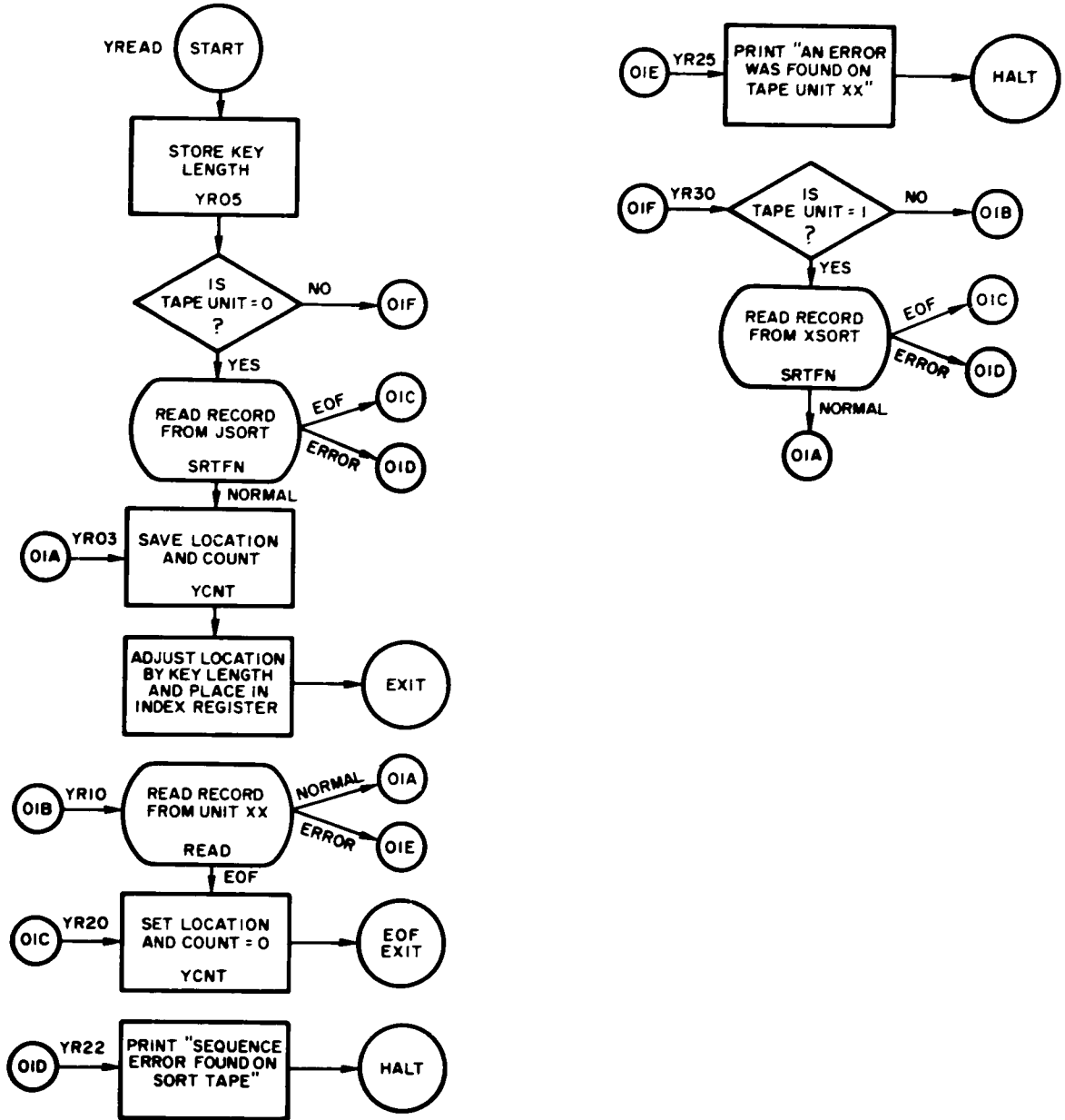
and the computer will halt. The program should be rerun.

If the READ subroutine is used and a redundancy error occurs, the following message is printed on-line:

AN ERROR WAS FOUND IN THE REPORTING PHASE ON
TAPE UNIT XX

and the computer will halt. The tape on unit XX should be replaced and the program rerun.

REGION YREAD



IV-J OTHER SUBROUTINES

Other subroutines used in processing PERT data are described on the remaining pages of this Subroutines section.

Unpacking Routine (UPCK)

EXPLANATION OF REGION:

This region takes one or more words in memory (6 characters per word) and stores each character into bits 30-35 of consecutive word in memory.

CALLING SEQUENCE:

L TSX UPCK, 4
L+1 PZE A, T, N
L+2 PZE B, I
L+3 Normal return

INPUT:

One or more words containing the N characters to be unpacked.

OUTPUT:

N characters contained in bits 30 through 35 of N consecutive words. Bits 5 through 29 are zero.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

A, T = Beginning location of the words to be unpacked
(first character in bits s, 1, ..., 5).
B, I = Beginning location of N words each containing one character
in bits 30-35.
N = Number of characters to be unpacked.

Packing Routine (PACK)

EXPLANATION OF REGION:

This region takes one or more characters, located in bits 30-35 of consecutive locations in memory, and forms one or more packed words (6 characters per word) in consecutive locations in memory.

CALLING SEQUENCE:

L TSX PACK, 4
L+1 PZE A, T, N
L+2 PZE B, I
L+3 Normal return

INPUT:

N characters starting in location B, I.

OUTPUT:

One or more packed words (6 characters each) beginning in location A, T. Incomplete words are justified left and filled out with zeros.

STORAGE USED:

Not applicable.

SUBREGIONS AND SUBROUTINES USED:

Not applicable.

EXPLANATION OF CALLING SEQUENCE:

A, T = Beginning location of packed words.
B, I = Beginning location of unpacked characters.
N = Number of characters to be packed.

Memory Sort (MSRT)

EXPLANATION OF REGION:

To internally sort one file of items in the same storage locations originally occupied by the file.

CALLING SEQUENCE:

L	TSX	MSRT, 4
L+1	PZE	A, , C
L+2	PZE	L, , N
L+3	PZE	K, , M
L+4	Normal return	

INPUT:

One file of items stored in consecutive locations in memory.

OUTPUT:

One file of sorted items arranged in memory in increasing order.

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

A	=	Location of first word of first item
C	=	Number of words in the key
L	=	Location of first word of key (L = 1, 2, ...)
N	=	Number of words in each item
K	=	0, logical sort
	=	1, algebraic sort
M	=	Number of items to be sorted

Three-Word to Three-Word Comparison Routine (YCOMP)

EXPLANATION OF REGION:

To compare two 3-word fields.

CALLING SEQUENCE:

L	TSX	YCOMP, 4
L+1	CAL	A, T
L+2	LAS	B, T
L+3	Return	A > B
L+4	Return	A = B
L+5	Return	A < B

INPUT:

Not applicable

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

Compares three words of field A, T to three words of field B, T.

Three-Word to Three-Word Comparison Routine (YCOMP)

EXPLANATION OF REGION:

To compare two 3-word fields.

CALLING SEQUENCE:

L	TSX	YCOMP, 4
L+1	CAL	A, T
L+2	LAS	B, T
L+3	Return	A > B
L+4	Return	A = B
L+5	Return	A < B

INPUT:

Not applicable

OUTPUT:

Not applicable

STORAGE USED:

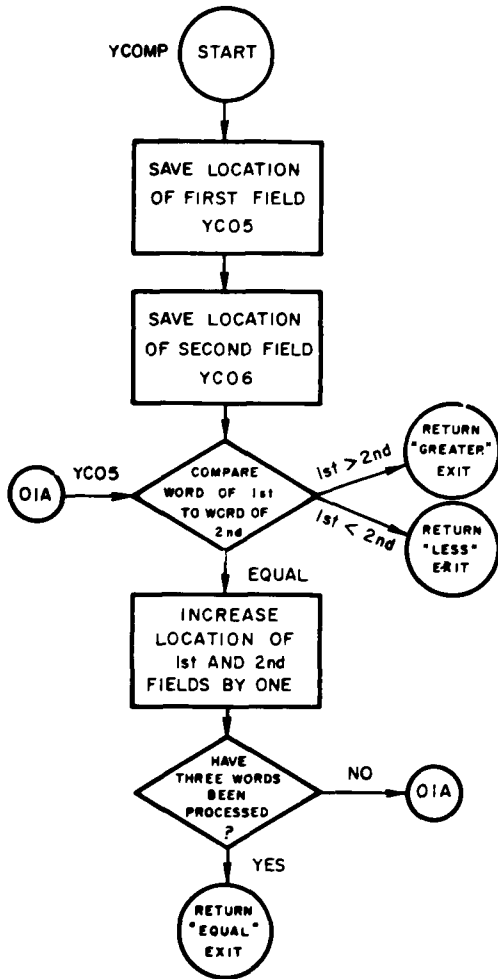
Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

Compares three words of field A, T to three words of field B, T.



Date Comparison Routine (YDCMP)

EXPLANATION OF REGION:

To compare two dates in the form of DDMMYY.

CALLING SEQUENCE:

L TSX YDCMP, 4
L+1 first date greater than second
L+2 first date equal to second
L+3 first date less than second

INPUT:

First date in Accumulator.
Second date in MQ.

OUTPUT:

Not applicable

STORAGE USED:

Not applicable

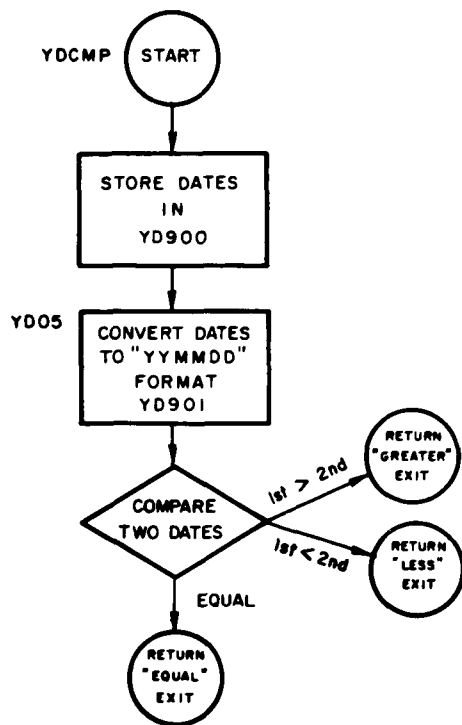
SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION YDCMP



Page Count Routine (YPAGE)

EXPLANATION OF REGION:

To reset or increment page counter.

CALLING SEQUENCE:

L TSX YPAGE, 4
L+1 PZE S
L+2 Normal return

INPUT:

Page number in ZPAGE.

OUTPUT:

Adjusted page number in ZPAGE.

STORAGE USED:

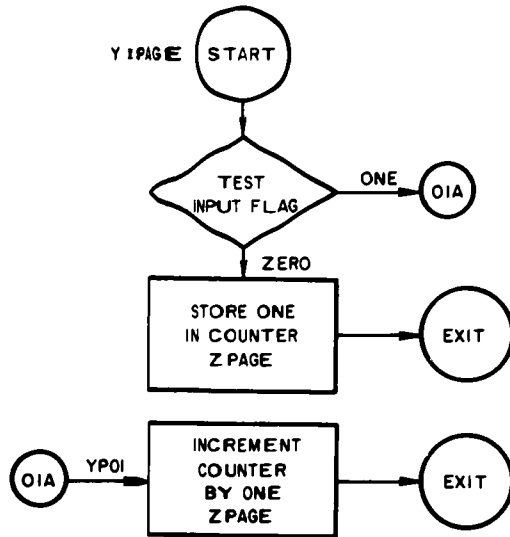
Not applicable

SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

S: 0 = reset page number to 1;
1 = increment page number by 1.



Security Number Incrementer Routine (YSEC)

EXPLANATION OF REGION:

To increment the security number by one.

CALLING SEQUENCE:

L TSX YSEC, 4

L+1 Normal return

INPUT:

ZSEC = previous security number.

ZSECI = character of section number to be incremented.

OUTPUT:

ZSEC = new security number.

STORAGE USED:

None

SUBREGIONS AND SUBROUTINES USED:

PACK

UPCK

EXPLANATION OF CALLING SEQUENCE:

Not applicable

Security Number Incrementer Routine (YSEC)

EXPLANATION OF REGION:

To increment the security number by one.

CALLING SEQUENCE:

L TSX YSEC, 4

L+1 Normal return

INPUT:

ZSEC = previous security number.

ZSECI = character of section number to be incremented.

OUTPUT:

ZSEC = new security number.

STORAGE USED:

None

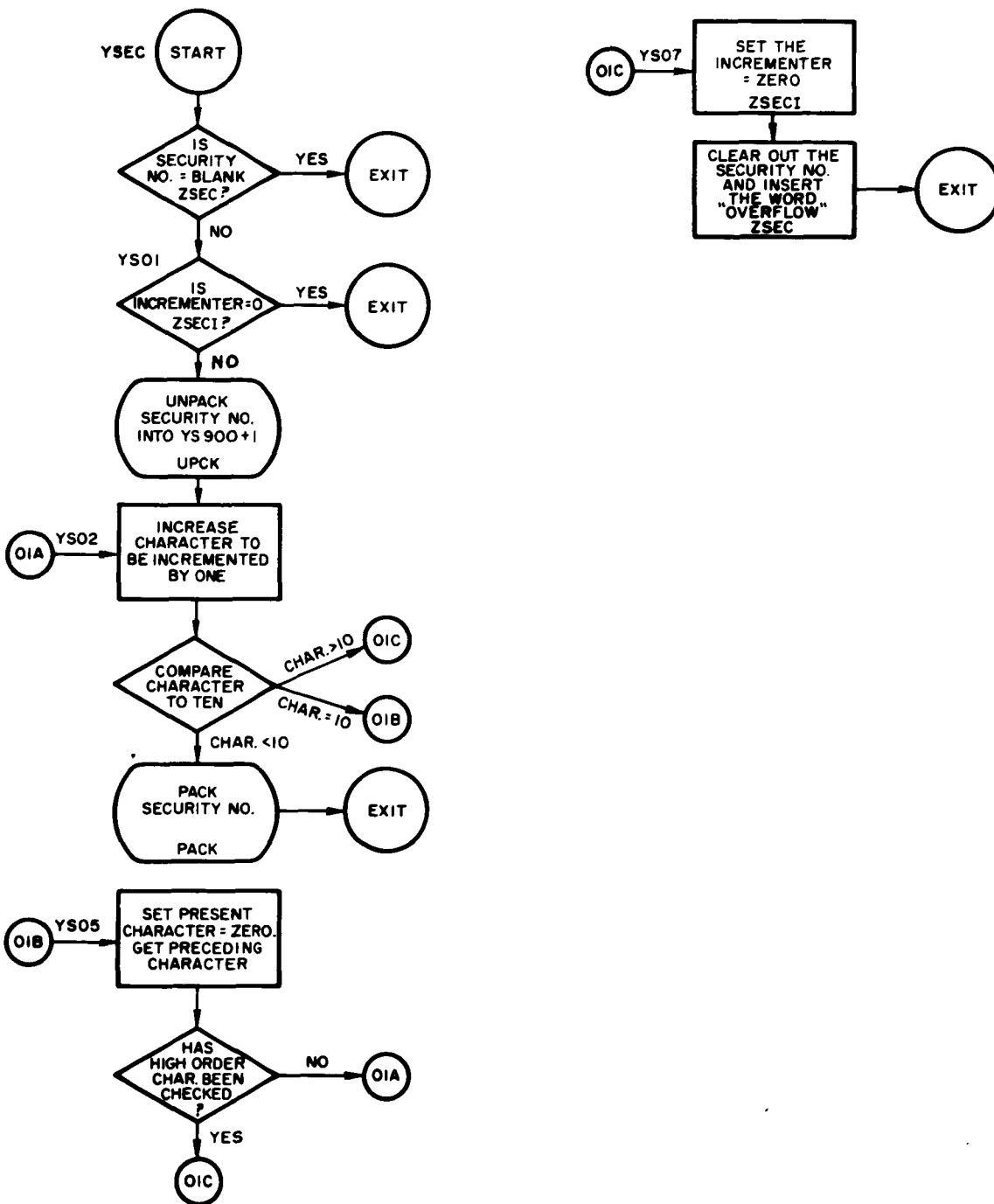
SUBREGIONS AND SUBROUTINES USED:

PACK

UPCK

EXPLANATION OF CALLING SEQUENCE:

Not applicable



Level Checking Routine (YLVL)

EXPLANATION OF REGION:

To check whether a charge number is on or connected to level L.

CALLING SEQUENCE:

L TSX YLVL, 4
L+1 PZE A, T, B
L+2 No connection exit
L+3 Connection to level exit
L+4 Next lower level exit
L+5 On level exit

INPUT:

Accumulator = level number "L" in address

OUTPUT:

Christmas Tree Indicator of level "L" in B (3 words).

STORAGE USED:

Not applicable

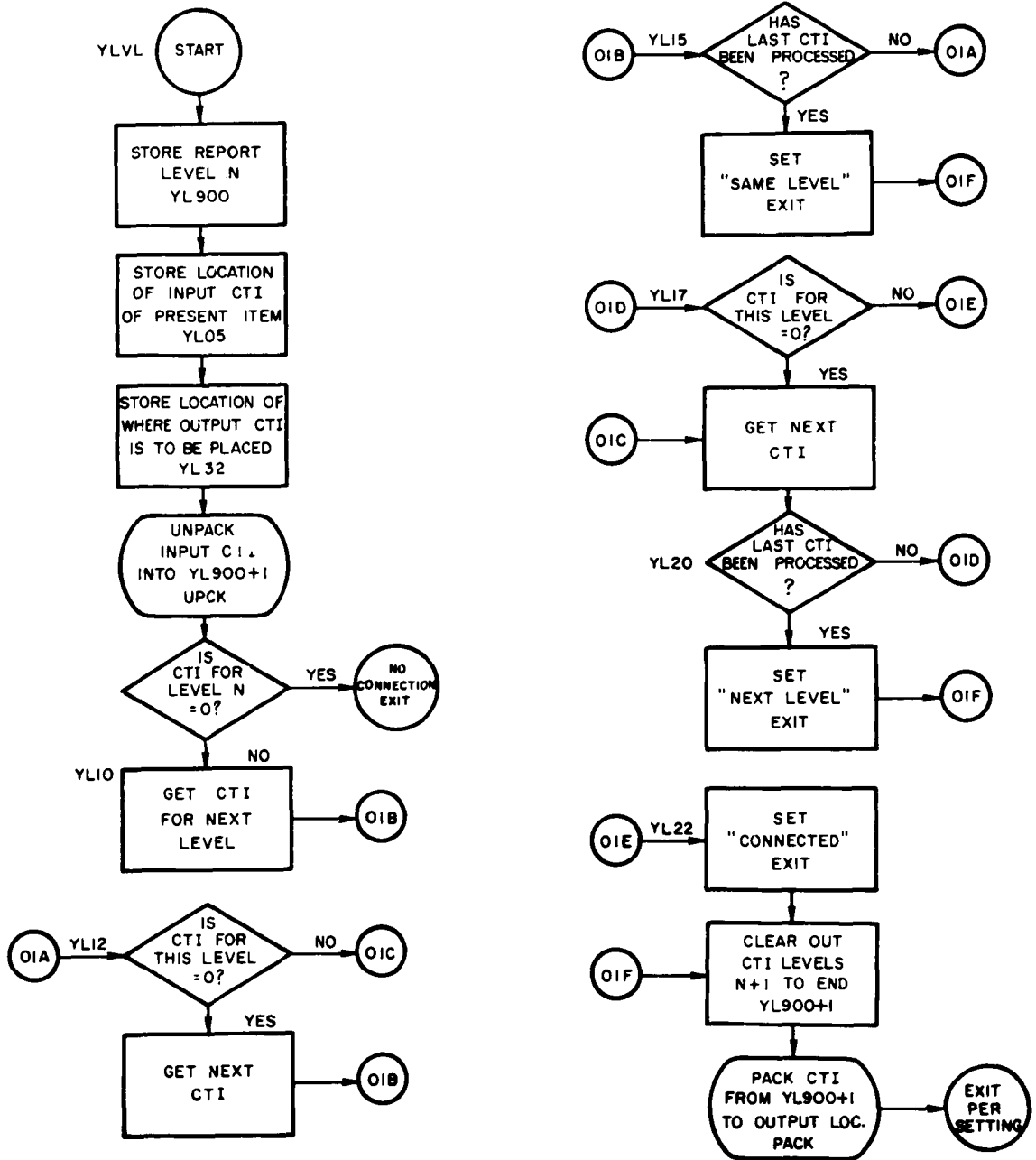
SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

A, T = Location of CTI for charge number.
B = Location where CTI for level "L" will be stored.

REGION YLVL



Field Change Routine (YBRAK)

EXPLANATION OF REGION:

To check for change in field.

CALLING SEQUENCE:

L TSX YBRAK, 4

L+1 Change exit

L+2 No change exit

INPUT

Accumulator: Location of field in address and tag number of words in field in decrementer.

OUTPUT:

If a change occurs in the field, the new field will be saved for future comparisons, and return will be made through the change exit.

STORAGE USED:

Not applicable

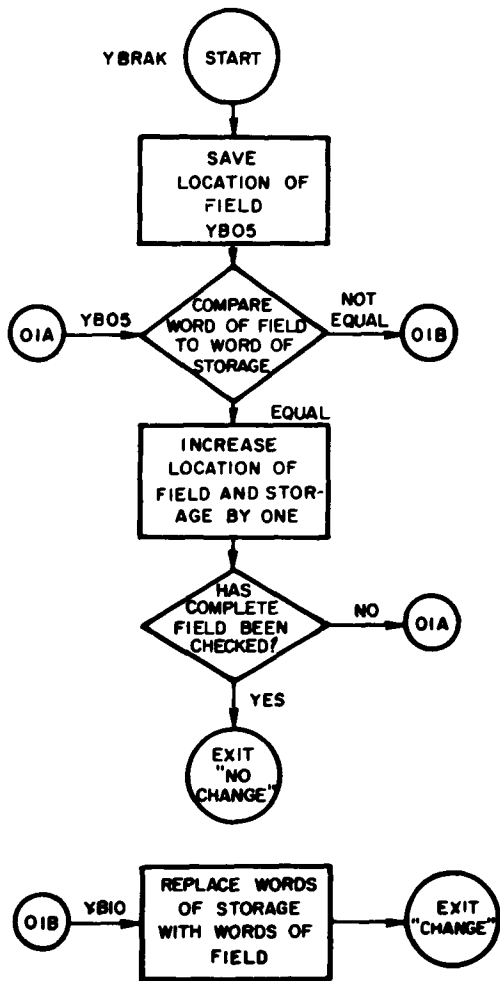
SUBREGIONS AND SUBROUTINES USED:

Not applicable

EXPLANATION OF CALLING SEQUENCE:

Not applicable

REGION YBRAK



Output Subroutine (ZKOUT)

EXPLANATION OF REGION:

This region processes and writes output messages on the output tape and/or the on-line printer.

CALLING SEQUENCE:

Output
PTH A, T, 1000 · N + PW (Note 1)
:
PTH
XXX XXX = PON or FVE

INPUT:

1. Location of a BCI image in core (A, T).
2. Number of words in image (N).
3. Right-most print-wheel desired in message (PW).
4. Off-line and/or on-line indicator.
5. Carriage control indicator (CC).

OUTPUT:

A message written on the output tape (SYSOU1) and/or the on-line printer.

SUBREGIONS AND SUBROUTINES USED:

PACK
UPCK

EXPLANATION OF CALLING SEQUENCE:

(a) PTH A, T, 1000 · N + PW (Note 1)

Prints N BCI words ($1 < N < 20$) where the first word is located in A, T. The last sixth character of the Nth word is printed by print wheel PW; i. e., PTH L, 0, 20120 will print the contents of L through L + 19 using print wheels 1-120.

- (b) CC = 1, Single space before printing.
2, Double space before printing.
3, Restore page before printing.
- (c) FVE Causes the line already set up by previous PTH pseudo-operations to be printed on the on-line printer regardless of Switch 2. (Note 1)
- (d) PON Causes the line already set up by previous PTH pseudo-operations to be output:
- 1) on the on-line printer and on SYSOU1 if Sense Switch 2 is on, or
 - 2) on SYSOU1 alone if Sense Switch 2 is off.
 - 3) on the on-line printer and on SYSOU1 if the decrement of the PON is not zero.

Note 1: HTH may be interchanged with PTH with the same results by writing the input parameters in the following format:

HTH A, T, N, PW

The same definitions apply. HTH L, 0, 20, 120 will print the contents of L through L + 19, using print wheels 1-120.