LOAN DOCUMENT

PHOTOGRAPH THIS SHEET

DTIC ACCESSION NUMBER

LEVEL

INVENTORY

DOCUMENT IDENTIFICATION

DISTRIBUTION STATEMENT

ACCESSION FOR
NTIS GRA&I
DTIC TRAC
UNANNOUNCED
JUSTIFICATION

BY

DISTRIBUTION/

AVAILABILITY CODES

DISTRIBUTION	AVAILABILITY AND/OR SPECIAL	
A-1		

DISTRIBUTION STAMP

DATE ACCESSIONED

DATE RETURNED

19981223 060

DATE RECEIVED IN DTIC

REGISTERED OR CERTIFIED NUMBER

PHOTOGRAPH THIS SHEET AND RETURN TO DTIC-FDAC

HANDLE WITH CARE

DTIC FORM 70A JUN 90

DOCUMENT PROCESSING SHEET

PREVIOUS EDITIONS MAY BE USED UNTIL STOCK IS EXHAUSTED.

LOAN DOCUMENT

APPENDIX 24

SIGNAL SORTER FLOW CHARTS

FINAL SOFTWARE REPORT

DATA ITEM NO. A005

INTEGRATED ELECTRONIC WARFARE SYSTEM ADVANCED DEVELOPMENT MODEL (ADM)

PREPARED FOR

NAVAL AIR DEVELOPMENT CENTER
WARMINSTER, PENNSYLVANIA

CONTRACT N62269-75-C-0070

RAYTHEON
ELECTROMAGNETIC SYSTEMS DIVISION

1 OCTOBER 1977

APPENDIX 24

SIGNAL SORTER FLOW CHARTS
FINAL SOFTWARE REPORT

DATA ITEM A005

INTEGRATED ELECTRONIC WARFARE SYSTEM (IEWS)
ADVANCED DEVELOPMENT MODEL (ADM)

Contract No. N62269-75-C-0070

Prepared for:

Naval Air Development Center
Warminister, Pennsylvania

Prepared by:

RAYTHEON COMPANY
Electromagnetic Systems Division
6380 Hollister Avenue
Goleta, California 93017

1 OCTOBER 1977

RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173	CODE IDENT NO. 49956	SPEC NO. CG-983645-2
		SHEET 1 OF	REV

TYPE OF SPEC

Computer Program Design Specification

TITLE OF SPEC

IEWS Signal Sorter Flow Charts

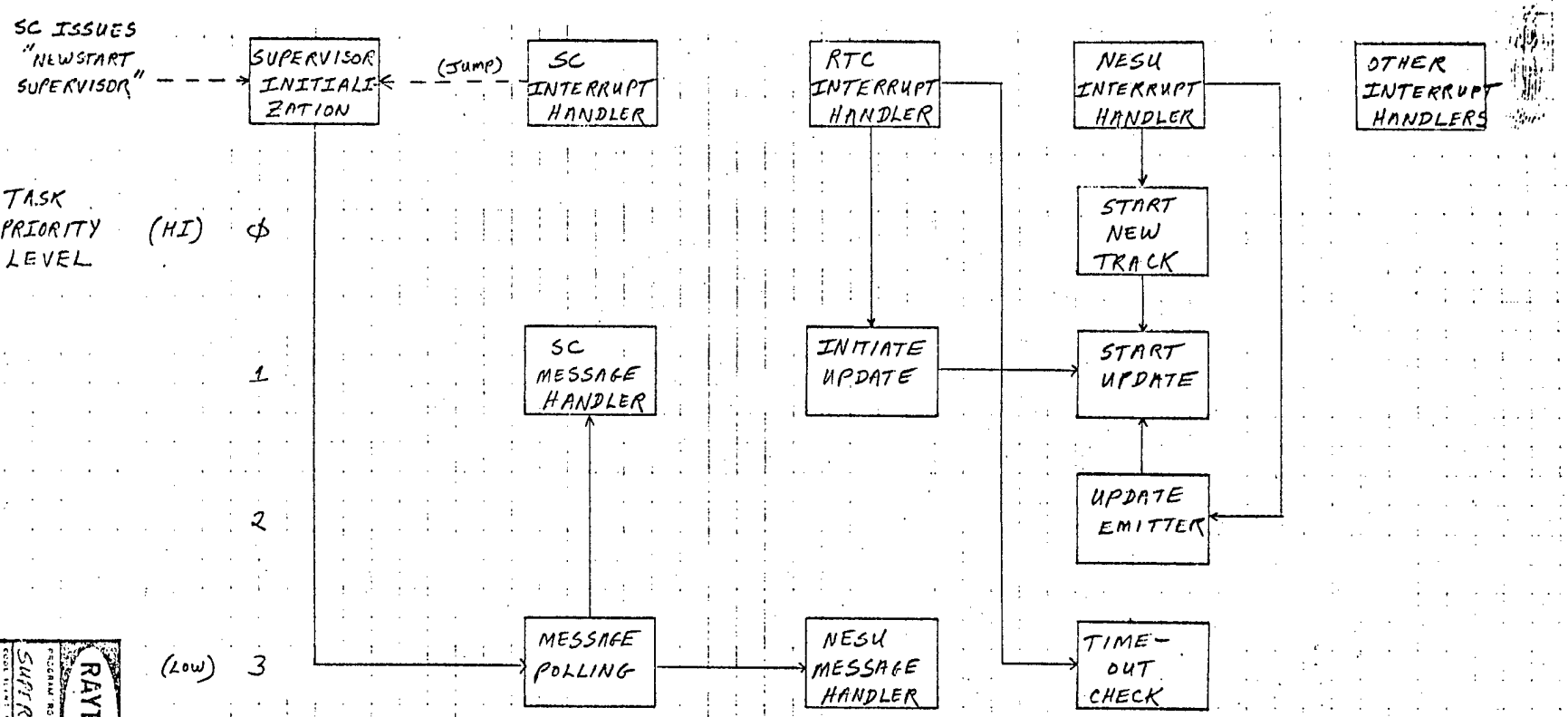
FUNCTION	APPROVED	DATE	FUNCTION	APPROVED	DATE
WRITER	T. Chernesky				

REVISIONS

CHK	DESCRIPTION	REV	CHK	DESCRIPTION	REV

REVISION																							
SHEET NO.																							
REV STATUS OF SHEETS	REVISION																						
	SHEET NO.																						

10-1348 (11/68) VELLUM PRINTED IN U.S.A.
10-1348 (11/68) FILM



INTERRUPT PRIORITY

HIGHEST =	8	BUS HUNG
	7	WATCHDOG TIMER EXPIRED
	6	PANIC BUTTON
	5	SC MESSAGE
	4	NESU MESSAGE
	3	REAL TIME CLOCK
	2	IB > 3/4 FULL
LOWEST =	1	IB < 1/4 FULL

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM: IIWS SOKTLR SUPV

SUPERVISOR TASK SCHEDULING

PREPARED BY: T. CHERNESKY

DOCUMENT NUMBER: 49956

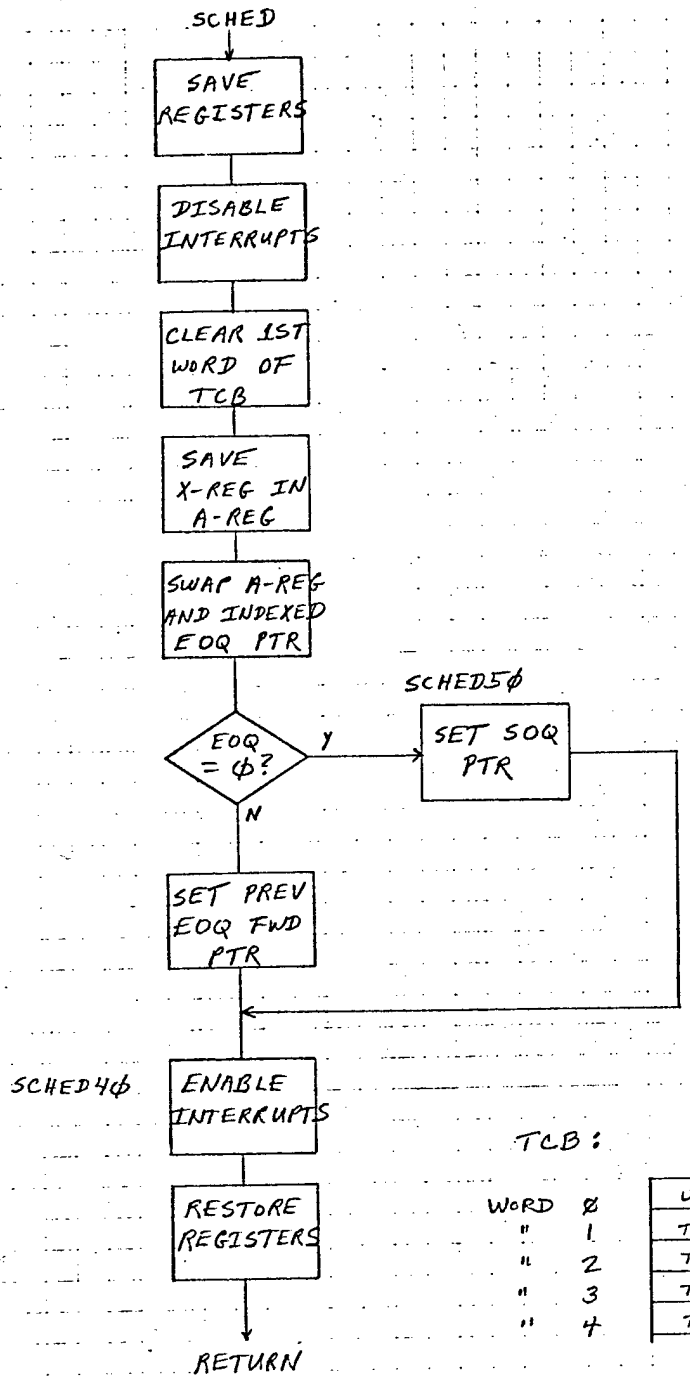
SHEET 1 OF 1

DATE: 30 APR 76

FLOW CHART

REMARKS

FLOW CHART



TCB:

WORD ϕ	USED BY SCHED
" 1	TASK ADDRESS
" 2	TASK ARG 1
" 3	TASK ARG 2
" 4	TASK ARG 3

CALL SEQ —

LDSX (ADDR OF TCB)

LDSB (TASK PRIORITY LEVEL)

JSUB (=SCHED)

— NORMAL RETURN

REMARKS

'TCB' MEANS 'TASK CONTROL BLOCK'

INDEXING IS BY TASK PRIORITY LEVEL

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

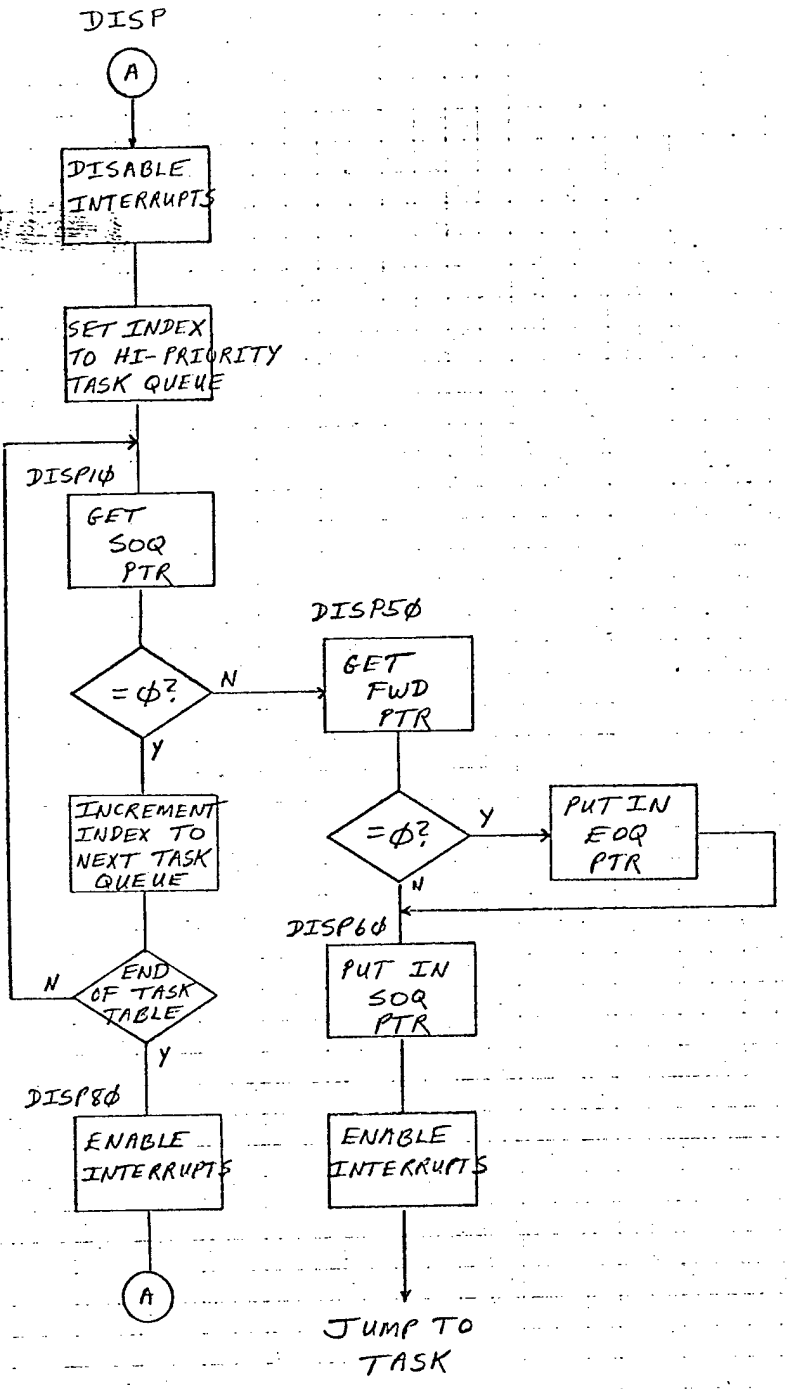
PROGRAM/ROUTINE/SUBROUTINE ACRONYM IEWS SORTER SUPV

SCHEDULER SUBROUTINE

CUST. IDENT. NO.	PREPARED BY	DATE
49956	T. CHERNESKY	9 APR 76
NUMBER 4	SHEET 1	OF 1

FLOW CHART

REMARKS



X-REG CONTAINS ADDR OF TASK CONTROL BLOCK

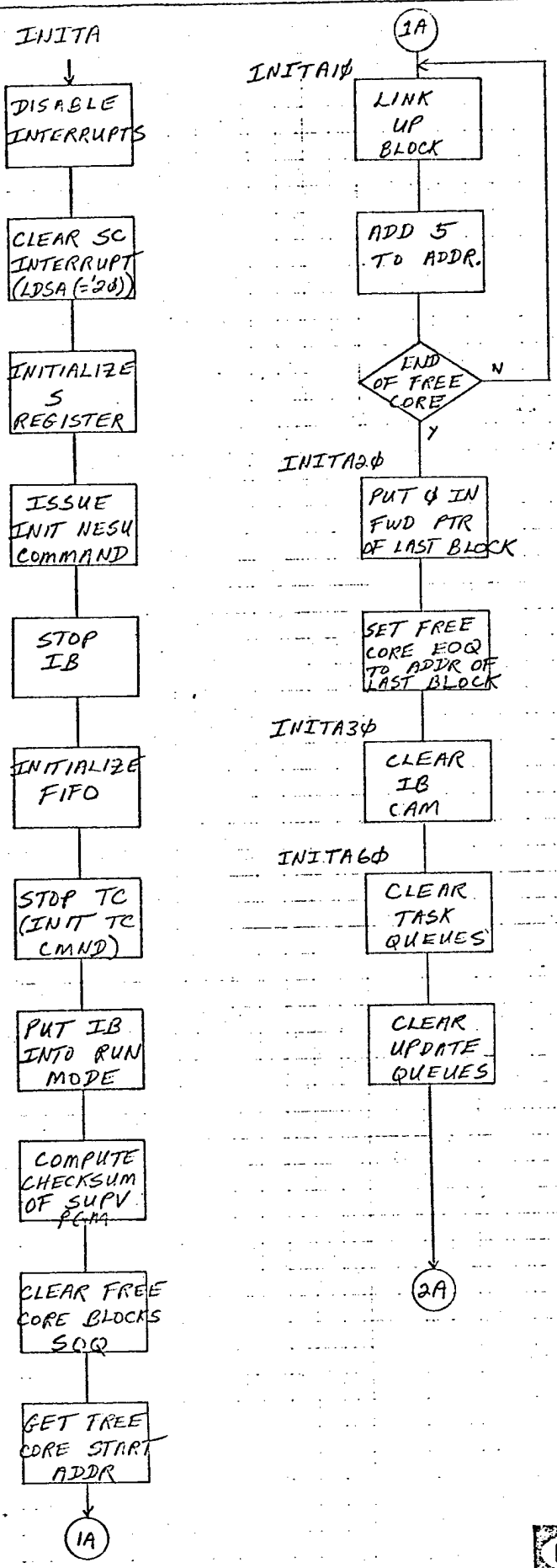
CALL SEQ —

— JUMP (=DISP)

RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173
PROGRAM-ROUTINE-SUBROUTINE ACRONYM	IEWS SORTER SUPV
DISPATCHER	
CHECKPOINT NO. 49956	PREPARED BY T. CHERNESKY
DATE 9 APR 76	
NUMBER 5	SHEET 1 OF 1

FLOW CHART

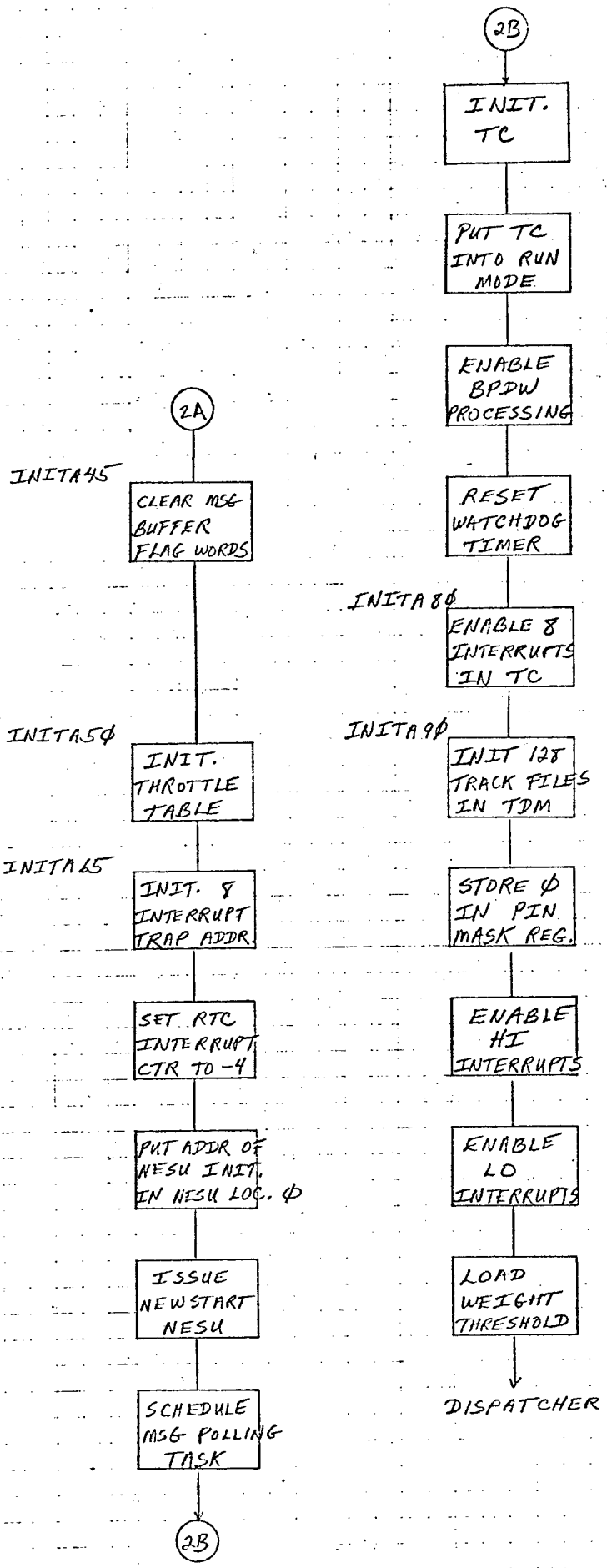
REMARKS



RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173
PROGRAM ROUTINE SUBROUTINE ACRONYM: IEWS SORTER SUPV	
INITIALIZATION MODULE	
COMPUTER PROG. NO. 49956	PREPARED BY T. CHERNESKY DATE 1 JUN 76
NUMBER 6	SHEET 1 OF 2

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

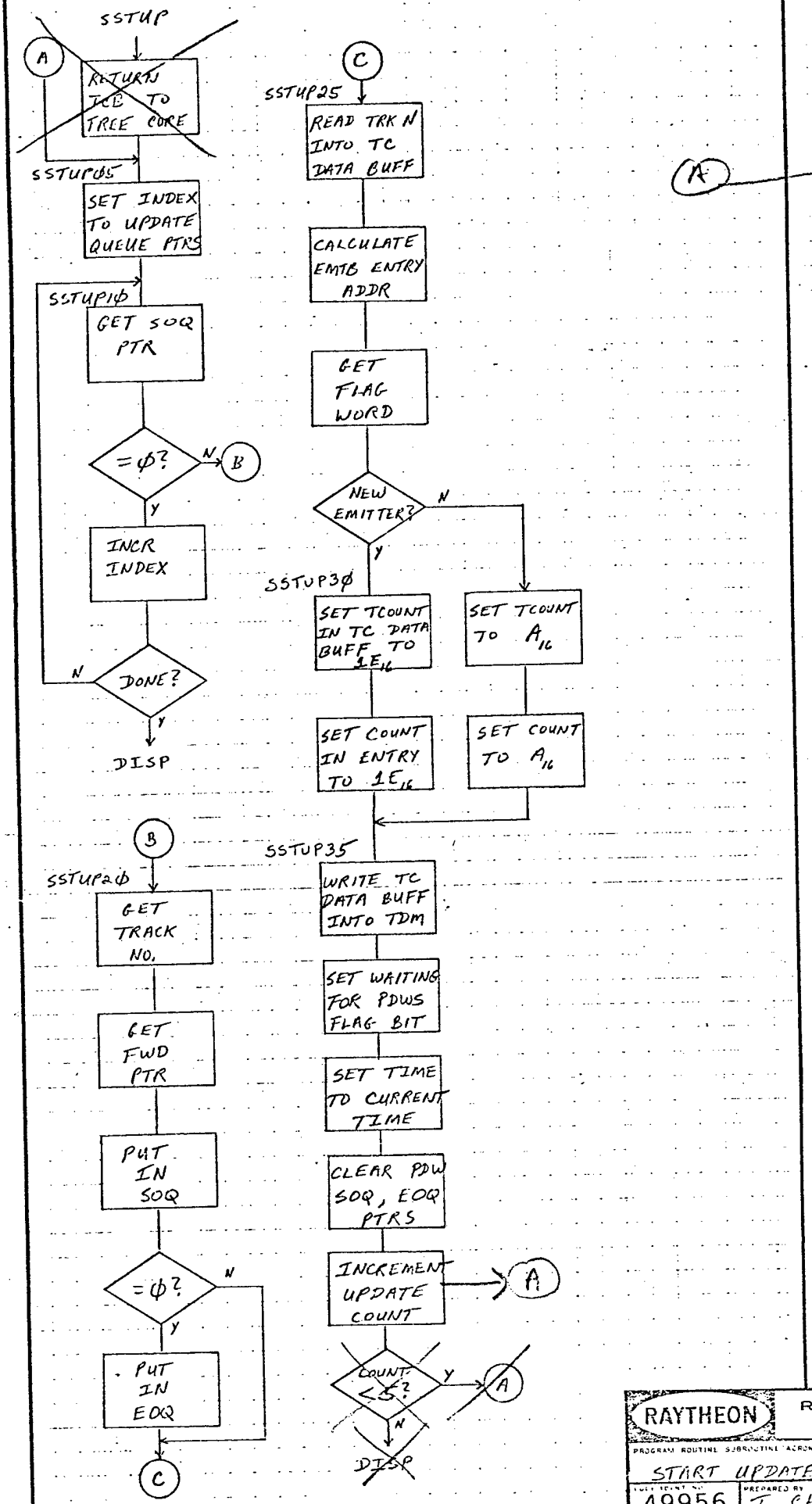
PROGRAM ROUTINE SUBROUTINE ACRONYM: IEWS SORTER SUPV

INITIALIZATION MODULE

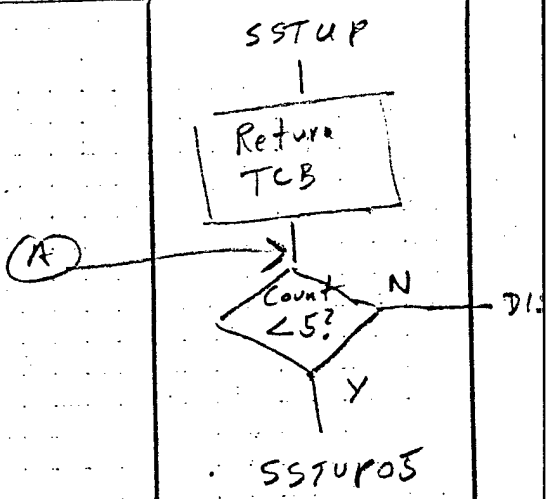
CODE IDENT. NO. 49956 | PREPARED BY T. CHERNESKY | DATE 1 JUN 76

NUMBER 7 | SHEET 2 OF 2

FLOW CHART

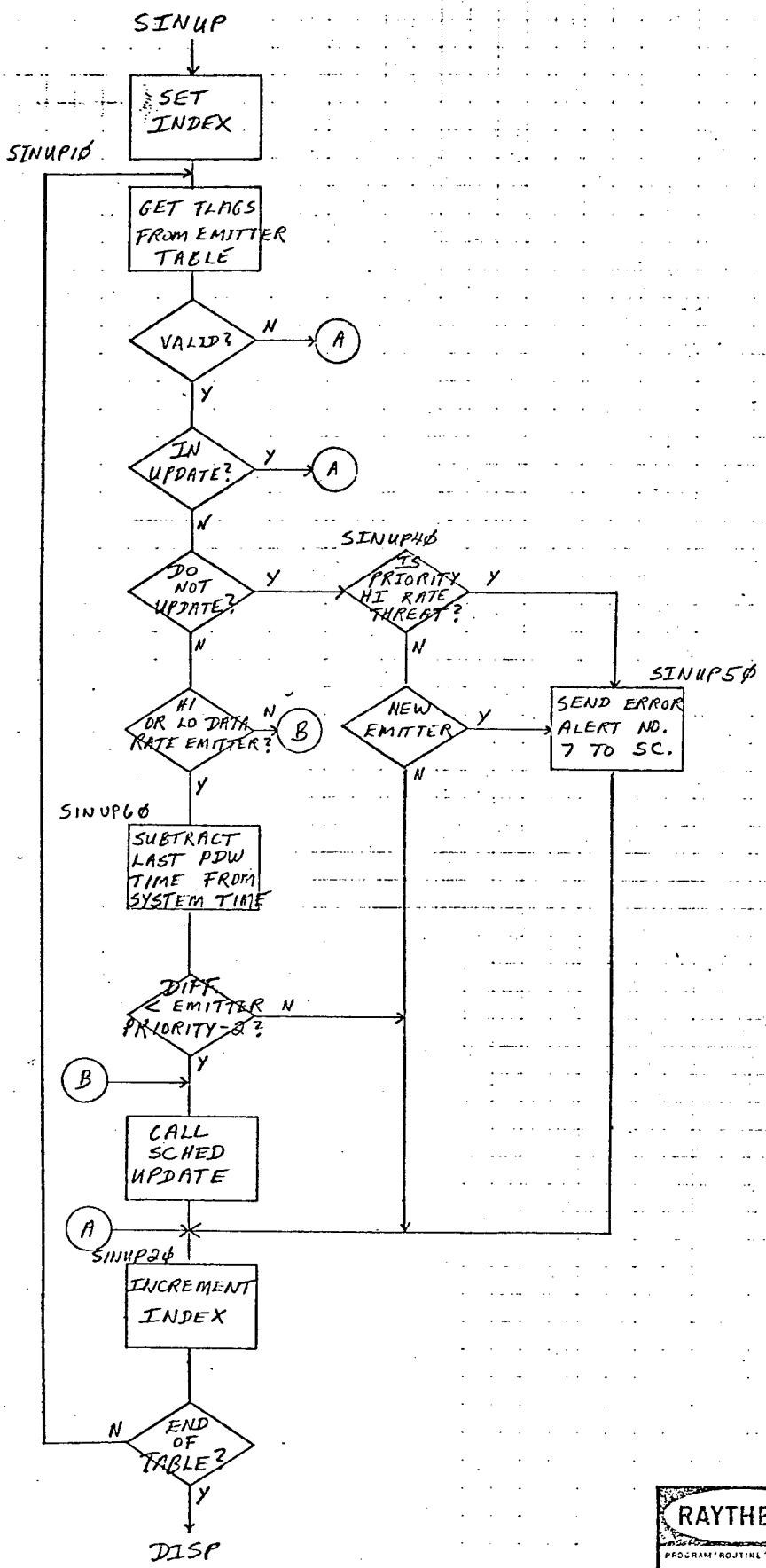


REMARKS



RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS 02173	
PROGRAM ROUTINE SUBROUTINE ACRONYM	ILWS SORTER SUPV	
START UPDATE TASK		
FLOW CHART NO. 49956	PREPARED BY T. CHERNESKY	DATE 3 JUN 76
NUMBER 8	SHEET 1 OF 1	

FLOW CHART



REMARKS

EMITTER UPDATE INTERVALS

1 SEC
- NEW EMITTER
- HI RATE THREAT

2 SEC
- HI RATE

4 SEC
- LO RATE

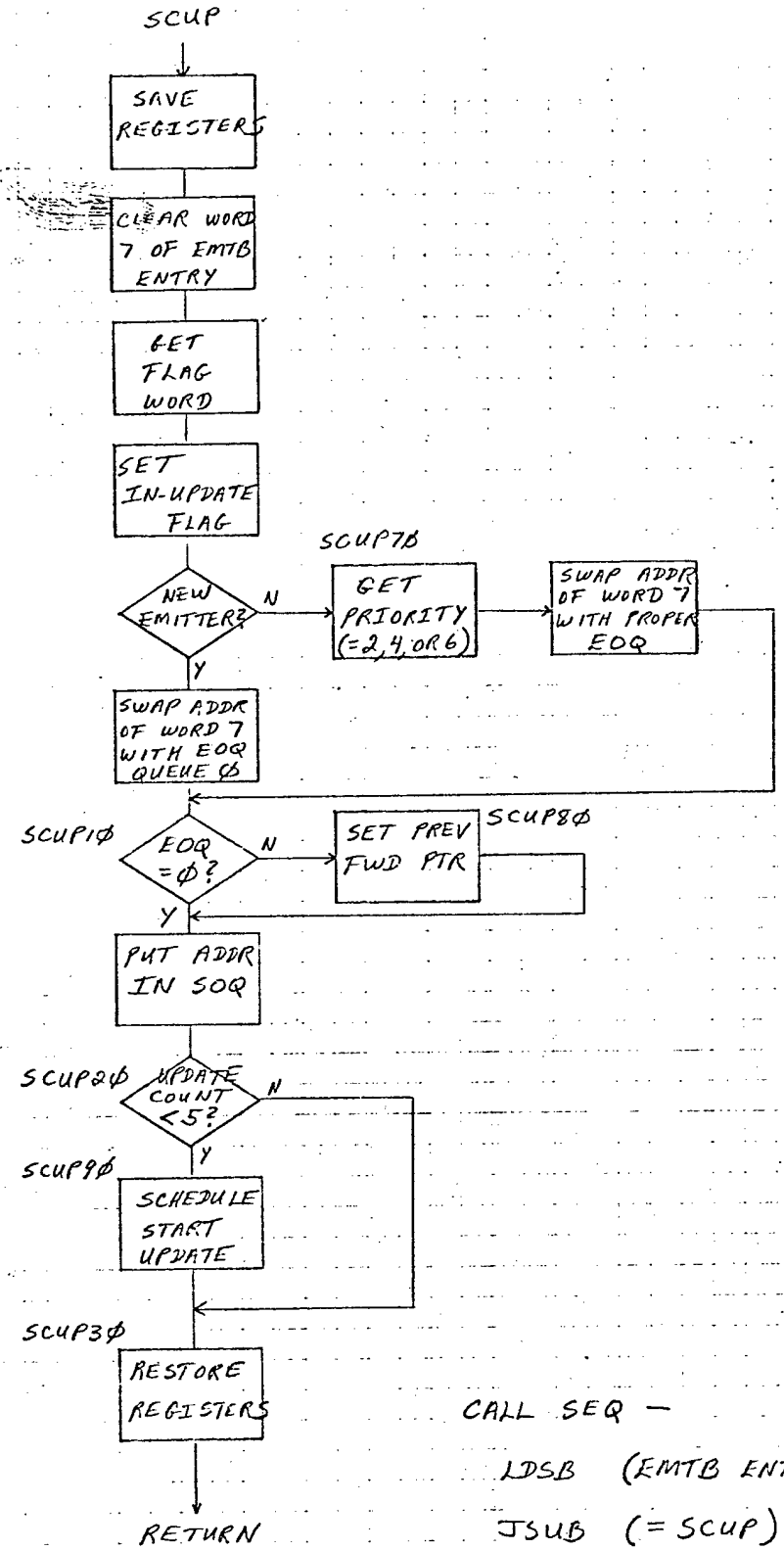
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM "ROUTINE "SUBROUTINE" ACRONYM IEWS SCHED SUPV
INITIATE UPDATE TASK

CODE IDENT NO. 49956 | PREPARED BY T. CHERNESKY | DATE 1 JUN 76

NUMBER 4 | SHEET 1 OF 1

FLOW CHART



REMARKS

'EMTB' MEANS 'SUPV EMITTER TABLE'

CALL SEQ —

LDSB (EMTB ENTRY ADDR)

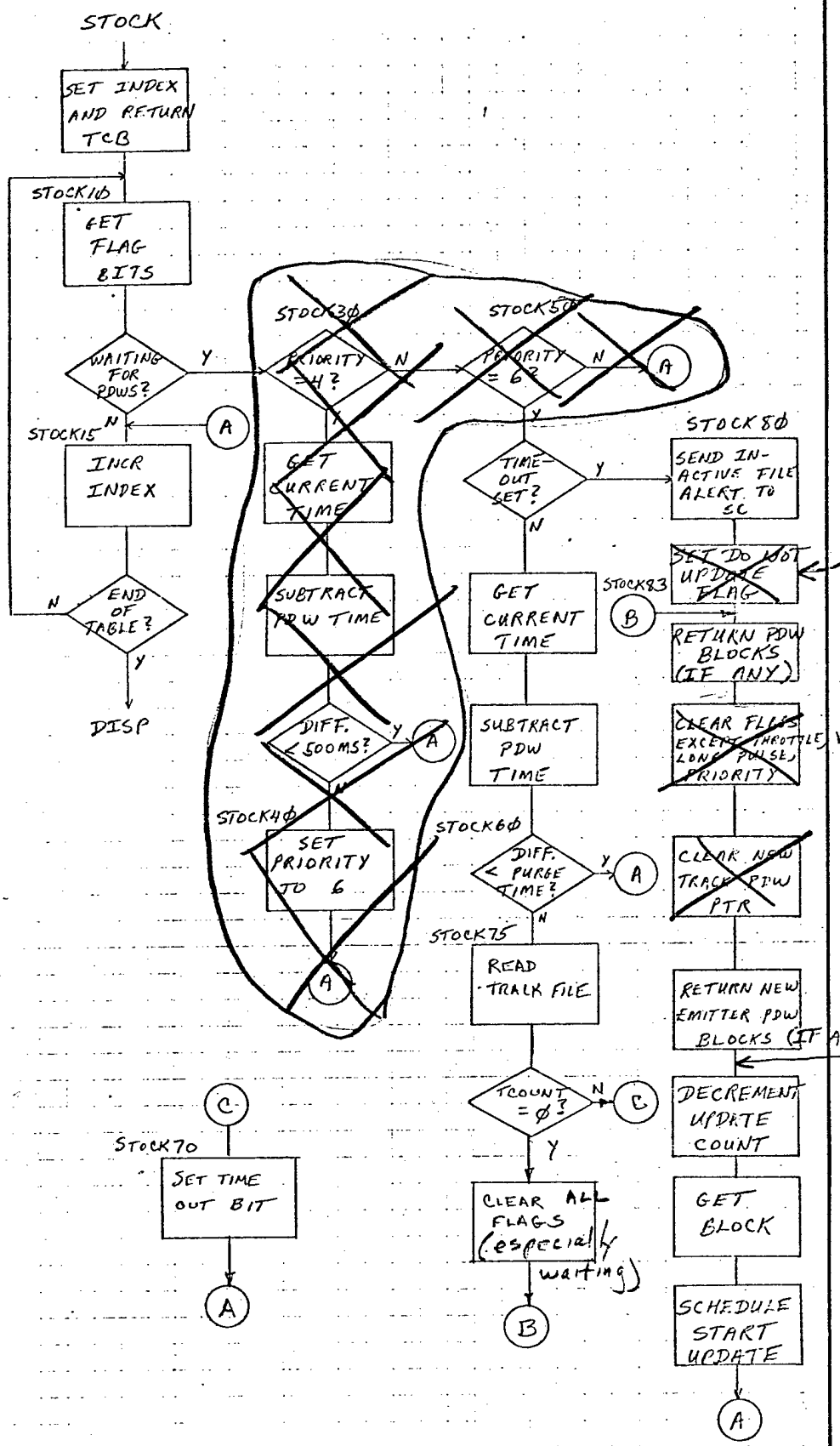
JSUB (= SCUP)

— NORMAL RETURN

RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173	
PROGRAM ROUTINE SUBROUTINE ACRONYM	IEWS SORTER SUPV SCHEDULE UPDATE SUBROUTINE	
CODE IDENT. NO. 49956	PREPARED BY T. CHERNESKY	DATE 12 APR 76
NUMBER 10	SHEET 1 OF 1	

FLOW CHART

REMARKS



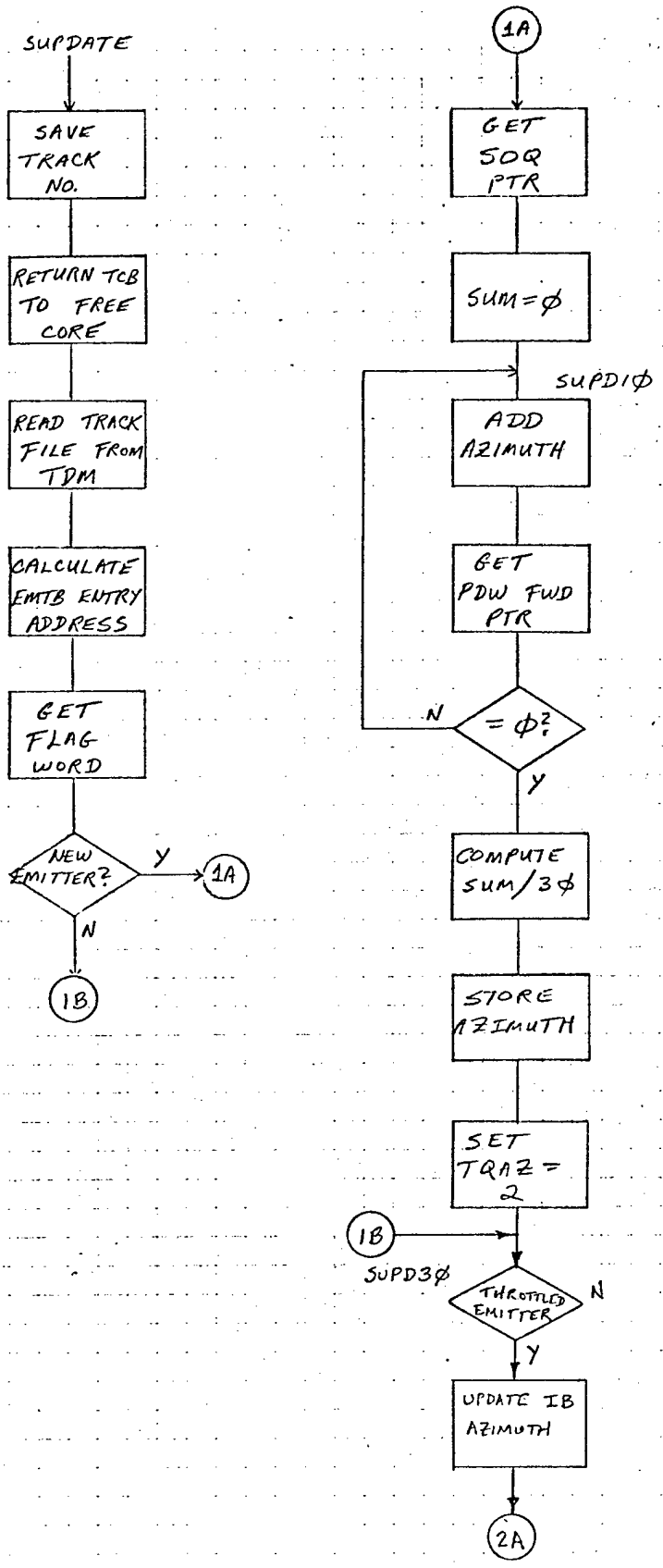
RAYTHEON COMPANY
LEXINGTON, MASS 02173

PROGRAM, ROUTINE, SUBROUTINE, ACRONYM: IEWS SORTER SUPV
TIME OUT CHECK TASK

CODE IDENT NO	PREPARED BY	DATE
49956	T. CHERNESKY	1 JUN 76

NUMBER 11 SHEET 1 OF 1

FLOW CHART



REMARKS

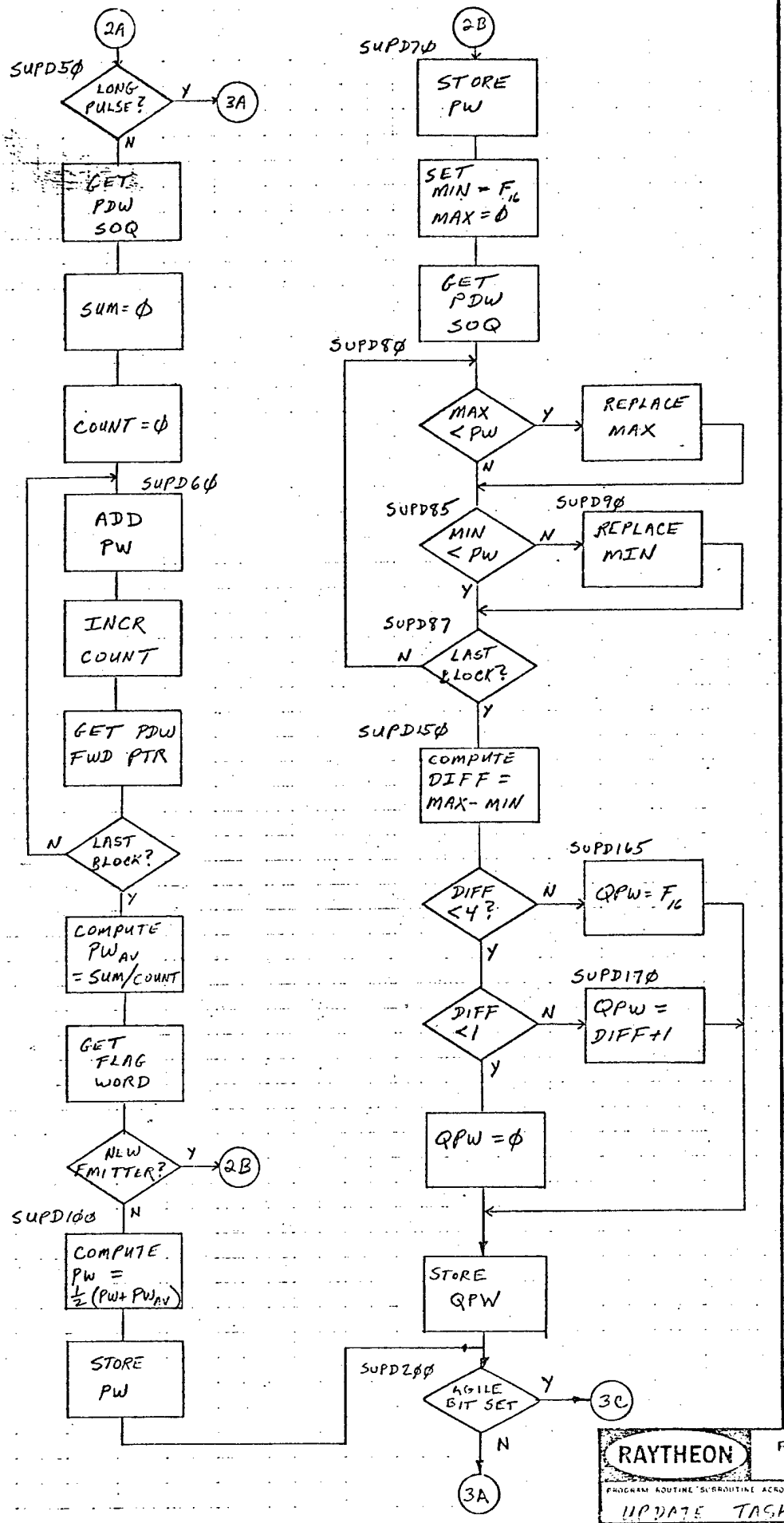
AZIMUTH CALCULATION

RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173	
PROGRAM "ROUTINE "SUBROUTINE" ACRONYM	ILWS SORTER SUPV UPDATE TASK	
CODE IDENT NO. 49956	PREPARED BY T. CHERNESKY	DATE 3 JUN 76
NUMBER 12	SHEET 1 OF 10	

FLOW CHART

REMARKS

PULSE WIDTH CALCULATION



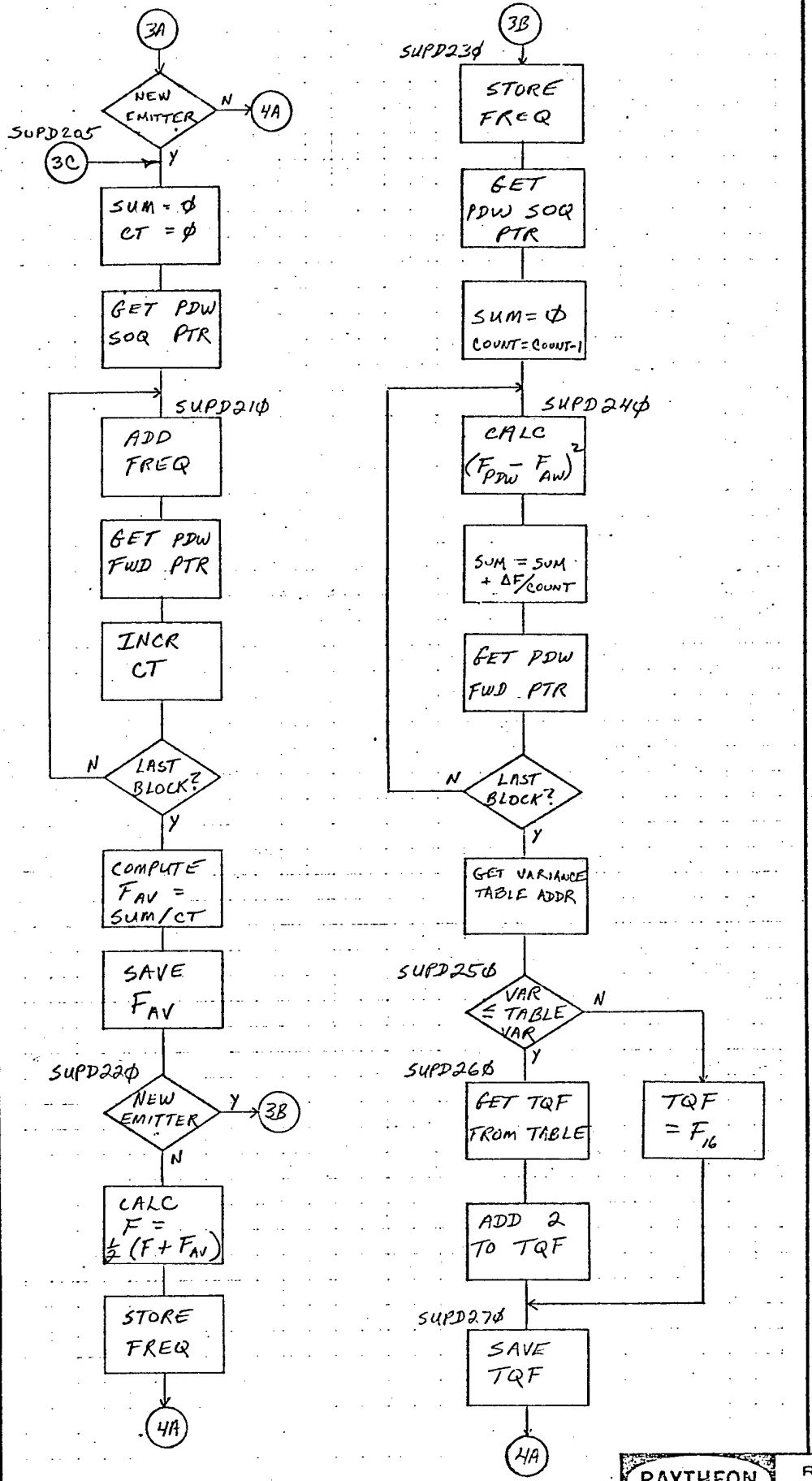
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM: ILWS SORTER SUPV
UPDATE TASK

CODE IDENT NO	PREPARED BY	DATE
49956	T. CHERNESKY	5 MAY 76

NUMBER 13 SHEET 2 OF 10

FLOW CHART

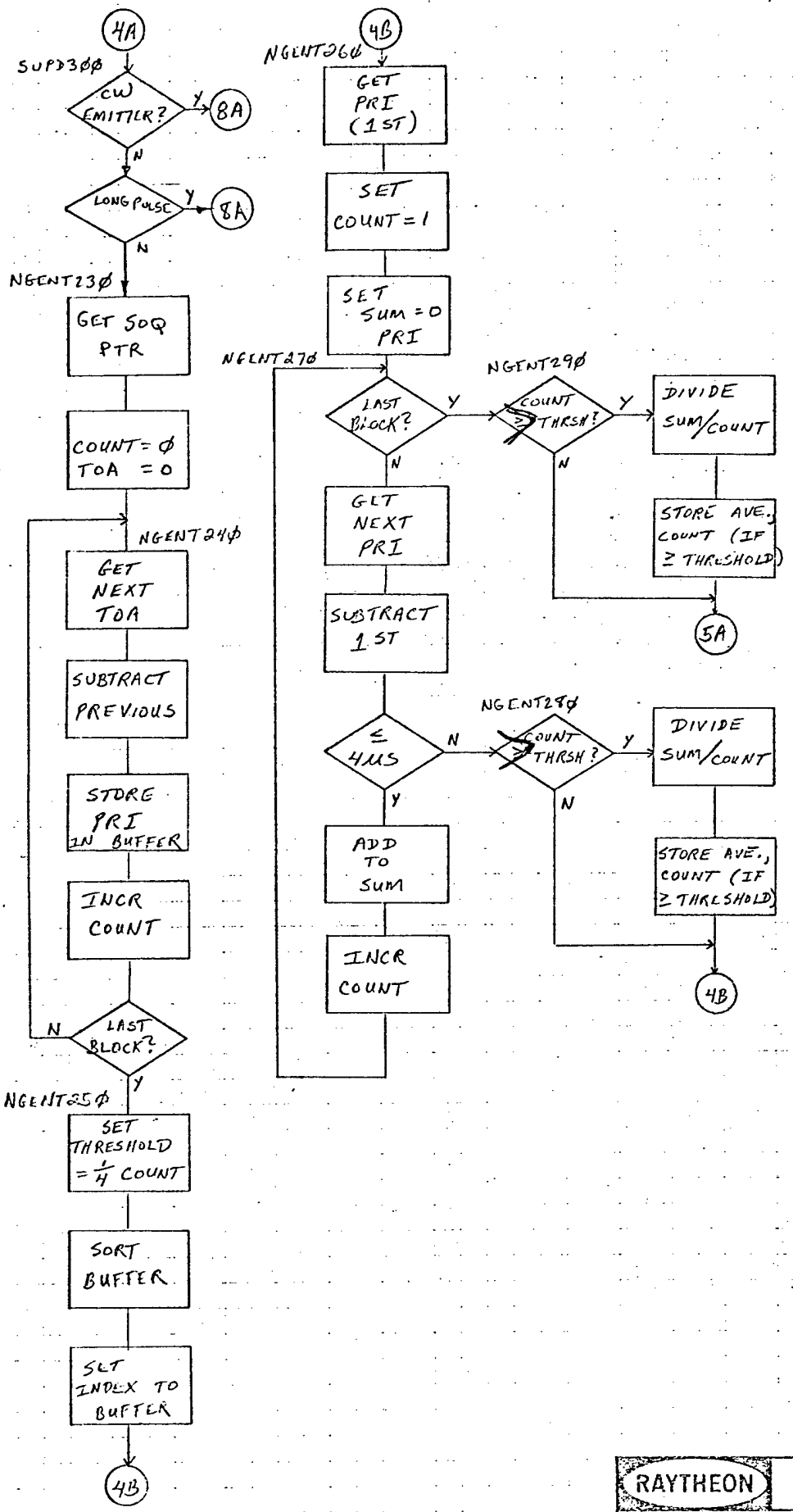


REMARKS

FREQUENCY CALCULATION

RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173
PROGRAM/ROUTINE/SUBROUTINE ACRONYM	IEWS SORTER SUPV UPDATE TASK
CODE IDENT NO. 49956	PREPARED BY T. CHERNESKY DATE 3 JUN 76
NUMBER JW	SHEET 3 OF 10

FLOW CHART



REMARKS

PRI CALCULATION

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

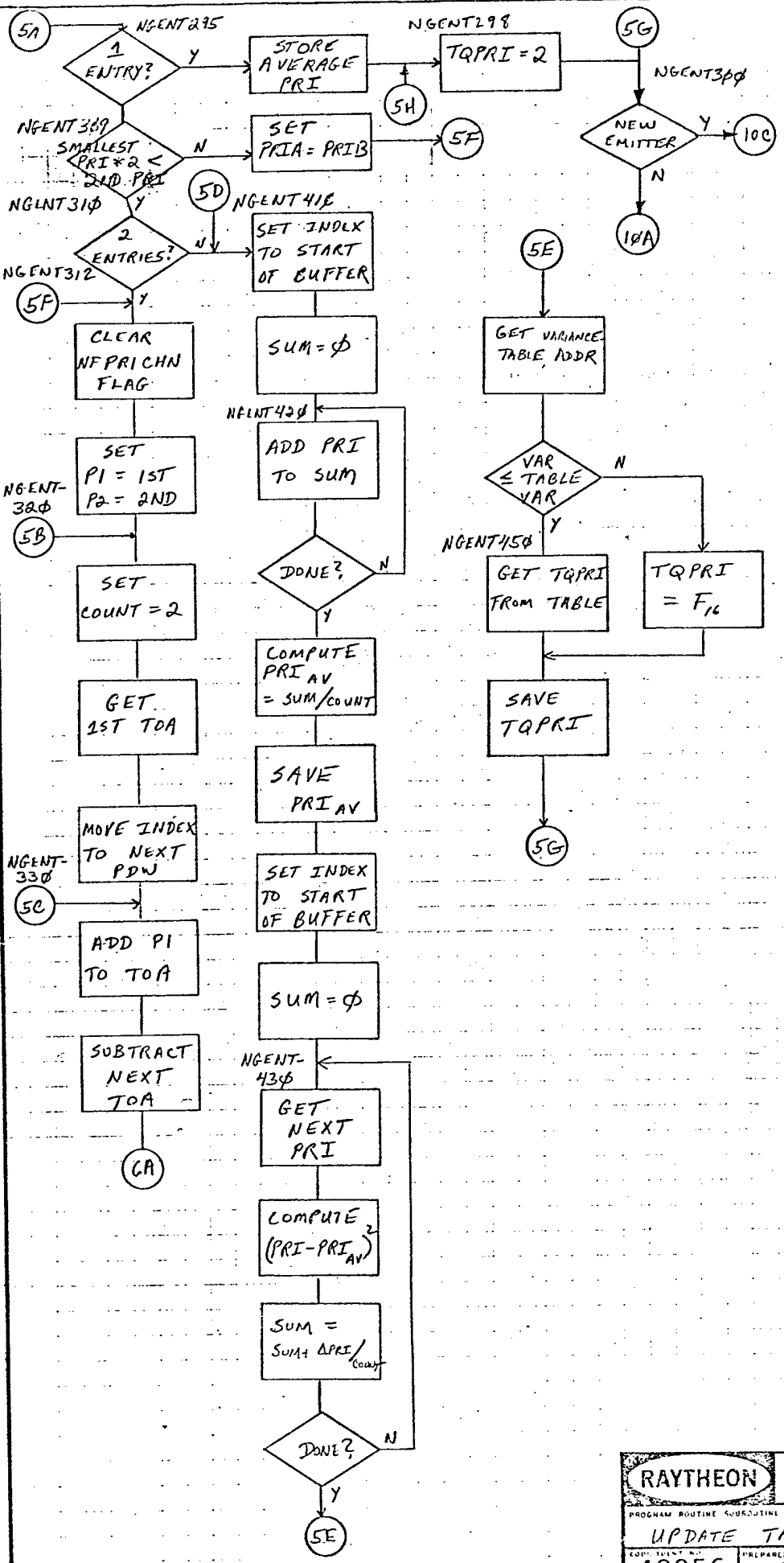
PROGRAM ROUTINE SUBROUTINE ACRONYM ILLUS SORTER SUPV

UPDATE TASK

CODE IDENT NO. 49956 | PREPARED BY T. CHESLEY | DATE 5 MAY 76

NUMBER 15 | SHEET 1 OF 10

FLOW CHART



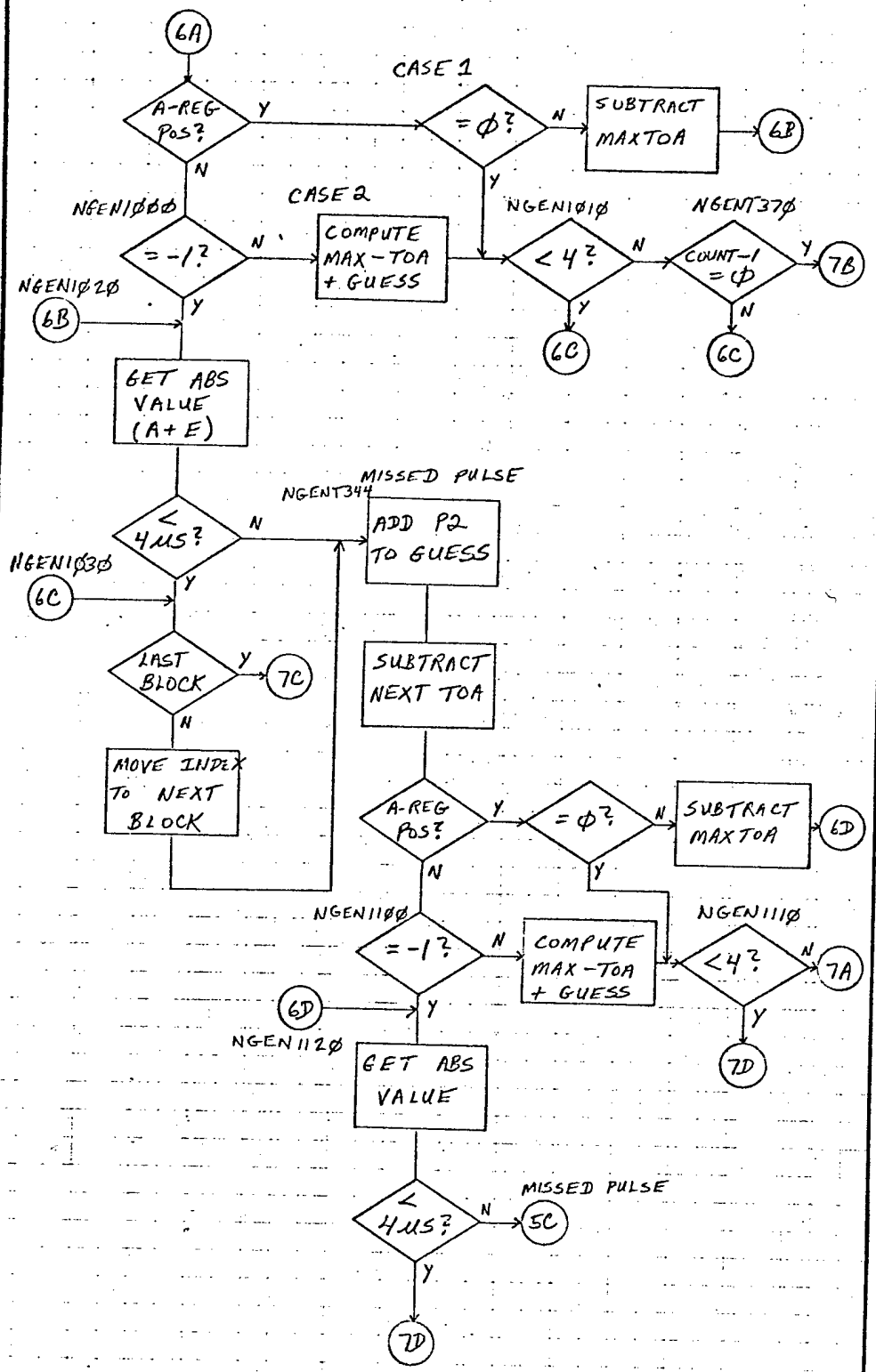
REMARKS

PRI CALCULATION

CHAINING AND VARIANCE CALCULATION

RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173
PROGRAM ROUTINE SUBROUTINE ACRONYM	ILWS SORTER SUPV UPDATE TASK
COMPUTER PROGRAM NO. 49956	PREPARED BY T. CHERNESKY DATE 3 JUN 76
NUMBER 1/6	SHEET 5 OF 10

FLOW CHART



REMARKS

PRI CHAIN CALCULATION – TOA WRAPAROUND PROBLEM

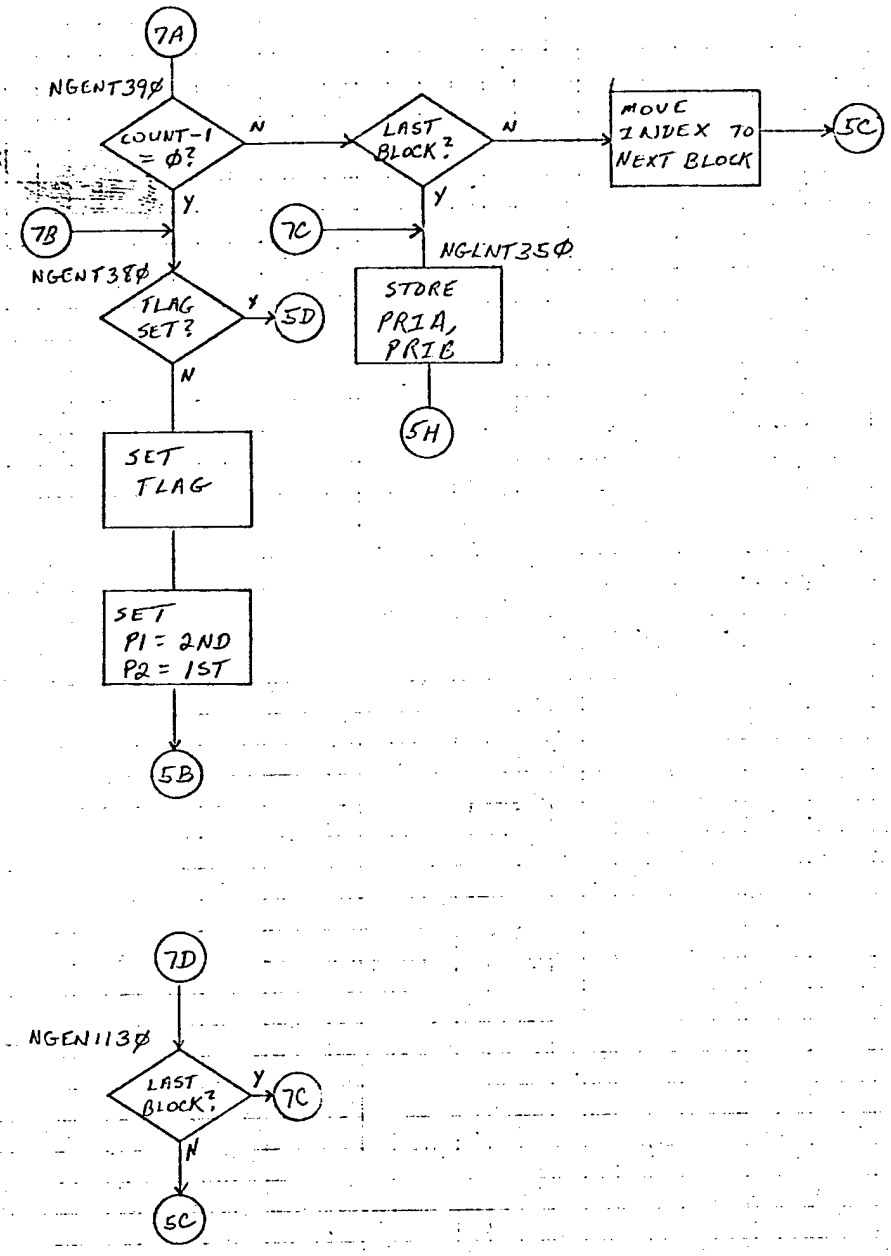
CASE 1 : GUESS = MAX–N N = Ø, 1, 2, 3
ACTUAL = M M = 3, 2, 1, Ø

GUESS – ACTUAL = LARGE POS NO., I.E., MAX–N–M > 2^{16}
THEREFORE, NEED N+M < 4, ELSE POSSIBLE MISSED PULSE.
IF A-REG POS AND NON-ZERO, THEN COMP((GUESS–ACT)–MAX) = N+M

CASE 2 : GUESS = M M = Ø, 1, 2, 3
ACTUAL = MAX – N N = 3, 2, 1, Ø.
GUESS–ACTUAL = LARGE NEG. NO., M–MAX–N
THEREFORE, N+M < 4, ELSE ERROR.
IF A NEG AND A ≠ –1, THEN
MAX–ACT+GUESS = MAX–(MAX–N)+M = N+M

RAYTHEON COMPANY LEXINGTON, MASS 02173	
PROGRAM ROUTINE SUBROUTINE ACRONYM	ILWS SORTER SUCV UPDATE TASK
CODE IDENT NO. 49956	PREPARED BY T. CHERNESKY
DATE 7 MAY 72	
NUMBER 17	SHEET 6 OF 10

FLOW CHART



REMARKS

PRI CHAIN CALCULATION

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

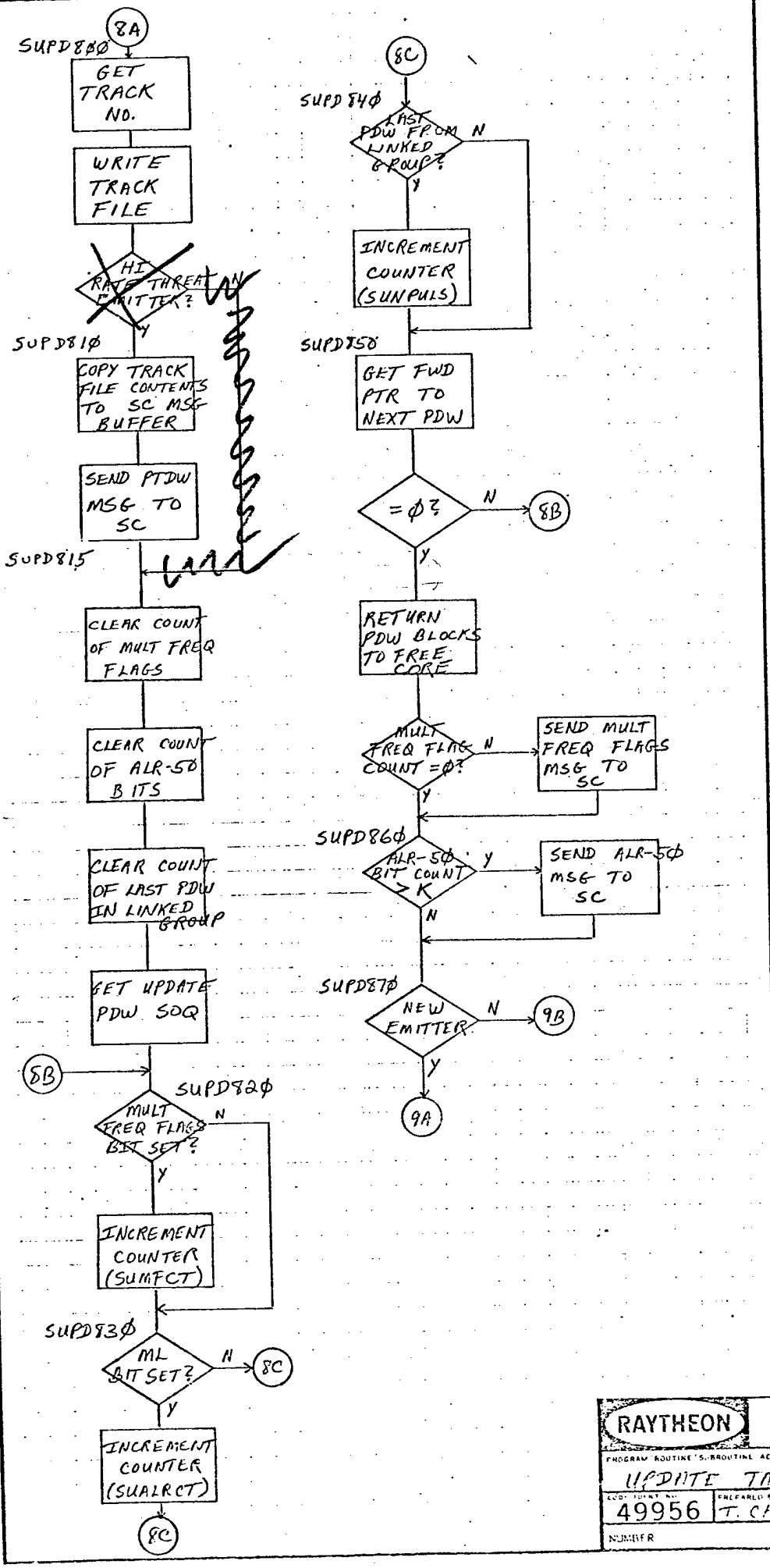
PROGRAM ROUTINE SUBROUTINE ACRONYM: IEWS SORTER SUPV
UPDATE TASK

CODE IDENT. NO.	PREPARED BY	DATE
49956	T. CHERNESKY	3 JUN 76

NUMBER 18 SHEET 7 OF 10

10-2319 (8-72)

FLOW CHART



REMARKS

WRITE TRACK FILE AND OUTPUT MESSAGES TO SC

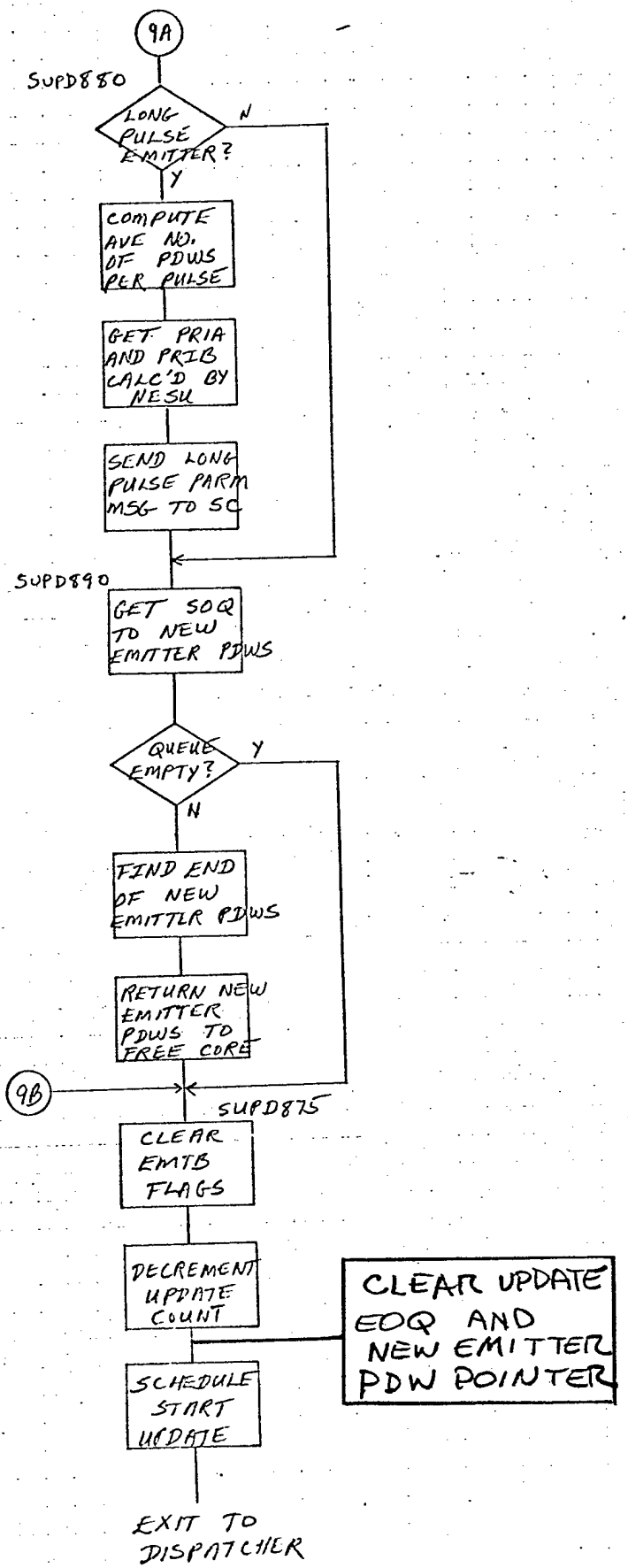
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE'S SUBROUTINE ACRONYM: JEWS SORTER SUPV
UPDATE TASK

COMPUTER PROGRAM NO. 49956 | PREPARED BY T. CHENNEVEY | DATE 3 JUN 76

NUMBER 19 | SHEET 8 OF 10

FLOW CHART



REMARKS

WRITE TRACK FILE AND OUTPUT MESSAGES TO SC

FLAGS CLEARED:
1. IN UPDATE
2. WAITING FOR PDWS
3. TIME OUT
4. NEW EMITTER

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

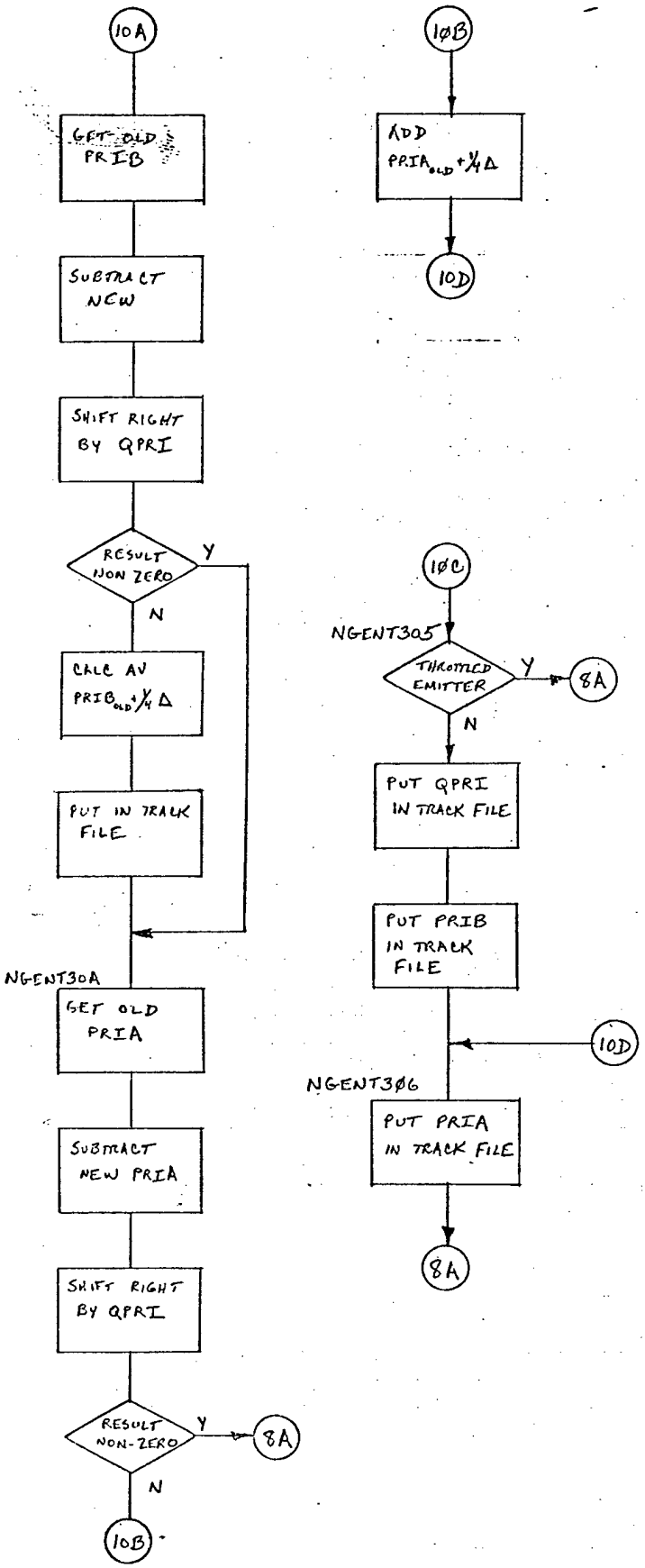
PROGRAM ROUTINE SUBROUTINE ACRONYM IEWS SORTER SUPV

UPDATE TASK

NOTE IDENT NO	PREPARED BY	DATE
49956	T. CHERNESKY	3 JUN 76
NUMBER 20		SHEET 9 OF 10

FLOW CHART

REMARKS



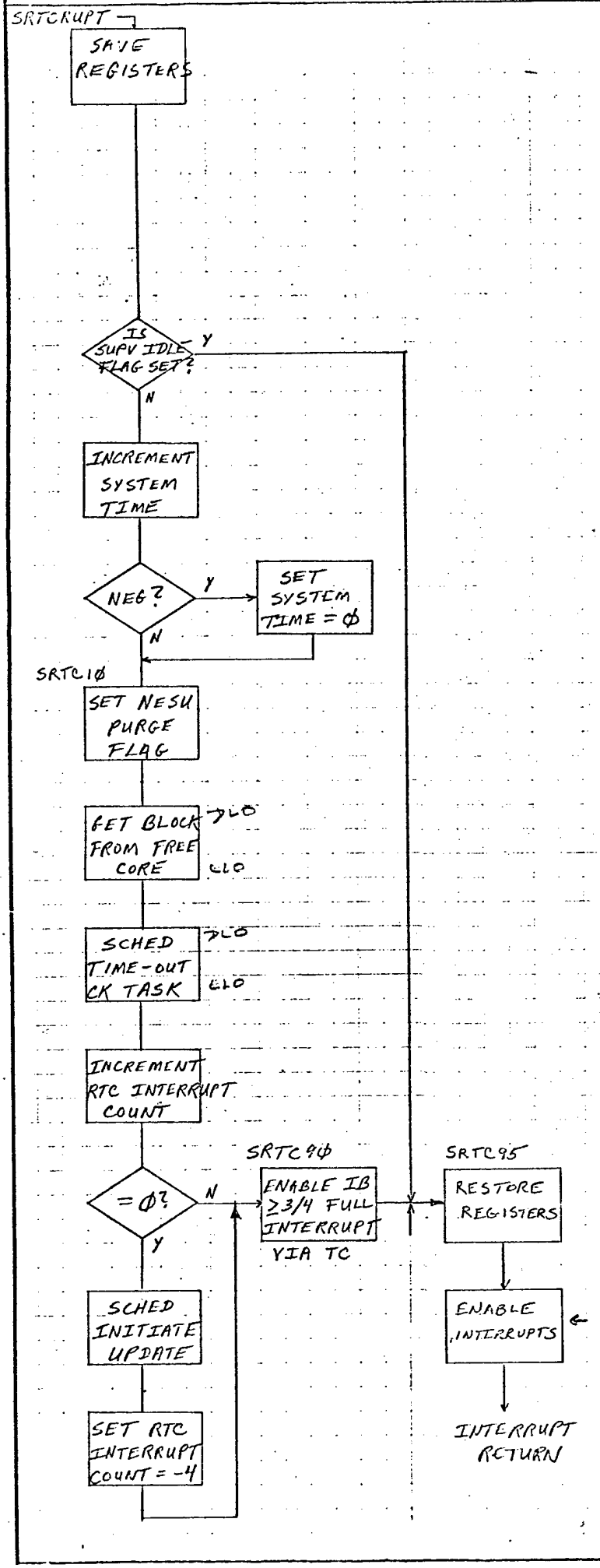
RAYTHEON	RAYTHEON COMPANY LEXINGTON, MASS. 02173
PROGRAM/ROUTINE/SUBROUTINE ACRONYM	IEWS SCRTER SUPV UPDATE TASK
CODE IDENT NO 49956	PREPARED BY / DATE
NUMBER 21	SHEET 10 OF 10

10-2319 (8-72)

FLOW CHART

REMARKS

RTC interrupt occurs every 50 msec



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

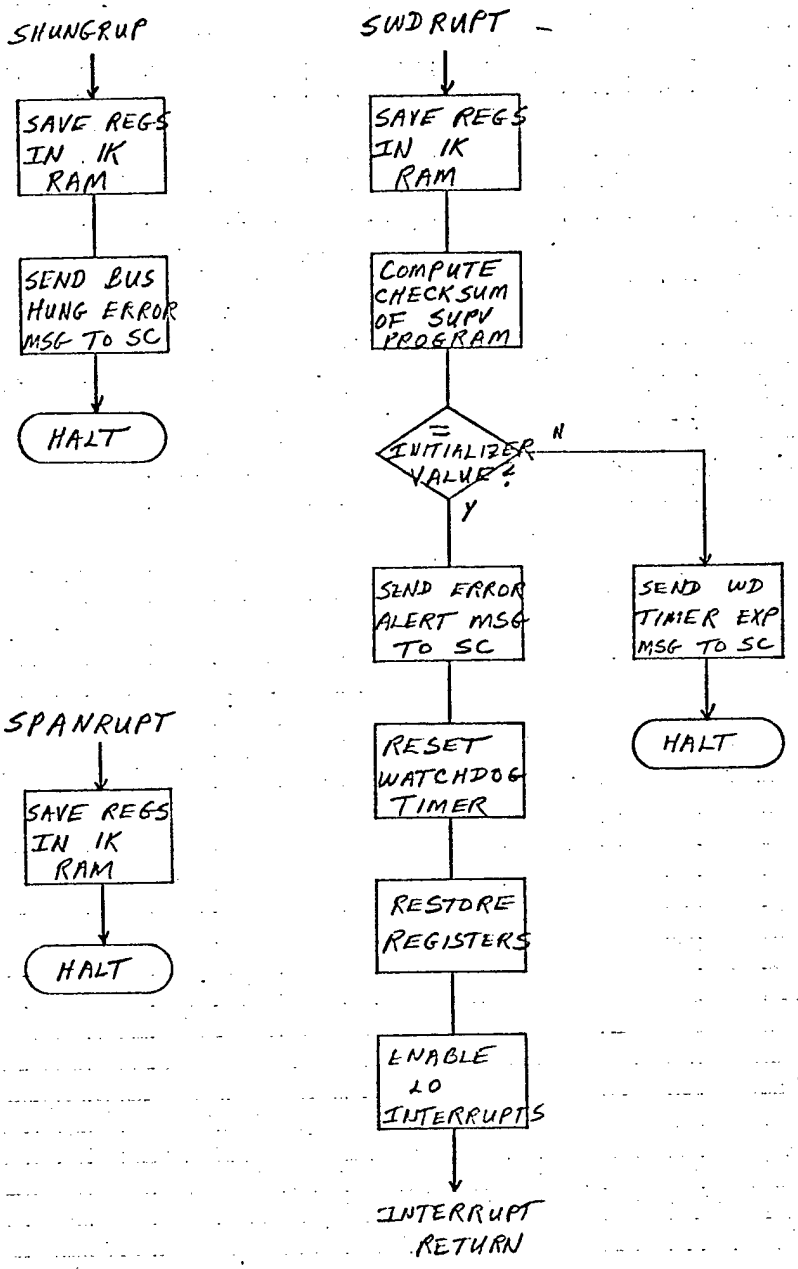
PROGRAM ROUTINE SUBROUTINE ACRONYM: ILUS SORTER SUPV

RTC INTERRUPT HANDLER

COMPONENT NO	PREPARED BY	DATE
49956	T. FITZPATRICK	28 MAY 76

NUMBER 22 SHEET 1 OF 1

FLOW CHART



REMARKS

REGS. SAVED ARE A, E, B, X, S, P

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

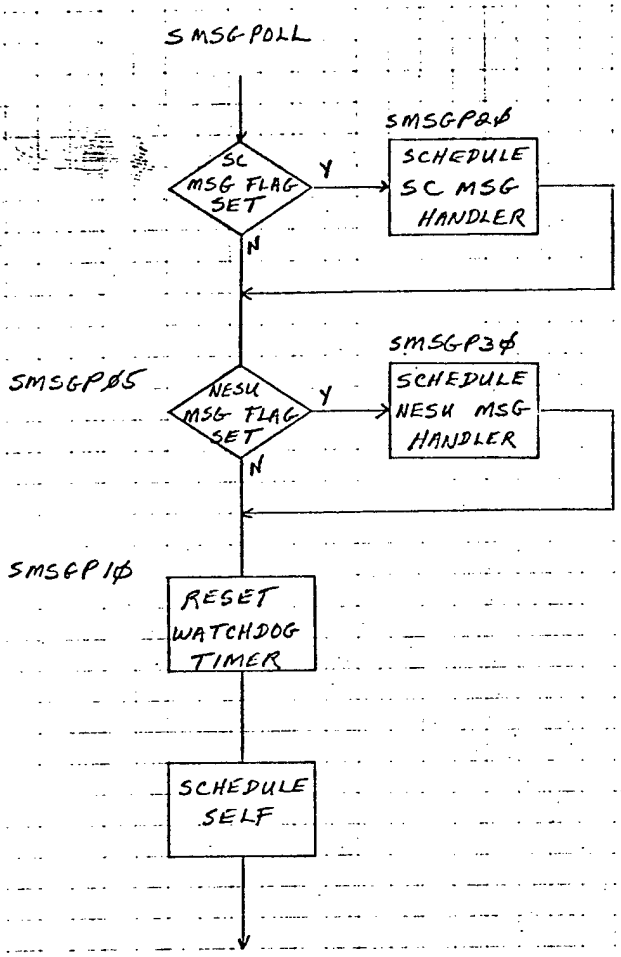
PROGRAM/ROUTINE/SUBROUTINE ACRONYM: IEWS SORTER SUPV BUS HUNG / WATCHDOG TIMER / CAN'C BUTTON

CODE IDENT. NO. 49956 | PREPARED BY T. CHERNESKY | DATE 27 MAY 76

NUMBER 23 | SHEET 1 OF 1

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

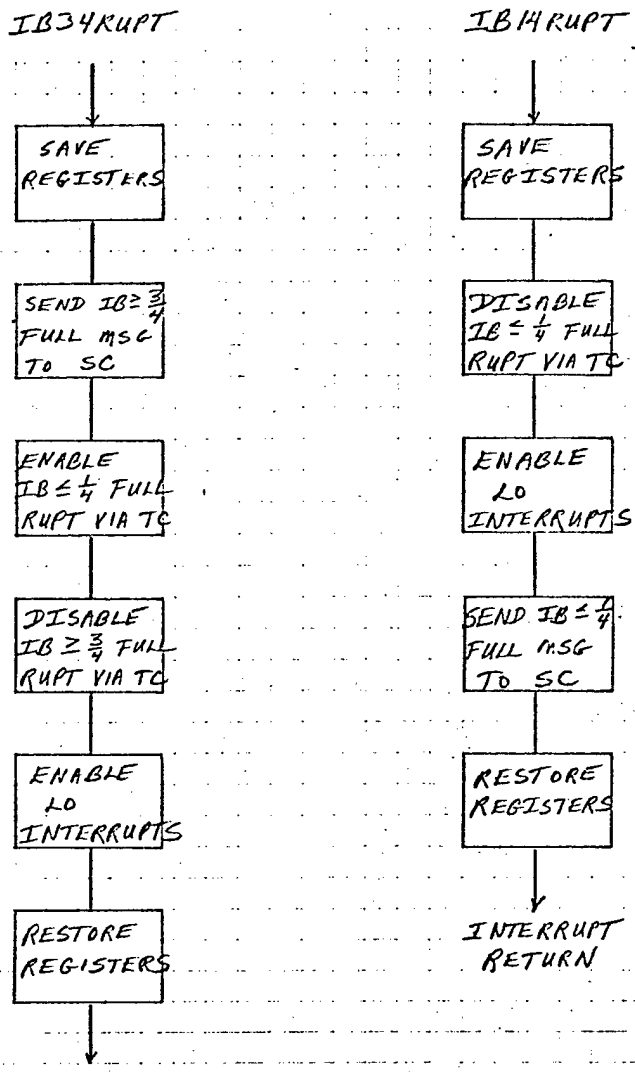
PROGRAM ROUTINE SUBROUTINE ACRONYM IEWS SORTER SUPV

MESSAGE POLLING TASK

CODE IDENT NO	PREPARED BY	DATE
49956	T. CHERNESKY	12 APR 76

NUMBER 04 SHEET 1 OF 1

FLOW CHART



REMARKS

IB ≥ 3/4 FULL INTERRUPT IS ENABLED VIA TC EVERY RTC INTERRUPT

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

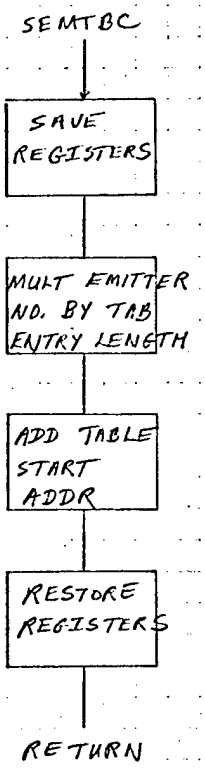
PROGRAM/ROUTINE/SUBROUTINE ACRONYM: IEWS SORTER SUPV
IB INTERRUPT HANDLERS

CODE IDENT NO	PREPARED BY	DATE
49956	T. CHERNESKY	30APR76

NUMBER 05 SHEET 1 OF 1

10-2319 (8 72)

FLOW CHART | REMARKS



CALL SEQ —

LDSA (EMITTER NO.)

JSUB (= SEMTBC)

STSA (EMTB ENTRY ADDR.)

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

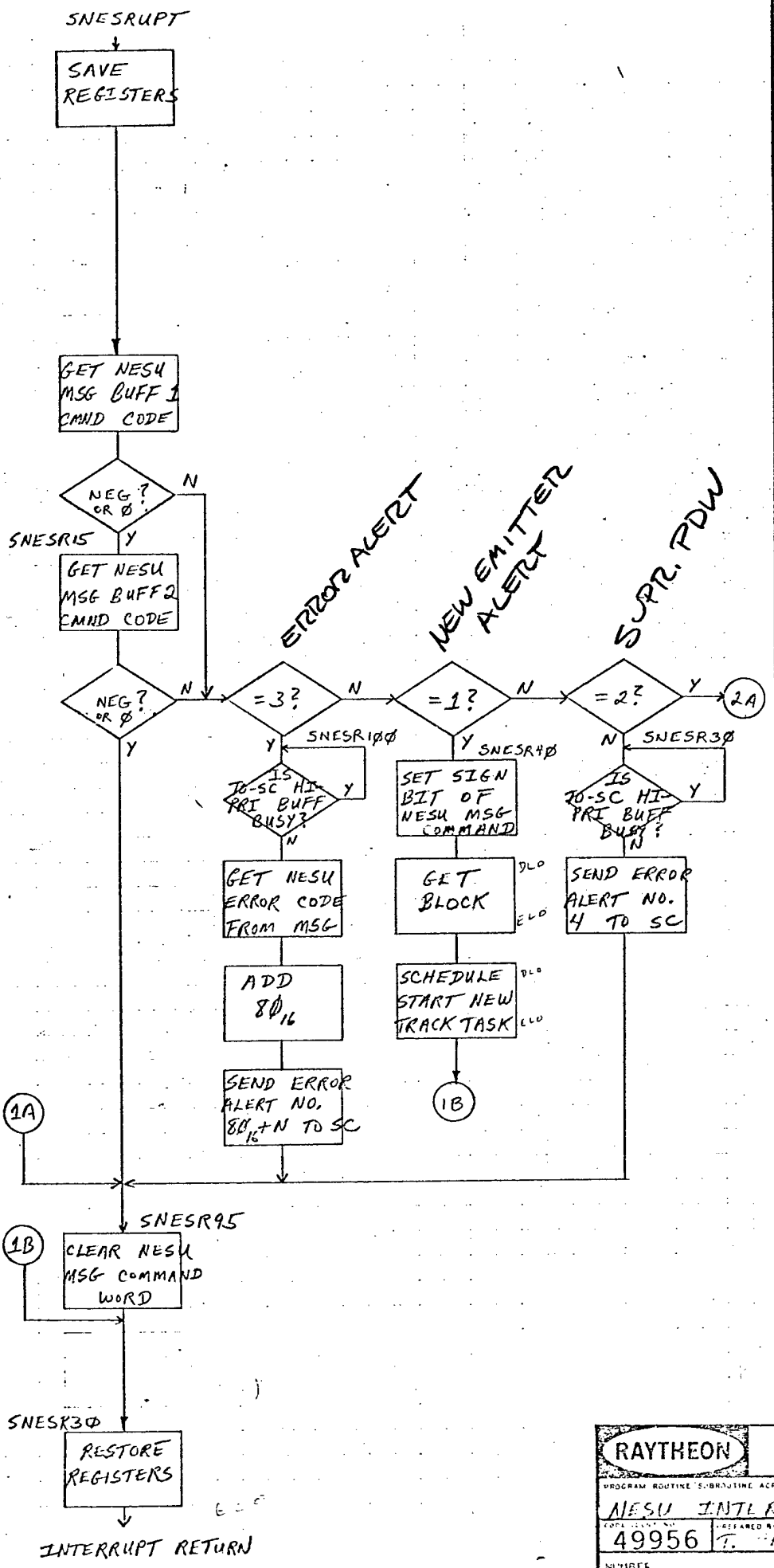
PROGRAM/ROUTINE/SUBROUTINE ACRONYM IEWS SORTER SUPV

CALC. EMITTER TABLE ENTRY ADDR SUBR.

SUBROUTINE NO.	PREPARED BY	DATE
49956	T. CHERNESKY	30APR76

NUMBER 26 | SHEET 1 OF 1

FLOW CHART



REMARKS

NEGATIVE COMMAND CODE MEANS NEW EMITTER ALERT MSG HAS BEEN PUT IN THIS BUFFER BY NESU AND IS BEING PROCESSED. (I.E., START NEW TRACK HAS BEEN SCHEDULED.)

ERROR ALERT NO. 4 MEANS "INVALID MSG REC'D FROM NESU"

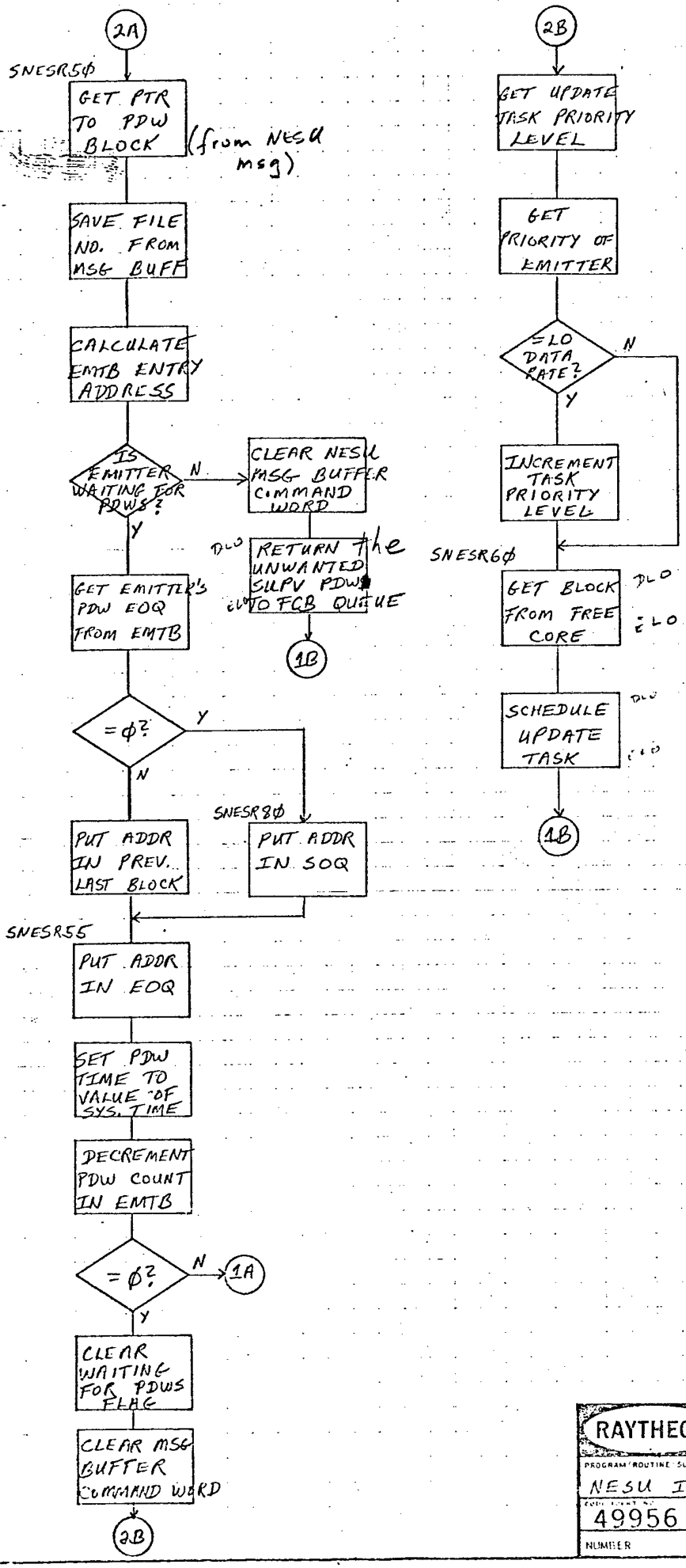
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM: IEWS SORTER SUBV
NESU INTERRUPT HANDLER

CODE IDENT NO.	PREPARED BY	DATE
49956	T. HERNICKY	2 JUN 74
NUMBER	27	SHEET 1 OF 2

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE ACRONYM: IEWS SORTER SUPV
NESU INTERRUPT HANDLER

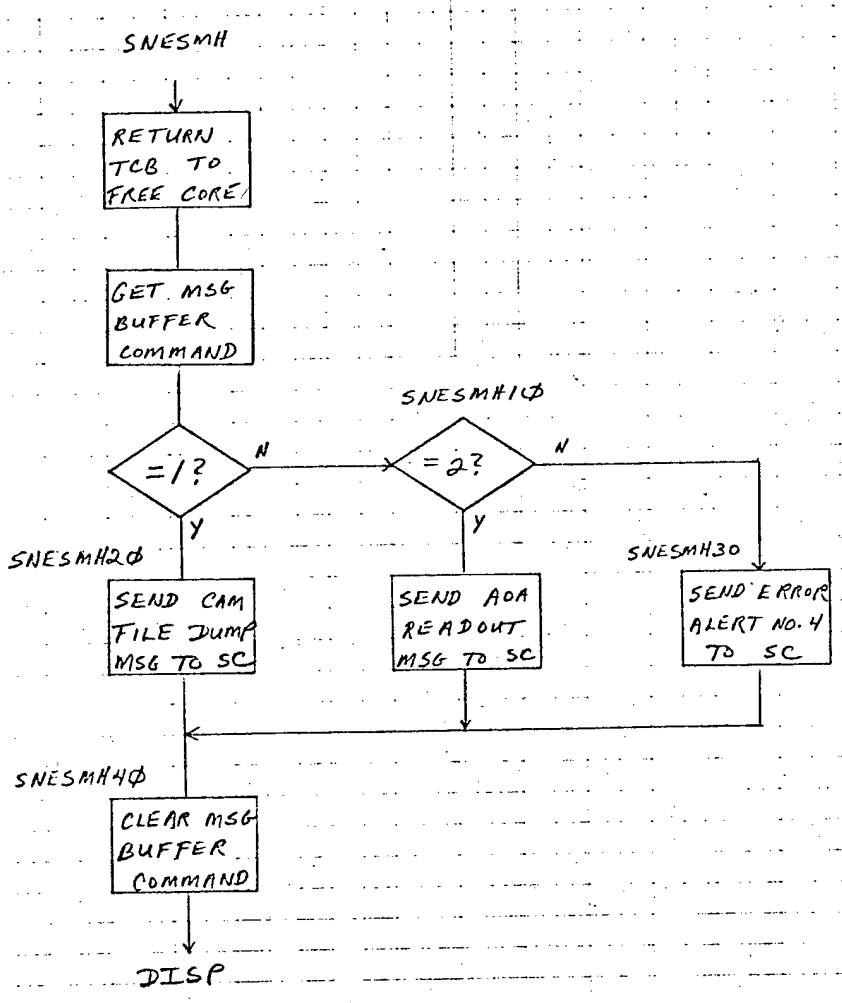
CODE IDENT NO.	PREPARED BY	DATE
49956	T. CHERNESKY	2JUN 74

NUMBER 28 SHEET 2 OF 2

10-2319-18 72

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

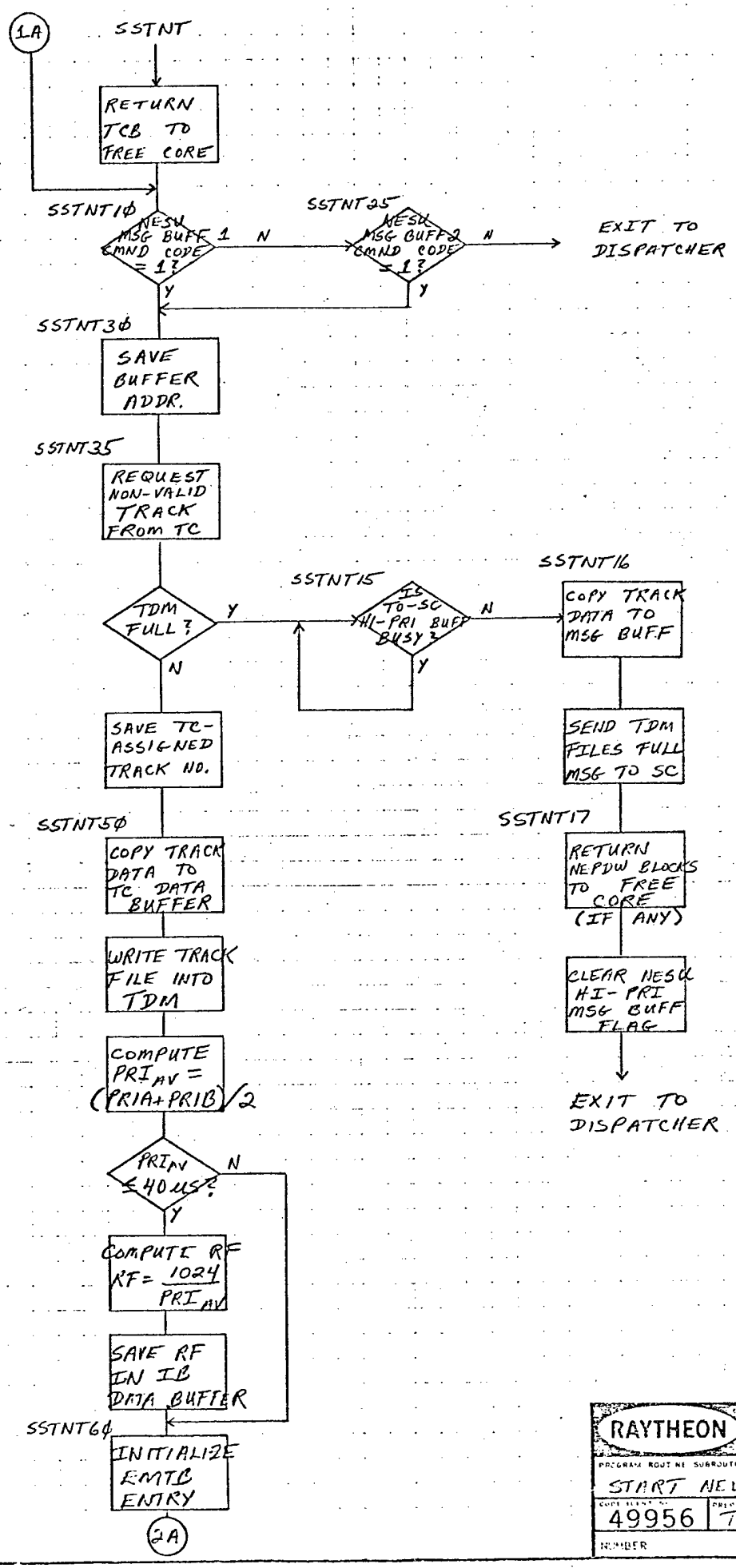
PROGRAM/ROUTINE/SUBROUTINE/ACRONYM: LEWS SORTER SUPV
NESU MESSAGE HANDLER

COST ITEM NO.	PREPARED BY	DATE
49956	T. CHERNESKY	10 APR 76

NUMBER 29 SHEET 1 OF 1

10-2316 (8-72)

FLOW CHART



REMARKS

$PRI_{AV} \leq 40\,ms$ MEANS THROTTLING OF NEW EMITTER IS REQUIRED.

'RF' MEANS 'REDUCTION FACTOR'

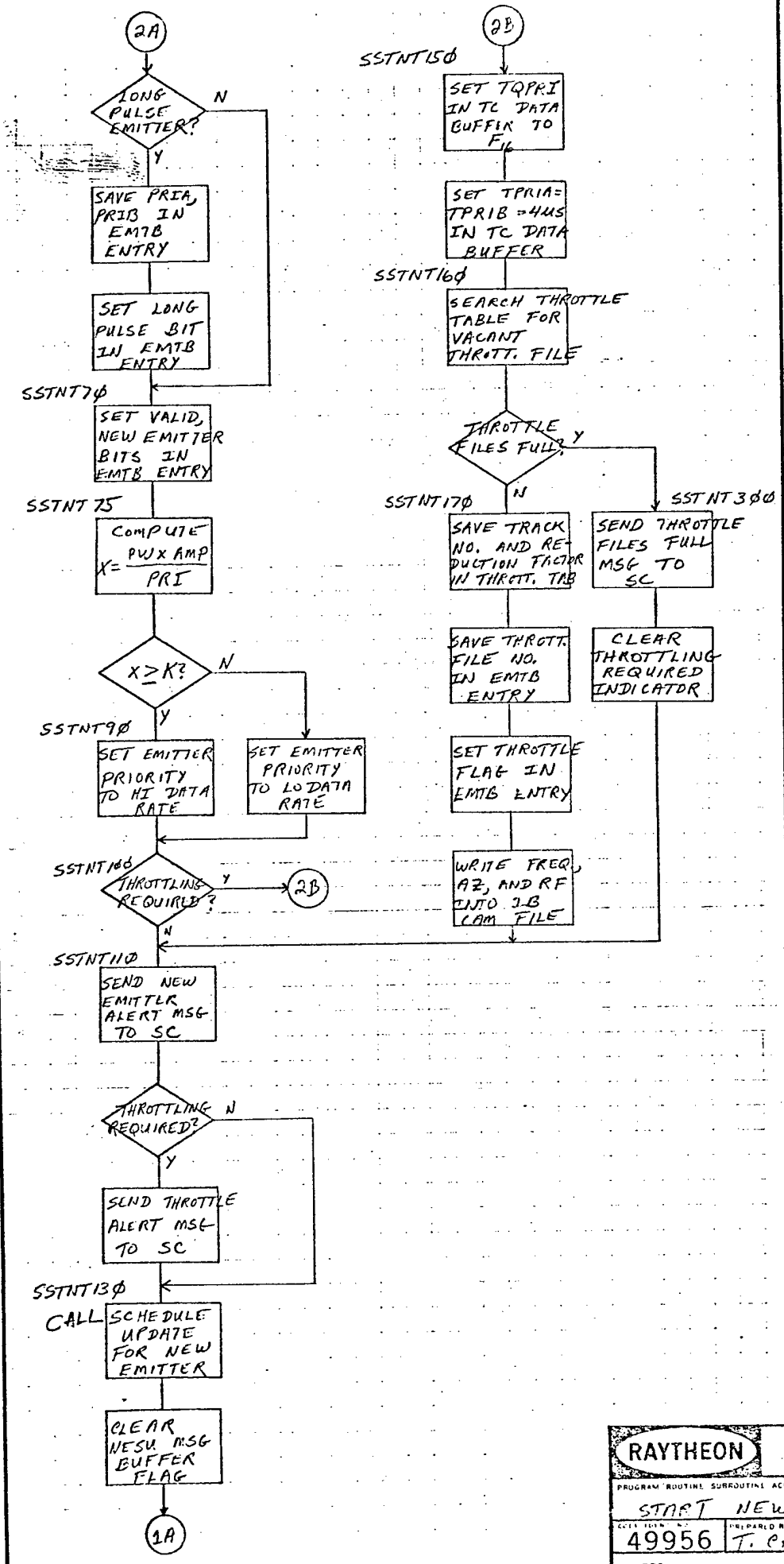
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM, ROUTINE, SUBROUTINE, ACRONYM: IEWS SORTER SUPV
START NEW TRACK TASK

CODE IDENT NO. 49956 | PREPARED BY T. CHERNESKY | DATE 8 JUN 76

NUMBER 50 | SHEET 1 OF 2

FLOW CHART



REMARKS

K = TARGET TRACK THRESHOLD

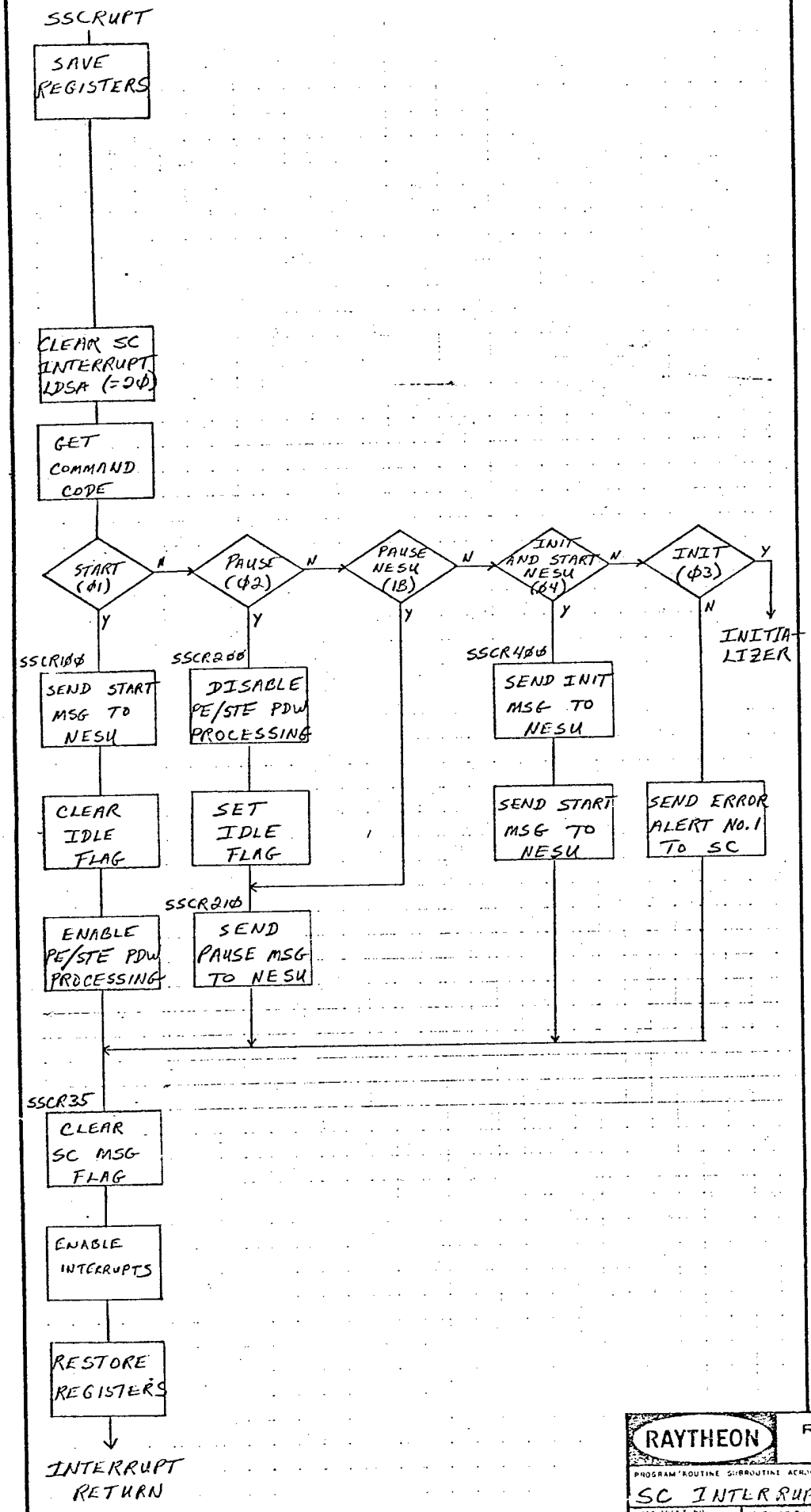
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM IEWS SORTER SUPV
START NEW TRACK TASK

CODE IDENT. NO.	PREPARED BY	DATE
49956	T. CHERNESKY	3 MAY 76
NUMBER 31	SHEET 2 OF 2	

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

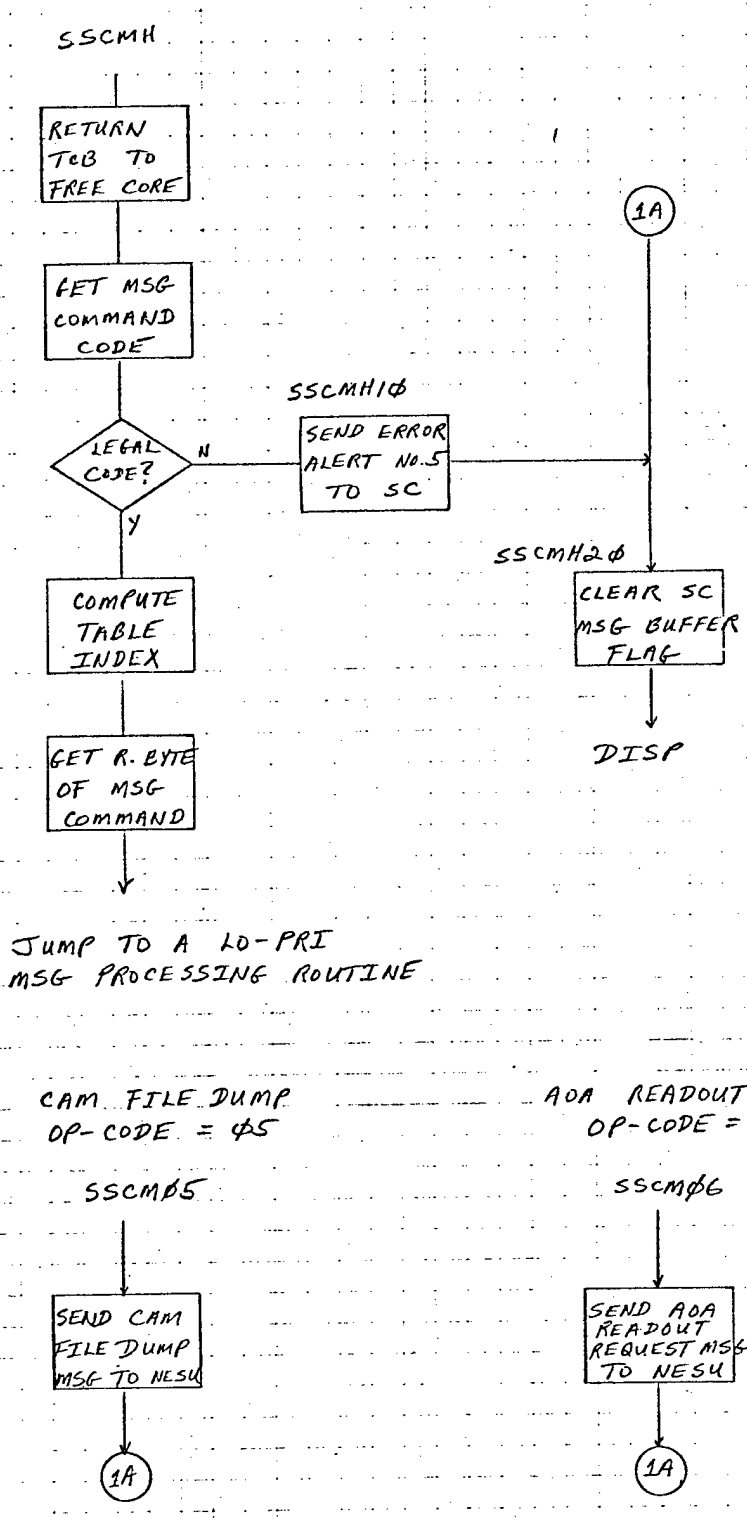
PROGRAM/ROUTINE SUBROUTINE ACRONYM: IIWS SORTER SUPV
SC INTERRUPT HANDLER

CODE IDENT NO: 49956
PREPARED BY: T. CHERNESKY
DATE: 2 JUN 76

NUMBER: 30
SHEET 1 OF 1

FLOW CHART

REMARKS



RIGHT BYTE USUALLY CONTAINS SORTER TRACK FILE NO.

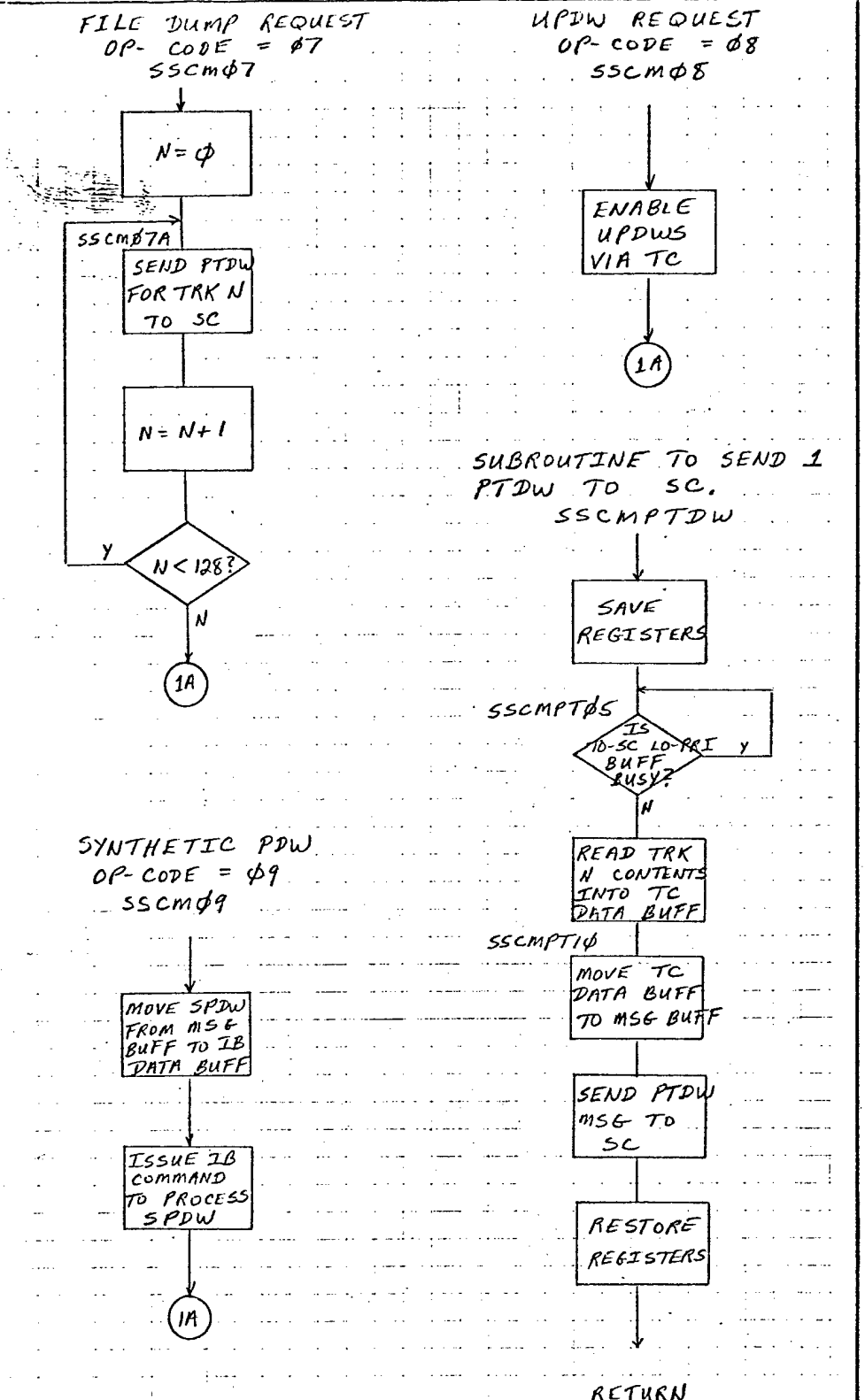
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE ACRONYM: IEWS SORTER SUPV
SC MESSAGE HANDLING

CODE IDENT NO: 49956
PREPARED BY: T. CHERNESKY
DATE: 19 APR 76
NUMBER: 33
SHEET 1 OF 5

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE ACRONYM: ILWS SORTLR SUPV

SC MESSAGE HANDLING

CODE IDENT NO	PREPARED BY	DATE
49956	T. CHERNESKY	12 APR 76

NUMBER 34 SHEET 2 OF 8

FLOW CHART

REMARKS

NESU TRACK THRESHOLD MODIFY
OP-CODE = ØA
SSCMØA

3B

GET TO-NESU MSG NO. (= 3)

SSCMØAA

IS TO-NESU BUFF BUSY? Y N

PUT NEW VALUE IN MSG BUFF

SEND MSG TO NESU

1A

TRACK PRIORITY MOD.
OP-CODE = ØC
SSCMØC

CALCULATE EMITTER TABLE ADDR

GET OLD FLAGS/PRIOR. FROM EMTB ENTRY

GET DATA WORD FROM MSG

BIT 14 SET? N Y

SSCMØCA

BIT 13 SET? N Y

SSCMØCB

SET PRIORITY TO HI-RATE THREAT

SET PRIORITY TO HI-DATA RATE

SET PRIORITY TO LO-DATA RATE

SSCMØCC

BIT 12 SET? Y N

CLEAR DONT UPDATE, TIME OUT FLAG BITS

SSCMØCD

SAVE NEW FLAGS/PRIOR. IN EMTB ENTRY

GET NEW PURGE TIME FROM SC MSG

SET SUPV PURGE TIME TO NEW VALUE

1A

QUALITY BIT MOD. OF TRACK N
OP-CODE = ØB
SSCMØB

READ TRK N CONTENTS INTO TC DATA BUFF

GET NEW QUALITY BITS FROM SC MSG

PUT INTO TC DATA BUFFER

3A

SSCMØBB

WRITE TC DATA BUFF INTO TRK N

1A

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE ACRONYM: IEWS SORTER SUPV
SC MESSAGE HANDLING

CODE IDENT NO. 49956 | PREPARED BY T. CHERNESKY | DATE 12 APR 76

NUMBER 35 | SHEET 3 OF 5

80-2319-8 7/71

FLOW CHART

REMARKS

PTDW REQUEST
OP-CODE = ØD
SSCMØD

SEND PTDW FOR TRACK N TO SC

1A

SPDW REQUEST
OP-CODE = ØE
SSCMØE

READ TRK N CONTENTS INTO TC DATA BUFF

GET TTAMP, TCODE FROM SC MSG

TRANSFORM INTO TDM FILE FORMAT

PUT INTO TC DATA BUFFER

SET THRSC IN TC DATA BUFFER

3A

SPDW STOP
OP-CODE = ØF
SSCMØF

READ TRK N CONTENTS INTO TC DATA BUFF

CLEAR THRSC IN TC DATA BUFFER

3A

NEPDW REQUEST
OP-CODE = 1Ø
SSCM1Ø

CALCULATE EMTB ENTRY ADDRESS

GET NEPDWS SOQ

=Ø? Y

SSCM1ØD

SEND ERR ALERT NO. 2 TO SC

1A

N

GET A NEPDW

SSCM1ØA

IS TO-SC 10 BUFF BUSY? PRI Y

N

PUT PDW IN MSG BUFFER

GET PDW'S FWD PTR

=Ø? Y

SSCM1ØB

SET LAST NEPDW MSG FLAG

N

SEND NEPDW MSG TO SC

SEND NEPDW MSG TO SC

RETURN THE NEPDW BLOCKS TO FREE CORE

CLEAR SOQ FOR NEPDWS IN EMTB ENTRY

1A

'NEPDW' MEANS 'NEW EMITTER PDW'

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

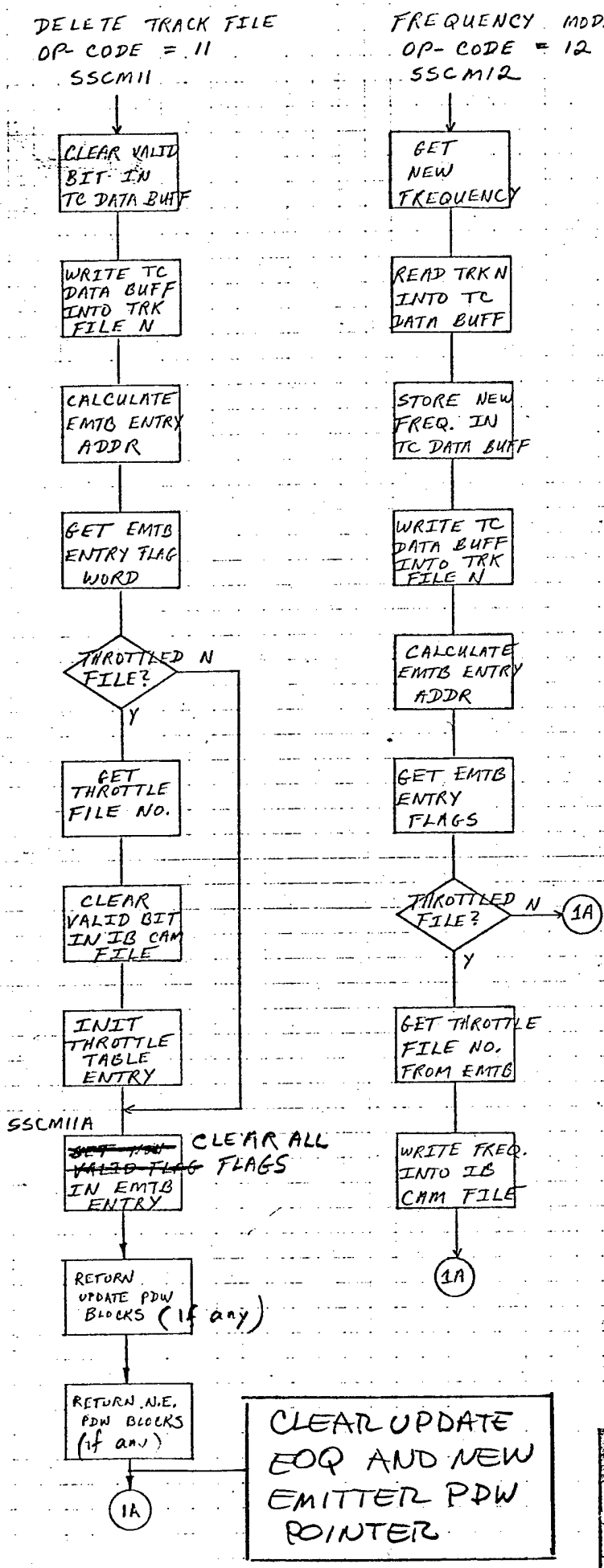
PROGRAM/ROUTINE SUBROUTINE ACRONYM IEWS SORTER SUBV
SC MESSAGE HANDLING

CODE IDENT NO 49956 | PREPARED BY T. CHERNESKY | DATE 13 APR 76

NUMBER 36 | SHEET 11 OF 4

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE ACRONYM: IEWS SORTER SUPV
SC MESSAGE HANDLING

CODE IDENT NO: 49956
PREPARED BY: T. CHERNLSKY
DATE: 12 APR 76

NUMBER: 37
SHEET 5 OF 9

FLOW CHART

REMARKS

PRI MODIFICATION OF TRACK N
OP-CODE = 13
SSCM13

READ TRK N CONTENTS INTO TC DATA BUFF

GET NEW PRIA FROM SC MSG

PUT INTO TC DATA BUFFER

GET NEW PRIB

PUT INTO TC DATA BUFFER

3A

THROTTLE FILE MODIFY.
OP-CODE = 14
SSCM14

CALCULATE EMTB ENTRY ADDR

GET EMTB ENTRY FLAGS

SET THROTTLE FLAG BIT

GET THROTTLE FILE NO. FROM SC MSG

SAVE IN EMTB ENTRY

COMPUTE THROTTB ENTRY ADDR

SAVE EMITTER NO. IN THROTTB

GET REDUCT. FACTOR FROM SC MSG

SAVE IN THROTTB ENTRY

WRITE REDUCTION FACTOR INTO IB CAM

6A

6A

GET NEW FREQ. FROM SC MSG

WRITE FREQ. INTO IB CAM

GET NEW AZIMUTH FROM SC MSG

WRITE AZIMUTH AND VALID INTO IB CAM

1A

AOA THRESHOLD MODIFY.
OP-CODE = 15
SSCM15

GET TO-NESU MSG NO. (=4)

3B

RAYTHEON

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE ACRONYM IEWS SORTER SUPV
SC MESSAGE HANDLING

CODE IDENT. NO.	PREPARED BY	DATE
49956	T. CHERNESKY	12 APR 76

NUMBER 38 SHEET 6 OF 6

FLOW CHART

REMARKS

CREATE FILE.
OP-CODE = 16
SSCM16

CALCULATE EMTB ENTRY ADDR

GET EMTB ENTRY FLAGS

SET EMITTER PRIORITY TO LO DATA RATE

INITIALIZE EMTB ENTRY

SSCM16A

COPY TRK DATA TO TC DATA BUFF

GET TRACK NO.

WRITE TC DATA BUFF INTO TDM

IS TO-SC LO-PRI BUFF BUSY? Y

N

SEND CONFIRM FILE CREATION MSG TO SC

1A

UPDW STOP
OP-CODE = 17
SSCM17

DISABLE UPDWS VIA TC

1A

PW MODIFY OF TRACK N
OP-CODE = 18
SSCM18

READ TRK N INTO TC DATA BUFF

GET NEW PW FROM SC MSG

PUT INTO TC DATA BUFFER

3A

TRANSFER TABLE
OP-CODE = 19
SSCM19

GET ADDR OF 8-WORD BLOCK TO BE SENT TO SC

IS TO-SC LO-PRI BUFF BUSY? Y

N

SSCM19A

PUT 8 WORDS OF SORTER MEM. IN MSG BUFFER

PUT OP-CODE IN MSG BUFFER

SET FLAG AND WORD COUNT

1A

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

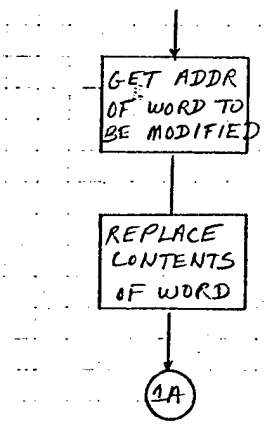
PROGRAM/ROUTINE/SUBROUTINE ACRONYM IEWS SORTER SUPV
SC MESSAGE HANDLING

CODE IDENT NO 49956 | PREPARED BY T. CHERNESKY | DATE 3 JUN 76

NUMBER 39 | SHEET 7 OF 8

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

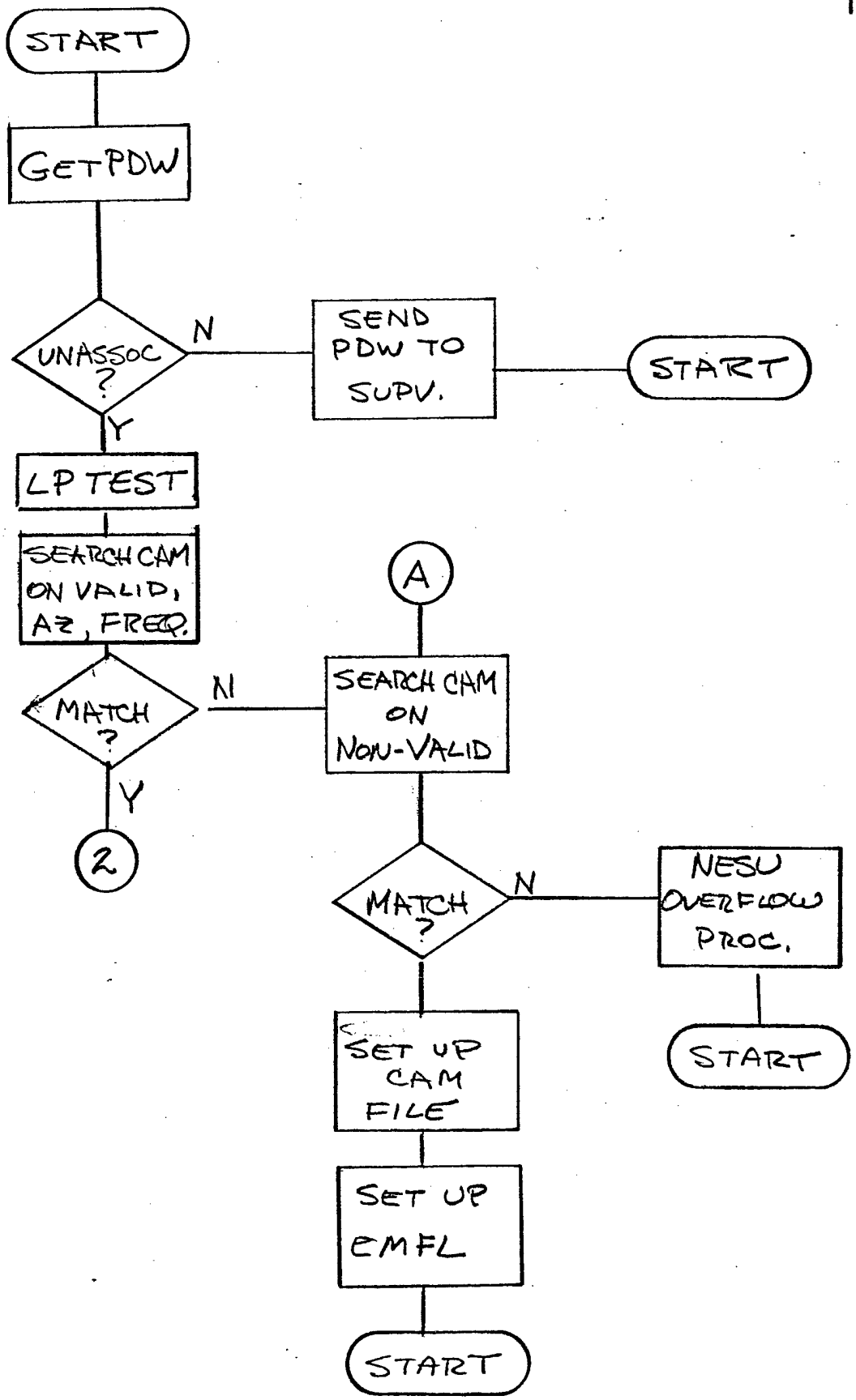
PROGRAM/ROUTINE/SUBROUTINE ACRONYM: IEWS SORTER SUPV
SC MESSAGE HANDLING

CODE IDENT NO	PREPARED BY	DATE
49956	T. CHERNESKY	12 APR 76

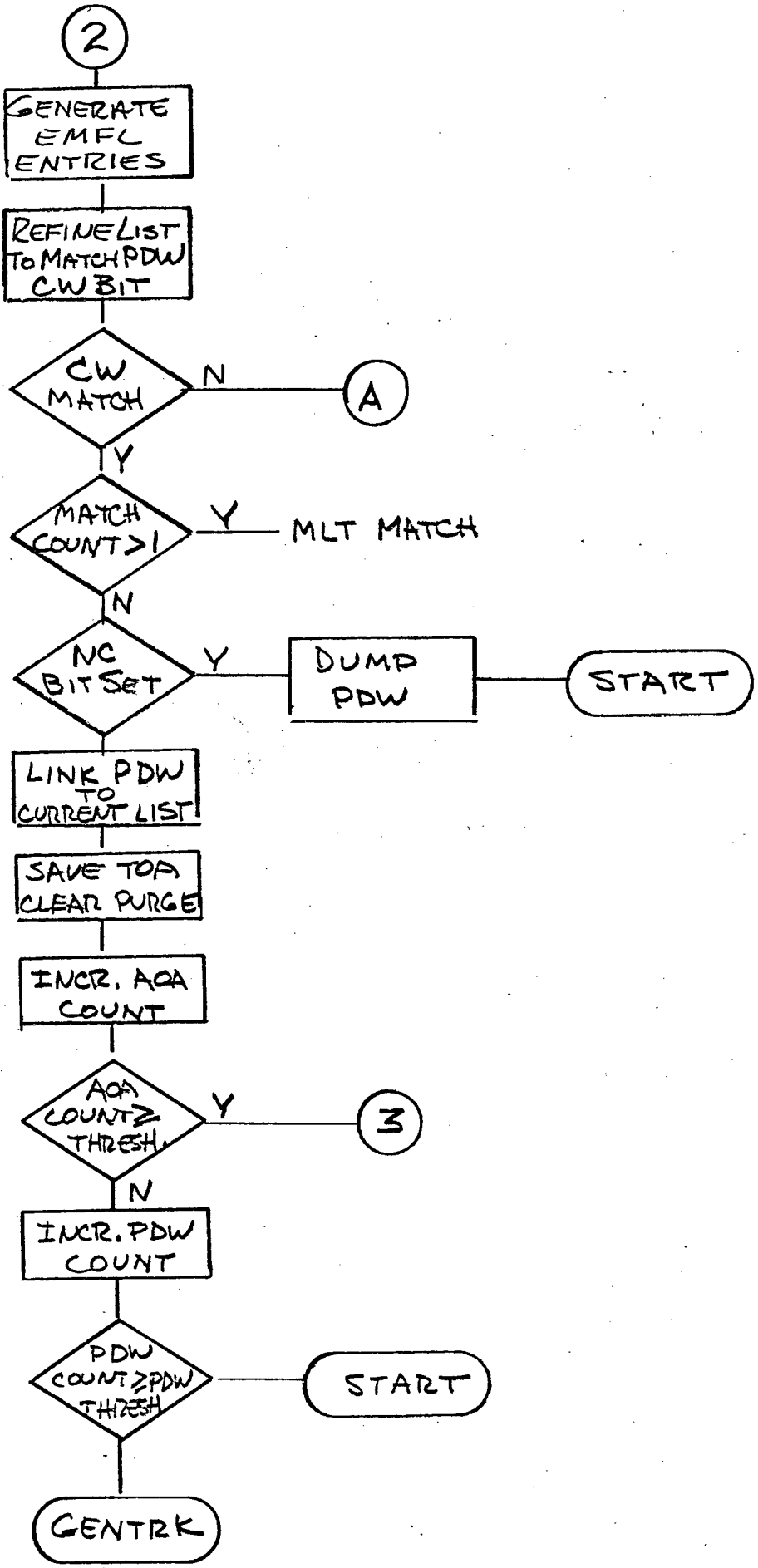
NUMBER 40 SHEET 5 OF 7

10-2319 (8 72)

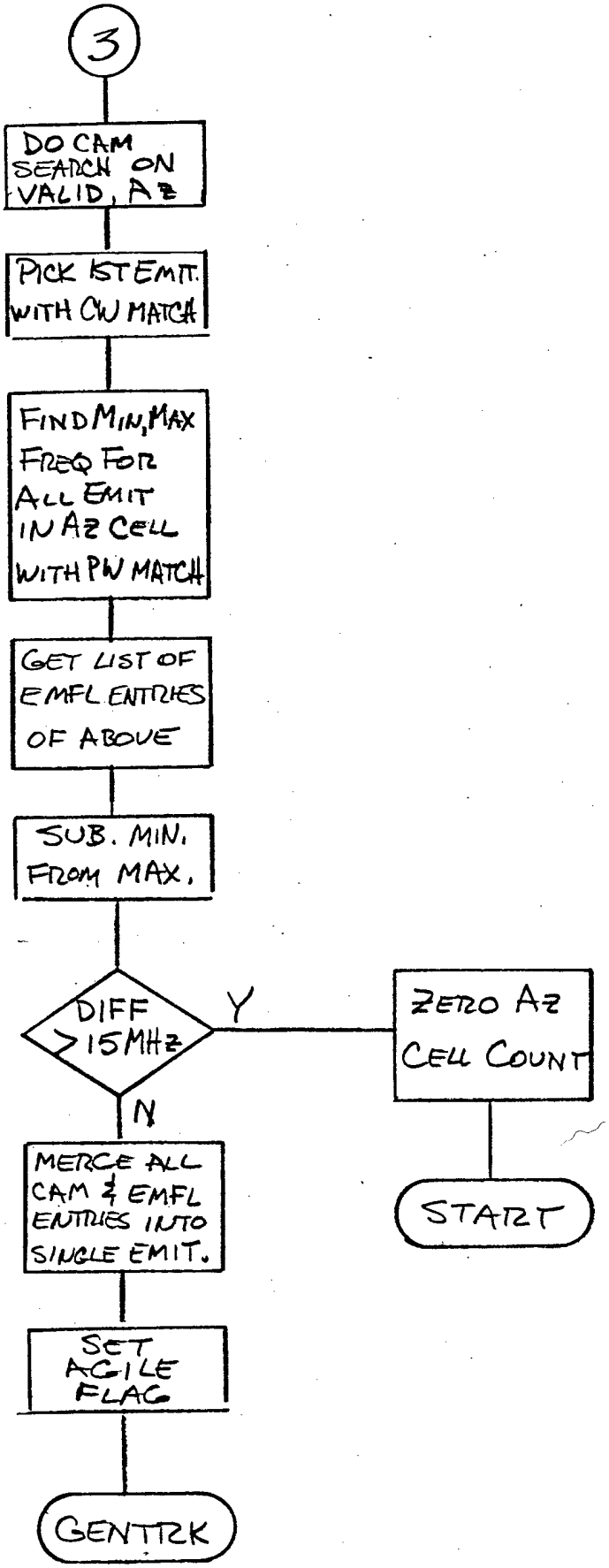
NESU
1


START
GETPDW
UNASSOC ?
N
SEND PDW TO SUPV.
START
Y
LP TEST
SEARCH CAM ON VALID, AZ, FREQ.
A
MATCH ?
N
SEARCH CAM ON NON-VALID
Y
2
MATCH ?
N
NESU OVERFLOW PROC.
START
SET UP CAM FILE
SET UP EMFL
START

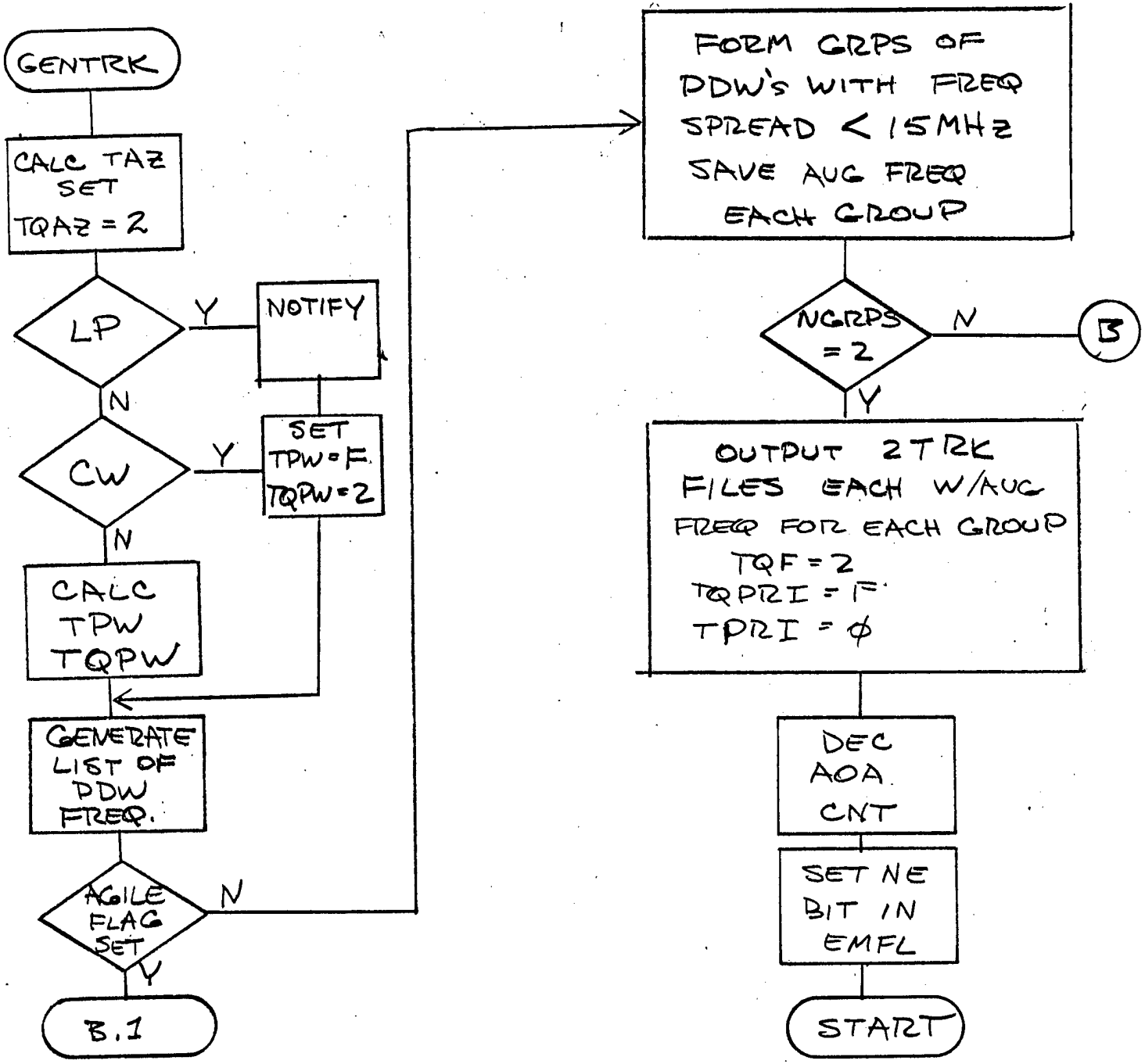
NESU
2


2
GENERATE EMFL ENTRIES
REFINE LIST TO MATCH PDW CW BIT
CW MATCH
N
A
Y
MATCH COUNT > 1
Y
MLT MATCH
N
NC BIT SET
Y
DUMP PDW
START
LINK PDW TO CURRENT LIST
SAVE TOA CLEAR PURGE
INCR. AOA COUNT
AOA COUNT ≥ THRESH.
Y
3
N
INCR. PDW COUNT
PDW COUNT ≥ PDW THRESH
START
GENTRK

NESU
3


3
DO CAM SEARCH ON VALID, AZ
PICK 1ST EMIT. WITH CW MATCH
FIND MIN, MAX FREQ FOR ALL EMIT IN AZ CELL WITH PW MATCH
GET LIST OF EMFL ENTRIES OF ABOVE
SUB. MIN. FROM MAX.
DIFF > 15MHz
Y
ZERO AZ CELL COUNT
START
N
MERGE ALL CAM & EMFL ENTRIES INTO SINGLE EMIT.
SET AGILE FLAG
GENTRK

NESU
GENTRK
PROC 1

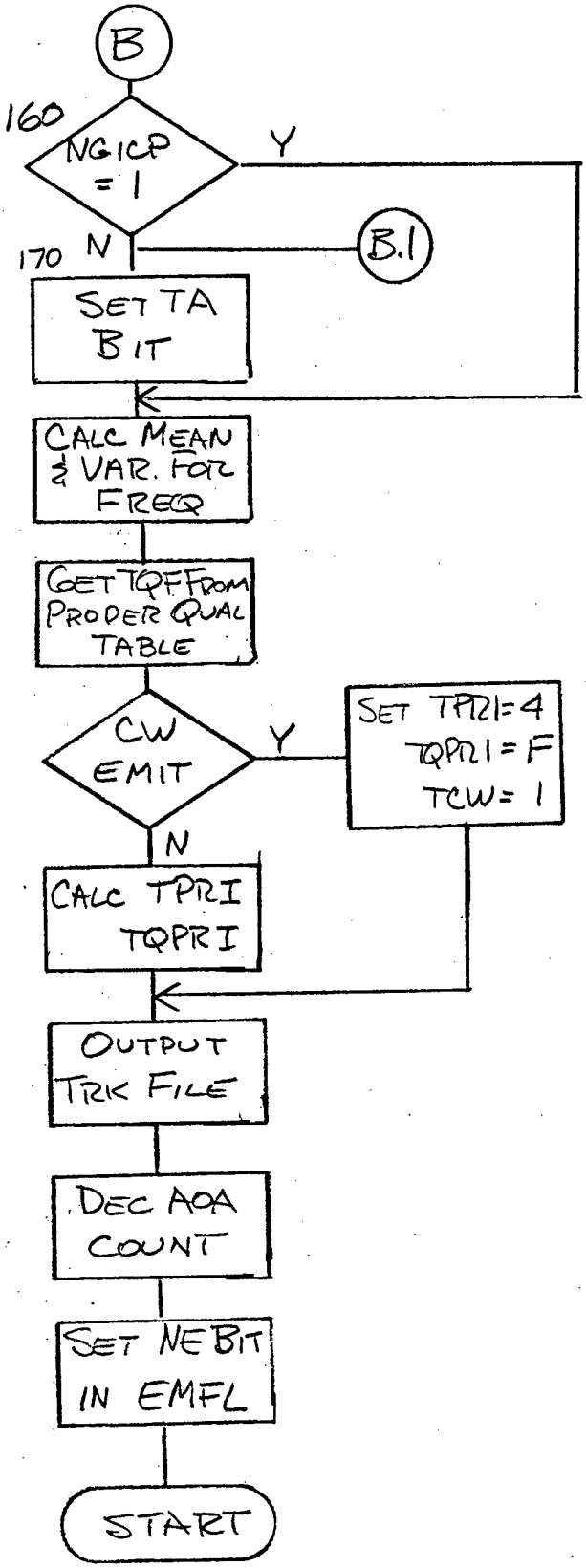


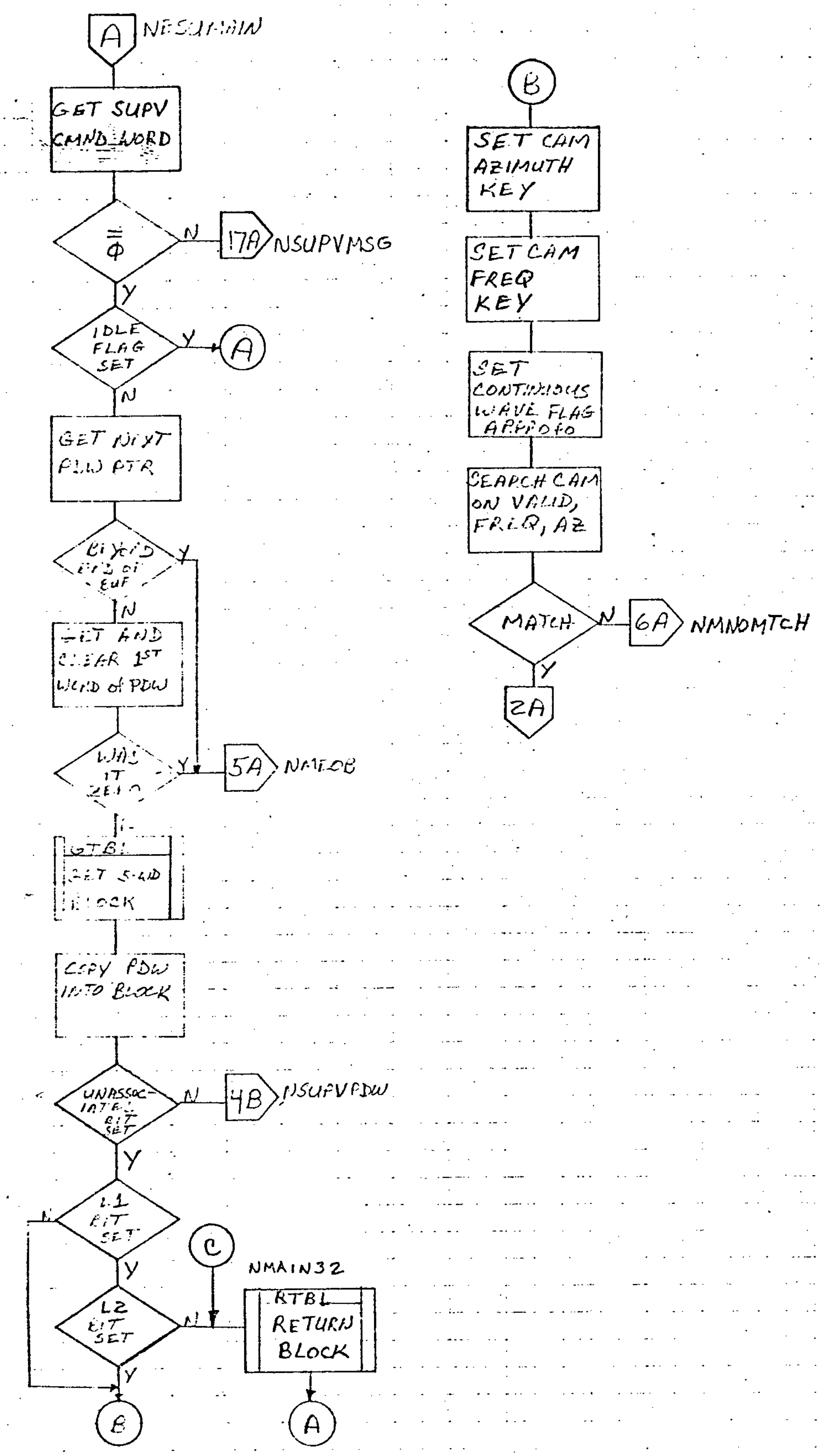
NESU

5

GENTRK

PROC 2



FLOW CHART	REMARKS
	NESUMAIN IS THE ROOT OF THE NESU TREE SUPERVISOR REQUESTS TAKE PRIORITY OVER PDW PROCESSING MATCH RETURNS INDEX TO START OF CORRESPONDING EMFL TABLE ENTRY ONLY THE LAST PDW DESCRIBING A LONG PULSE IS USED

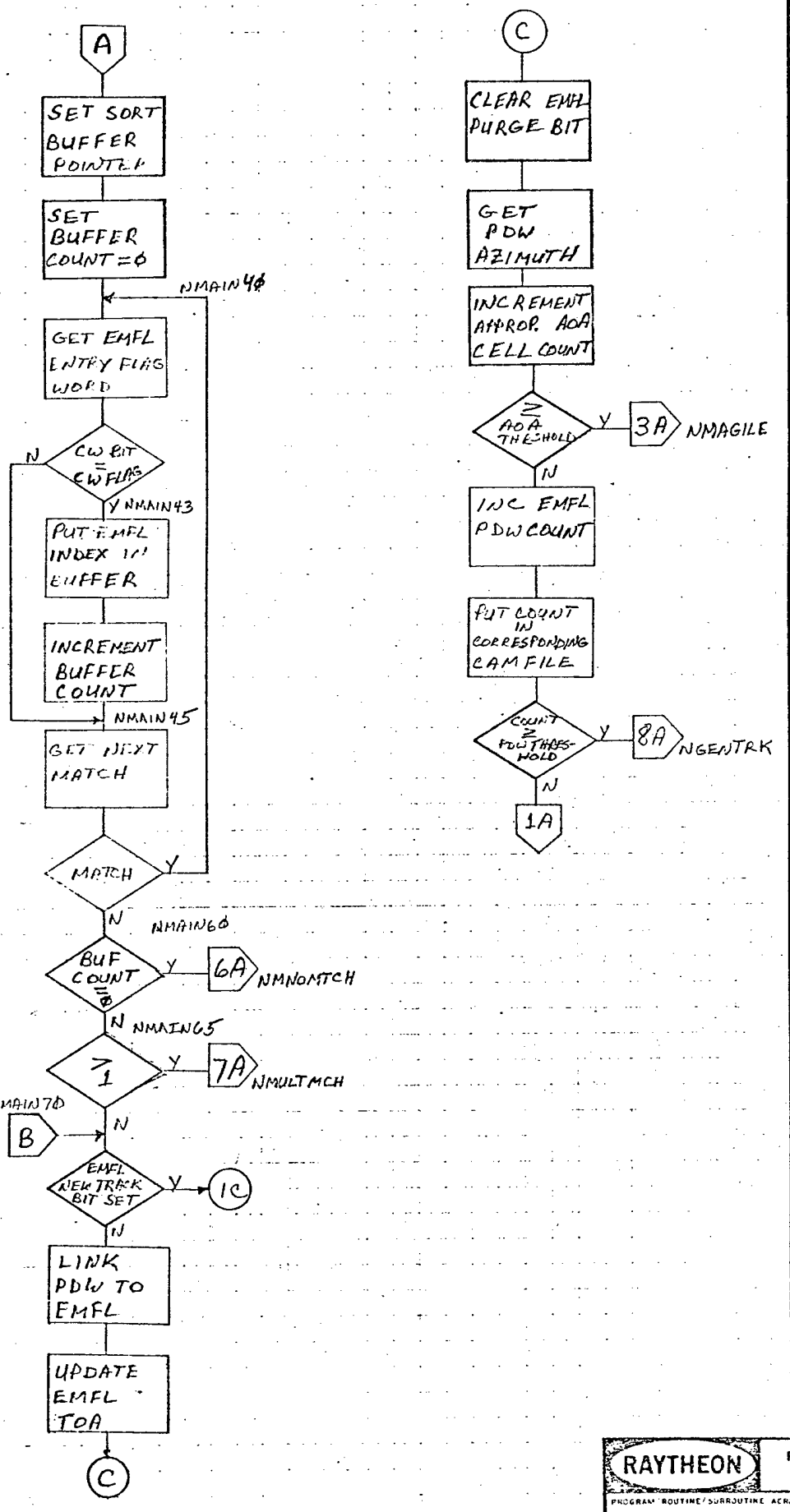
NOTE: 7B DENOTES SHEET 7 LABEL B

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM: IEWS-SORTER – NESU (DETAIL)

49956 | PREPARED BY: G. G. LONARDO

NUMBER: MAIN | SHEET 1 OF 19



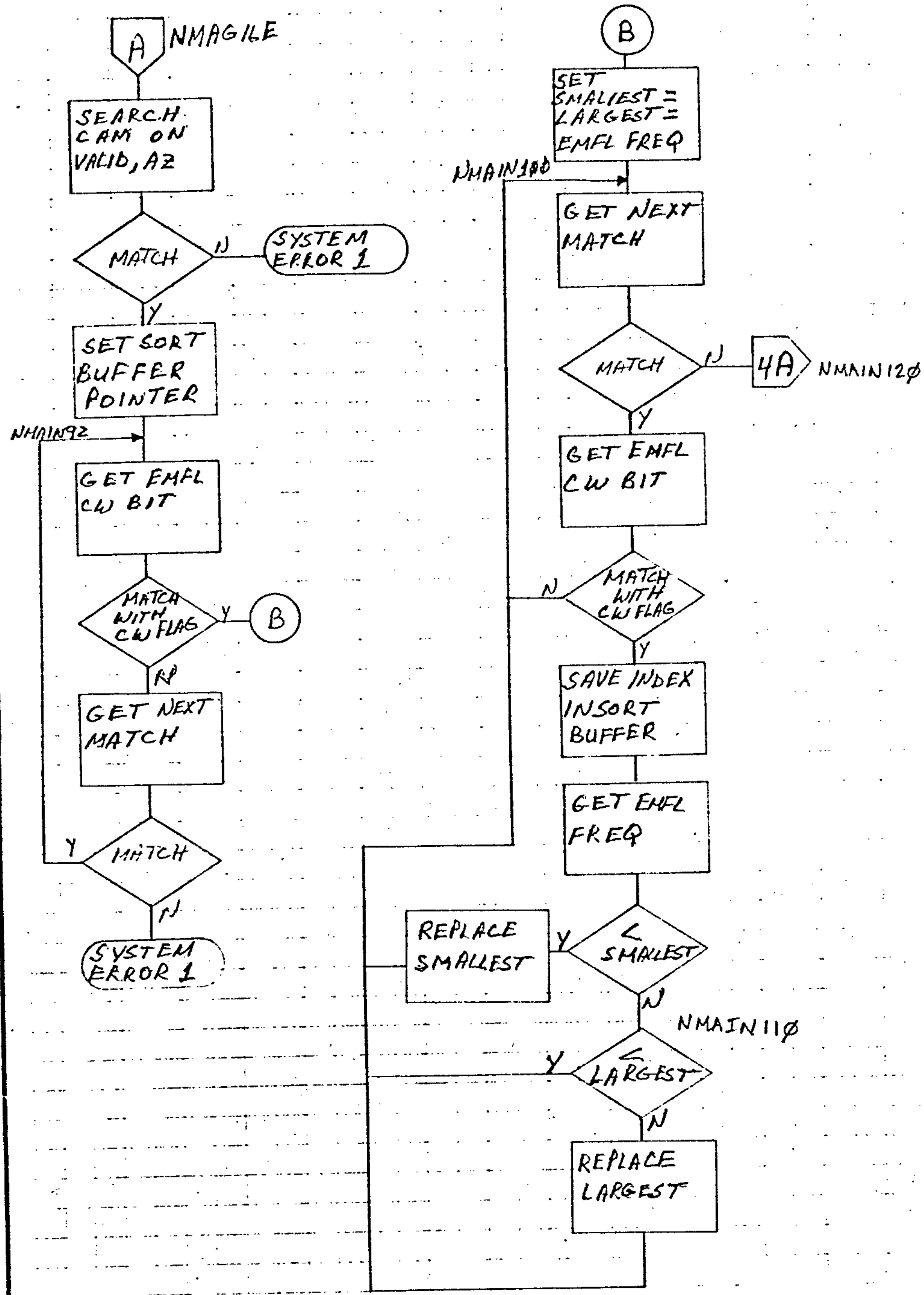
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM / ROUTINE / SUBROUTINE ACRONYM
JEWS SORTER - NESU

CODE IDENT NO 49956 | PREPARED BY | DATE

NUMBER MAIN | SHEET 2 OF 19

FLOW CHART | REMARKS



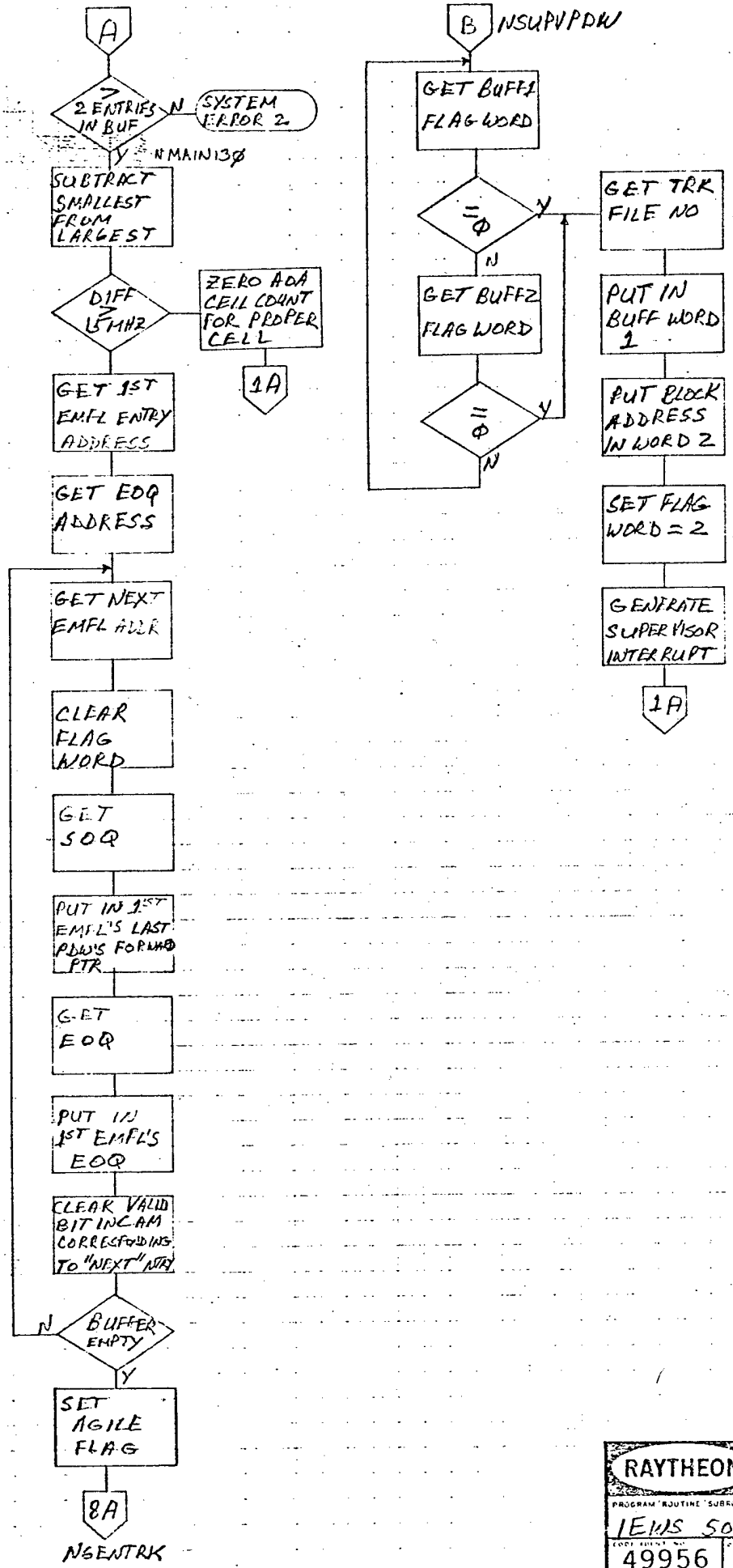
RAYTHEON | RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE/ACRONYM: IEWS SORTER-NESU

49956 | PREPARED BY | DATE

NUMBER: AGILE MERGE | SHEET 3 OF 19

FLOW CHART



REMARKS

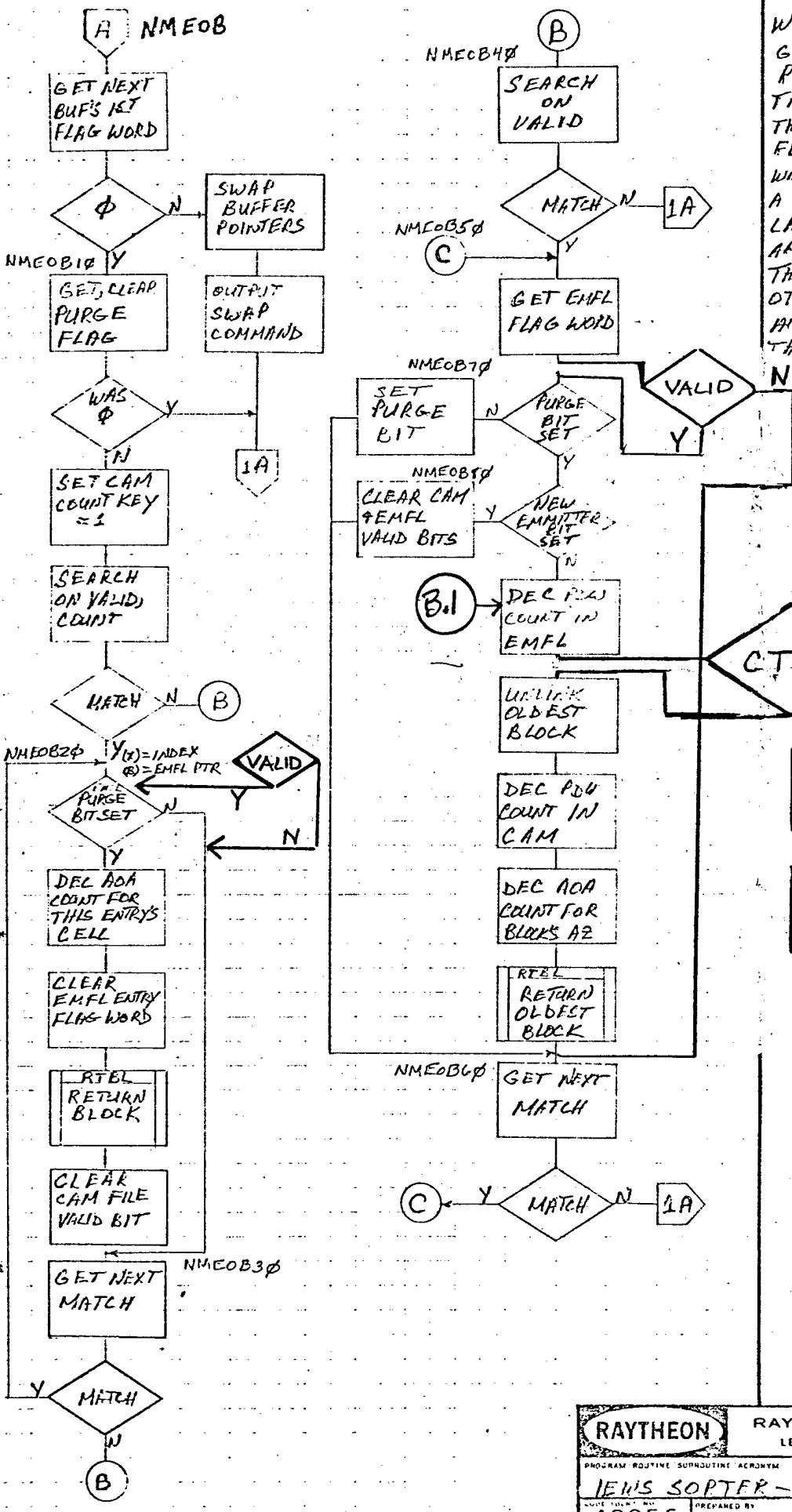
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM
IEMS SORTER – NESU

COST ESTIMATE NO. 49956 | PREPARED BY | DATE

NUMBER CUFY FDW | SHEET 4 OF 19

FLOW CHART



REMARKS

WHEN THE NESU GETS AHEAD OF POW INPUT AND THE SUPV HAS SET THE NESU PURGE FLAG, EMFL ENTRIES WHO HAVE NOT RECEIVED A POW SINCE THE LAST PURGE CYCLE ARE RELIEVED OF THEIR OLDEST POW. OTHER VALID ENTRIES ARE MARKED FOR THE NEXT CYCLE.

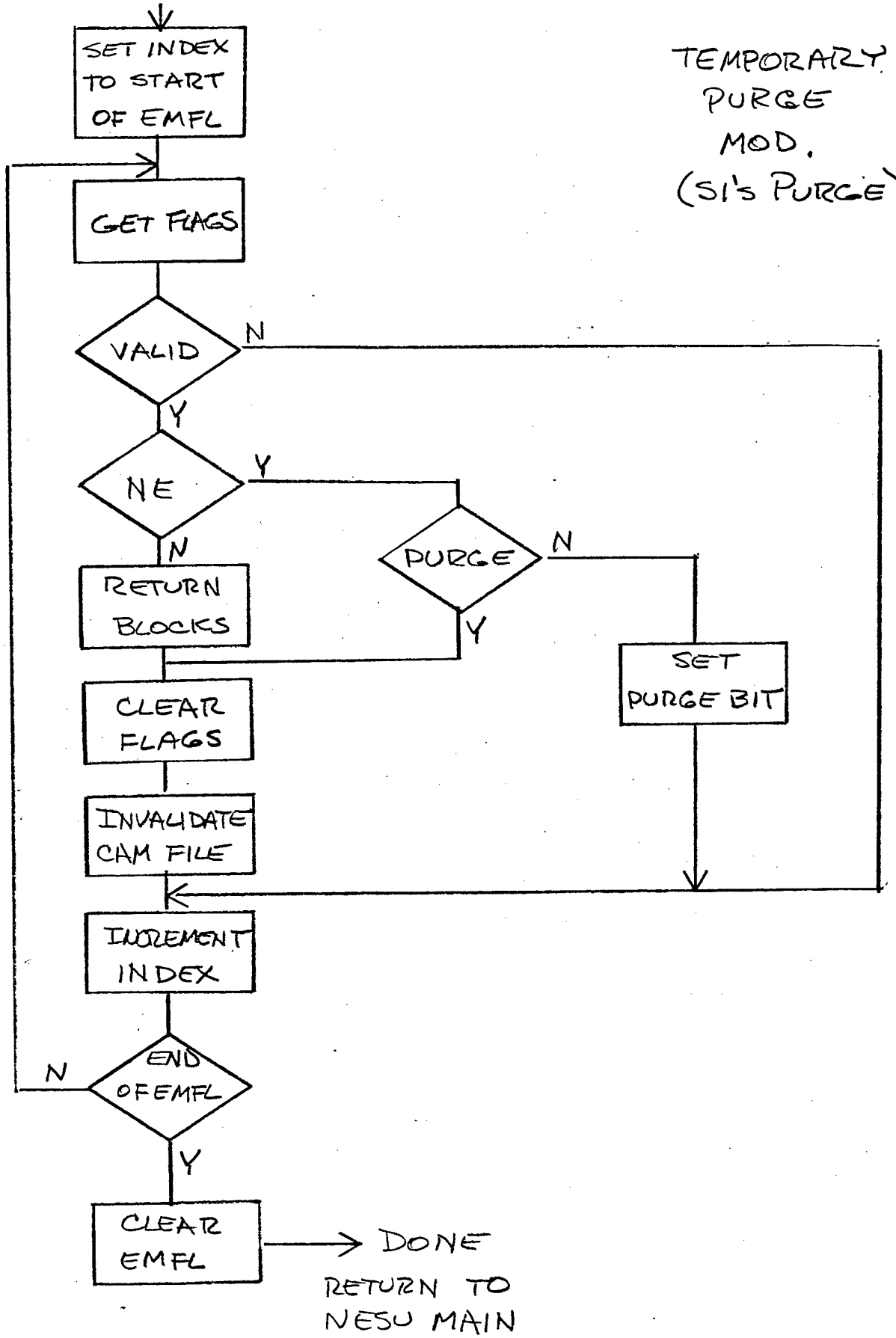
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM
IENS SOPTER – NESU

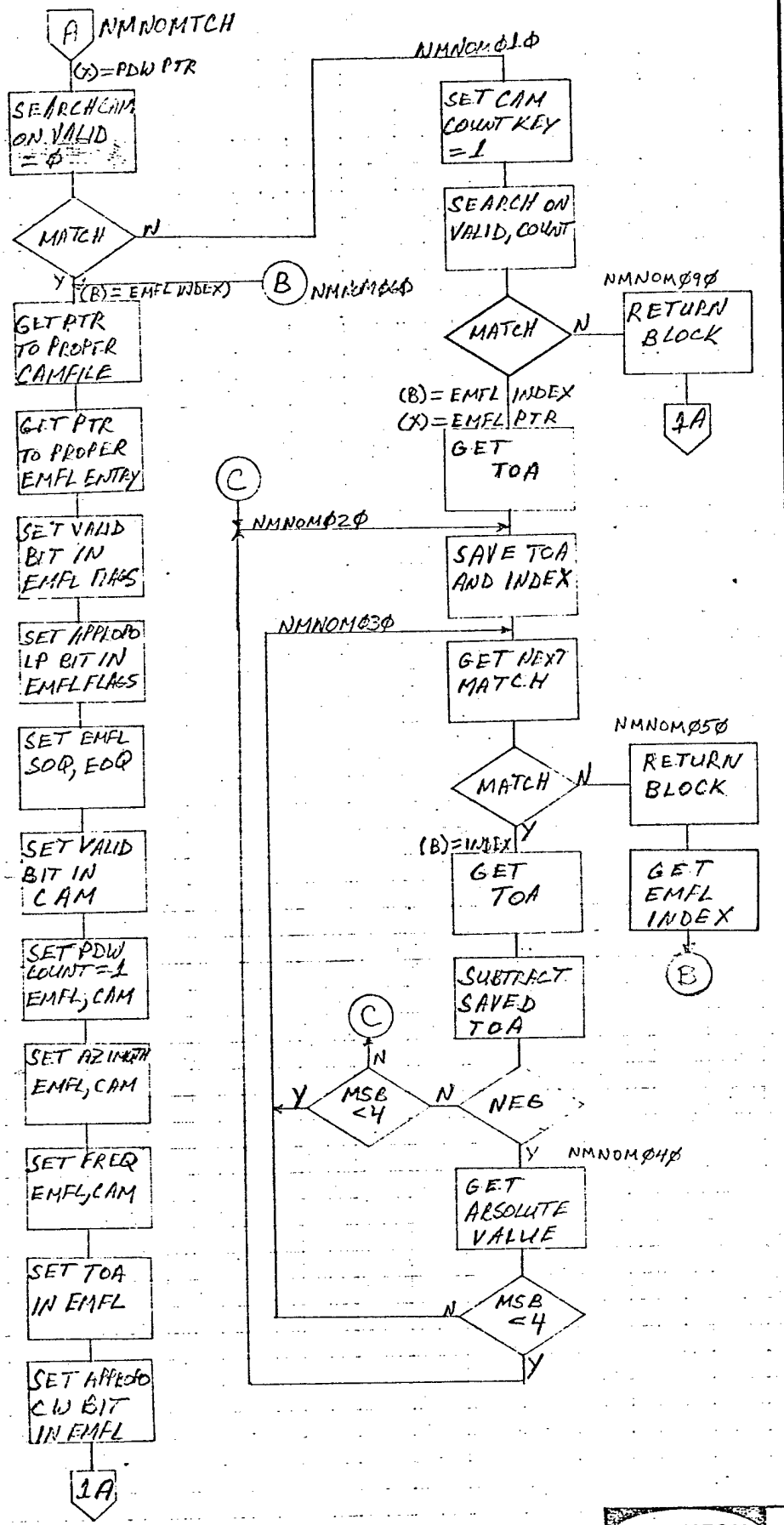
DRAWING NO. 49956 PREPARED BY DATE

NUMBER NMEOB SHEET 5 OF 19

TEMPORARY PURGE MOD. (SI's PURGE)



FLOW CHART



REMARKS

NO MATCH = EMFL FULL
I.E. NEW EMMITTER OVERFLOW

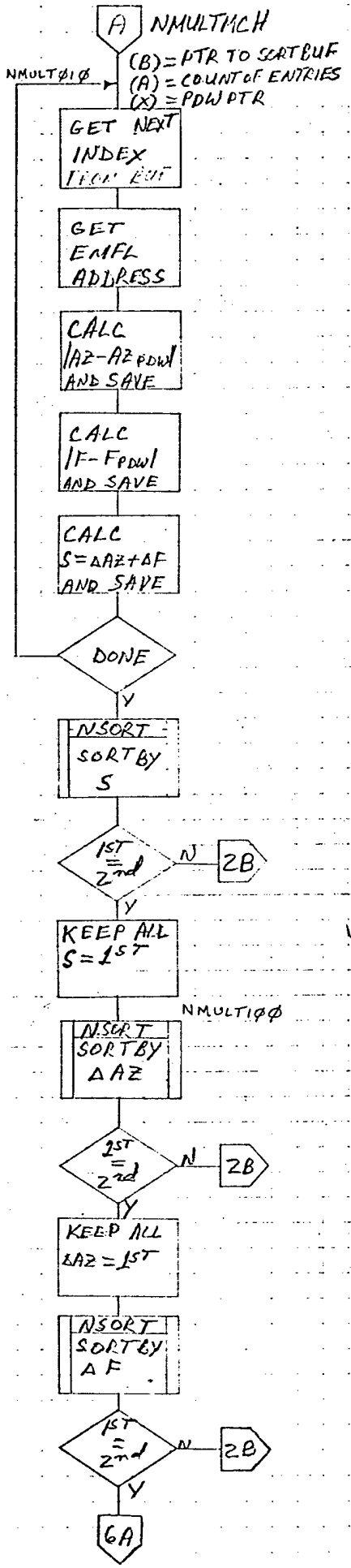
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM
LEWIS SORTER - NESU

LOCUMENT NO. 49956 | PREPARED BY | DATE

NUMBER NOMATCH | SHEET 6 OF 19

FLOW CHART



REMARKS

SORTBUF ENTRIES:

WD Ø: EMFL INDEX
WD 1: ΔAZ
WD 2: ΔF
WD 3: S

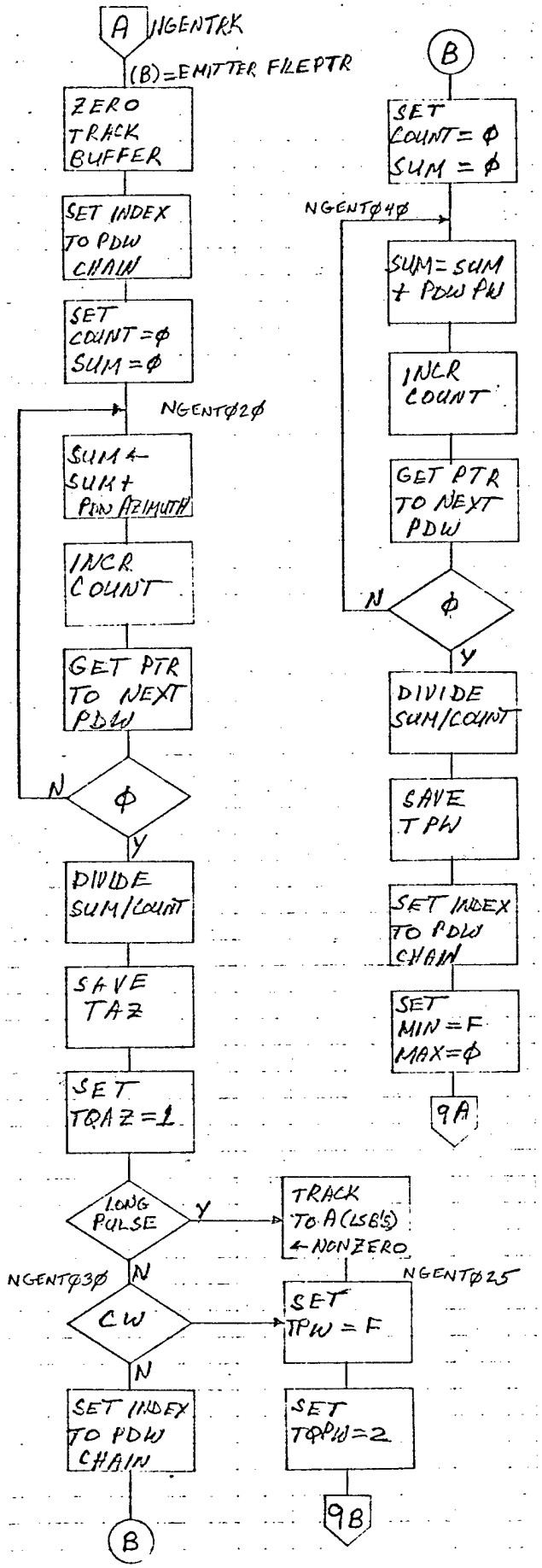
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM/ROUTINE/SUBROUTINE ACRONYM
IEWS SORTER – NESU

CODE IDENT NO. 49956 | PREPARED BY | DATE

NUMBER MULTI-MATCH | SHEET 7 OF 19

FLOW CHART



REMARKS

NON-ZERO TQA INDICATES LONG PULSE

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

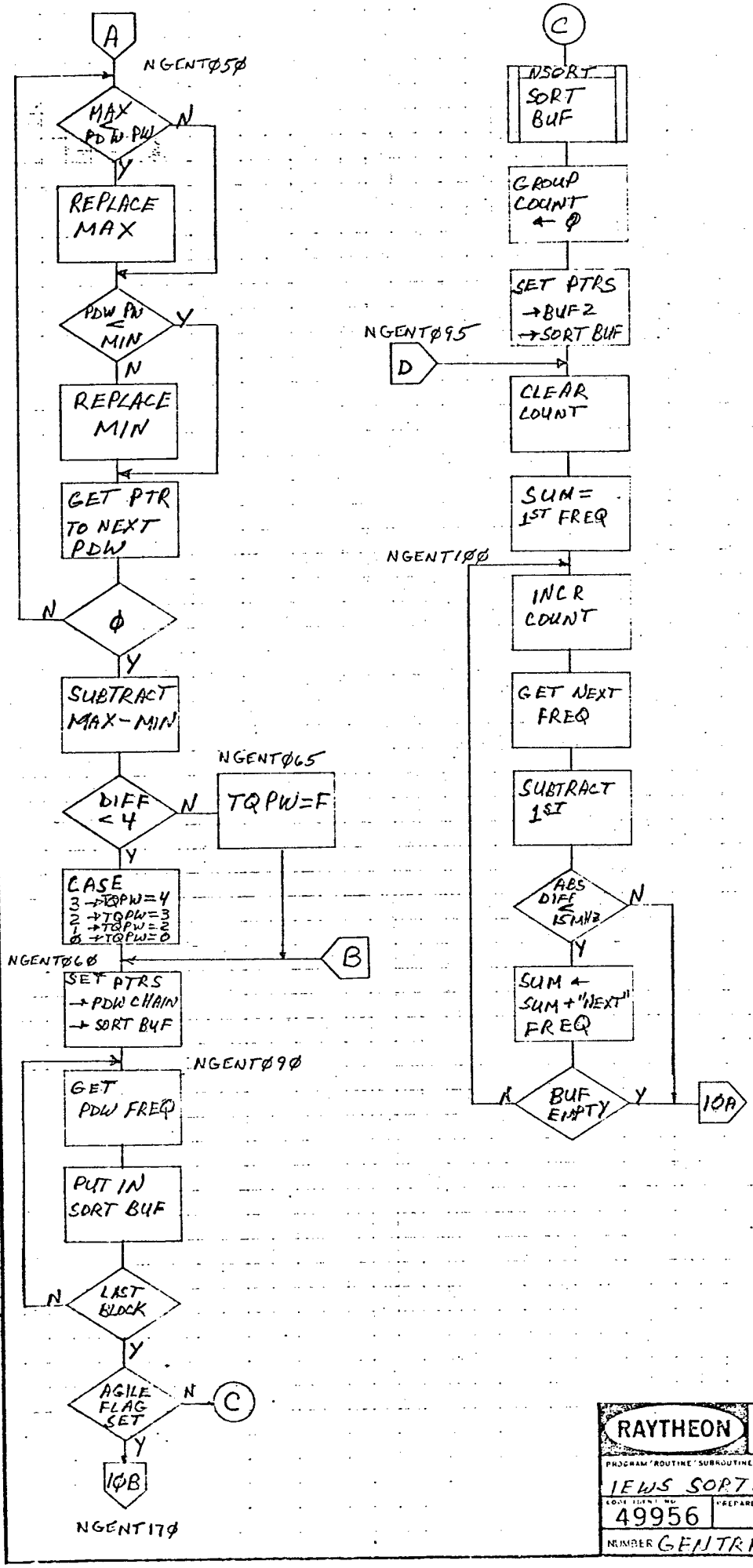
PROGRAM 'ROUTINE, SUBROUTINE, ACRONYM: IELIS SORTER – NESU

CODE IDENT NO. 49956 | PREPARED BY | DATE

NUMBER GENERATE TRACK | SHEET 8 OF 19

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

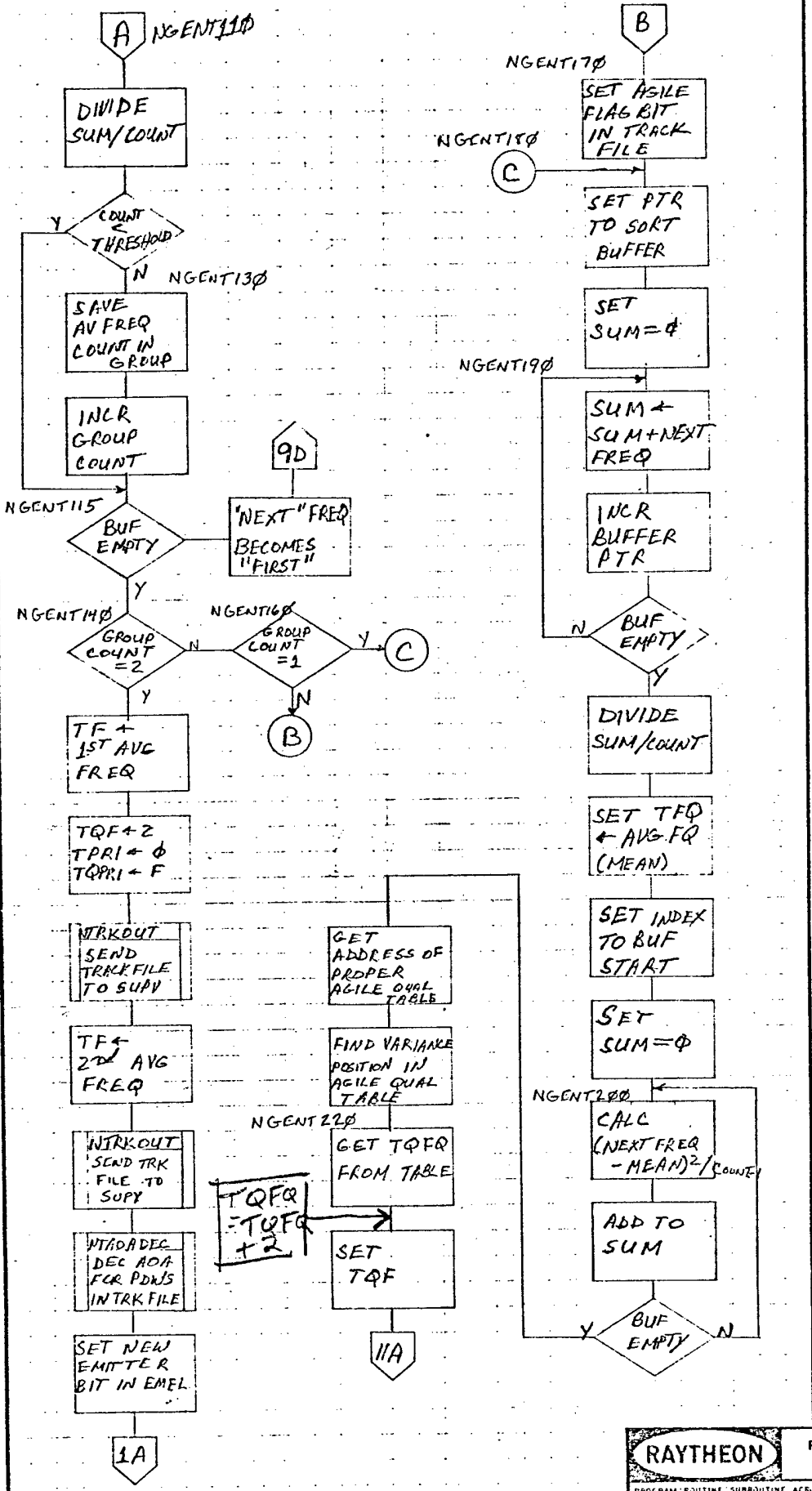
PROGRAM / ROUTINE / SUBROUTINE ACRONYM
IEWS SORTER – NESU

CODE IDENT NO. 49956 | PREPARED BY | DATE

NUMBER GENTRY (UNIT) | SHEET 9 OF 19

10-2319 (8-72)

FLOW CHART



REMARKS

VARIANCE =

$$\frac{\sum_{1}^{N}(\text{FREQ}-\text{MEAN})^2}{(N-1)}$$

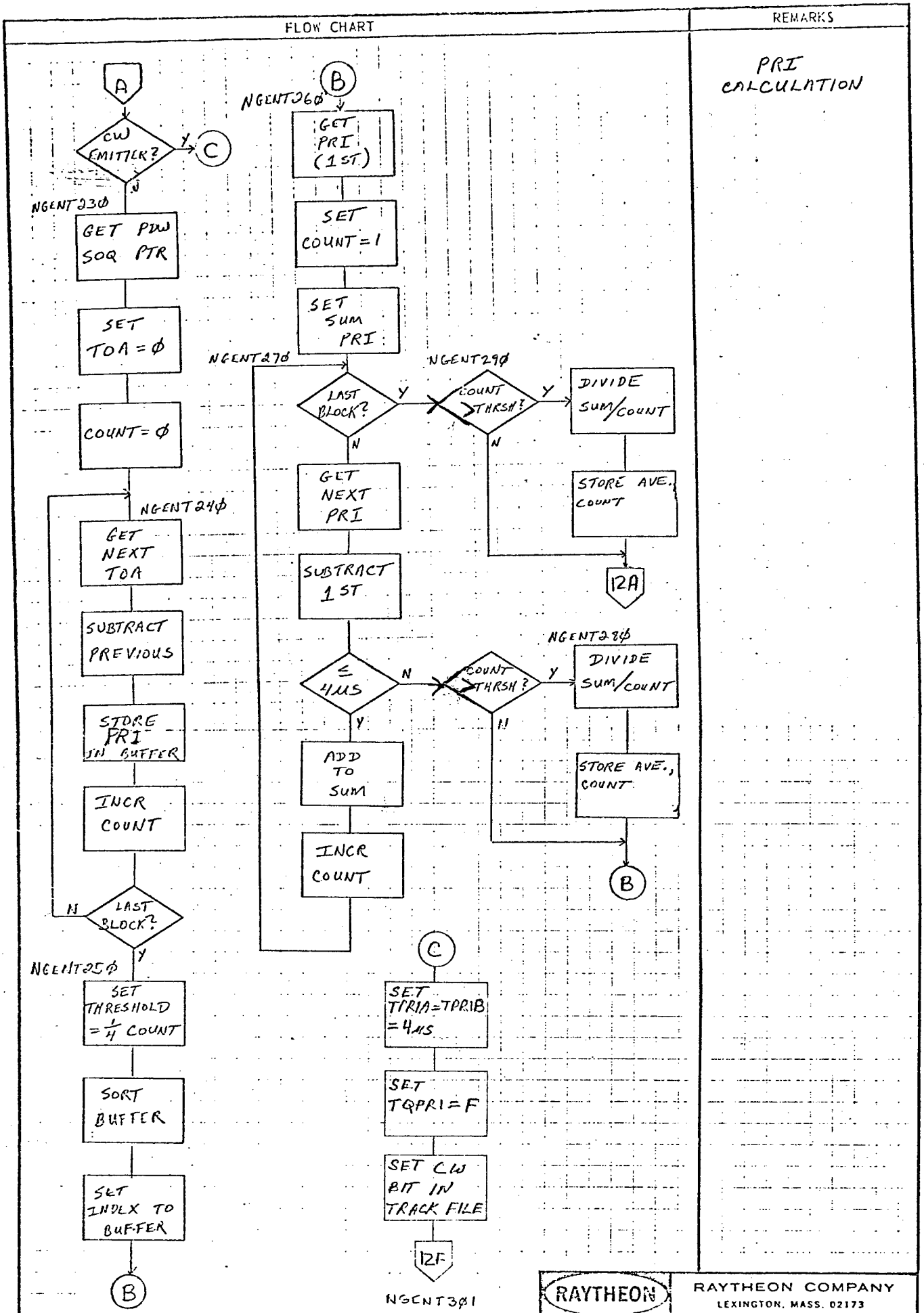
NOTE: NOT SAMPLE VARIANCE

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE SUBROUTINE ACRONYM: IFLS SORTER – NESU

CODE IDENT NO. 49956 | PREPARED BY | DATE

NUMBER GENTIK (FREQ) | SHEET 10 OF 19



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

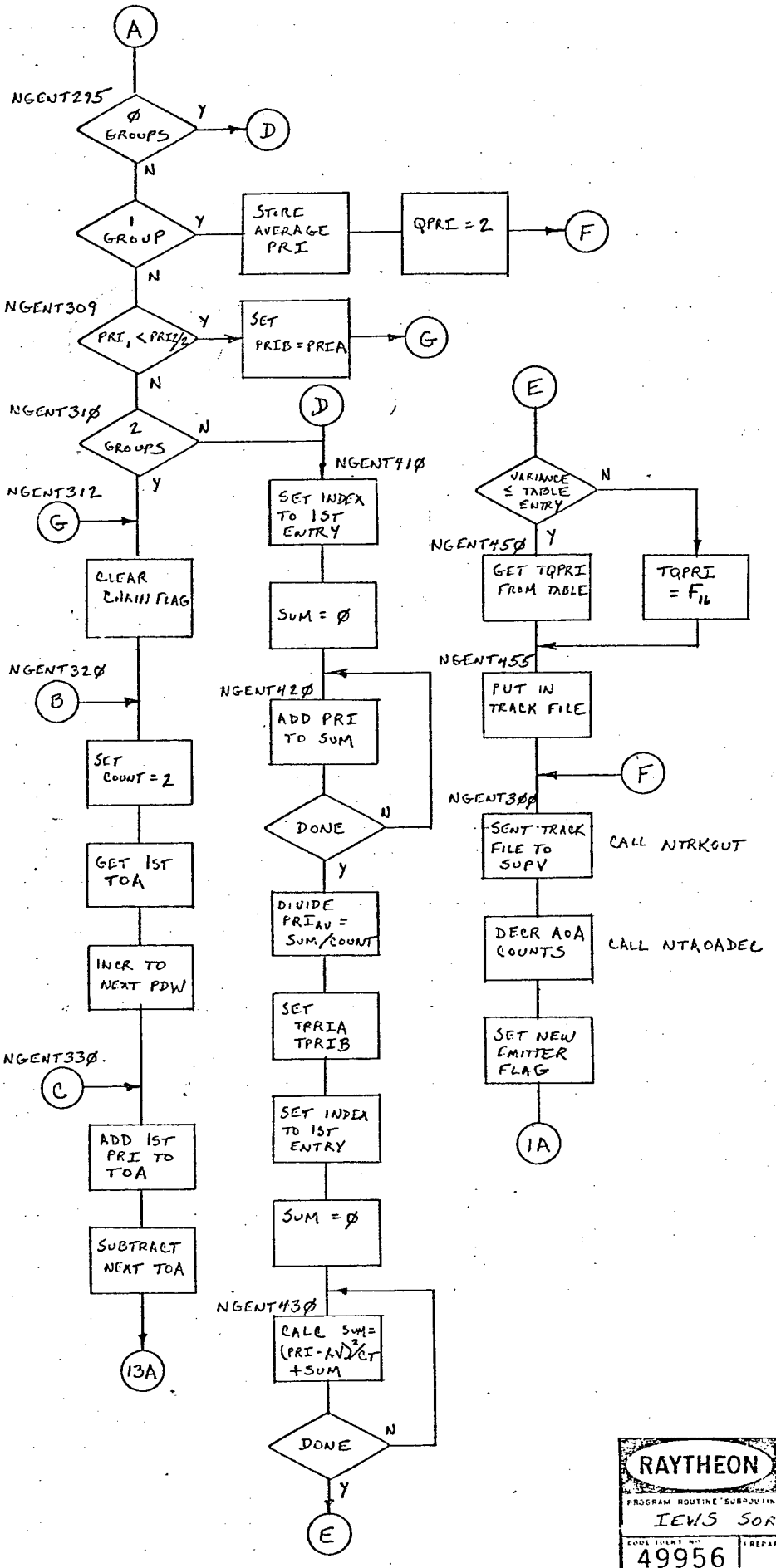
IEWS SORTER- NESU

49956

NUMERGEN TRK

SHEET 11 OF 19

FLOW CHART



REMARKS

PRI CALCULATION CHAINING AND VARIANCE

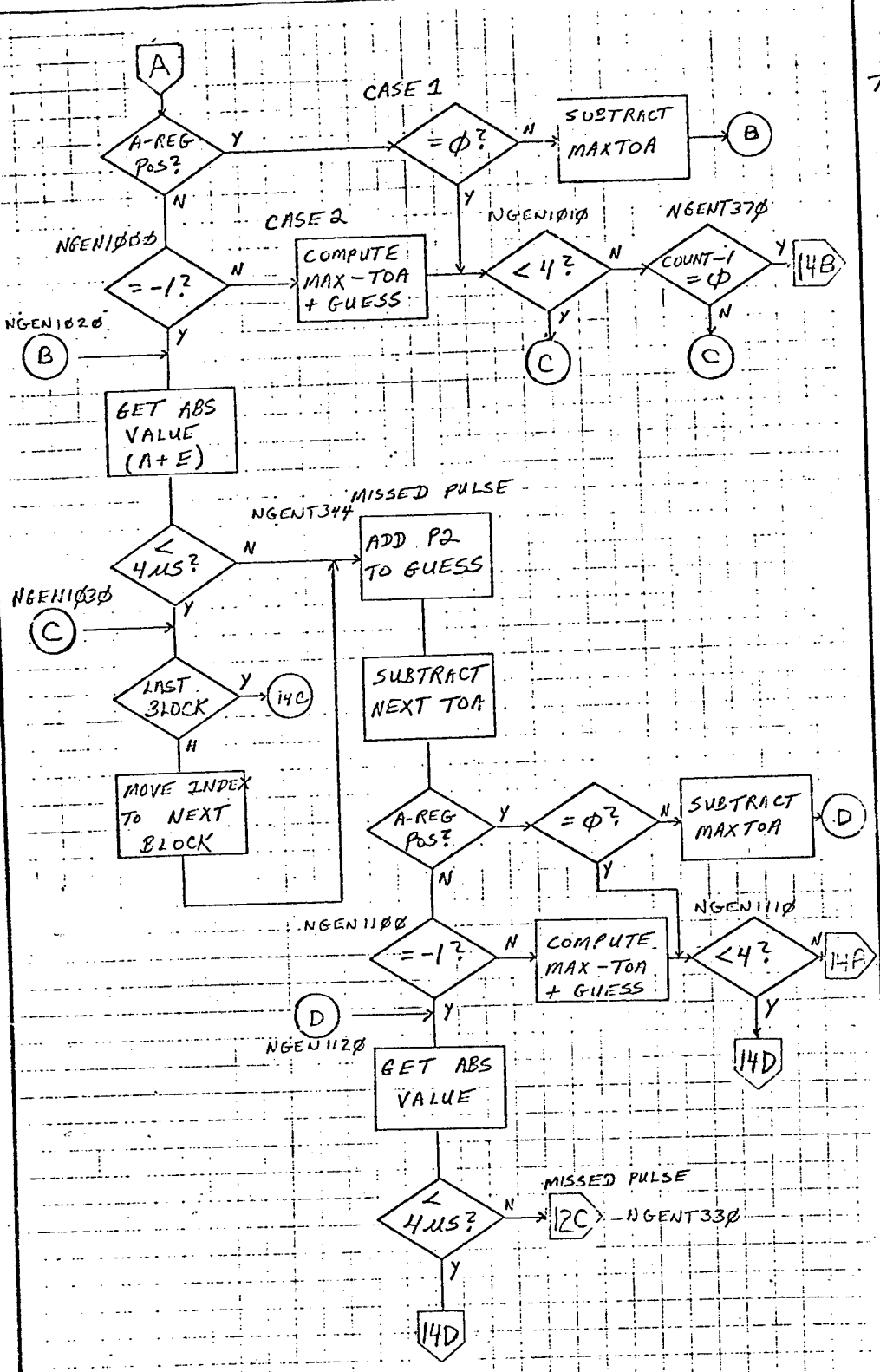
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE/SUBROUTINE ACRONYM
IEWS SORTER - NESU

CODE IDENT NO. 49956 | PREPARED BY | DATE

NUMBER | SHEET 12 OF 19

FLOW CHART



CASE 1 : GUESS = MAX-N N = Ø, 1, 2, 3
ACTUAL = M M = 3, 2, 1, Ø

GUESS - ACTUAL = LARGE POS NO., I.E., MAX-N-M > 2^{16}
THEREFORE, NEED N+M < 4, ELSE POSSIBLE MISSED PULSE.
IF A-REG POS AND NON-ZERO, THEN COMP((GUESS-ACT)-MAX) = N+M

CASE 2 : GUESS = M M = Ø, 1, 2, 3
ACTUAL = MAX - N N = 3, 2, 1, Ø
GUESS - ACTUAL = LARGE NEG. NO., M - MAX - N
THEREFORE, N+M < 4, ELSE ERROR.
IF A NEG AND A ≠ -1, THEN
MAX - ACT + GUESS = MAX - (MAX-N) + M = N+M

REMARKS

PRI CHAIN CALCULATION - TOA WRAPAROUND PROBLEM

MAXTOA = constant = 100000_{16}

P1 is first avg PRI

P2 is 2nd avg PRI

PRI chaining is an attempt to search for dual stagger PRI

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

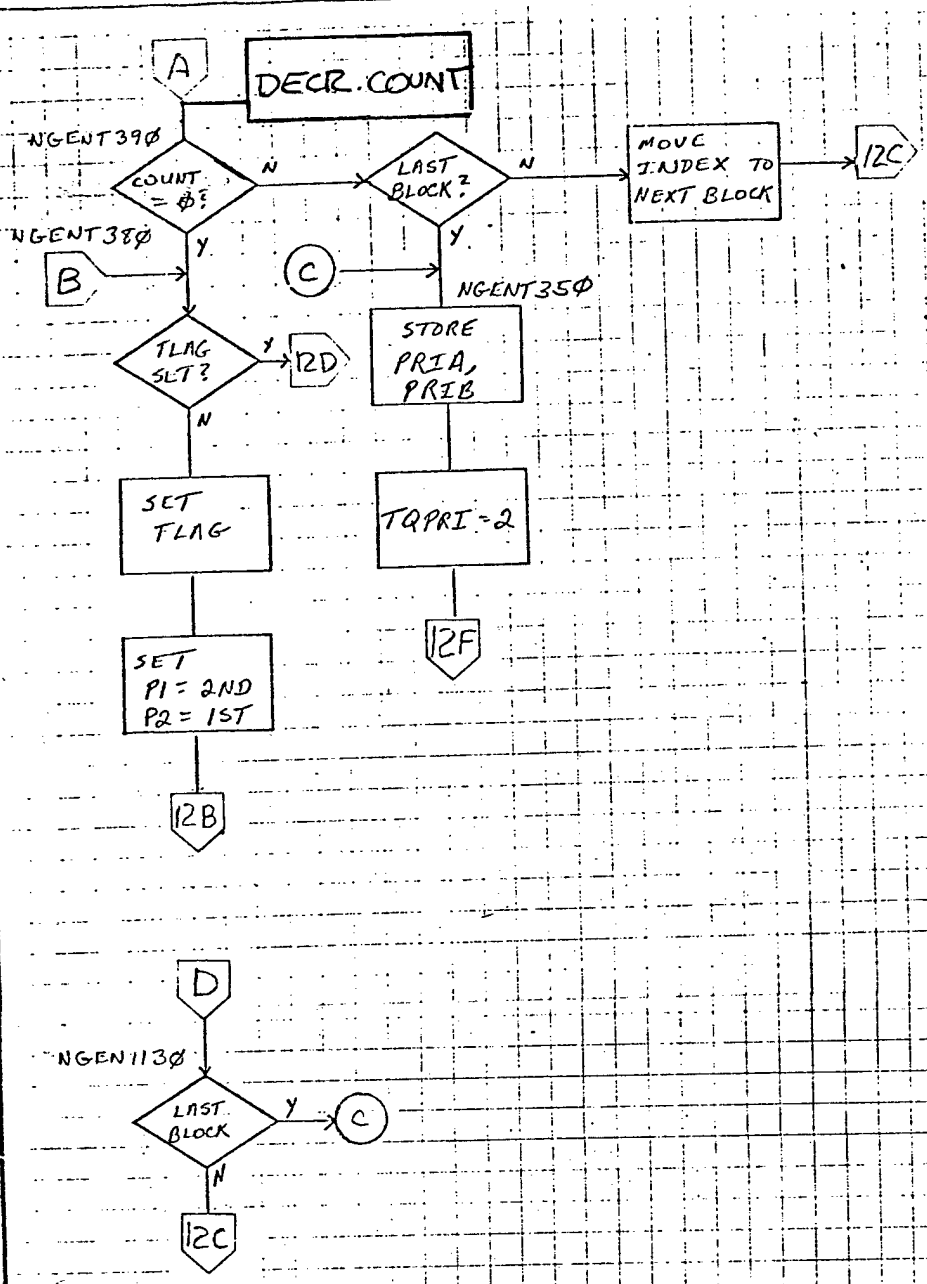
PROGRAM/SYSTEM/SUBSYSTEM/ACRONYM
IEWS SORTER - NESU

LOCATION NO.
49956

NUMBER

SHEET 13 OF 19

FLOW CHART



REMARKS

PRI CHAIN CALCULATION

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM / ROUTINE / SUBROUTINE / ACRONYM
IEWS SORTER - NESU

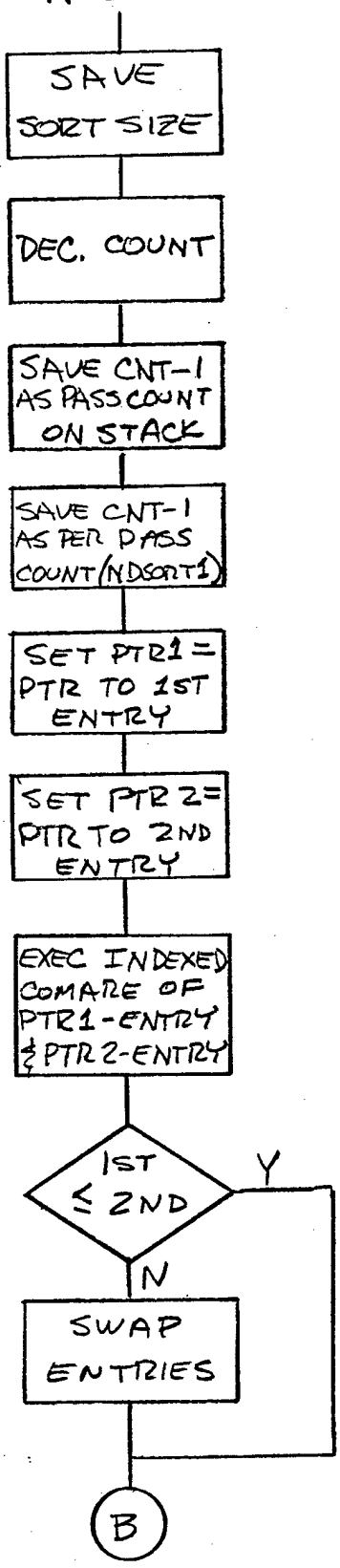
CODE IDENT. NO.
49956

NUMBER

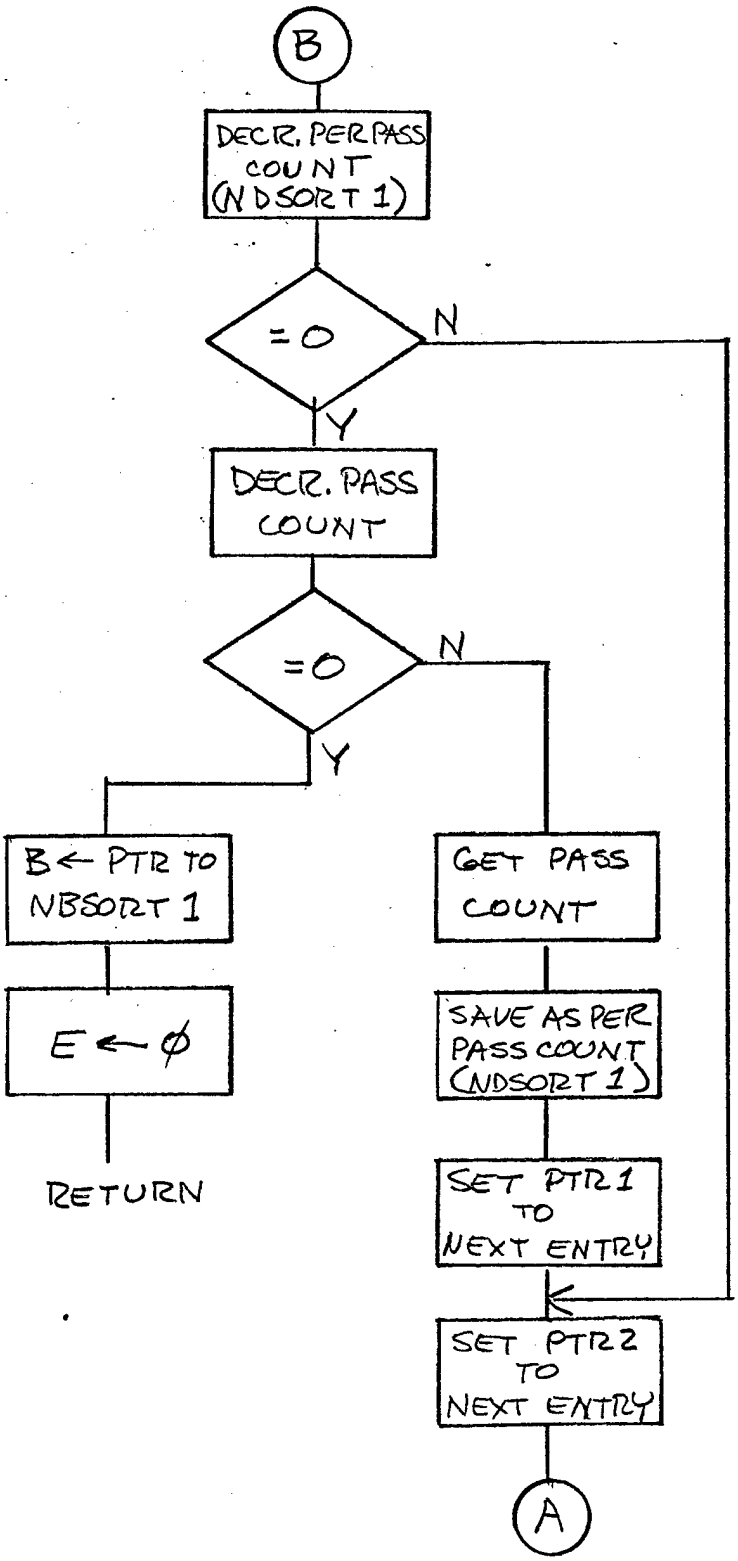
SHEET 14 OF 10

10-2219 8 72

NSORT

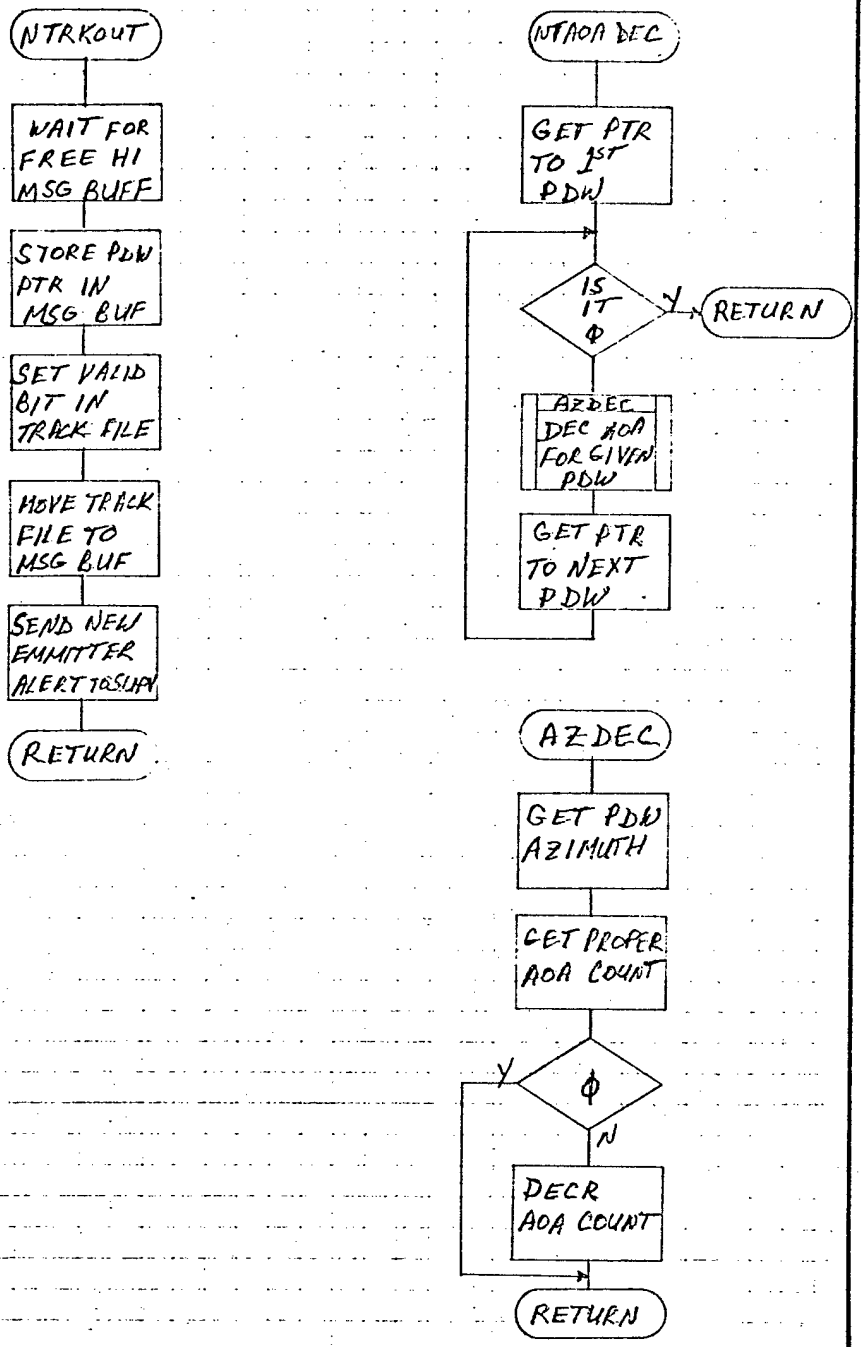


NBSORT 1 contains (E)-word entries
(E) is count (GT 1)
(A) is word to sort on (0-3)
(B) is entry size (max=4)



FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

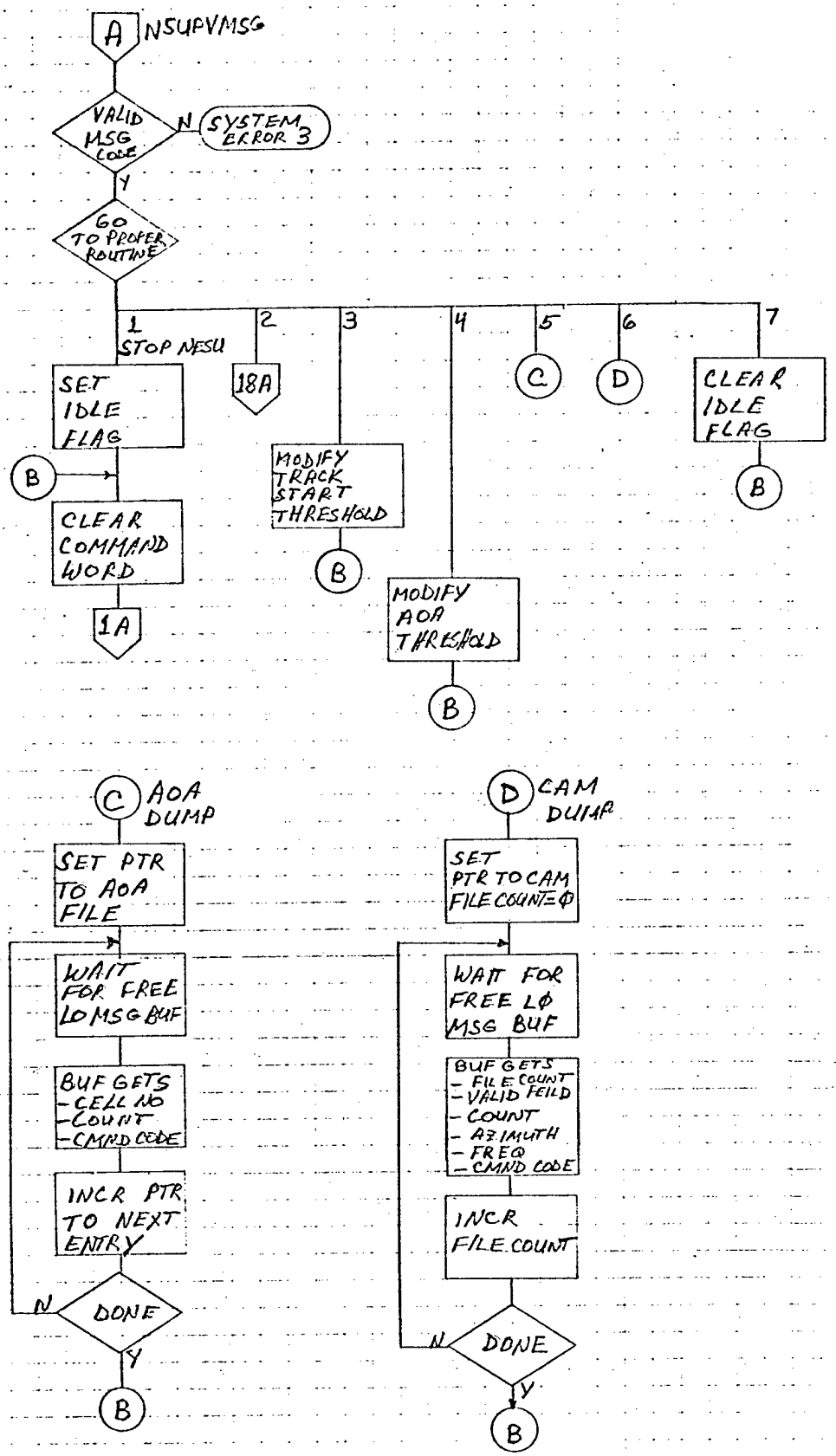
PROGRAM/ROUTINE/SUBROUTINE ACRONYM
LEWIS SORTER – NESU

CODE IDENT NO 49956 | PREPARED BY | DATE

NUMBER GEN TAK ROUTINES | SHEET 16 OF 19

FLOW CHART

REMARKS



RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM ROUTINE/SUBROUTINE ACRONYM
IEWS SORTER – NESU

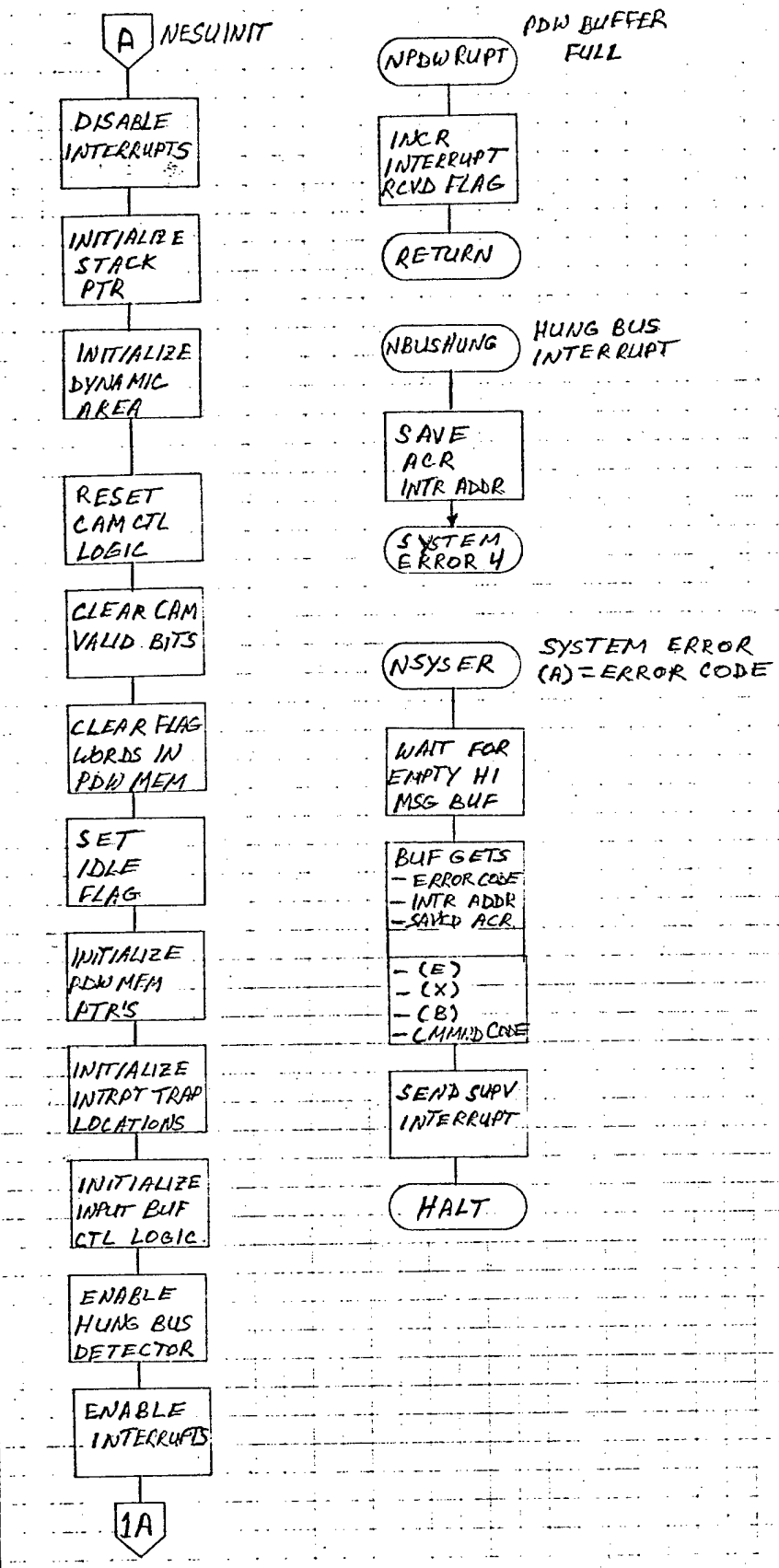
CODE IDENT NO 49956 | PREPARED BY | DATE

NUMBER SUPV CMND RSPNS | SHEET 17 OF 19

10-2319 (8-72)

FLOW CHART

REMARKS



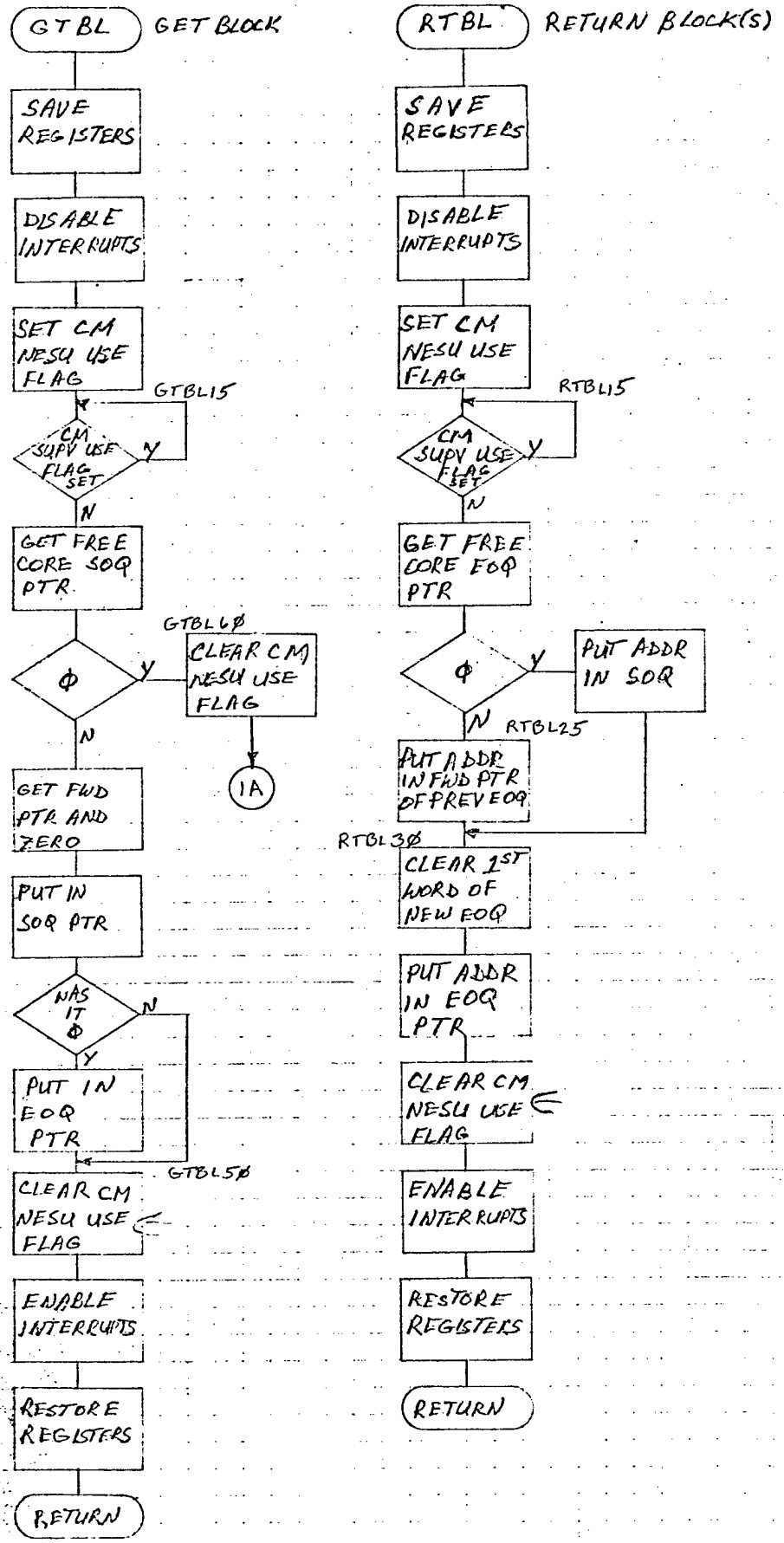
RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM 'ROUTINE 'SUBROUTINE 'ACRONYM
IEWS SORTER-NESU

CODE IDENT NO 49956 | PREPARED BY | DATE

NUMBER INITIALIZER | SHEET 18 OF 19

FLOW CHART



REMARKS

CM MEANS CORE MANAGER

RAYTHEON COMPANY
LEXINGTON, MASS. 02173

PROGRAM · ROUTINE · SUBROUTINE · ACRONYM
IEWS SORTER - NESU

CODE ELEMENT NO. 49956 | PREPARED BY | DATE

NUMBER CORE MANAGER | SHEET 19 OF 19