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Final Technical Report
Appendix

ANALYTICAL AERIAL TRIANGULATION ERROR ANALYSIS AND APPLICATION OF COMPENSATING EQUATIONS TO THE GENERAL BLOCK TRIANGULATION AND ADJUSTMENT PROGRAM

MARCH 1960 TO FEBRUARY 1962
DEPARTMENT OF THE ARMY TASK NO. 8T35-11-001-05
CONTRACT NO. DA-44-009 ENG 4420

U.S. Army Engineer
Geodesy, Intelligence, and Mapping
Research and Development Agency

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DEPARTMENT OF CIVIL ENGINEERING

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ANALYTICAL AERIAL TRIANGULATION ERROR ANALYSIS
and
APPLICATION OF COMPENSATING EQUATIONS
to
THE GENERAL BLOCK TRIANGULATION AND ADJUSTMENT PROGRAM.

APPENDIX.

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U. S. Army Engineer
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Research and Development Agency

CIVIL ENGINEERING SYSTEMS LABORATORY
Department of Civil Engineering
(14) R[redacted]ch Re[redacted] R62-4)
Massachusetts Institute of Technology
Cambridge, Massachusetts

PREFACE

These investigations were carried out under the authority contained in Contract No. DA-44-009 ENG 4420, "Analytical Aerial Triangulation Error Analysis and Application of Compensating Equations to the General Block Triangulation Adjustment Program."

The investigation was conducted under the direction of Professor Charles L. Miller and Mr. E. Phillip Gladding, Instructor, Department of Civil Engineering. The investigation was conducted, from March 10, 1960 to March 10, 1962, by Messrs. Luis Andrew R., Ziad M. Elias, and Frank S. Greatorex, Research Assistants in the Department of Civil Engineering. Also contributing to the investigation were Messrs. Daniel R. Schurz, Instructor, Armen Gabrielian, Student Assistant, and Lawrence Kalman, Student Assistant.

ABSTRACT

~~The objective of the activities reported is to effect~~ Improved accuracy in the supplied General Block Triangulation digital computer program is described through incorporation in the program means of error adjustment and compensation, as follows: ~~The first volume of the report presents:~~

(1) the nature of random and systematic errors and the basic techniques for treating their effects as applicable to the analytical photogrammetric problem;

(2) the basic least squares method and its incorporation in the computer program;

(3) complete mathematical description of the program;

(4) studies of the nature and effects of the important error sources: lens and camera errors, atmospheric refraction, film distortion;

(5) the study of various techniques for the solution of simultaneous equations;

(6) operating instructions; and

(7) the results, conclusions, and resulting recommendations of test runs of the final computer program.

The second volume contains the appendices which consist of the complete flow charts representing the original and final programs.

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FLOW CHART OUTLINE

Original IBM 704 Computer Program - Flow Chart

Segment I - Chain I

START -	Initializations	A1
	Read Control cards: J,P	A1-A2
FILE -	Input card read routine	A3
ECARD -	Preliminary processing and storing of E-card data	A4-A9
GCARD -	Preliminary processing and storing of G-card data	A10-A18
DEXFR -	Normal Matrix Bookkeeping	A19
DEXPR -	Termination of Segment I - tape writing for Segment II and print outs.	A20

Segment II - Chain 2

CEQBE -	Preliminary initializations	A22
CEQES -	General exposure station equation forming routine	A22
ESTYT -	Test for type of exposure station and transfer to corresponding equation forming routine	A23
ESTYA, ESTYB, ESTYC, ESTYD, ESTYE, ESTYF, ESTYG, and ESTYH -	control for forming of equations by exposure station type	A24-A29
CEQST -	Scaling and printing of condition equations	A26-A27
MATFR -	Form normal equations	A27
EQ11, EQ12, EQ12A, and EQ13 -	Conditional equation forming routine	A30-A34
PHXYZ -	Exposure station data processing	A35
CEQFA -	General ground point data bookkeeping for equation forming	A36-A43

GPTYB, GPTYC, GPTYD, GPTYE, GPTYF, GPTYG, GPTYH, CEQFJ - control for forming of equations by ground point type A44-A48

SUB1, SUB2, XYZRA - subroutines for computing quantities used in equation forming A49-A59

TEFCL - Process type A ground point A59-A61

SUEFX - Process type C ground point A62

EQ56 - Equation former for ground point equation 56 A62-A65

EQ1 - Equation former for ground point equation 1 A66-A69

EQ2 - Equation former for ground point equation 2 A69-A76

EQ34 - Equation former for ground points equation 34 A77-A80

EQ5 - Equation former for ground point equation 5 A80-A81

EQ6 - Equation former for ground point equation 6 A82-A83

EQ6A - Equation former for ground point equation 6A A83-A85

EQ7 - Equation former for ground point equation 7 A85-A87

EQ70 - Equation former for ground point equation 70 A87-A91

EQ 101, 102A - Equation former for ground point equations 101, 102, 103 A92-A97

FCVSQ - Compute sum of squares of right hand sides of the normal equations and print normal matrix and constant vector and transfer to Segment III A98

Segment III - Chain 3

RESEG3 - Initialize for Chebyshev routine A99-A102

CEBYA, CEBYB, CEBYC, CEBYD, CEBYE, CEBYF, CEBYG - Chebyshev routine for generating initial values for the Steifel iteration method A103-A104

STEFB, STEFC, STEFD - Steifel solution initializations for execution of Steifel iteration cycle STEFL A104-A105

STEFE, STEFF, STEFG, STEFM, SSDMT, SSDMD, SSDMP - Post Steifelcycle control routines A105-A107

STEFZ - Non-convergence print out and control routine A107
SSVAL - Error print out routine A107
SSEND - Cycle solution print out routine A108
CHEBY - Routine used in CEBYF A109-A110
MXV - Routine used in CEBYB A110-A112
STEFL - Steifel iteration routine used in STEFD A113-A117
DPMXV - Routine used in STEFL A118-A120
SEG3B - Initializations for segment 3B A121
CMRBE - Testing for sufficient convergences of exposure station position vector A121
CORMR, CORREC, CMPUTE, AYEBEE, BEET, BB, DD, FF - Routines using Steifel solution to correct position vectors and orientation matrices of exposure stations A121-A125
CMTSX+3, ITERC, SEGTX - Print out and store on magnetic tape corrected position vectors and orientation matrices of every exposure station, and test for transfer to resection computation or to segment 2. A125-A127
RESBE - Initializations for resection routine A127
RESTR, LFXYZ, FXMAT, ... , FULLC, PRANG, PREST - Computation, storing, and printing out of exposure station position and orientation parameters A127-A134
GPRES, GPANL, GPCAL, GBCCB - Print out the given ground point coordinates corresponding to different pairs of photographs. Rewind magnetic tape, halt, and transfer to start a new segment 3 iteration if desired. A134-A139

Additions and Modifications to Original Program - Flow Chart

Segment 2 - Chain 2

TMX* -	Formation of T matrix associated with each image point	B1-B3
FRBWN -	Write on magnetic tape condition equation and control data	B3-B5
CEQST -	Print out coefficients of unknowns as in original program. Compute control words defining equation type	B5-B8
MFALP -	Equation 70 tape writing routine	B8-B9
SUB1 -	Modified to include computations introduced by changes in conditional equations	B9-B10
EQ1 -	Additions to original EQ1	B11-B12
EQ2 -	Additions to original EQ2	B13-B17
EQ34 -	Additions to original EQ34	B18-B20
EQ5 -	Additions to original EQ5	B21-B22
EQ6 -	Additions to original EQ6	B23-B25
EQ6A -	Additions to original EQ6A	B26-B28
EQ7 -	Additions to original EQ7	B29-B30
ESTYA -	Additions to original ESTYA	B30-B32
EQ11 -	Additions to original EQ11	B32
EQ12 -	Additions to original EQ12	B32-B33
EQ12A -	Additions to original EQ12A	B33-B34
EQ13 -	Additions to original EQ13	B34
EQ56 -	Additions to original EQ56	B35-B38
EQ101 -	Additions to original EQ101	B39-B40

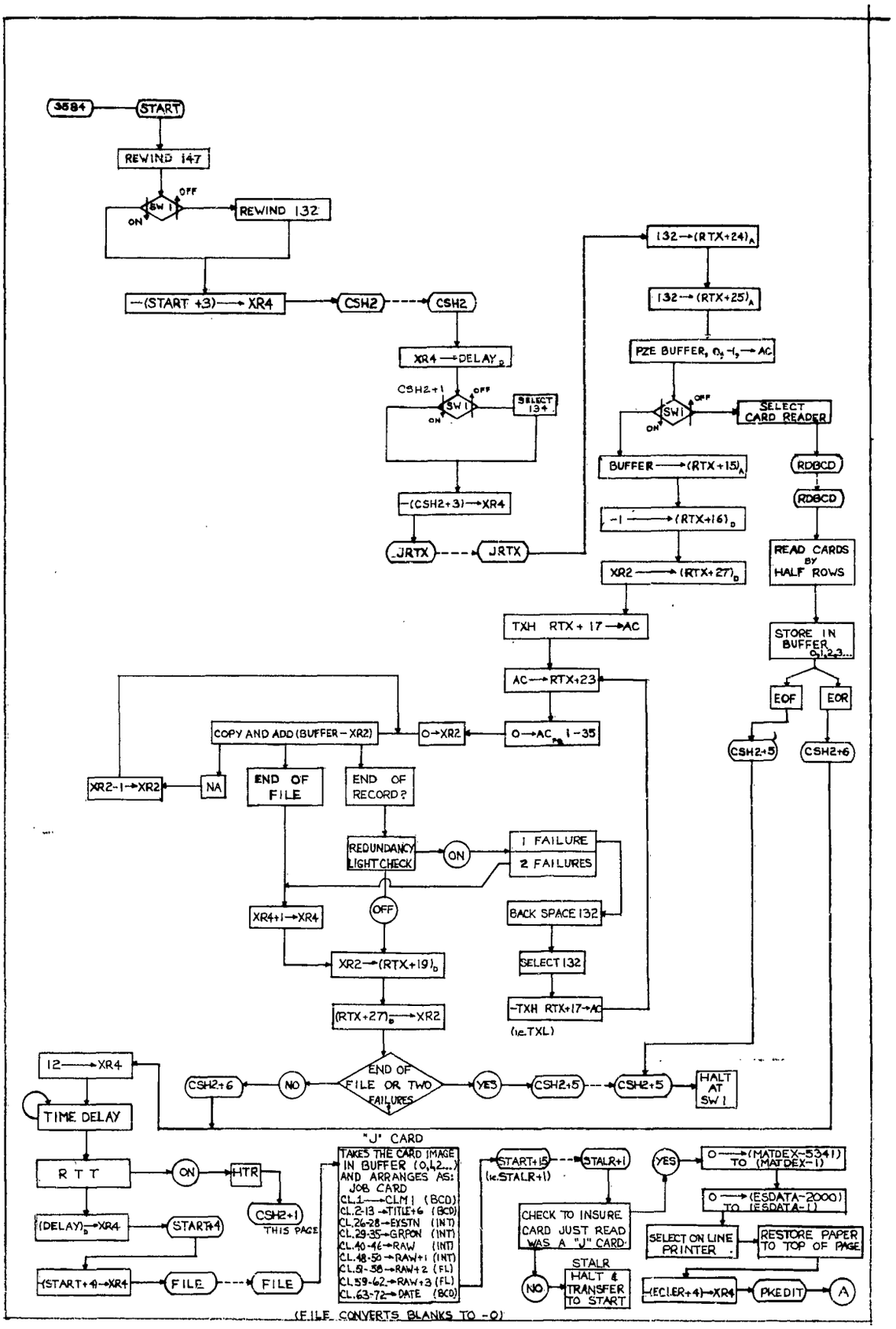
Segment 23 - Chain 23

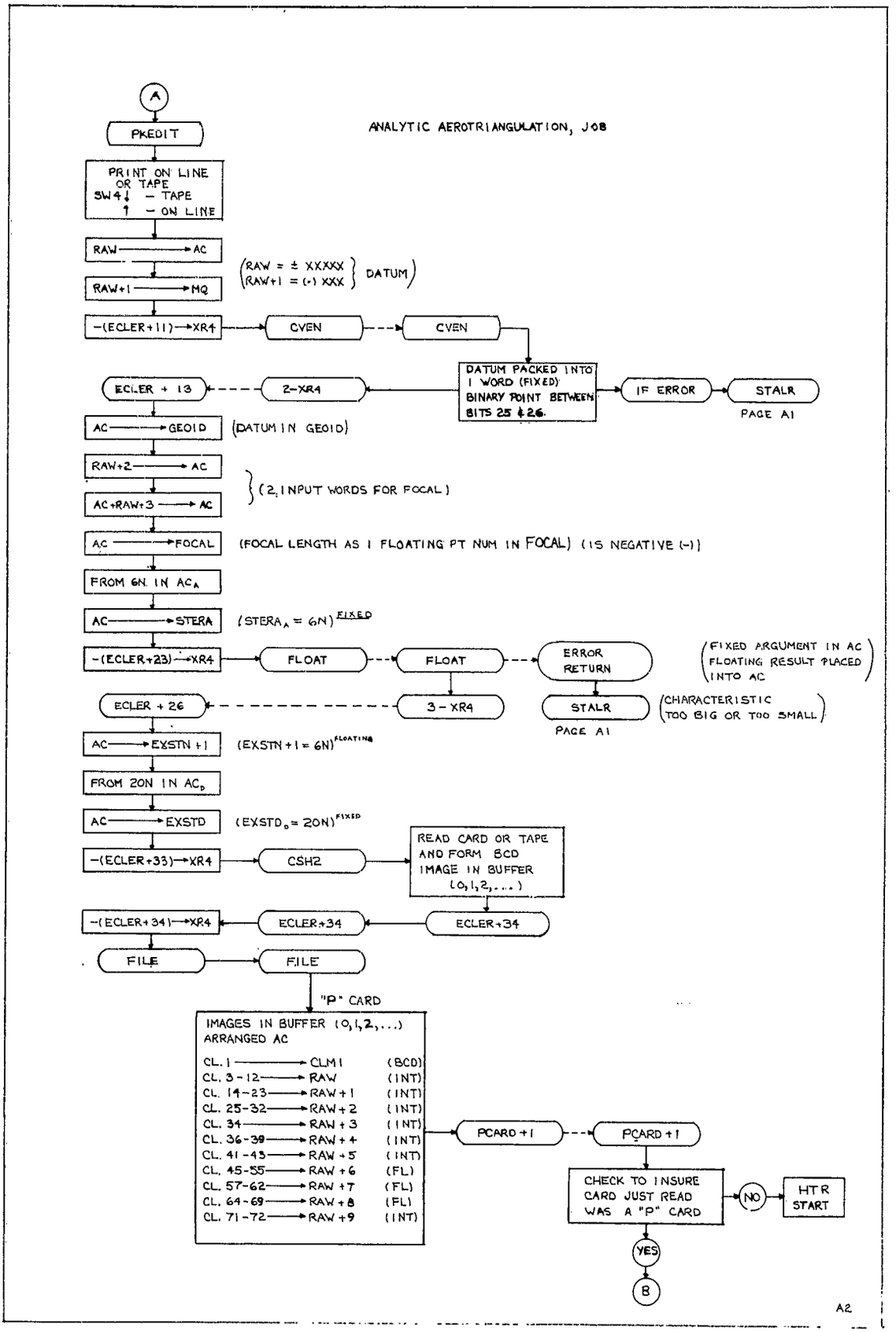
ECHO* -	Read conditional equations from tape	B41-B43
FRBWN* -	Weight matrix and normal equation forming and storing routine	B44-B50

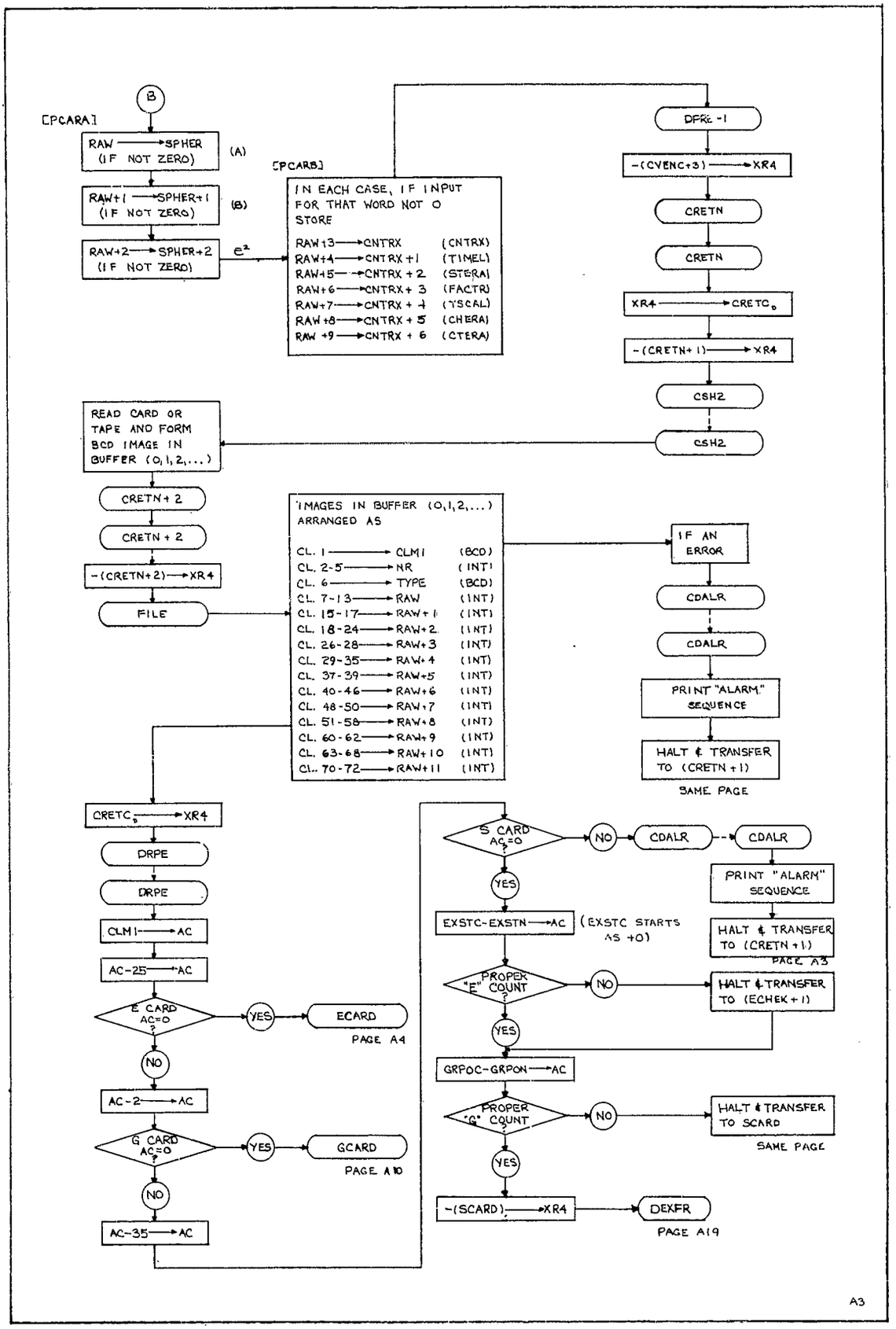
* Additions

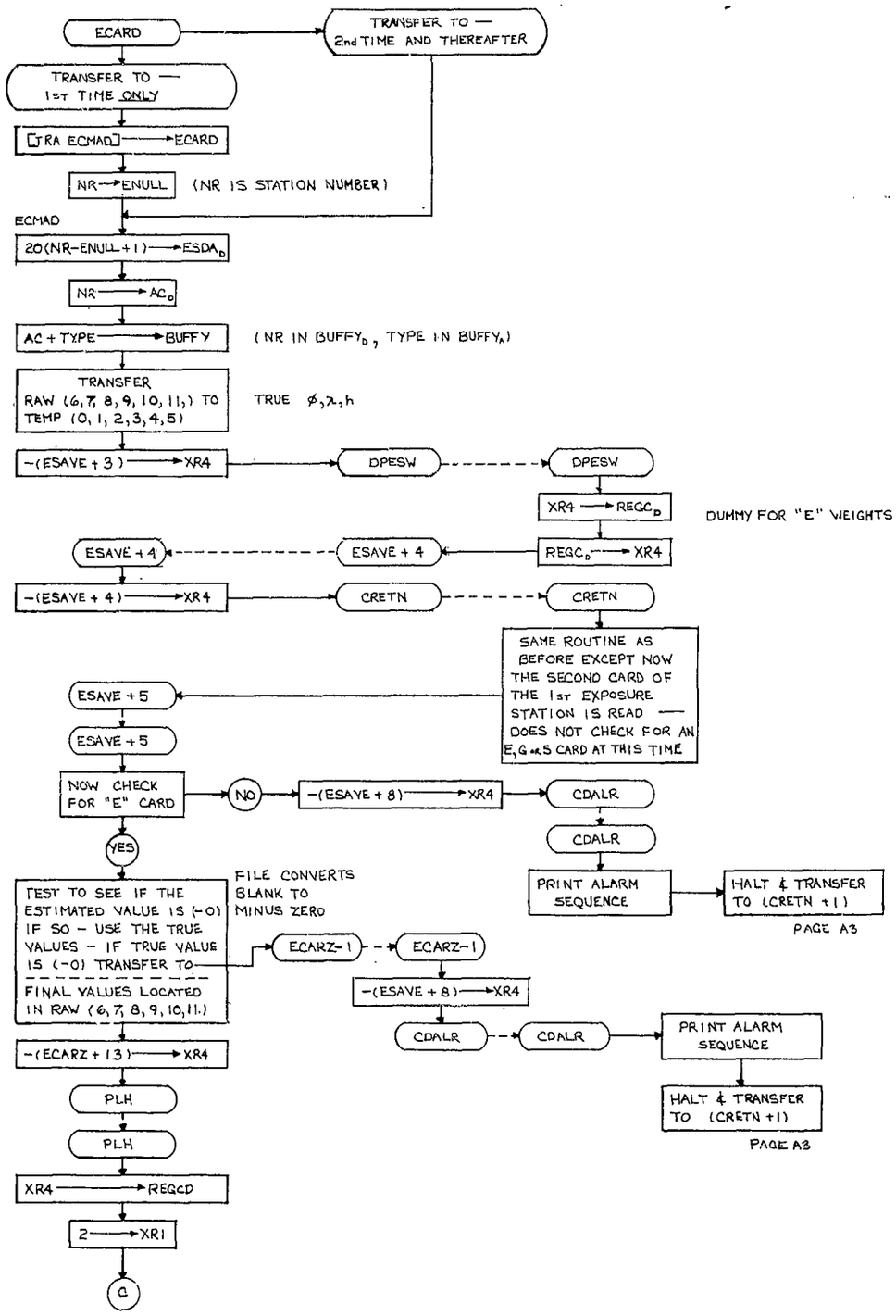
APPENDIX A

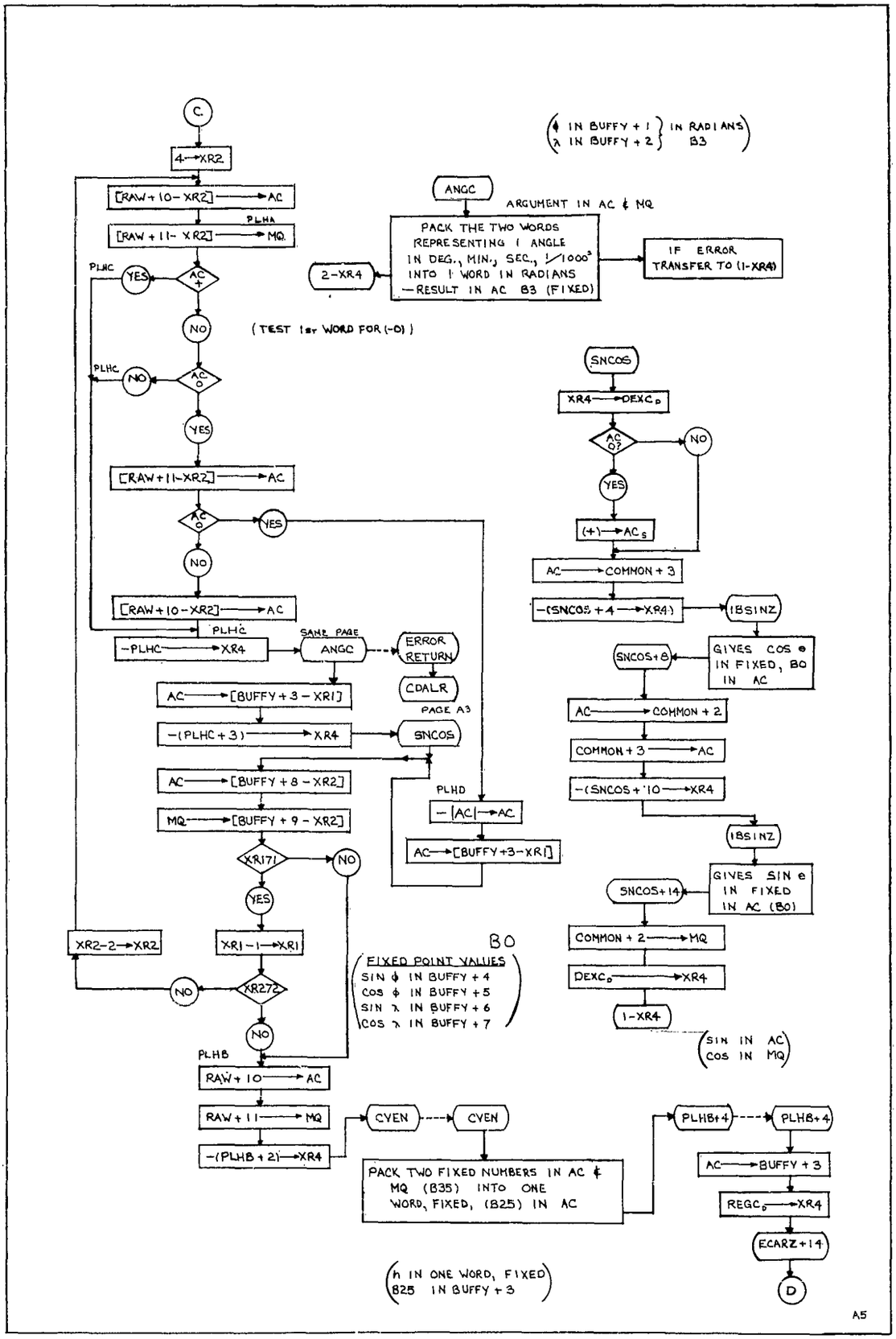
ORIGINAL IBM 704 COMPUTER PROGRAM - FLOW CHART

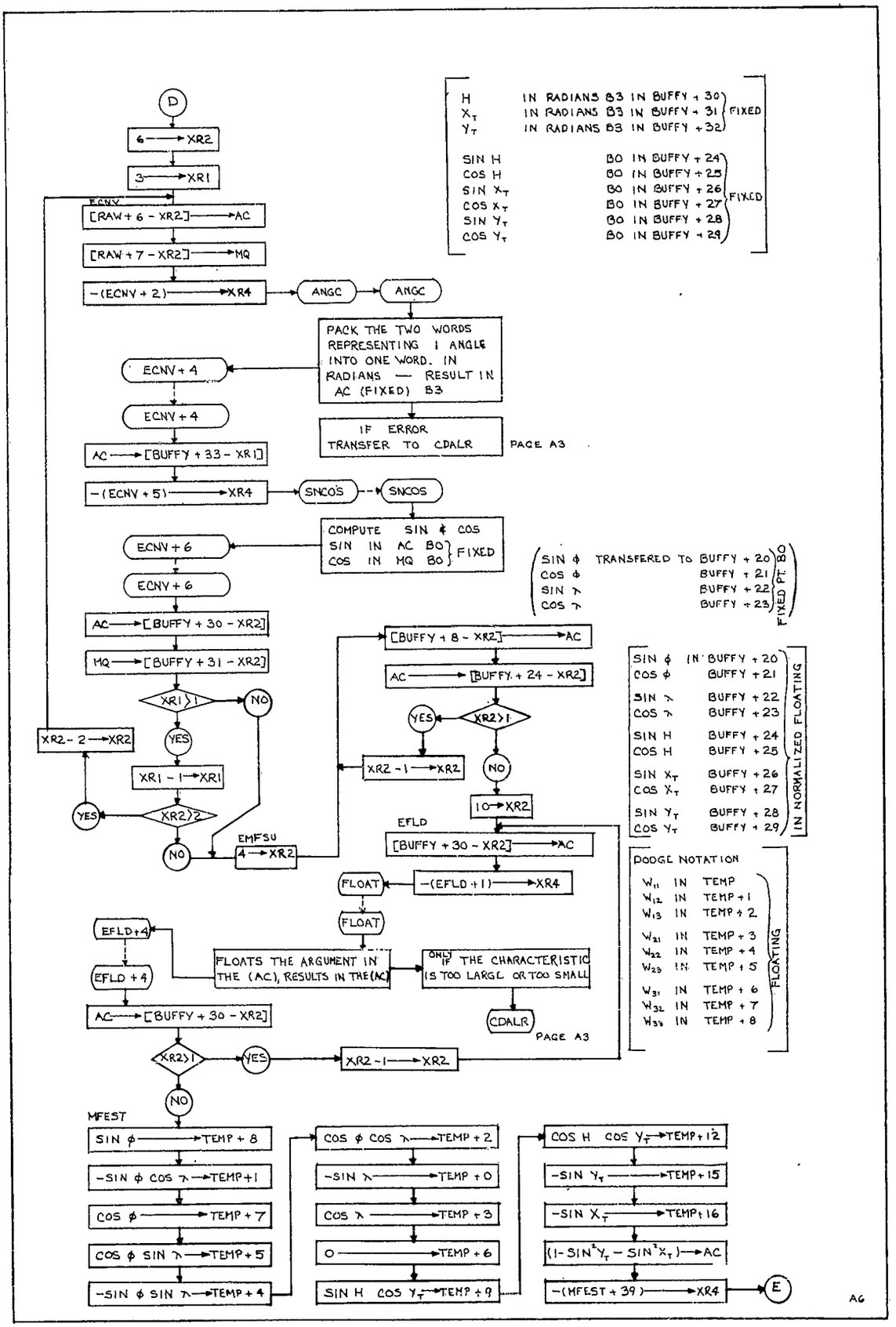

3584
START
REWIND 147
SW 1
OFF
ON
REWIND 132
-(START +3) → XR4
CSH2
CSH2
XR4 → DELAY_D
CSH2+1
SW 1
SELECT 134
-(CSH2+3) → XR4
JRTX
JRTX
132 → (RTX+24)_A
132 → (RTX+25)_A
PZE BUFFER, 0, -1, → AC
SW1
SELECT CARD READER
BUFFER → (RTX+15)_A
RDBCD
RDBCD
-1 → (RTX+16)_D
READ CARDS BY HALF ROWS
XR2 → (RTX+27)_D
TXH RTX + 17 → AC
STORE IN BUFFER 0,1,2,3...
AC → RTX+23
EOF
EOR
COPY AND ADD (BUFFER – XR2)
0 → XR2
0 → AC_P, 1-35
CSH2+5
CSH2+6
XR2-1 → XR2
NA
END OF FILE
END OF RECORD?
REDUNDANCY LIGHT CHECK
ON
1 FAILURE
2 FAILURES
XR4+1 → XR4
OFF
BACK SPACE 132
XR2 → (RTX+19)_D
SELECT 132
(RTX+27)_D → XR2
-TXH RTX+17 → AC
(ie. TXL)
12 → XR4
CSH2+6
NO
END OF FILE OR TWO FAILURES
YES
CSH2+5
CSH2+5
HALT AT SW 1
TIME DELAY
"J" CARD
TAKES THE CARD IMAGE IN BUFFER (0,1,2...) AND ARRANGES AS:
JOB CARD
CL.1 → CLM 1 (BCD)
CL.2-13 → TITLE+6 (BCD)
CL.26-28 → EYSTN (INT)
CL.29-35 → GRPON (INT)
CL.40-46 → RAW (INT)
CL.48-50 → RAW+1 (INT)
CL.51-58 → RAW+2 (FL)
CL.59-62 → RAW+3 (FL)
CL.63-72 → DATE (BCD)
START+15
(ie. STALR+1)
STALR+1
YES
0 → (MATDEX-5341) TO (MATDEX-1)
0 → (ESDATA-2000) TO (ESDATA-1)
R T T
ON
HTR
CSH2+1
THIS PAGE
(DELAY)_D → XR4
START+4
CHECK TO INSURE CARD JUST READ WAS A "J" CARD
SELECT ON LINE PRINTER
RESTORE PAPER TO TOP OF PAGE
STALR
NO
HALT & TRANSFER TO START
-(START+4) → XR4
FILE
FILE
-(ECLER+4) → XR4
PKEDIT
A
(FILE CONVERTS BLANKS TO -0)

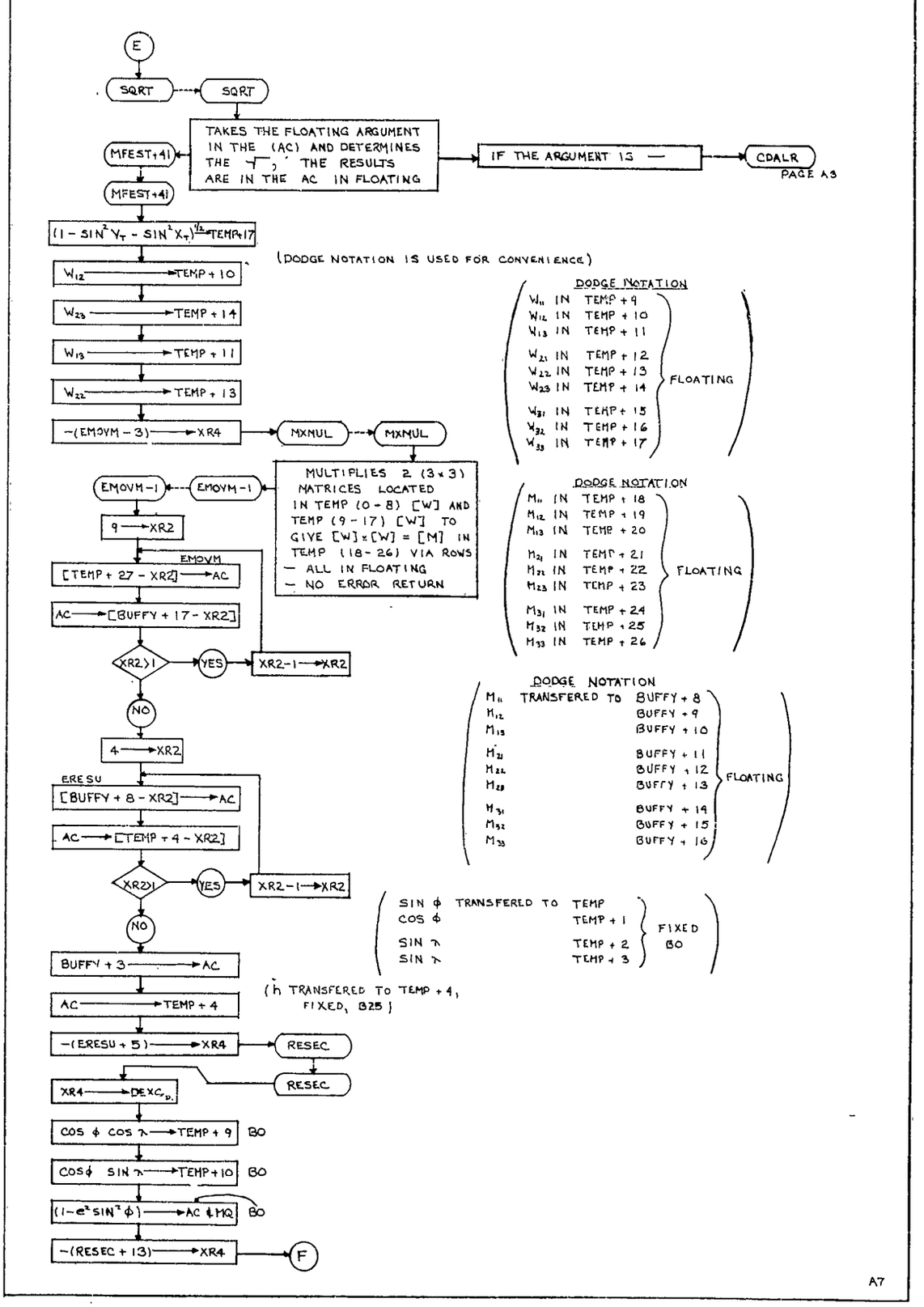

A
PKEDIT
ANALYTIC AEROTRIANGULATION, JOB
PRINT ON LINE OR TAPE
SW4↓ – TAPE
↑ – ON LINE
RAW → AC
RAW+1 → MQ
(RAW = ± XXXXX
RAW+1 = (-) XXX } DATUM)
–(ECLER+11) → XR4
CVEN
CVEN
DATUM PACKED INTO 1 WORD (FIXED) BINARY POINT BETWEEN BITS 25 & 26.
IF ERROR
STALR
PAGE A1
2–XR4
ECLER + 13
AC → GEOID
(DATUM IN GEOID)
RAW+2 → AC
AC+RAW+3 → AC
(2, INPUT WORDS FOR FOCAL)
AC → FOCAL
(FOCAL LENGTH AS 1 FLOATING PT NUM IN FOCAL) (IS NEGATIVE (-))
FROM 6N. IN AC_A
AC → STERA
(STERA_A = 6N) FIXED
–(ECLER+23) → XR4
FLOAT
FLOAT
ERROR RETURN
(FIXED ARGUMENT IN AC FLOATING RESULT PLACED INTO AC)
3 – XR4
STALR
PAGE A1
(CHARACTERISTIC TOO BIG OR TOO SMALL)
ECLER + 26
AC → EXSTN+1
(EXSTN+1 = 6N) FLOATING
FROM 20N IN AC_D
AC → EXSTD
(EXSTD_D = 20N) FIXED
–(ECLER+33) → XR4
CSH2
READ CARD OR TAPE AND FORM BCD IMAGE IN BUFFER (0,1,2,...)
ECLER+34
ECLER+34
–(ECLER+34) → XR4
FILE
FILE
"P" CARD
IMAGES IN BUFFER (0,1,2,...) ARRANGED AC
CL. 1 → CLM1 (BCD)
CL. 3-12 → RAW (INT)
CL. 14-23 → RAW+1 (INT)
CL. 25-32 → RAW+2 (INT)
CL. 34 → RAW+3 (INT)
CL. 36-39 → RAW+4 (INT)
CL. 41-43 → RAW+5 (INT)
CL. 45-55 → RAW+6 (FL)
CL. 57-62 → RAW+7 (FL)
CL. 64-69 → RAW+8 (FL)
CL. 71-72 → RAW+9 (INT)
PCARD+1
PCARD+1
CHECK TO INSURE CARD JUST READ WAS A "P" CARD
NO
HTR START
YES
B
A2

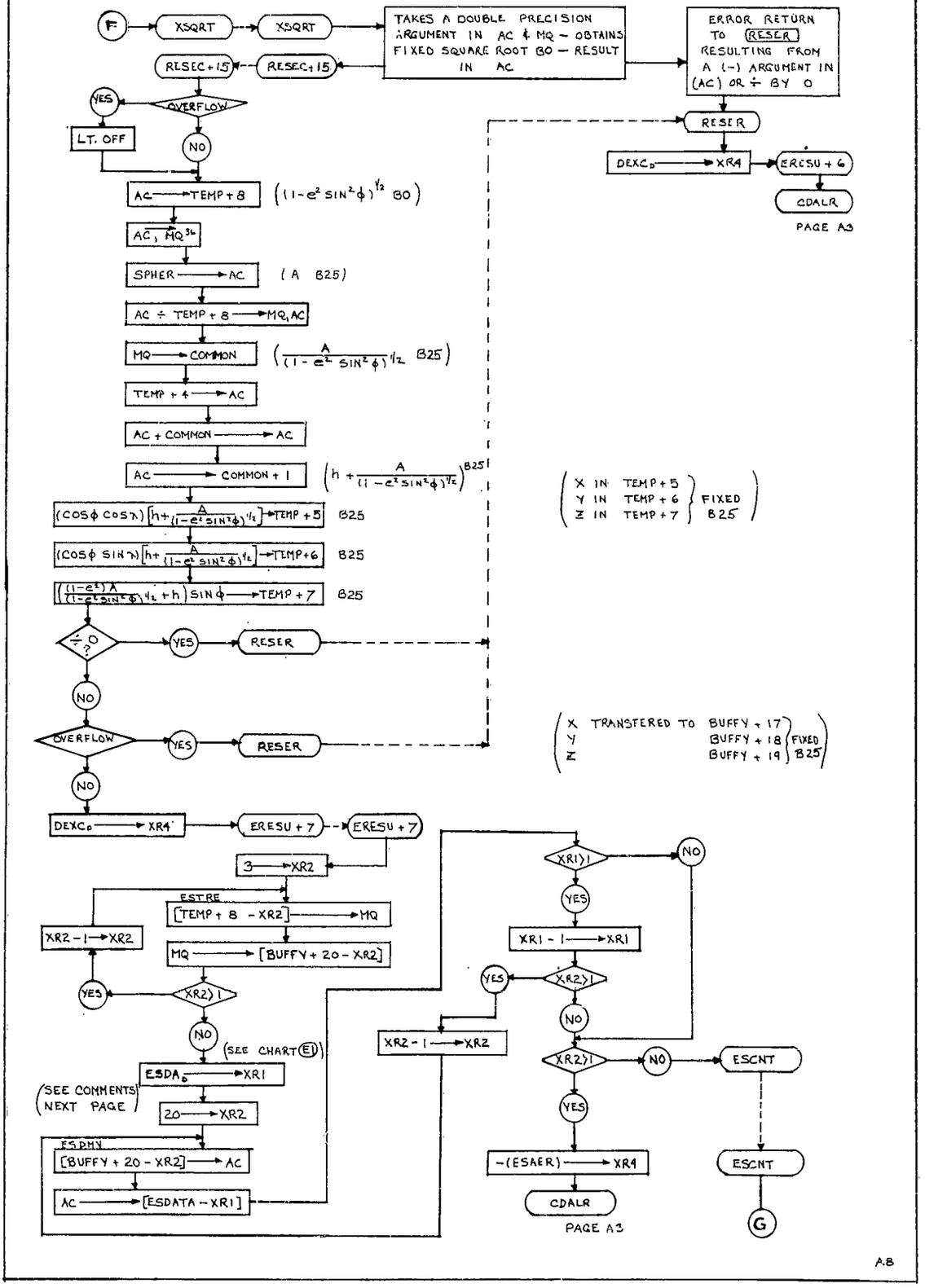

B
[PCARA]
RAW → SPHER (IF NOT ZERO) (A)
RAW+1 → SPHER+1 (IF NOT ZERO) (B)
RAW+2 → SPHER+2 (IF NOT ZERO) e^2
[PCARB]
IN EACH CASE, IF INPUT FOR THAT WORD NOT 0 STORE
RAW+3 → CNTRX (CNTRX)
RAW+4 → CNTRX+1 (TIMEL)
RAW+5 → CNTRX+2 (STERA)
RAW+6 → CNTRX+3 (FACTR)
RAW+7 → CNTRX+4 (YSCAL)
RAW+8 → CNTRX+5 (CHERA)
RAW+9 → CNTRX+6 (CTERA)
DFR. -1
-(CVENC+3) → XR4
CRETN
CRETN
XR4 → CRETC0
-(CRETN+1) → XR4
CSH2
CSH2
READ CARD OR TAPE AND FORM BCD IMAGE IN BUFFER (0,1,2,...)
CRETN+2
CRETN+2
-(CRETN+2) → XR4
FILE
IMAGES IN BUFFER (0,1,2,...) ARRANGED AS
CL. 1 → CLM1 (BCD)
CL. 2-5 → NR (INT)
CL. 6 → TYPE (BCD)
CL. 7-13 → RAW (INT)
CL. 15-17 → RAW+1 (INT)
CL. 18-24 → RAW+2 (INT)
CL. 26-28 → RAW+3 (INT)
CL. 29-35 → RAW+4 (INT)
CL. 37-39 → RAW+5 (INT)
CL. 40-46 → RAW+6 (INT)
CL. 48-50 → RAW+7 (INT)
CL. 51-58 → RAW+8 (INT)
CL. 60-62 → RAW+9 (INT)
CL. 63-68 → RAW+10 (INT)
CL. 70-72 → RAW+11 (INT)
IF AN ERROR
CDALR
CDALR
PRINT "ALARM" SEQUENCE
HALT & TRANSFER TO (CRETN+1)
SAME PAGE
CRETC0 → XR4
DRPE
DRPE
CLM1 → AC
AC-25 → AC
E CARD AC=0 ?
YES
ECARD
PAGE A4
NO
AC-2 → AC
G CARD AC=0 ?
YES
GCARD
PAGE A10
NO
AC-35 → AC
S CARD AC=0 ?
NO
CDALR
CDALR
PRINT "ALARM" SEQUENCE
HALT & TRANSFER TO (CRETN+1)
PAGE A3
YES
EXSTC-EXSTN → AC
(EXSTC STARTS AS +0)
PROPER "E" COUNT ?
NO
HALT & TRANSFER TO (ECHEK+1)
YES
GRPOC-GRPON → AC
PROPER "G" COUNT ?
NO
HALT & TRANSFER TO SCARD
SAME PAGE
YES
-(SCARD) → XR4
DEXFR
PAGE A19
A3


ECARD
TRANSFER TO — 2nd TIME AND THEREAFTER
TRANSFER TO — 1ST TIME ONLY
[TRA ECMAD] → ECARD
NR → ENULL
(NR IS STATION NUMBER)
ECMAD
20(NR-ENULL+1) → ESDA_D
NR → AC_D
AC + TYPE → BUFFY
(NR IN BUFFY_D, TYPE IN BUFFY_A)
TRANSFER RAW (6,7,8,9,10,11,) TO TEMP (0,1,2,3,4,5)
TRUE ø,λ,h
-(ESAVE + 3) → XR4
DPESW
DPESW
XR4 → REGC_D
DUMMY FOR "E" WEIGHTS
ESAVE + 4
ESAVE + 4
REGC_D → XR4
-(ESAVE + 4) → XR4
CRETN
CRETN
SAME ROUTINE AS BEFORE EXCEPT NOW THE SECOND CARD OF THE 1ST EXPOSURE STATION IS READ — DOES NOT CHECK FOR AN E,G or S CARD AT THIS TIME
ESAVE + 5
ESAVE + 5
NOW CHECK FOR "E" CARD
NO
-(ESAVE + 8) → XR4
CDALR
CDALR
PRINT ALARM SEQUENCE
HALT & TRANSFER TO (CRETN +1)
PAGE A3
YES
TEST TO SEE IF THE ESTIMATED VALUE IS (-0) IF SO - USE THE TRUE VALUES - IF TRUE VALUE IS (-0) TRANSFER TO
FINAL VALUES LOCATED IN RAW (6,7,8,9,10,11.)
FILE CONVERTS BLANK TO MINUS ZERO
ECARZ-1
ECARZ-1
-(ESAVE + 8) → XR4
CDALR
CDALR
PRINT ALARM SEQUENCE
HALT & TRANSFER TO (CRETN +1)
PAGE A3
-(ECARZ + 13) → XR4
PLH
PLH
XR4 → REGCD
2 → XR1
a

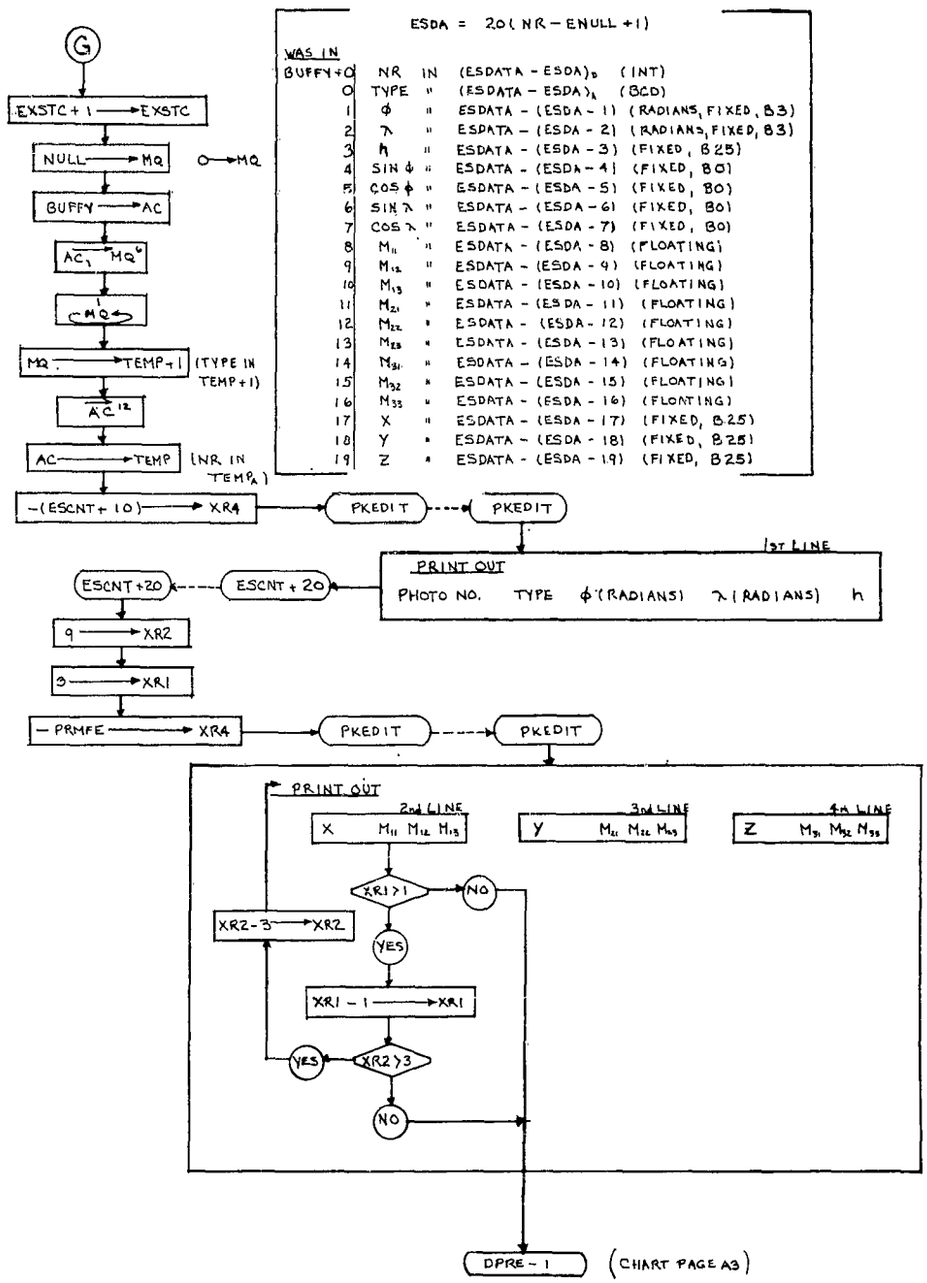

C
4→XR2
[RAW+10-XR2]→AC
PLHA
[RAW+11-XR2]→MQ
PLHC
YES
AC +
NO
(TEST 1st WORD FOR (-0))
PLHC
NO
AC 0
YES
[RAW+11-XR2]→AC
AC 0
YES
NO
[RAW+10-XR2]→AC
PLHC
-PLHC→XR4
SAME PAGE
ANGC
ERROR RETURN
CDALR
AC→[BUFFY+3-XR1]
PAGE A3
-(PLHC+3)→XR4
SNCOS
AC→[BUFFY+8-XR2]
MQ→[BUFFY+9-XR2]
XR1?1
NO
YES
XR2-2→XR2
XR1-1→XR1
XR2?2
NO
NO
PLHD
-|AC|→AC
AC→[BUFFY+3-XR1]
PLHB
RAW+10→AC
RAW+11→MQ
-(PLHB+2)→XR4
CVEN
CVEN
PACK TWO FIXED NUMBERS IN AC & MQ (B35) INTO ONE WORD, FIXED, (B25) IN AC
(h IN ONE WORD, FIXED B25 IN BUFFY+3)
PLHB+4
PLHB+4
AC→BUFFY+3
REGC0→XR4
ECARZ+14
D
(φ IN BUFFY+1, λ IN BUFFY+2 } IN RADIANS B3)
ANGC
ARGUMENT IN AC & MQ
PACK THE TWO WORDS REPRESENTING 1 ANGLE IN DEG., MIN., SEC., 1/1000³ INTO 1 WORD IN RADIANS —RESULT IN AC B3 (FIXED)
2-XR4
IF ERROR TRANSFER TO (1-XR4)
SNCOS
XR4→DEXC0
AC 0?
NO
YES
(+)→AC5
AC→COMMON+3
-(SNCOS+4→XR4)
IBSINZ
GIVES COS θ IN FIXED, B0 IN AC
SNCOS+8
AC→COMMON+2
COMMON+3→AC
-(SNCOS+10→XR4
IBSINZ
GIVES SIN θ IN FIXED IN AC (B0)
SNCOS+14
COMMON+2→MQ
DEXC0→XR4
1-XR4
(SIN IN AC, COS IN MQ)
B0
FIXED POINT VALUES
SIN φ IN BUFFY+4
COS φ IN BUFFY+5
SIN λ IN BUFFY+6
COS λ IN BUFFY+7
A5


D
6 → XR2
3 → XR1
ECNV
[RAW + 6 - XR2] → AC
[RAW + 7 - XR2] → MQ
-(ECNV + 2) → XR4
ANGC
ANGC
PACK THE TWO WORDS REPRESENTING 1 ANGLE INTO ONE WORD. IN RADIANS — RESULT IN AC (FIXED) B3
ECNV + 4
ECNV + 4
IF ERROR TRANSFER TO CDALR
PAGE A3
AC → [BUFFY + 33 - XR1]
-(ECNV + 5) → XR4
SNCOS
SNCOS
COMPUTE SIN & COS
SIN IN AC B0
COS IN MQ B0
FIXED
ECNV + 6
ECNV + 6
AC → [BUFFY + 30 - XR2]
MQ → [BUFFY + 31 - XR2]
XR1 > 1
NO
YES
XR1 - 1 → XR1
XR2 > 2
YES
NO
XR2 - 2 → XR2
EMFSU
4 → XR2
[BUFFY + 8 - XR2] → AC
AC → [BUFFY + 24 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
10 → XR2
EFLD
[BUFFY + 30 - XR2] → AC
-(EFLD + 1) → XR4
FLOAT
FLOAT
EFLD + 4
EFLD + 4
FLOATS THE ARGUMENT IN THE (AC), RESULTS IN THE (AC)
ONLY IF THE CHARACTERISTIC IS TOO LARGE OR TOO SMALL
CDALR
PAGE A3
AC → [BUFFY + 30 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
MFEST
SIN φ → TEMP + 8
-SIN φ COS λ → TEMP + 1
COS φ → TEMP + 7
COS φ SIN λ → TEMP + 5
-SIN φ SIN λ → TEMP + 4
COS φ COS λ → TEMP + 2
-SIN λ → TEMP + 0
COS λ → TEMP + 3
0 → TEMP + 6
SIN H COS Y_T → TEMP + 9
COS H COS Y_T → TEMP + 12
-SIN Y_T → TEMP + 15
-SIN X_T → TEMP + 16
(1 - SIN²Y_T - SIN²X_T) → AC
-(MFEST + 39) → XR4
E
H IN RADIANS B3 IN BUFFY + 30
X_T IN RADIANS B3 IN BUFFY + 31
Y_T IN RADIANS B3 IN BUFFY + 32
FIXED
SIN H B0 IN BUFFY + 24
COS H B0 IN BUFFY + 25
SIN X_T B0 IN BUFFY + 26
COS X_T B0 IN BUFFY + 27
SIN Y_T B0 IN BUFFY + 28
COS Y_T B0 IN BUFFY + 29
FIXED
SIN φ TRANSFERED TO BUFFY + 20
COS φ BUFFY + 21
SIN λ BUFFY + 22
COS λ BUFFY + 23
FIXED PT B0
SIN φ IN BUFFY + 20
COS φ BUFFY + 21
SIN λ BUFFY + 22
COS λ BUFFY + 23
SIN H BUFFY + 24
COS H BUFFY + 25
SIN X_T BUFFY + 26
COS X_T BUFFY + 27
SIN Y_T BUFFY + 28
COS Y_T BUFFY + 29
IN NORMALIZED FLOATING
DODGE NOTATION
W11 IN TEMP
W12 IN TEMP + 1
W13 IN TEMP + 2
W21 IN TEMP + 3
W22 IN TEMP + 4
W23 IN TEMP + 5
W31 IN TEMP + 6
W32 IN TEMP + 7
W33 IN TEMP + 8
FLOATING
A6


E
SQRT
SQRT
TAKES THE FLOATING ARGUMENT IN THE (AC) AND DETERMINES THE √, THE RESULTS ARE IN THE AC IN FLOATING
IF THE ARGUMENT IS —
CDALR
PAGE A3
MFEST+41
MFEST+41
(1 − SIN² V_T − SIN² X_T)^1/2 → TEMP+17
(DODGE NOTATION IS USED FOR CONVENIENCE)
W12 → TEMP + 10
W23 → TEMP + 14
W13 → TEMP + 11
W22 → TEMP + 13
−(EMOVM − 3) → XR4
MXMUL
MXMUL
MULTIPLIES 2 (3 × 3) MATRICES LOCATED IN TEMP (0 − 8) [W] AND TEMP (9 − 17) [W] TO GIVE [W] × [W] = [M] IN TEMP (18 − 26) VIA ROWS
— ALL IN FLOATING
— NO ERROR RETURN
EMOVM−1
EMOVM−1
9 → XR2
EMOVM
[TEMP + 27 − XR2] → AC
AC → [BUFFY + 17 − XR2]
XR2>1
YES
XR2−1 → XR2
NO
4 → XR2
ERESU
[BUFFY + 8 − XR2] → AC
AC → [TEMP + 4 − XR2]
XR2>1
YES
XR2−1 → XR2
NO
BUFFY + 3 → AC
AC → TEMP + 4
−(ERESU + 5) → XR4
RESEC
RESEC
XR4 → DEXC_D
COS φ COS λ → TEMP + 9 BO
COS φ SIN λ → TEMP + 10 BO
(1 − e² SIN² φ) → AC & MQ BO
−(RESEC + 13) → XR4
F
DODGE NOTATION
W11 IN TEMP + 9
W12 IN TEMP + 10
W13 IN TEMP + 11
W21 IN TEMP + 12
W22 IN TEMP + 13
W23 IN TEMP + 14
W31 IN TEMP + 15
W32 IN TEMP + 16
W33 IN TEMP + 17
FLOATING
DODGE NOTATION
M11 IN TEMP + 18
M12 IN TEMP + 19
M13 IN TEMP + 20
M21 IN TEMP + 21
M22 IN TEMP + 22
M23 IN TEMP + 23
M31 IN TEMP + 24
M32 IN TEMP + 25
M33 IN TEMP + 26
FLOATING
DODGE NOTATION
M11 TRANSFERED TO BUFFY + 8
M12 BUFFY + 9
M13 BUFFY + 10
M21 BUFFY + 11
M22 BUFFY + 12
M23 BUFFY + 13
M31 BUFFY + 14
M32 BUFFY + 15
M33 BUFFY + 16
FLOATING
SIN φ TRANSFERED TO TEMP
COS φ TEMP + 1
SIN λ TEMP + 2
SIN λ TEMP + 3
FIXED
BO
(h TRANSFERED TO TEMP + 4, FIXED, B25)
A7

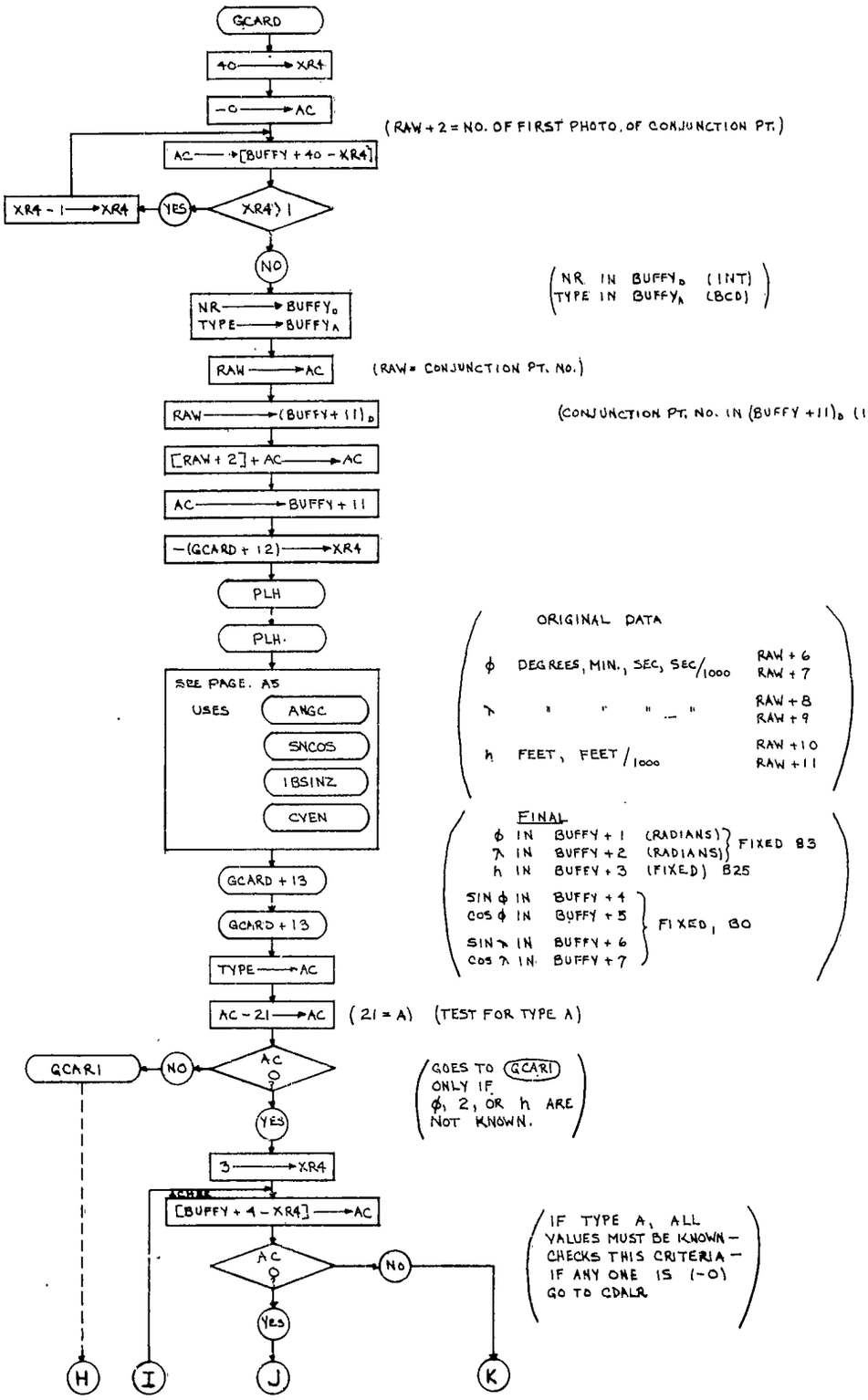

F
XSQRT
XSQRT
TAKES A DOUBLE PRECISION ARGUMENT IN AC & MQ — OBTAINS FIXED SQUARE ROOT BO — RESULT IN AC
RESEC+15
RESEC+15
ERROR RETURN TO RESER RESULTING FROM A (-) ARGUMENT IN (AC) OR ÷ BY 0
YES
OVERFLOW
LT. OFF
NO
RESER
DEXC0 → XR4
ERESU+6
CDALR
PAGE A3
AC → TEMP+8
(1-e² SIN²φ)^1/2 BO
AC, MQ^36
SPHER → AC
(A B25)
AC ÷ TEMP+8 → MQ, AC
MQ → COMMON
(A / (1-e² SIN²φ)^1/2 B25)
TEMP+4 → AC
AC + COMMON → AC
AC → COMMON+1
(h + A / (1-e² SIN²φ)^1/2)^B25
(COS φ COS λ)[h + A / (1-e² SIN²φ)^1/2] → TEMP+5 B25
(COS φ SIN λ)[h + A / (1-e² SIN²φ)^1/2] → TEMP+6 B25
((1-e²) A / (1-e² SIN²φ)^1/2 + h) SIN φ → TEMP+7 B25
(X IN TEMP+5, Y IN TEMP+6, Z IN TEMP+7 FIXED B25)
≟ 0
YES
RESER
NO
OVERFLOW
YES
RESER
NO
(X TRANSFERED TO BUFFY+17, Y BUFFY+18, Z BUFFY+19 FIXED B25)
DEXC0 → XR4
ERESU+7
ERESU+7
3 → XR2
ESTRE
[TEMP+8 - XR2] → MQ
MQ → [BUFFY+20 - XR2]
XR2 - 1 → XR2
YES
XR2 > 1
NO
(SEE CHART E1)
ESDA0 → XR1
(SEE COMMENTS NEXT PAGE)
20 → XR2
ESDMY
[BUFFY+20 - XR2] → AC
AC → [ESDATA - XR1]
XR1 > 1
NO
YES
XR1 - 1 → XR1
YES
XR2 > 1
NO
XR2 - 1 → XR2
XR2 > 1
NO
ESCNT
YES
-(ESAER) → XR4
CDALR
PAGE A3
ESCNT
G

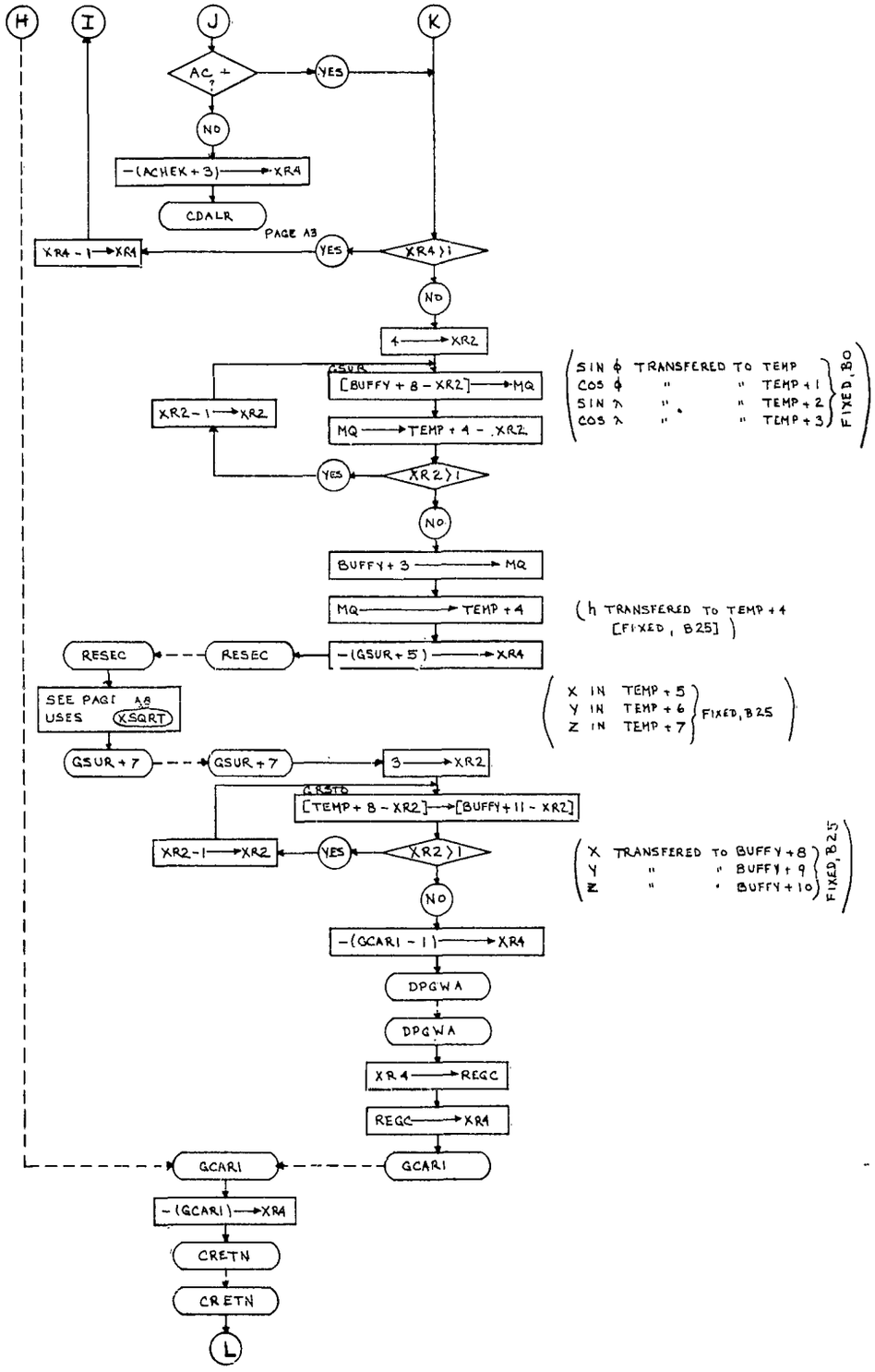
A.8

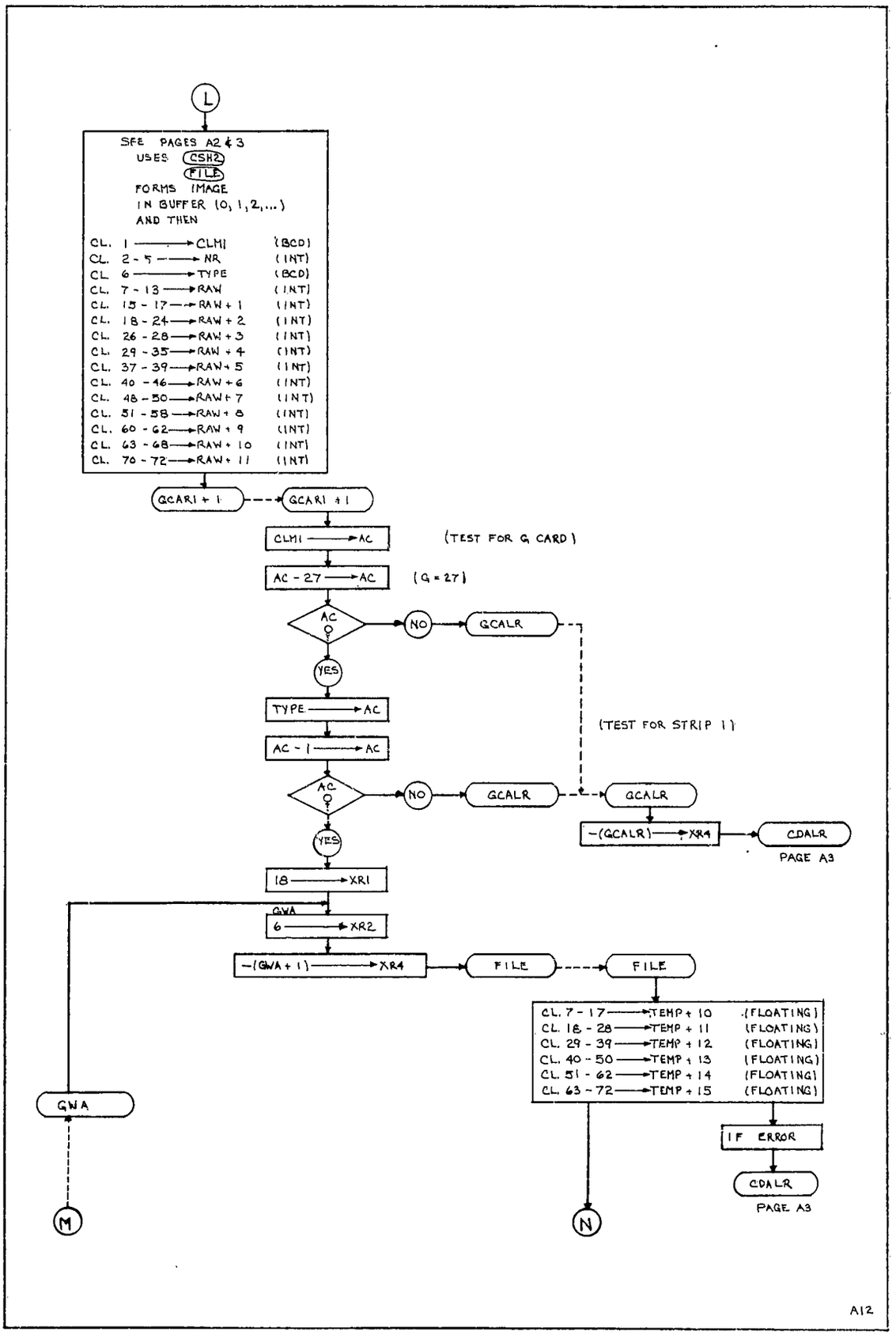


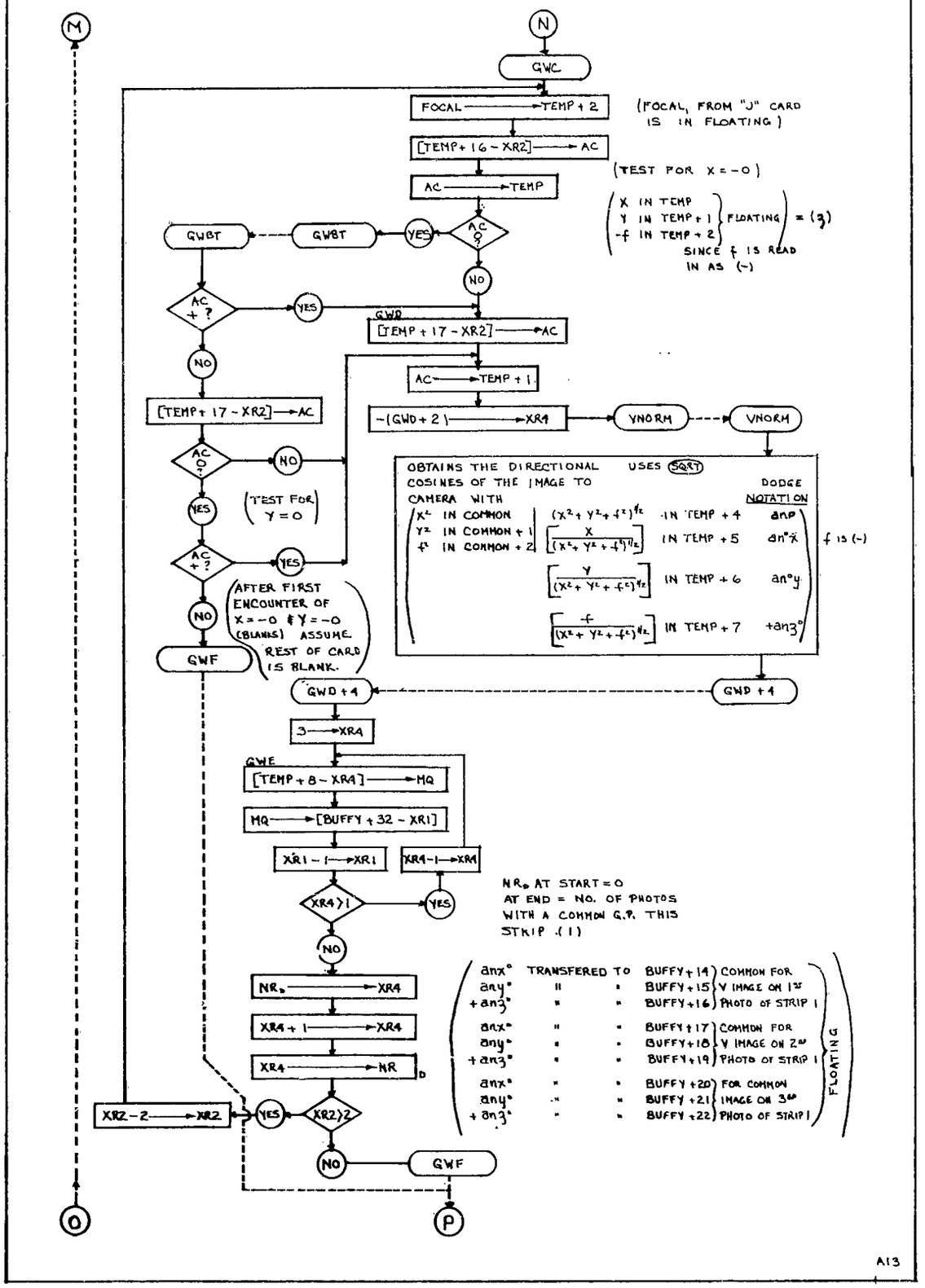
ESDA = 20(NR − ENULL + 1)

WAS IN BUFFY +				
0	NR	IN	(ESDATA − ESDA)$_0$	(INT)
0	TYPE	"	(ESDATA − ESDA)$_1$	(BCD)
1	ϕ	"	ESDATA − (ESDA − 1)	(RADIANS, FIXED, B3)
2	λ	"	ESDATA − (ESDA − 2)	(RADIANS, FIXED, B3)
3	h	"	ESDATA − (ESDA − 3)	(FIXED, B25)
4	SIN ϕ	"	ESDATA − (ESDA − 4)	(FIXED, B0)
5	COS ϕ	"	ESDATA − (ESDA − 5)	(FIXED, B0)
6	SIN λ	"	ESDATA − (ESDA − 6)	(FIXED, B0)
7	COS λ	"	ESDATA − (ESDA − 7)	(FIXED, B0)
8	M_{11}	"	ESDATA − (ESDA − 8)	(FLOATING)
9	M_{12}	"	ESDATA − (ESDA − 9)	(FLOATING)
10	M_{13}	"	ESDATA − (ESDA − 10)	(FLOATING)
11	M_{21}	"	ESDATA − (ESDA − 11)	(FLOATING)
12	M_{22}	"	ESDATA − (ESDA − 12)	(FLOATING)
13	M_{23}	"	ESDATA − (ESDA − 13)	(FLOATING)
14	M_{31}	"	ESDATA − (ESDA − 14)	(FLOATING)
15	M_{32}	"	ESDATA − (ESDA − 15)	(FLOATING)
16	M_{33}	"	ESDATA − (ESDA − 16)	(FLOATING)
17	X	"	ESDATA − (ESDA − 17)	(FIXED, B25)
18	Y	"	ESDATA − (ESDA − 18)	(FIXED, B25)
19	Z	"	ESDATA − (ESDA − 19)	(FIXED, B25)

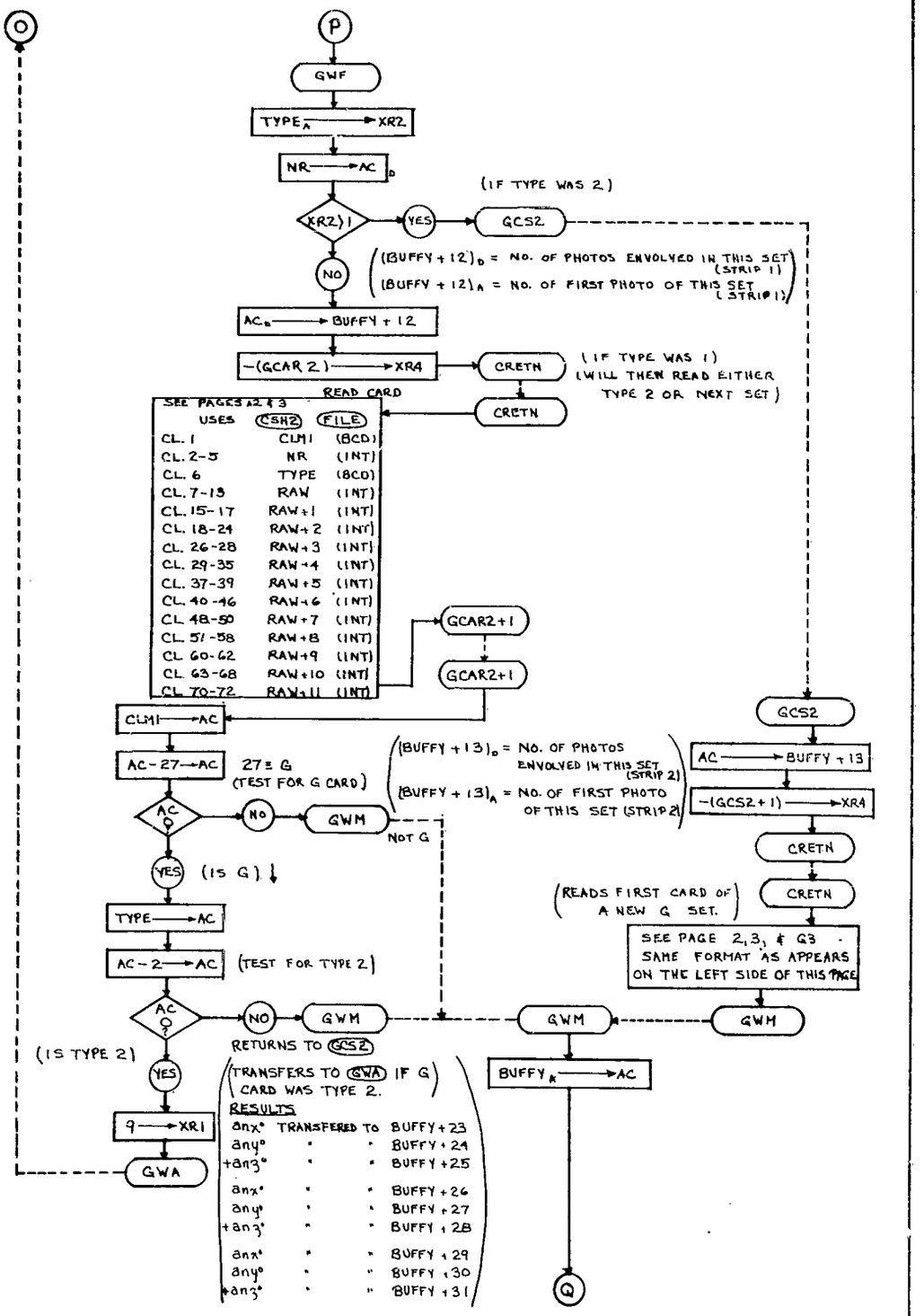

GCARD
40 → XR4
−0 → AC
(RAW + 2 = NO. OF FIRST PHOTO. OF CONJUNCTION PT.)
AC → [BUFFY + 40 − XR4]
XR4 − 1 → XR4
YES
XR4 ≥ 1
NO
NR → BUFFY$_D$
TYPE → BUFFY$_A$
(NR IN BUFFY$_D$ (INT)
TYPE IN BUFFY$_A$ (BCD))
RAW → AC
(RAW = CONJUNCTION PT. NO.)
RAW → (BUFFY + 11)$_D$
(CONJUNCTION PT. NO. IN (BUFFY + 11)$_D$ (INT))
[RAW + 2] + AC → AC
AC → BUFFY + 11
−(GCARD + 12) → XR4
PLH
PLH.
SEE PAGE. A5
USES
ANGC
SNCOS
IBSINZ
CVEN
ORIGINAL DATA
ϕ DEGREES, MIN., SEC, SEC/1000 RAW + 6 RAW + 7
λ " " " " RAW + 8 RAW + 9
h FEET, FEET/1000 RAW + 10 RAW + 11
FINAL
ϕ IN BUFFY + 1 (RADIANS)
λ IN BUFFY + 2 (RADIANS) FIXED 83
h IN BUFFY + 3 (FIXED) B25
SIN ϕ IN BUFFY + 4
COS ϕ IN BUFFY + 5
SIN λ IN BUFFY + 6
COS λ IN BUFFY + 7
FIXED, B0
GCARD + 13
GCARD + 13
TYPE → AC
AC − 21 → AC
(21 = A) (TEST FOR TYPE A)
GCARI
NO
AC = 0 ?
YES
(GOES TO GCARI ONLY IF ϕ, λ, OR h ARE NOT KNOWN.)
3 → XR4
ACHK
[BUFFY + 4 − XR4] → AC
AC = 0 ?
NO
YES
(IF TYPE A, ALL VALUES MUST BE KNOWN — CHECKS THIS CRITERIA — IF ANY ONE IS (−0) GO TO CDALR)
H
I
J
K

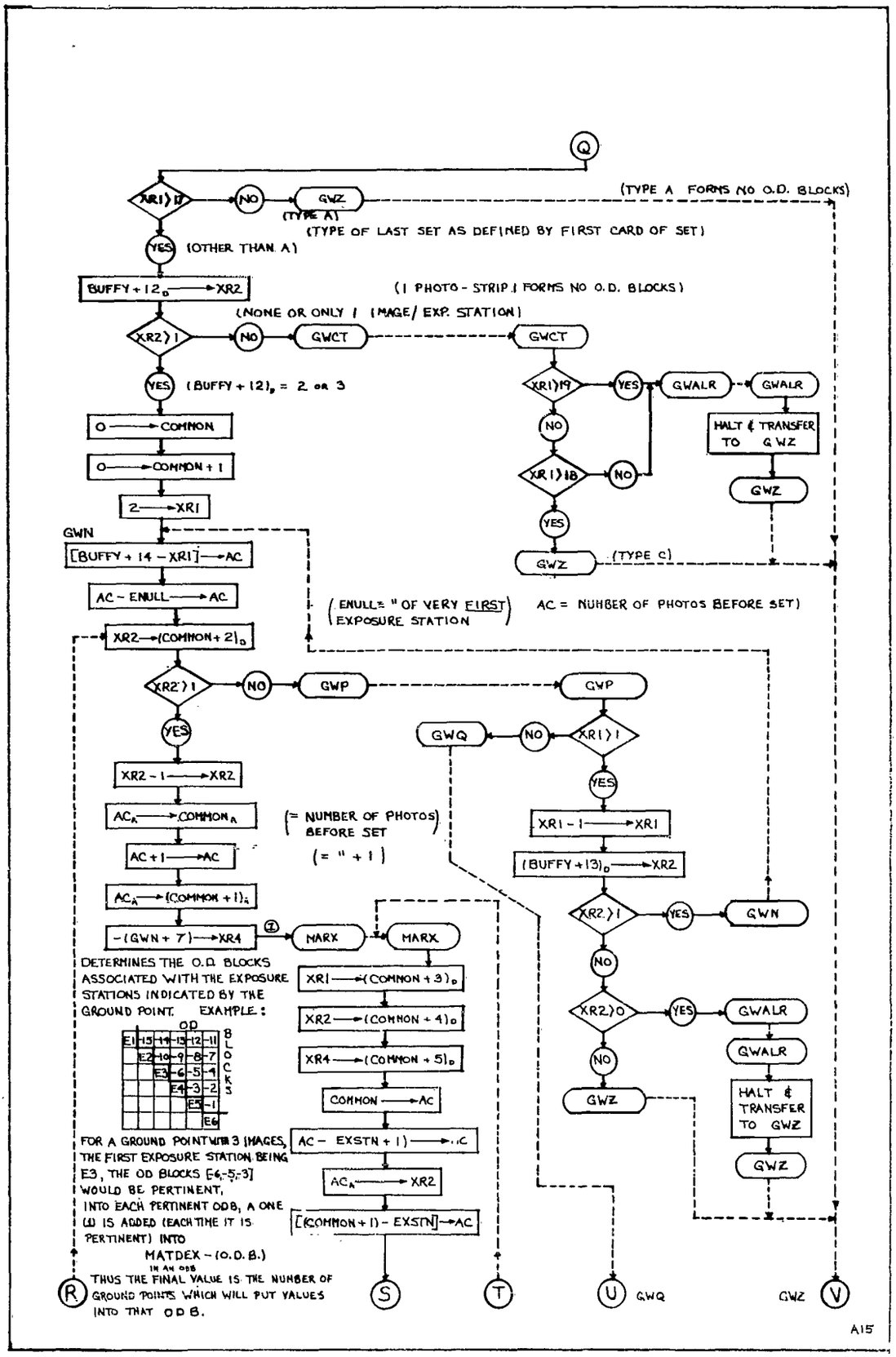

H
I
J
K
AC + ?
YES
NO
-(ACHEK + 3) → XR4
CDALR
PAGE A3
XR4 - 1 → XR4
YES
XR4 > 1
NO
4 → XR2
GSUR
[BUFFY + 8 - XR2] → MQ
XR2 - 1 → XR2
MQ → TEMP + 4 - XR2
YES
XR2 > 1
NO
SIN φ TRANSFERED TO TEMP
COS φ " " TEMP + 1
SIN λ " " TEMP + 2
COS λ " " TEMP + 3
FIXED, B0
BUFFY + 3 → MQ
MQ → TEMP + 4
h TRANSFERED TO TEMP + 4
[FIXED, B25]
RESEC
RESEC
-(GSUR + 5) → XR4
SEE PAGE A8
USES XSQRT
X IN TEMP + 5
Y IN TEMP + 6
Z IN TEMP + 7
FIXED, B25
GSUR + 7
GSUR + 7
3 → XR2
GRSTD
[TEMP + 8 - XR2] → [BUFFY + 11 - XR2]
XR2 - 1 → XR2
YES
XR2 > 1
NO
X TRANSFERED TO BUFFY + 8
Y " " BUFFY + 9
Z " " BUFFY + 10
FIXED, B25
-(GCARI - 1) → XR4
DPGWA
DPGWA
XR4 → REGC
REGC → XR4
GCARI
GCARI
-(GCARI) → XR4
CRETN
CRETN
L


L
SEE PAGES A2 & 3
USES CSH2
FILE
FORMS IMAGE
IN BUFFER (0, 1, 2, ...)
AND THEN
CL. 1 → CLM1 (BCD)
CL. 2 - 5 → NR (INT)
CL. 6 → TYPE (BCD)
CL. 7 - 13 → RAW (INT)
CL. 15 - 17 → RAW + 1 (INT)
CL. 18 - 24 → RAW + 2 (INT)
CL. 26 - 28 → RAW + 3 (INT)
CL. 29 - 35 → RAW + 4 (INT)
CL. 37 - 39 → RAW + 5 (INT)
CL. 40 - 46 → RAW + 6 (INT)
CL. 48 - 50 → RAW + 7 (INT)
CL. 51 - 58 → RAW + 8 (INT)
CL. 60 - 62 → RAW + 9 (INT)
CL. 63 - 68 → RAW + 10 (INT)
CL. 70 - 72 → RAW + 11 (INT)
GCARI + 1
GCARI + 1
CLM1 → AC
(TEST FOR G CARD)
AC - 27 → AC
(G = 27)
AC ?
NO
GCALR
YES
TYPE → AC
(TEST FOR STRIP 1)
AC - 1 → AC
AC ?
NO
GCALR
GCALR
YES
-(GCALR) → XR4
CDALR
PAGE A3
18 → XR1
GWA
6 → XR2
-(GWA + 1) → XR4
FILE
FILE
CL. 7 - 17 → TEMP + 10 (FLOATING)
CL. 18 - 28 → TEMP + 11 (FLOATING)
CL. 29 - 39 → TEMP + 12 (FLOATING)
CL. 40 - 50 → TEMP + 13 (FLOATING)
CL. 51 - 62 → TEMP + 14 (FLOATING)
CL. 63 - 72 → TEMP + 15 (FLOATING)
IF ERROR
CDALR
PAGE A3
GWA
M
N

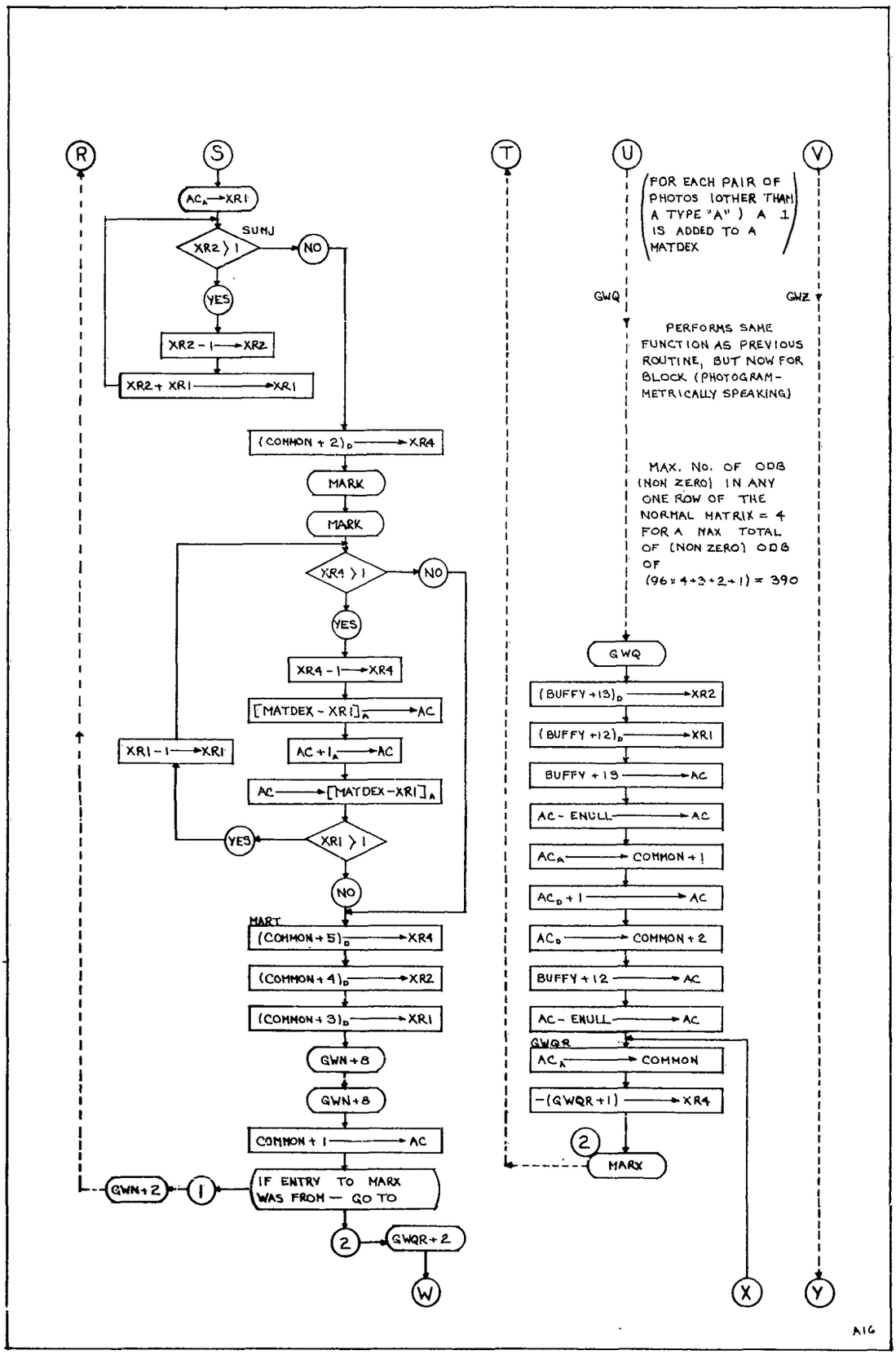

M
N
GWC
FOCAL → TEMP + 2
(FOCAL, FROM "J" CARD IS IN FLOATING)
[TEMP + 16 − XR2] → AC
(TEST FOR X = −0)
AC → TEMP
X IN TEMP
Y IN TEMP + 1
−f IN TEMP + 2
FLOATING = (3)
SINCE f IS READ IN AS (−)
AC 0 ?
YES
NO
GWBT
GWBT
AC + ?
YES
NO
GWB
[TEMP + 17 − XR2] → AC
AC → TEMP + 1
−(GWD + 2) → XR4
VNORM
VNORM
[TEMP + 17 − XR2] → AC
AC 0 ?
NO
YES
(TEST FOR Y = 0)
AC + ?
YES
NO
(AFTER FIRST ENCOUNTER OF X = −0 & Y = −0 (BLANKS) ASSUME REST OF CARD IS BLANK.)
GWF
OBTAINS THE DIRECTIONAL COSINES OF THE IMAGE TO CAMERA WITH
USES SQRT
DODGE NOTATION
X² IN COMMON
Y² IN COMMON + 1
f² IN COMMON + 2
(X² + Y² + f²)^½ IN TEMP + 4 anp
X / (X² + Y² + f²)^½ IN TEMP + 5 an°x
Y / (X² + Y² + f²)^½ IN TEMP + 6 an°y
−f / (X² + Y² + f²)^½ IN TEMP + 7 +an3°
f IS (−)
GWD + 4
GWD + 4
3 → XR4
GWE
[TEMP + 8 − XR4] → MQ
MQ → [BUFFY + 32 − XR1]
XR1 − 1 → XR1
XR4 − 1 → XR4
XR4 > 1
YES
NO
NR_D AT START = 0
AT END = NO. OF PHOTOS WITH A COMMON G.P. THIS STRIP (1)
NR_D → XR4
XR4 + 1 → XR4
XR4 → NR_D
XR2 − 2 → XR2
YES
XR2 > 2
NO
GWF
anx° TRANSFERED TO BUFFY + 14 COMMON FOR
any° " " BUFFY + 15 Y IMAGE ON 1st
+an3° " " BUFFY + 16 PHOTO OF STRIP 1
anx° " " BUFFY + 17 COMMON FOR
any° " " BUFFY + 18 Y IMAGE ON 2nd
+an3° " " BUFFY + 19 PHOTO OF STRIP 1
anx° " " BUFFY + 20 FOR COMMON
any° " " BUFFY + 21 IMAGE ON 3rd
+an3° " " BUFFY + 22 PHOTO OF STRIP 1
FLOATING
O
P

A13

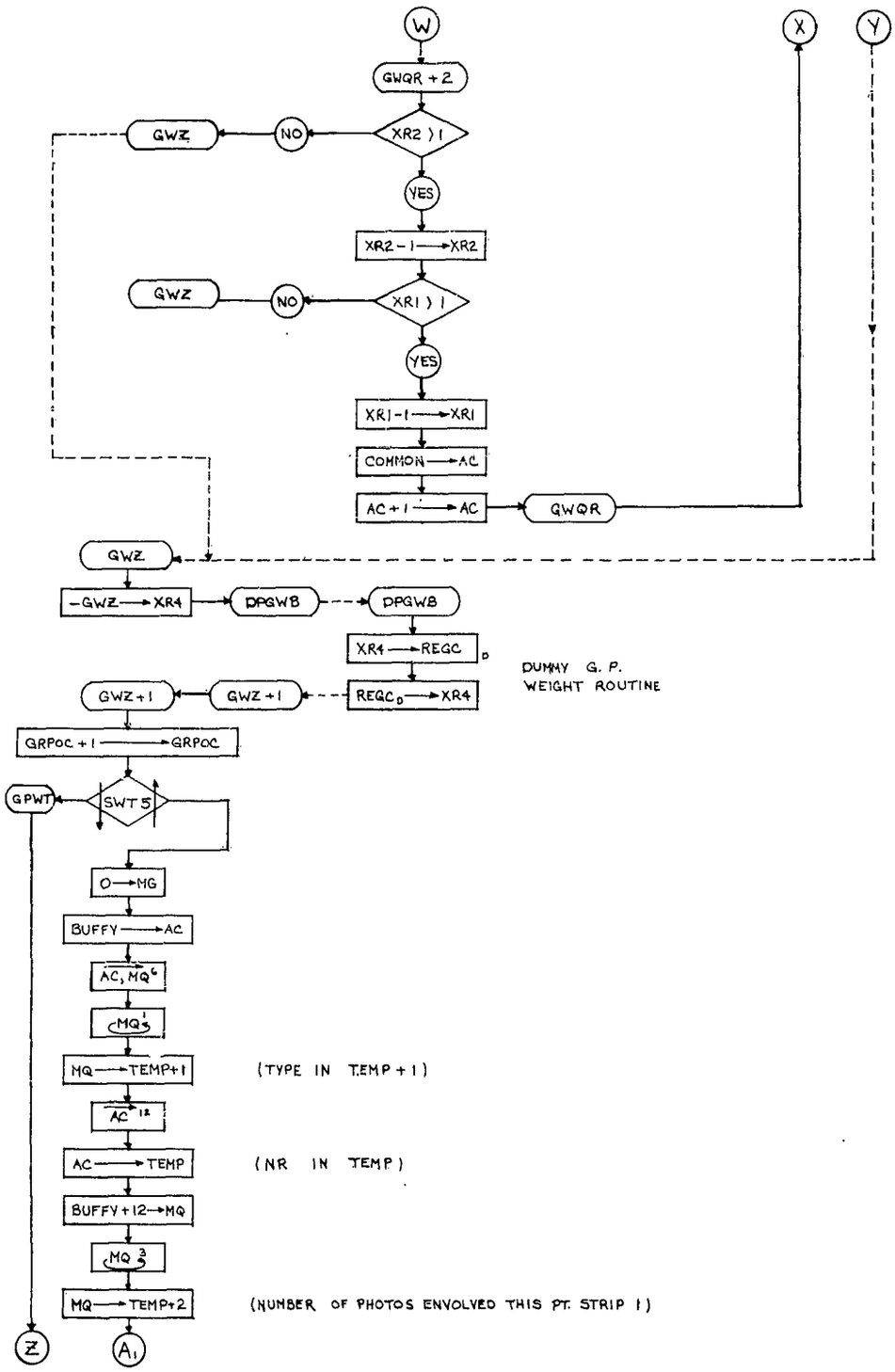

O
P
GWF
TYPE_A → XR2
NR → AC_D
(IF TYPE WAS 2)
XR2 > 1
YES
GCS2
NO
(BUFFY + 12)_D = NO. OF PHOTOS ENVOLVED IN THIS SET (STRIP 1)
(BUFFY + 12)_A = NO. OF FIRST PHOTO OF THIS SET (STRIP 1)
AC_D → BUFFY + 12
−(GCAR 2) → XR4
CRETN
(IF TYPE WAS 1) (WILL THEN READ EITHER TYPE 2 OR NEXT SET)
READ CARD
CRETN
SEE PAGES 2, 3 & 3
USES CSH2 FILE
CL. 1 CLM1 (BCD)
CL. 2-5 NR (INT)
CL. 6 TYPE (BCD)
CL. 7-13 RAW (INT)
CL. 15-17 RAW+1 (INT)
CL. 18-24 RAW+2 (INT)
CL. 26-28 RAW+3 (INT)
CL. 29-35 RAW+4 (INT)
CL. 37-39 RAW+5 (INT)
CL. 40-46 RAW+6 (INT)
CL. 48-50 RAW+7 (INT)
CL. 51-58 RAW+8 (INT)
CL. 60-62 RAW+9 (INT)
CL. 63-68 RAW+10 (INT)
CL. 70-72 RAW+11 (INT)
GCAR2+1
GCAR2+1
CLM1 → AC
AC − 27 → AC
27 ≡ G (TEST FOR G CARD)
AC 0?
NO
GWM
NOT G
YES
(IS G)
TYPE → AC
AC − 2 → AC
(TEST FOR TYPE 2)
AC 0?
NO
GWM
RETURNS TO GCS2
(IS TYPE 2)
YES
(TRANSFERS TO GWA IF G CARD WAS TYPE 2.)
RESULTS
ānx° TRANSFERED TO BUFFY + 23
āny° " " BUFFY + 24
+ān3° " " BUFFY + 25
ānx° " " BUFFY + 26
āny° " " BUFFY + 27
+ān3° " " BUFFY + 28
ānx° " " BUFFY + 29
āny° " " BUFFY + 30
+ān3° " " BUFFY + 31
9 → XR1
GWA
(BUFFY + 13)_D = NO. OF PHOTOS ENVOLVED IN THIS SET (STRIP 2)
(BUFFY + 13)_A = NO. OF FIRST PHOTO OF THIS SET (STRIP 2)
GCS2
AC → BUFFY + 13
−(GCS2 + 1) → XR4
CRETN
CRETN
(READS FIRST CARD OF A NEW G SET.)
SEE PAGE 2, 3, & G3 - SAME FORMAT AS APPEARS ON THE LEFT SIDE OF THIS PAGE
GWM
GWM
BUFFY_A → AC
Q


Q
XR1 > 17
NO
GWZ
(TYPE A)
(TYPE A FORMS NO O.D. BLOCKS)
(TYPE OF LAST SET AS DEFINED BY FIRST CARD OF SET)
YES
(OTHER THAN A)
BUFFY + 12D → XR2
(1 PHOTO - STRIP 1 FORMS NO O.D. BLOCKS)
(NONE OR ONLY 1 IMAGE/ EXP. STATION)
XR2 > 1
NO
GWCT
GWCT
YES
(BUFFY + 12)D = 2 OR 3
XR1 > 19
YES
GWALR
GWALR
NO
HALT & TRANSFER TO GWZ
0 → COMMON
0 → COMMON + 1
XR1 > 18
NO
GWZ
2 → XR1
YES
GWN
[BUFFY + 14 - XR1] → AC
GWZ
(TYPE C)
AC - ENULL → AC
(ENULL = # OF VERY FIRST EXPOSURE STATION)
AC = NUMBER OF PHOTOS BEFORE SET)
XR2 → (COMMON + 2)D
XR2 > 1
NO
GWP
GWP
YES
GWQ
NO
XR1 > 1
YES
XR2 - 1 → XR2
ACA → COMMONA
(= NUMBER OF PHOTOS BEFORE SET)
(= " + 1)
XR1 - 1 → XR1
AC + 1 → AC
(BUFFY + 13)D → XR2
ACA → (COMMON + 1)A
XR2 > 1
YES
GWN
-(GWN + 7) → XR4
4
MARX
MARX
NO
DETERMINES THE O.D. BLOCKS ASSOCIATED WITH THE EXPOSURE STATIONS INDICATED BY THE GROUND POINT. EXAMPLE:
XR1 → (COMMON + 3)D
XR2 > 0
YES
GWALR
XR2 → (COMMON + 4)D
GWALR
XR4 → (COMMON + 5)D
NO
COMMON → AC
GWZ
HALT & TRANSFER TO GWZ
AC - EXSTN + 1) → AC
GWZ
ACA → XR2
[(COMMON + 1) - EXSTN] → AC
OD
BLOCKS
E1 -15 -14 -13 -12 -11
E2 -10 -9 -8 -7
E3 -6 -5 -4
E4 -3 -2
E5 -1
E6
FOR A GROUND POINT WITH 3 IMAGES, THE FIRST EXPOSURE STATION BEING E3, THE OD BLOCKS [-6,-5,-3] WOULD BE PERTINENT, INTO EACH PERTINENT ODB, A ONE (1) IS ADDED (EACH TIME IT IS PERTINENT) INTO
MATDEX - (O.D.B.)
IN AN ODB
THUS THE FINAL VALUE IS THE NUMBER OF GROUND POINTS WHICH WILL PUT VALUES INTO THAT ODB.
R
S
T
U
GWQ
GWZ
V

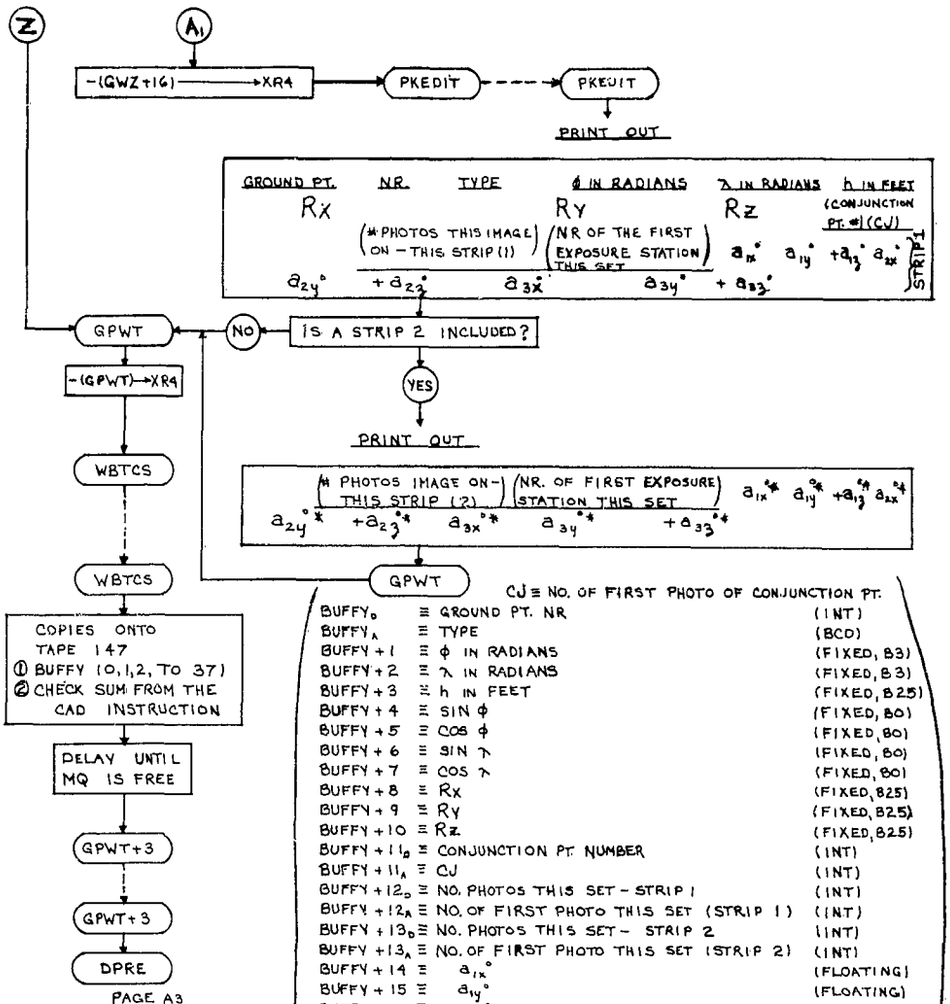
A15


R
S
T
U
V
AC_A → XR1
SUMJ
XR2 > 1
NO
YES
XR2 - 1 → XR2
XR2 + XR1 → XR1
(COMMON + 2)_D → XR4
MARK
MARK
XR4 > 1
NO
YES
XR4 - 1 → XR4
[MATDEX - XR1]_A → AC
AC + 1_A → AC
AC → [MATDEX - XR1]_A
XR1 > 1
YES
XR1 - 1 → XR1
NO
MART
(COMMON + 5)_D → XR4
(COMMON + 4)_D → XR2
(COMMON + 3)_D → XR1
GWN + 8
GWN + 8
COMMON + 1 → AC
IF ENTRY TO MARX WAS FROM — GO TO
GWN + 2
1
2
GWQR + 2
W
(FOR EACH PAIR OF PHOTOS (OTHER THAN A TYPE "A") A 1 IS ADDED TO A MATDEX)
GWQ
GWZ
PERFORMS SAME FUNCTION AS PREVIOUS ROUTINE, BUT NOW FOR BLOCK (PHOTOGRAMMETRICALLY SPEAKING)
MAX. NO. OF ODB (NON ZERO) IN ANY ONE ROW OF THE NORMAL MATRIX = 4 FOR A MAX TOTAL OF (NON ZERO) ODB OF (96 × 4 + 3 + 2 + 1) = 390
GWQ
(BUFFY + 13)_D → XR2
(BUFFY + 12)_D → XR1
BUFFY + 13 → AC
AC - ENULL → AC
AC_A → COMMON + 1
AC_D + 1 → AC
AC_D → COMMON + 2
BUFFY + 12 → AC
AC - ENULL → AC
GWQR
AC_A → COMMON
-(GWQR + 1) → XR4
2
MARX
X
Y

A16

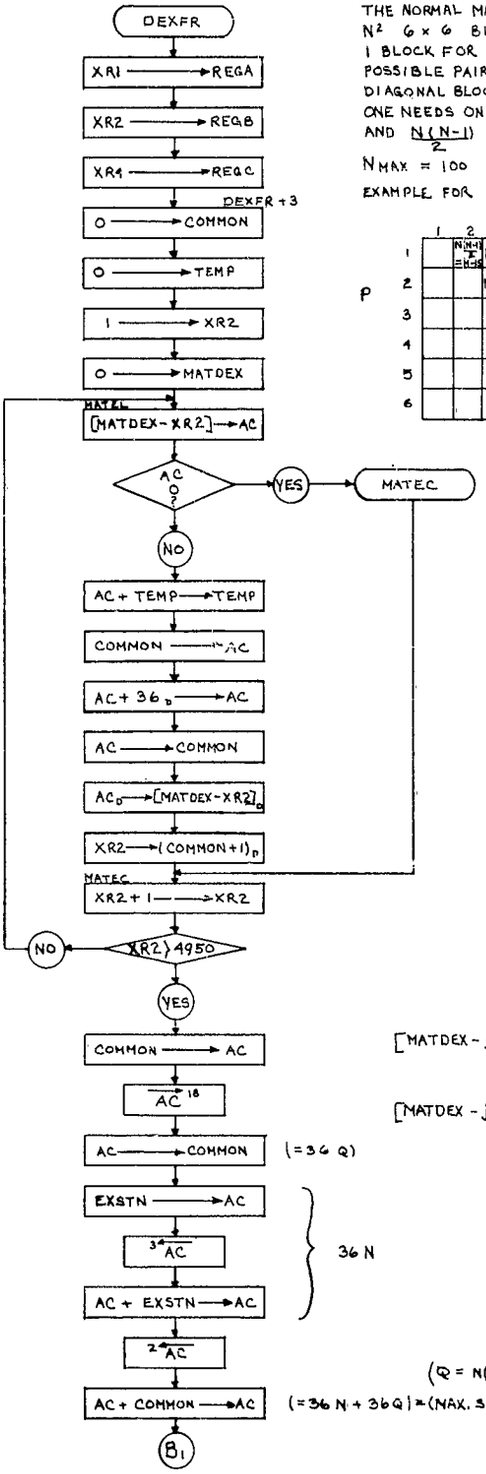

W
X
Y
GWQR + 2
XR2) 1
NO
GWZ
YES
XR2 - 1 → XR2
XR1) 1
NO
GWZ
YES
XR1 - 1 → XR1
COMMON → AC
AC + 1 → AC
GWQR
GWZ
- GWZ → XR4
DPGWB
DPGWB
XR4 → REGC D
DUMMY G. P.
WEIGHT ROUTINE
REGC D → XR4
GWZ + 1
GWZ + 1
GRPOC + 1 → GRPOC
SWT 5
GPWT
0 → MG
BUFFY → AC
AC, MQ 6
MQ 1 3
MQ → TEMP+1
(TYPE IN TEMP + 1)
AC 12
AC → TEMP
(NR IN TEMP)
BUFFY + 12 → MQ
MQ 3 3
MQ → TEMP+2
(NUMBER OF PHOTOS ENVOLVED THIS PT. STRIP 1)
Z
A1

A17



CJ ≡ NO. OF FIRST PHOTO OF CONJUNCTION PT.

$BUFFY_0$	≡ GROUND PT. NR	(INT)
$BUFFY_A$	≡ TYPE	(BCD)
BUFFY + 1	≡ φ IN RADIANS	(FIXED, B3)
BUFFY + 2	≡ λ IN RADIANS	(FIXED, B3)
BUFFY + 3	≡ h IN FEET	(FIXED, B25)
BUFFY + 4	≡ SIN φ	(FIXED, B0)
BUFFY + 5	≡ COS φ	(FIXED, B0)
BUFFY + 6	≡ SIN λ	(FIXED, B0)
BUFFY + 7	≡ COS λ	(FIXED, B0)
BUFFY + 8	≡ Rx	(FIXED, B25)
BUFFY + 9	≡ Ry	(FIXED, B25)
BUFFY + 10	≡ Rz	(FIXED, B25)
$BUFFY + 11_0$	≡ CONJUNCTION PT. NUMBER	(INT)
$BUFFY + 11_A$	≡ CJ	(INT)
$BUFFY + 12_0$	≡ NO. PHOTOS THIS SET - STRIP 1	(INT)
$BUFFY + 12_A$	≡ NO. OF FIRST PHOTO THIS SET (STRIP 1)	(INT)
$BUFFY + 13_0$	≡ NO. PHOTOS THIS SET - STRIP 2	(INT)
$BUFFY + 13_A$	≡ NO. OF FIRST PHOTO THIS SET (STRIP 2)	(INT)
BUFFY + 14	≡ $a_{1x}°$	(FLOATING)
BUFFY + 15	≡ $a_{1y}°$	(FLOATING)
BUFFY + 16	≡ $+a_{13}°$	(FLOATING)
BUFFY + 17	≡ $a_{2x}°$	(FLOATING)
BUFFY + 18	≡ $a_{2y}°$	(FLOATING)
BUFFY + 19	≡ $+a_{23}°$	(FLOATING)
BUFFY + 20	≡ $a_{3x}°$	(FLOATING)
BUFFY + 21	≡ $a_{3y}°$	(FLOATING)
BUFFY + 22	≡ $+a_{33}°$	(FLOATING)
BUFFY + 23	≡ $a_{1x}°*$	(FLOATING)
BUFFY + 24	≡ $a_{1y}°*$	(FLOATING)
BUFFY + 25	≡ $+a_{13}°*$	(FLOATING)
BUFFY + 26	≡ $a_{2x}°*$	(FLOATING)
BUFFY + 27	≡ $a_{2y}°*$	(FLOATING)
BUFFY + 28	≡ $+a_{23}°*$	(FLOATING)
BUFFY + 29	≡ $a_{3x}°*$	(FLOATING)
BUFFY + 30	≡ $a_{3y}°*$	(FLOATING)
BUFFY + 31	≡ $+a_{33}°*$	(FLOATING)
BUFFY + 32	≡ -0	(INT)
BUFFY + 33	≡ -0	(INT)
BUFFY + 34	≡ -0	(INT)
BUFFY + 35	≡ -0	(INT)
BUFFY + 36	≡ -0	(INT)
BUFFY + 37	≡ -0	(INT)



THE NORMAL MATRIX WILL BE 6N × 6N SIZE AND WILL CONTAIN N^2 6 × 6 BLOCKS. THE BASE IS 1 BLOCK PER PHOTO PLUS (+) 1 BLOCK FOR EACH POSSIBLE PAIR. NOW THERE ARE N(N-1) POSSIBLE PAIRS OF PHOTOS (OR, THINK OF THEM AS OFF-DIAGONAL BLOCKS). SINCE THE NORMAL MATRIX IS SYMMETRICAL, ONE NEEDS ONLY TO WORRY ABOUT THE N DISTINCT BLOCKS AND $\frac{N(N-1)}{2}$ OFF-DIAGONAL BLOCKS. FOR THIS PROGRAM

$N_{MAX} = 100 \quad \therefore \quad \frac{N(N-1)}{2} = 4950$

EXAMPLE FOR N = 6

p \ q	1	2	3	4	5	6
1		N-1 = M-15	M-14	M-13	M-12	M-11
2			M-10	M-9	M-8	M-7
3				M-6	M-5	M-4
4					M-3	M-2
5						M-1
6						

NOTATION INSIDE IS FOR MATDEX ADDRESSING

$$\text{MATDEX} - \left[N - q + 1 + \sum_{j=1}^{j=N-q-1} (J)\right]$$

M ≡ MATDEX

(MATDEX - 1 TO MATDEX - 4950 COME IN AS ZERO IF NOT RELAVENT TO PROBLEM)

(EXIST WITH SUCCESSIVE JUMPS IN VALUES OF 36)

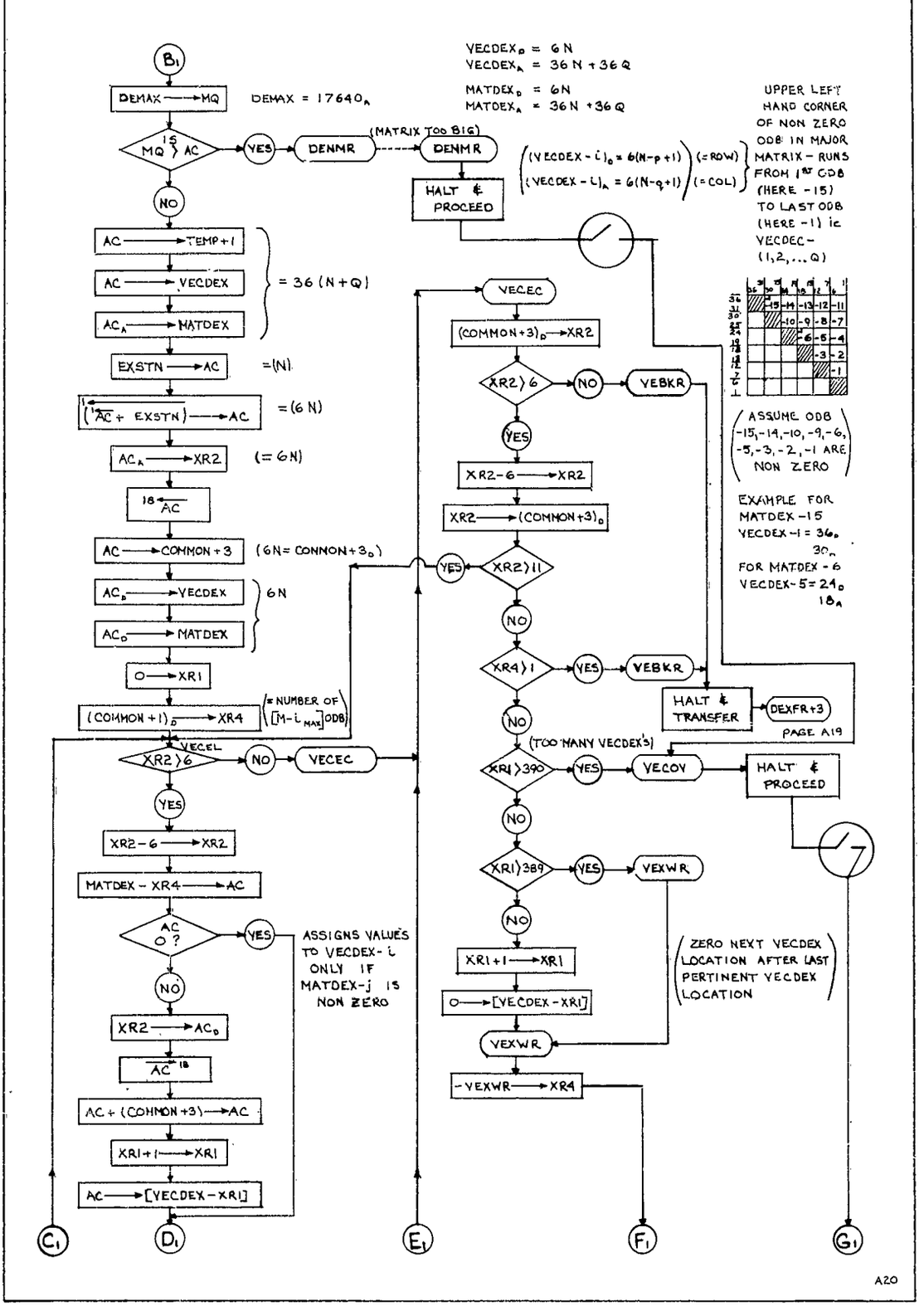
EXAMPLE ASSUME MATDEX (13, 12, 11, 9, 8, 7, 5, 4, 2) CONTAIN ZEROS, THEN

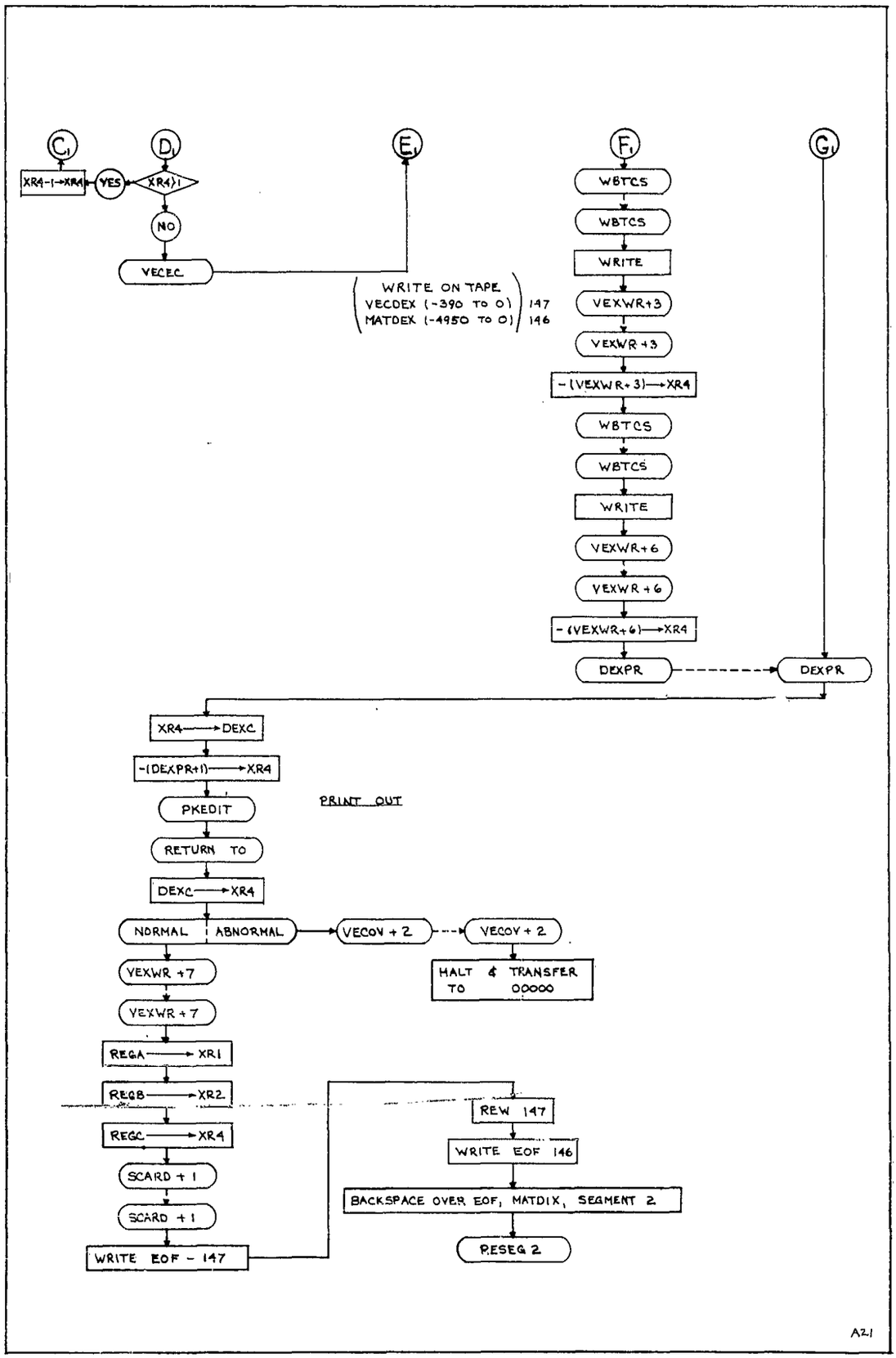
MATDEX - 1	=	36
- 2	=	0
- 3	=	72
- 4	=	0
- 5	=	0
- 6	=	108
- 7	=	0
- 8	=	0
- 9	=	0
- 10	=	144
- 11	=	0
- 12	=	0
- 13	=	0
- 14	=	180
- 15	=	216
(COMMON + 1)D	=	15
TEMP	=	180

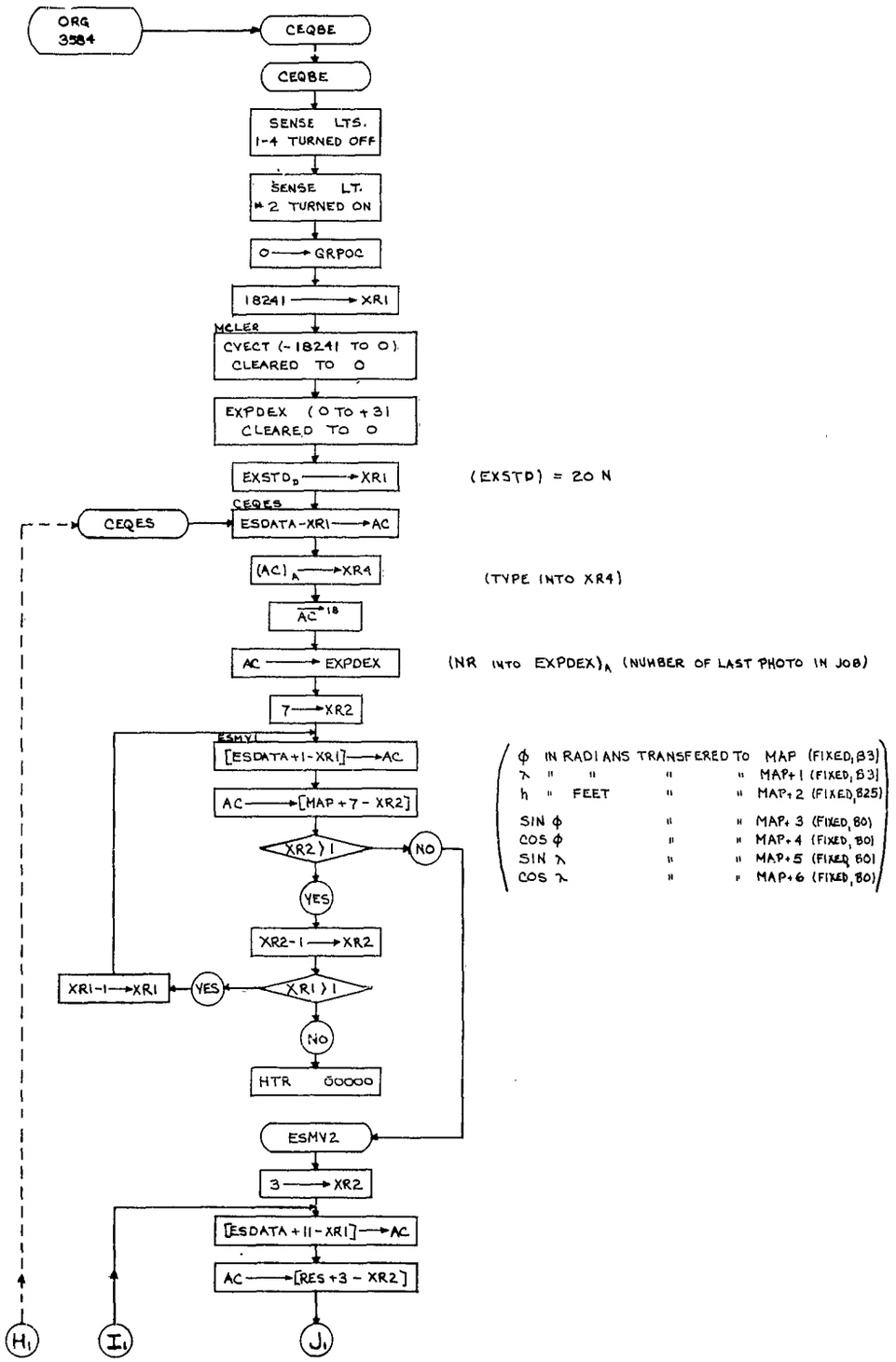
$[\text{MATDEX} - j]_D$ = MULTIPLES OF 36 (ONLY FOR PERTINENT ODB) - PROVIDES A BOOKING SYSTEM FOR STORING THE BLOCKS - GOES BACKWARDS.

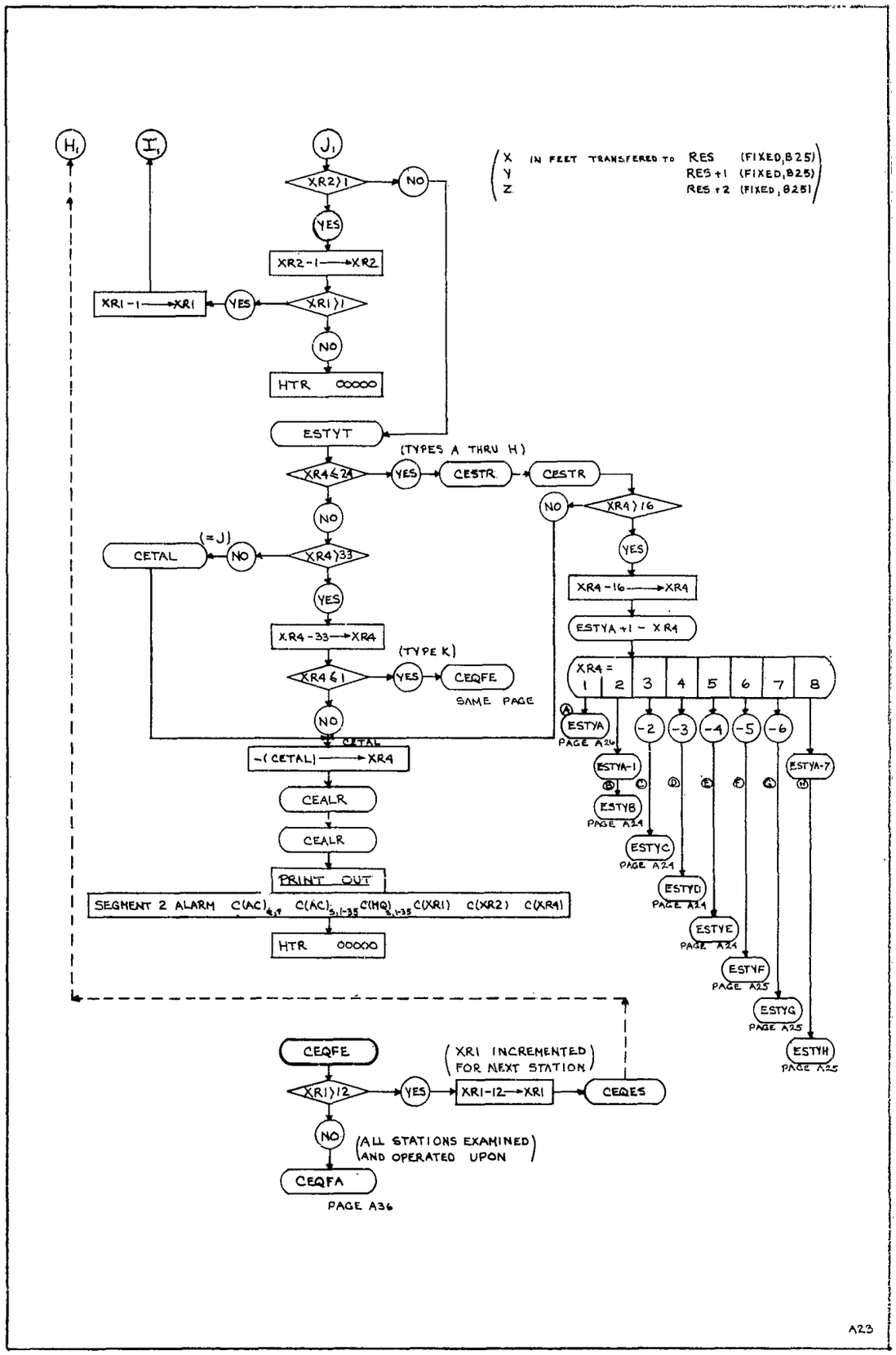
$[\text{MATDEX} - j]_A$ = NUMBER OF GROUND PTS. CONTRIBUTING TO THIS ODB

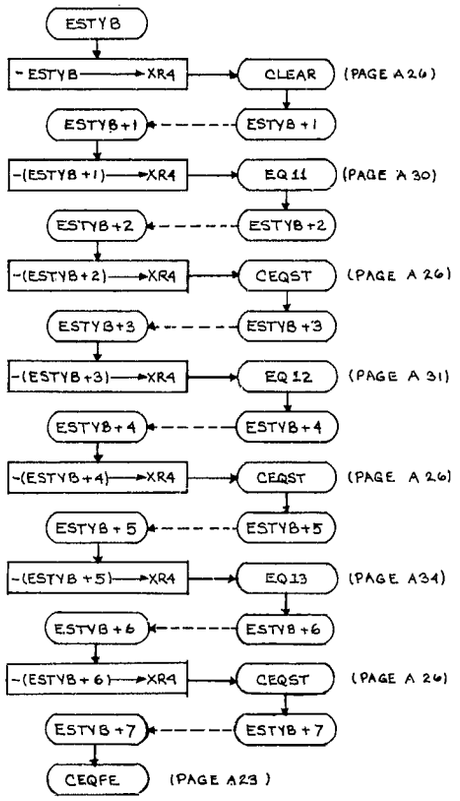
$\left(Q = N\left(\frac{N-1}{2}\right) \text{ [NON ZERO]}\right)$

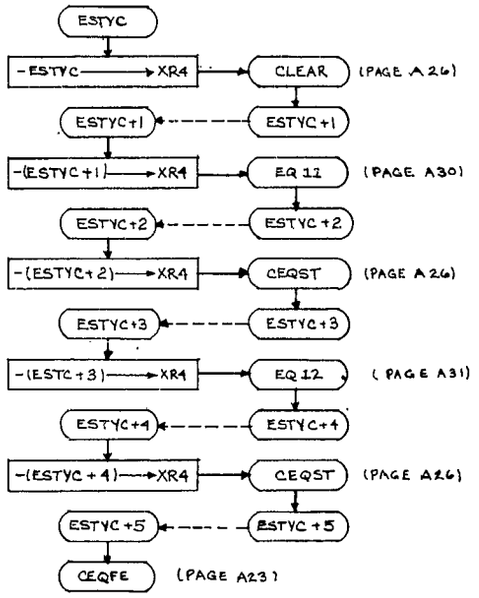

B1
DEMAX → MQ
DEMAX = 17640A
MQ 15 AC
YES
DENMR
(MATRIX TOO BIG)
DENMR
HALT & PROCEED
NO
AC → TEMP+1
AC → VECDEX
AC A → MATDEX
= 36 (N+Q)
EXSTN → AC
=(N)
(18 AC + EXSTN) → AC
=(6 N)
AC A → XR2
(= 6N)
18 AC
AC → COMMON+3
(6N= COMMON+3D)
AC D → VECDEX
AC D → MATDEX
6N
0 → XR1
(COMMON+1)D → XR4
(= NUMBER OF [M-i MAX] ODB)
VECEL
XR2 > 6
NO
VECEC
YES
XR2-6 → XR2
MATDEX - XR4 → AC
AC 0 ?
YES
ASSIGNS VALUES TO VECDEX-i ONLY IF MATDEX-j IS NON ZERO
NO
XR2 → AC D
AC 18
AC + (COMMON+3) → AC
XR1+1 → XR1
AC → [VECDEX-XR1]
C1
D1
VECDEXD = 6N
VECDEXA = 36N + 36Q
MATDEXD = 6N
MATDEXA = 36N + 36Q
(VECDEX - i)D = 6(N-p+1) (=ROW)
(VECDEX - i)A = 6(N-q+1) (=COL)
UPPER LEFT HAND CORNER OF NON ZERO ODB IN MAJOR MATRIX - RUNS FROM 1ST ODB (HERE -15) TO LAST ODB (HERE -1) ie VECDEC-(1,2,...Q)
ASSUME ODB -15,-14,-10,-9,-6,-5,-3,-2,-1 ARE NON ZERO
EXAMPLE FOR MATDEX -15 VECDEX -1 = 36D 30A
FOR MATDEX - 6 VECDEX-5 = 24D 18A
VECEC
(COMMON+3)D → XR2
XR2 > 6
NO
VEBKR
YES
XR2-6 → XR2
XR2 → (COMMON+3)D
YES
XR2 > 11
NO
XR4 > 1
YES
VEBKR
NO
HALT & TRANSFER
DEXFR+3
PAGE A19
(TOO MANY VECDEX'S)
XR1 > 390
YES
VECOV
HALT & PROCEED
NO
XR1 > 389
YES
VEXWR
NO
XR1+1 → XR1
0 → [VECDEX-XR1]
ZERO NEXT VECDEX LOCATION AFTER LAST PERTINENT VECDEX LOCATION
VEXWR
-VEXWR → XR4
E1
F1
G1

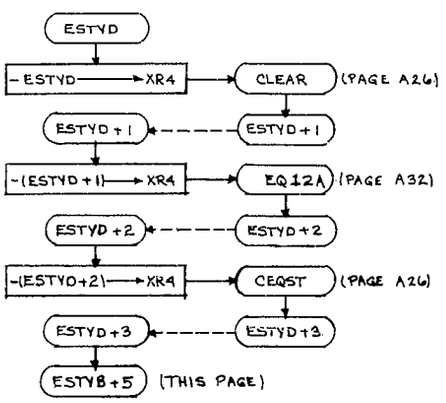

C1
D1
E1
F1
G1
XR4-1→XR4
YES
XR4>1
NO
VECEC
WRITE ON TAPE
VECDEX (-390 TO 0) 147
MATDEX (-4950 TO 0) 146
WBTCS
WBTCS
WRITE
VEXWR+3
VEXWR+3
-(VEXWR+3)→XR4
WBTCS
WBTCS
WRITE
VEXWR+6
VEXWR+6
-(VEXWR+6)→XR4
DEXPR
DEXPR
XR4→DEXC
-(DEXPR+1)→XR4
PKEDIT
PRINT OUT
RETURN TO
DEXC→XR4
NORMAL
ABNORMAL
VECOV+2
VECOV+2
HALT & TRANSFER TO 00000
VEXWR+7
VEXWR+7
REGA→XR1
REGB→XR2
REGC→XR4
SCARD+1
SCARD+1
WRITE EOF - 147
REW 147
WRITE EOF 146
BACKSPACE OVER EOF, MATDIX, SEGMENT 2
RESEG 2
A2-1

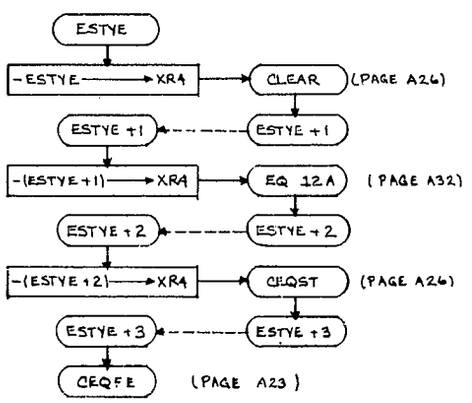

ORG 3584
CEQBE
CEQBE
SENSE LTS. 1-4 TURNED OFF
SENSE LT. #2 TURNED ON
0 → GRPOC
18241 → XR1
MCLER
CVECT (-18241 TO 0) CLEARED TO 0
EXPDEX (0 TO +31 CLEARED TO 0
EXSTD$_D$ → XR1
(EXSTD) = 20 N
CEQES
CEQES
ESDATA-XR1 → AC
(AC)$_A$ → XR4
(TYPE INTO XR4)
AC$^{\rightarrow 18}$
AC → EXPDEX
(NR INTO EXPDEX)$_A$ (NUMBER OF LAST PHOTO IN JOB)
7 → XR2
ESMV1
[ESDATA+1-XR1] → AC
AC → [MAP+7-XR2]
XR2 > 1
NO
YES
XR2-1 → XR2
XR1 > 1
YES
XR1-1 → XR1
NO
HTR 60000
ESMV2
3 → XR2
[ESDATA+11-XR1] → AC
AC → [RES+3-XR2]
H1
I1
J1
φ IN RADIANS TRANSFERED TO MAP (FIXED,B3)
λ " " " " MAP+1 (FIXED,B3)
h " FEET " " MAP+2 (FIXED,B25)
SIN φ " " MAP+3 (FIXED,B0)
COS φ " " MAP+4 (FIXED,B0)
SIN λ " " MAP+5 (FIXED,B0)
COS λ " " MAP+6 (FIXED,B0)

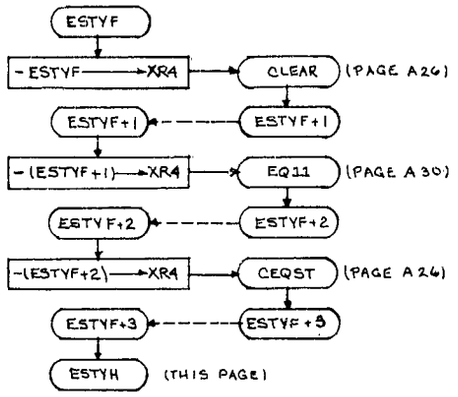

H1
I1
J1
XR2>1
NO
YES
XR2-1 → XR2
XR1-1 → XR1
YES
XR1>1
NO
HTR 00000
ESTYT
(TYPES A THRU H)
XR4≤24
YES
CESTR
CESTR
NO
XR4>16
YES
XR4-16 → XR4
ESTYA+1 - XR4
XR4 =
1 2 3 4 5 6 7 8
ESTYA
PAGE A26
-2 -3 -4 -5 -6
ESTYA-1
ESTYA-7
ESTYB
PAGE A24
ESTYC
PAGE A24
ESTYD
PAGE A24
ESTYE
PAGE A24
ESTYF
PAGE A25
ESTYG
PAGE A25
ESTYH
PAGE A25
NO
XR4>33
(=J)
CETAL
YES
XR4-33 → XR4
XR4≤1
(TYPE K)
YES
CEQFE
SAME PAGE
NO
CETAL
-(CETAL) → XR4
CEALR
CEALR
PRINT OUT
SEGMENT 2 ALARM C(AC)6,9 C(AC)5,1-35 C(MQ)5,1-35 C(XR1) C(XR2) C(XR4)
HTR 00000
CEQFE
XR1>12
YES
XR1-12 → XR1
CEQES
(XR1 INCREMENTED FOR NEXT STATION)
NO
(ALL STATIONS EXAMINED AND OPERATED UPON)
CEQFA
PAGE A36
(X IN FEET TRANSFERED TO RES (FIXED,B25)
Y RES+1 (FIXED,B25)
Z RES+2 (FIXED,B25))

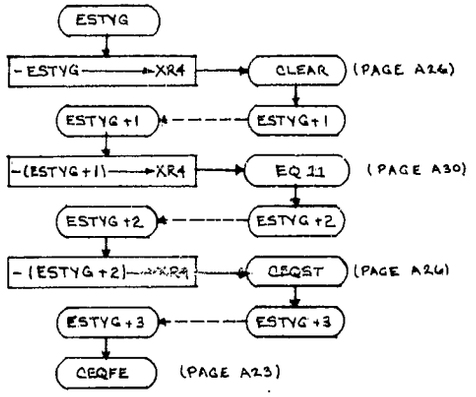

ESTYB
-ESTYB → XR4
CLEAR
(PAGE A26)
ESTYB+1
ESTYB+1
-(ESTYB+1) → XR4
EQ 11
(PAGE A30)
ESTYB+2
ESTYB+2
-(ESTYB+2) → XR4
CEQST
(PAGE A26)
ESTYB+3
ESTYB+3
-(ESTYB+3) → XR4
EQ 12
(PAGE A31)
ESTYB+4
ESTYB+4
-(ESTYB+4) → XR4
CEQST
(PAGE A26)
ESTYB+5
ESTYB+5
-(ESTYB+5) → XR4
EQ13
(PAGE A34)
ESTYB+6
ESTYB+6
-(ESTYB+6) → XR4
CEQST
(PAGE A26)
ESTYB+7
ESTYB+7
CEQFE
(PAGE A23)

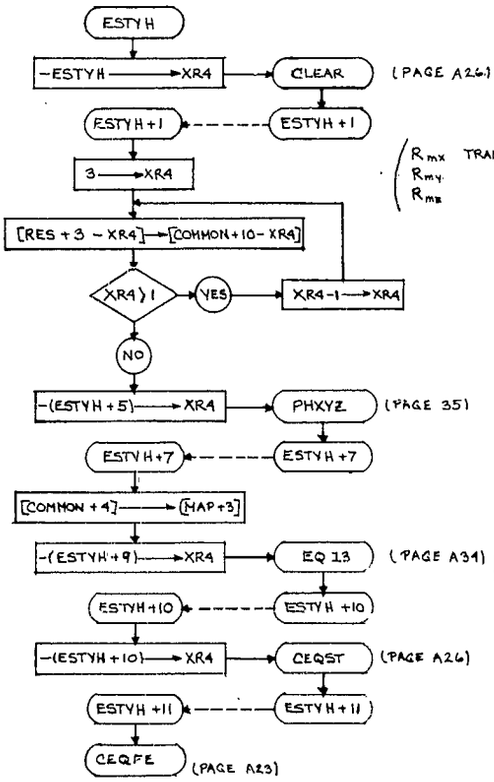

ESTYC
-ESTYC → XR4
CLEAR
(PAGE A26)
ESTYC+1
ESTYC+1
-(ESTYC+1) → XR4
EQ 11
(PAGE A30)
ESTYC+2
ESTYC+2
-(ESTYC+2) → XR4
CEQST
(PAGE A26)
ESTYC+3
ESTYC+3
-(ESTC+3) → XR4
EQ 12
(PAGE A31)
ESTYC+4
ESTYC+4
-(ESTYC+4) → XR4
CEQST
(PAGE A26)
ESTYC+5
ESTYC+5
CEQFE
(PAGE A23)


ESTYD
-ESTYD → XR4
CLEAR
(PAGE A26)
ESTYD+1
ESTYD+1
-(ESTYD+1) → XR4
EQ12A
(PAGE A32)
ESTYD+2
ESTYD+2
-(ESTYD+2) → XR4
CEQST
(PAGE A26)
ESTYD+3
ESTYD+3
ESTYB+5
(THIS PAGE)


ESTYE
-ESTYE → XR4
CLEAR
(PAGE A26)
ESTYE+1
ESTYE+1
-(ESTYE+1) → XR4
EQ 12A
(PAGE A32)
ESTYE+2
ESTYE+2
-(ESTYE+2) → XR4
CEQST
(PAGE A26)
ESTYE+3
ESTYE+3
CEQFE
(PAGE A23)





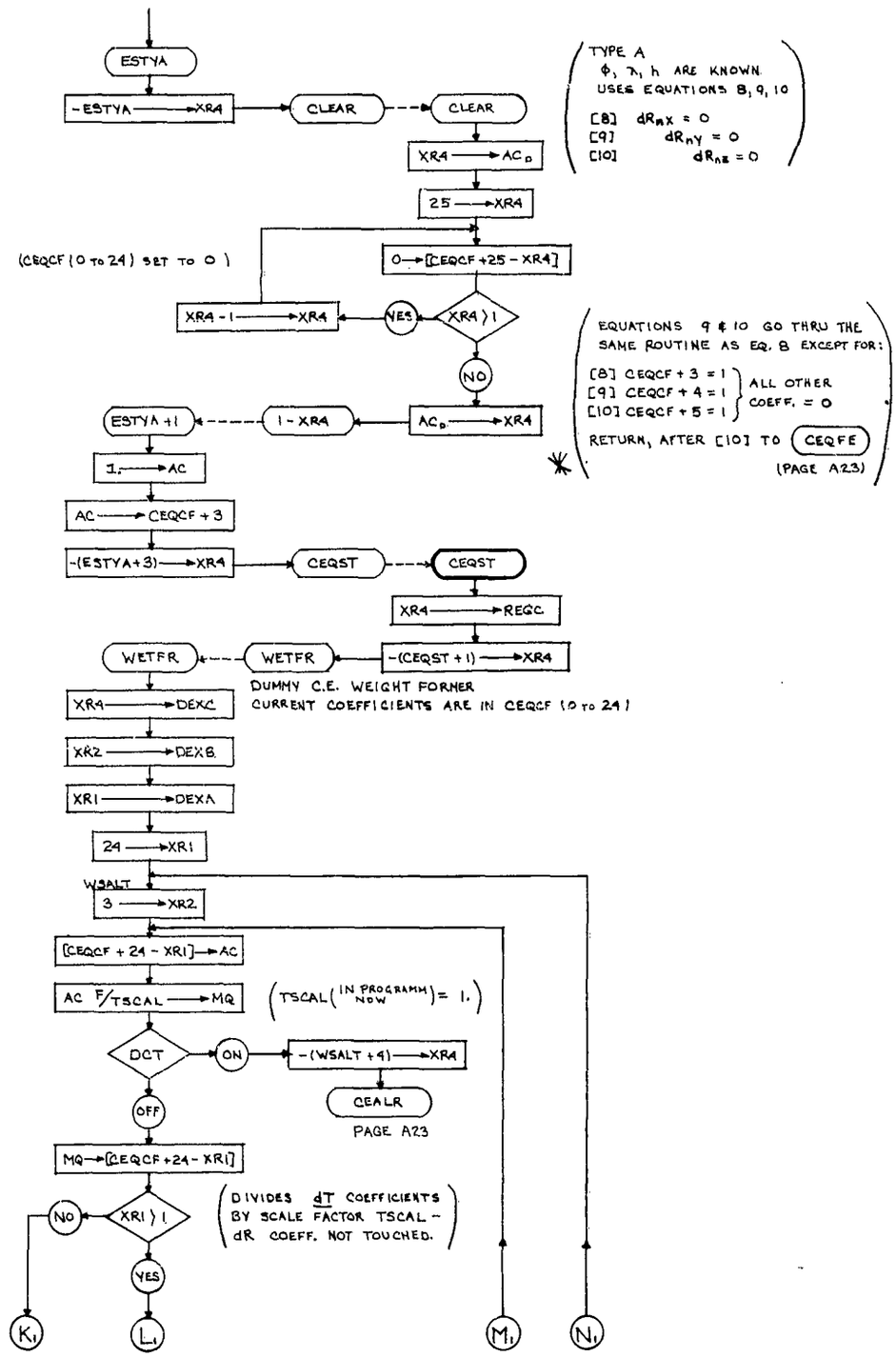


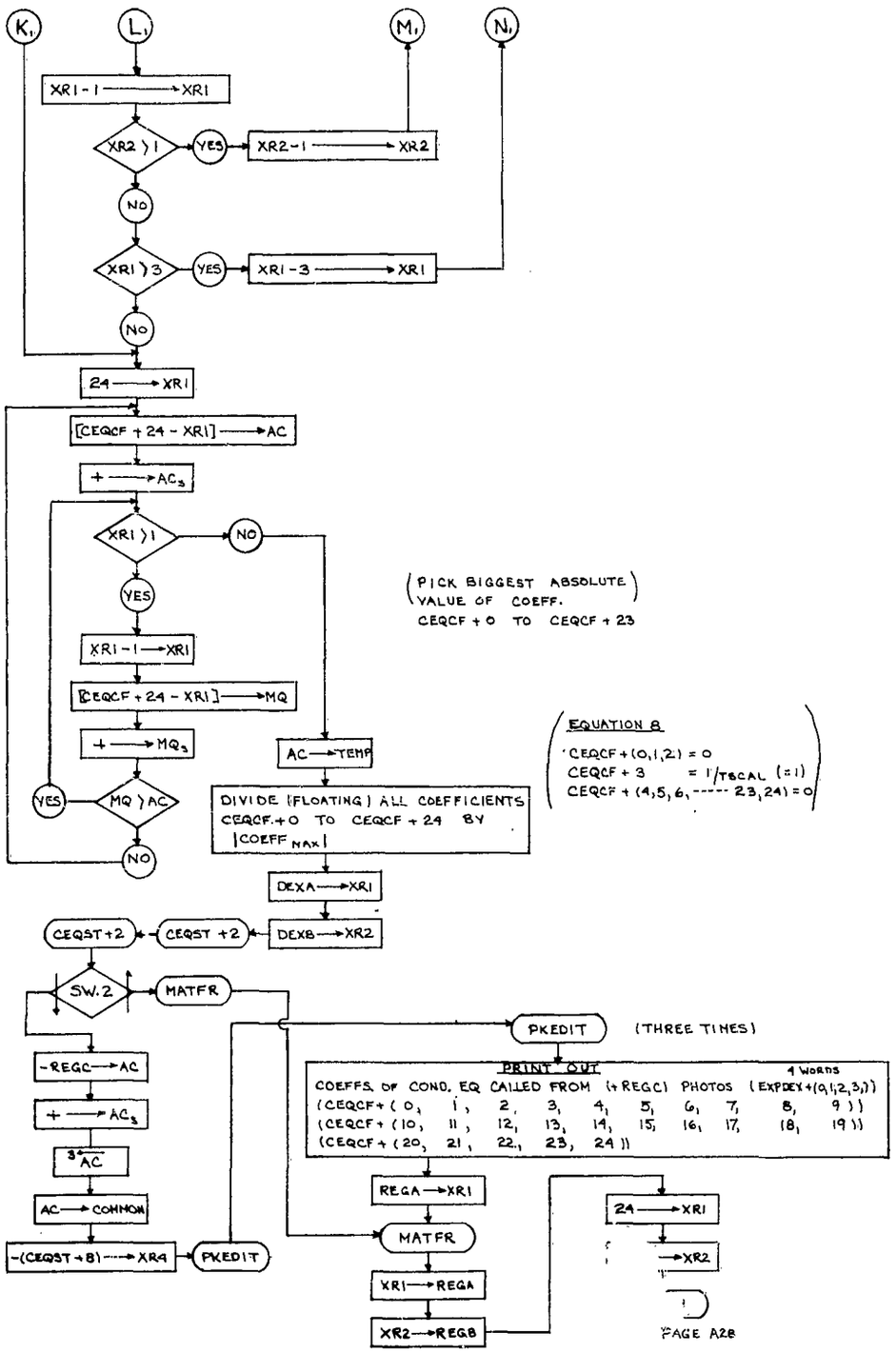
R_{mx} TRANSFERED TO COMMON + 7
R_{my} " " COMMON + 8
R_{mz} " " COMMON + 9
} FIXED, 825

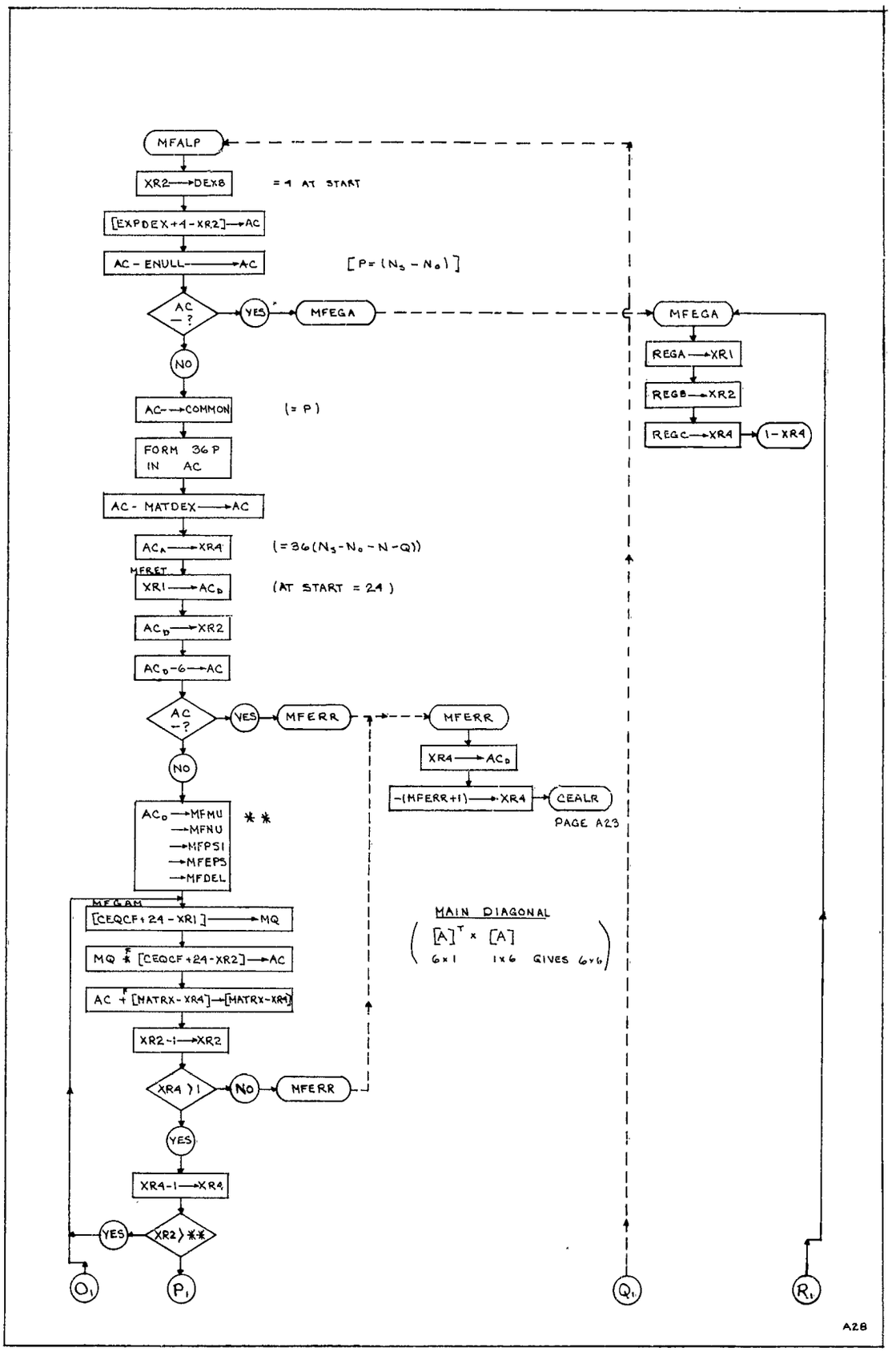
(COMPUTER SIN ϕ)

SUMMARY

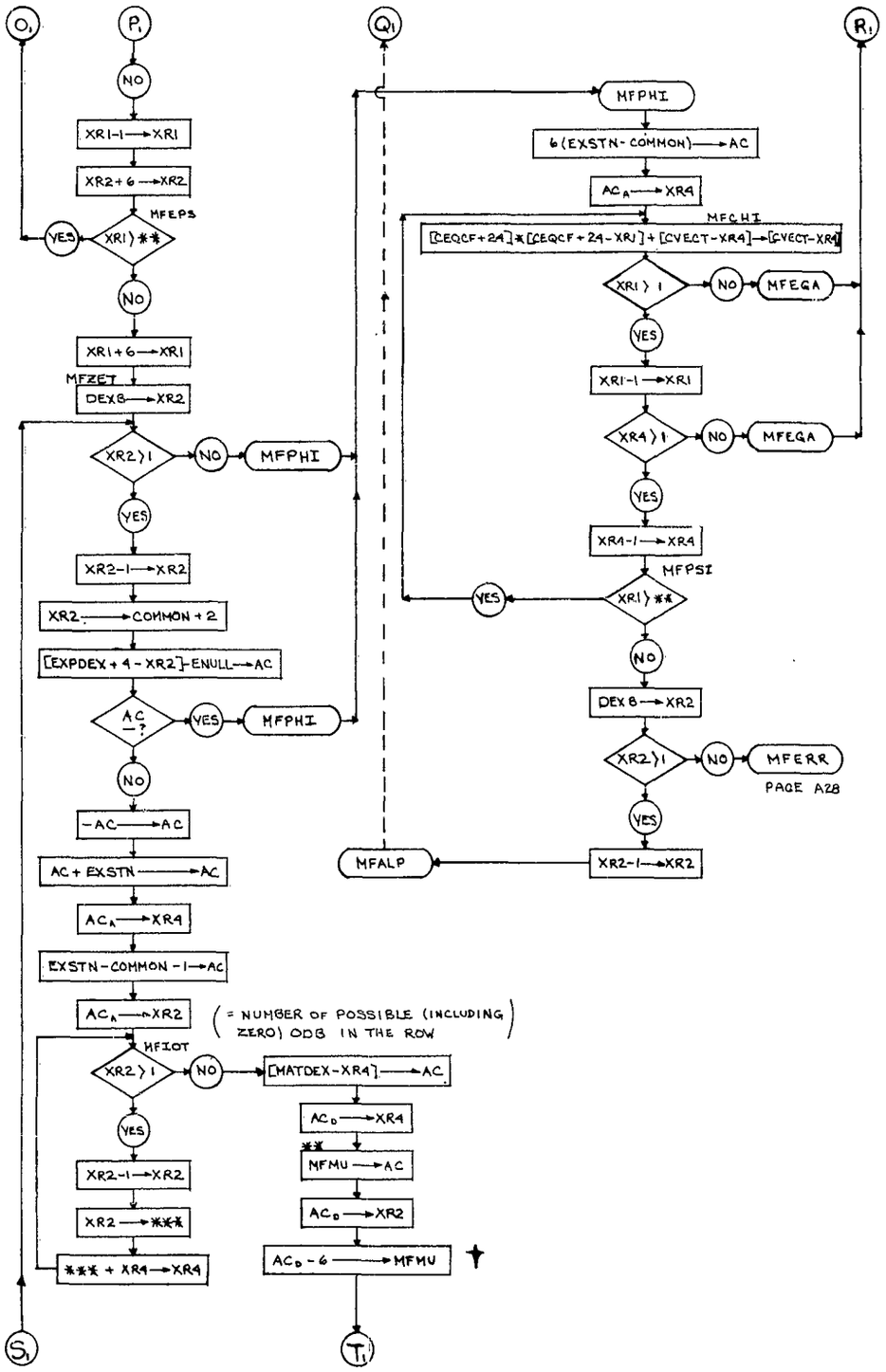
TYPE	KNOWNS	EQs.
A	ϕ, λ, h	8, 9, 10
B	$\phi\ \lambda, h$ (UNEQUAL IN QUALITY)	11, 12, 13
C	ϕ, λ	11, 12
D	ϕ, h	12A, 13
E	ϕ	12 A
F	λ, h	11, (PHXYZ) 13
G	λ	11
H	h	(PHXYZ) 13

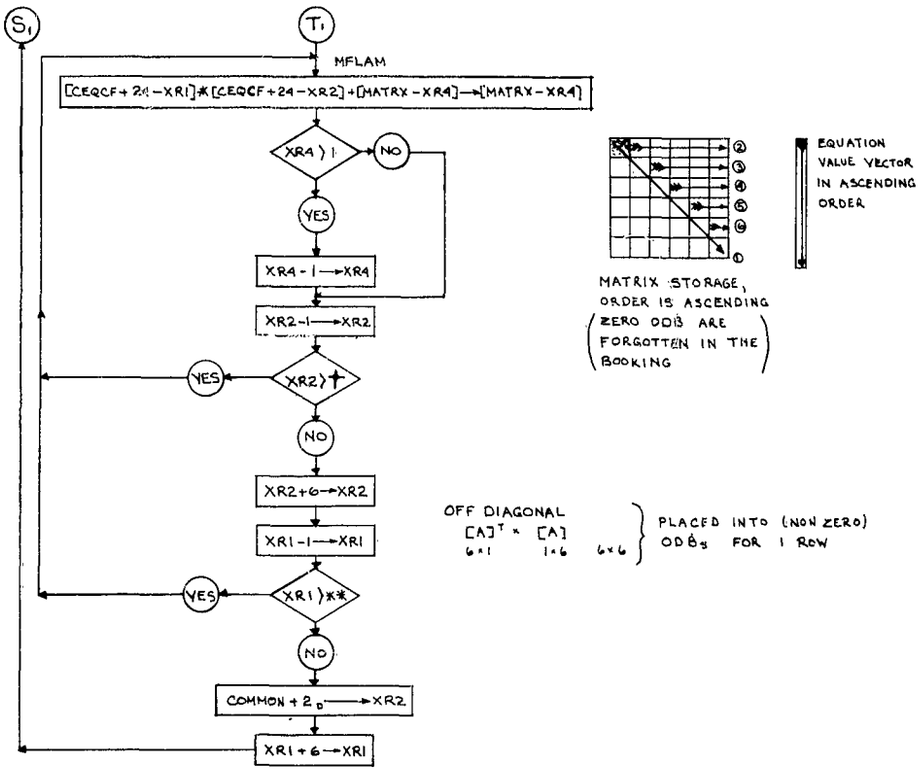

ESTYA
-ESTYA → XR4
CLEAR
CLEAR
XR4 → AC_D
25 → XR4
(CEQCF (0 TO 24) SET TO 0)
0 → [CEQCF + 25 - XR4]
XR4 - 1 → XR4
YES
XR4 > 1
NO
ESTYA + 1
1 - XR4
AC_D → XR4
1. → AC
AC → CEQCF + 3
-(ESTYA + 3) → XR4
CEQST
CEQST
XR4 → REGC
WETFR
WETFR
-(CEQST + 1) → XR4
DUMMY C.E. WEIGHT FORMER
CURRENT COEFFICIENTS ARE IN CEQCF (0 TO 24)
XR4 → DEXC
XR2 → DEXB
XR1 → DEXA
24 → XR1
WSALT
3 → XR2
[CEQCF + 24 - XR1] → AC
AC F/TSCAL → MQ
(TSCAL (IN PROGRAMM NOW) = 1.)
DCT
ON
-(WSALT + 9) → XR4
CEALR
PAGE A23
OFF
MQ → [CEQCF + 24 - XR1]
XR1 > 1
NO
YES
DIVIDES dT COEFFICIENTS BY SCALE FACTOR TSCAL - dR COEFF. NOT TOUCHED.
K1
L1
M1
N1
TYPE A
φ, λ, h ARE KNOWN
USES EQUATIONS 8, 9, 10
[8] dR_nX = 0
[9] dR_nY = 0
[10] dR_nZ = 0
EQUATIONS 9 & 10 GO THRU THE SAME ROUTINE AS EQ. 8 EXCEPT FOR:
[8] CEQCF + 3 = 1
[9] CEQCF + 4 = 1
[10] CEQCF + 5 = 1
ALL OTHER COEFF. = 0
RETURN, AFTER [10] TO CEQFE
(PAGE A23)


K1
L1
M1
N1
XR1 - 1 → XR1
XR2 > 1
YES
XR2 - 1 → XR2
NO
XR1 > 3
YES
XR1 - 3 → XR1
NO
24 → XR1
[CEQCF + 24 - XR1] → AC
+ → AC3
XR1 > 1
NO
YES
XR1 - 1 → XR1
[CEQCF + 24 - XR1] → MQ
+ → MQ3
AC → TEMP
YES
MQ > AC
NO
DIVIDE (FLOATING) ALL COEFFICIENTS CEQCF.+0 TO CEQCF + 24 BY |COEFF MAX|
(PICK BIGGEST ABSOLUTE VALUE OF COEFF. CEQCF + 0 TO CEQCF + 23)
EQUATION 8
CEQCF + (0,1,2) = 0
CEQCF + 3 = 1/TSCAL (=1)
CEQCF + (4,5,6,----- 23,24) = 0
DEXA → XR1
DEXB → XR2
CEQST+2
CEQST +2
SW.2
MATFR
PKEDIT
(THREE TIMES)
PRINT OUT
4 WORDS
COEFFS. OF COND. EQ CALLED FROM (+REGC) PHOTOS (EXPDEY+(0,1,2,3,))
(CEQCF+(0, 1, 2, 3, 4, 5, 6, 7, 8, 9))
(CEQCF+(10, 11, 12, 13, 14, 15, 16, 17, 18, 19))
(CEQCF+(20, 21, 22, 23, 24))
-REGC → AC
+ → AC3
3 AC
AC → COMMON
-(CEQST+8) → XR4
PKEDIT
REGA → XR1
MATFR
XR1 → REGA
XR2 → REGB
24 → XR1
→ XR2
PAGE A28

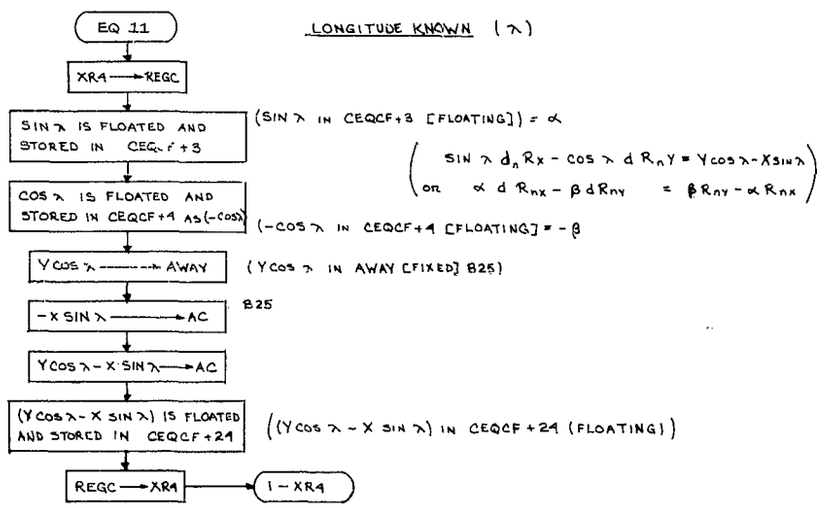

MFALP
XR2 → DEXB
= 4 AT START
[EXPDEX+4-XR2] → AC
AC - ENULL → AC
[P = (N3 - N0)]
AC = ?
YES
MFEGA
NO
AC → COMMON
(= P)
FORM 36 P IN AC
AC - MATDEX → AC
ACA → XR4
(= 36(N3 - N0 - N - Q))
MFRET
XR1 → ACD
(AT START = 24)
ACD → XR2
ACD - 6 → AC
AC = ?
YES
MFERR
NO
ACD → MFMU
→ MFNU
→ MFPSI
→ MFEPS
→ MFDEL
**
MFGAM
[CEQCF+24-XR1] → MQ
MQ * [CEQCF+24-XR2] → AC
AC + [MATRX-XR4] → [MATRX-XR4]
XR2 - 1 → XR2
XR4 > 1
NO
MFERR
YES
XR4 - 1 → XR4
XR2 > **
YES
O1
P1
MFEGA
REGA → XR1
REGB → XR2
REGC → XR4
1 - XR4
MFERR
XR4 → ACD
-(MFERR+1) → XR4
CEALR
PAGE A23
MAIN DIAGONAL
([A]T × [A])
6×1 1×6 GIVES 6×6
Q1
R1

A28

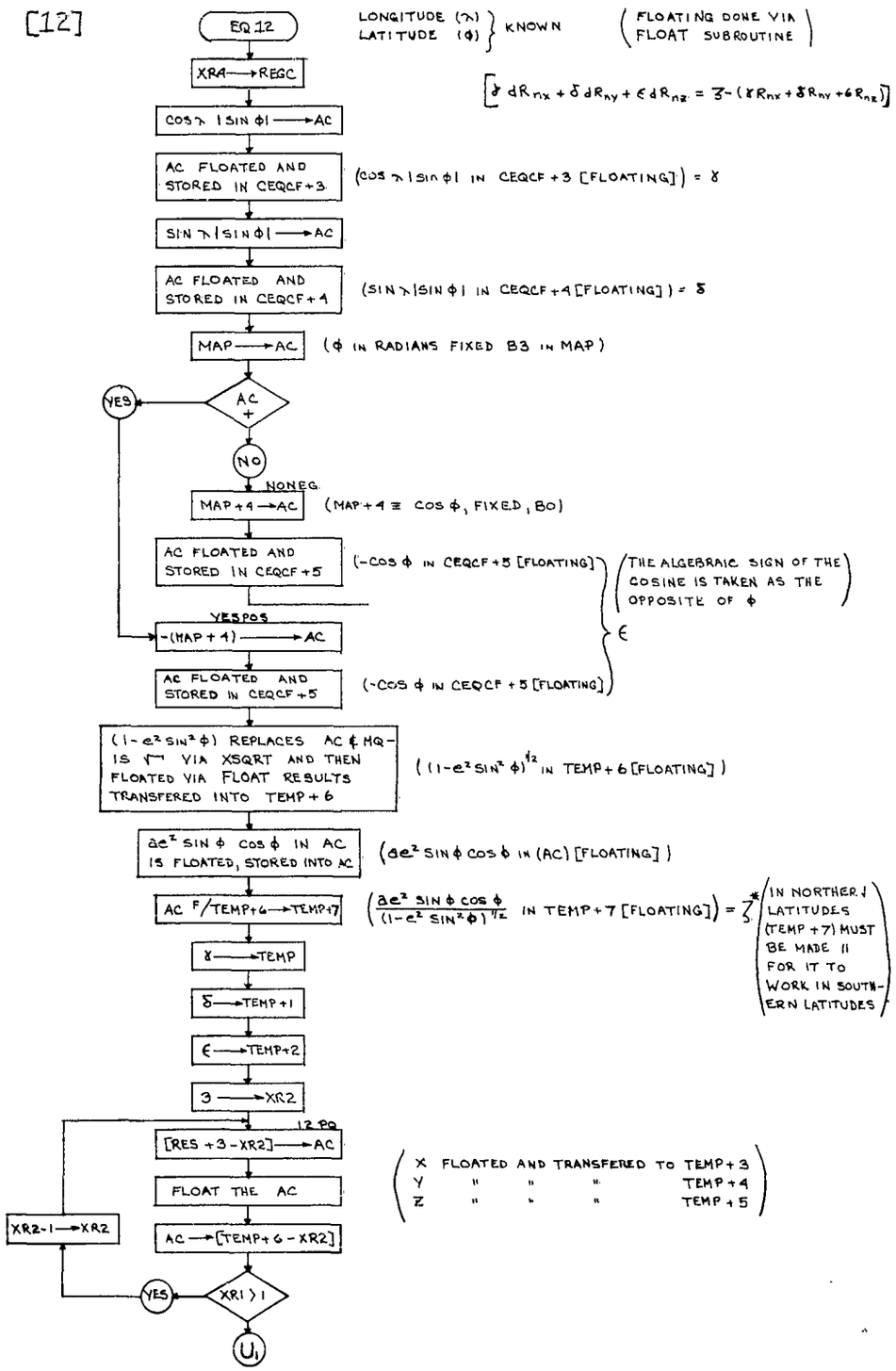

O1
P1
Q1
R1
NO
XR1-1 → XR1
XR2+6 → XR2
MFEPS
XR1) **
YES
NO
XR1+6 → XR1
MFZET
DEX8 → XR2
XR2) 1
NO
MFPHI
YES
XR2-1 → XR2
XR2 → COMMON + 2
[EXPDEX + 4 - XR2] - ENULL → AC
AC ?
YES
MFPHI
NO
-AC → AC
AC + EXSTN → AC
AC_A → XR4
EXSTN - COMMON - 1 → AC
AC_A → XR2
(= NUMBER OF POSSIBLE (INCLUDING ZERO) ODB IN THE ROW)
MFIOT
XR2) 1
NO
[MATDEX - XR4] → AC
AC_D → XR4
**
MFMU → AC
AC_D → XR2
AC_D - 6 → MFMU
YES
XR2-1 → XR2
XR2 → ***
*** + XR4 → XR4
S1
T1
MFPHI
6 (EXSTN - COMMON) → AC
AC_A → XR4
MFCHI
[CEQCF+24] * [CEQCF + 24 - XR1] + [CVECT - XR4] → [CVECT - XR4]
XR1) 1
NO
MFEQA
YES
XR1-1 → XR1
XR4) 1
NO
MFEQA
YES
XR4-1 → XR4
MFPSI
XR1) **
YES
NO
DEX8 → XR2
XR2) 1
NO
MFERR
PAGE A28
YES
XR2-1 → XR2
MFALP

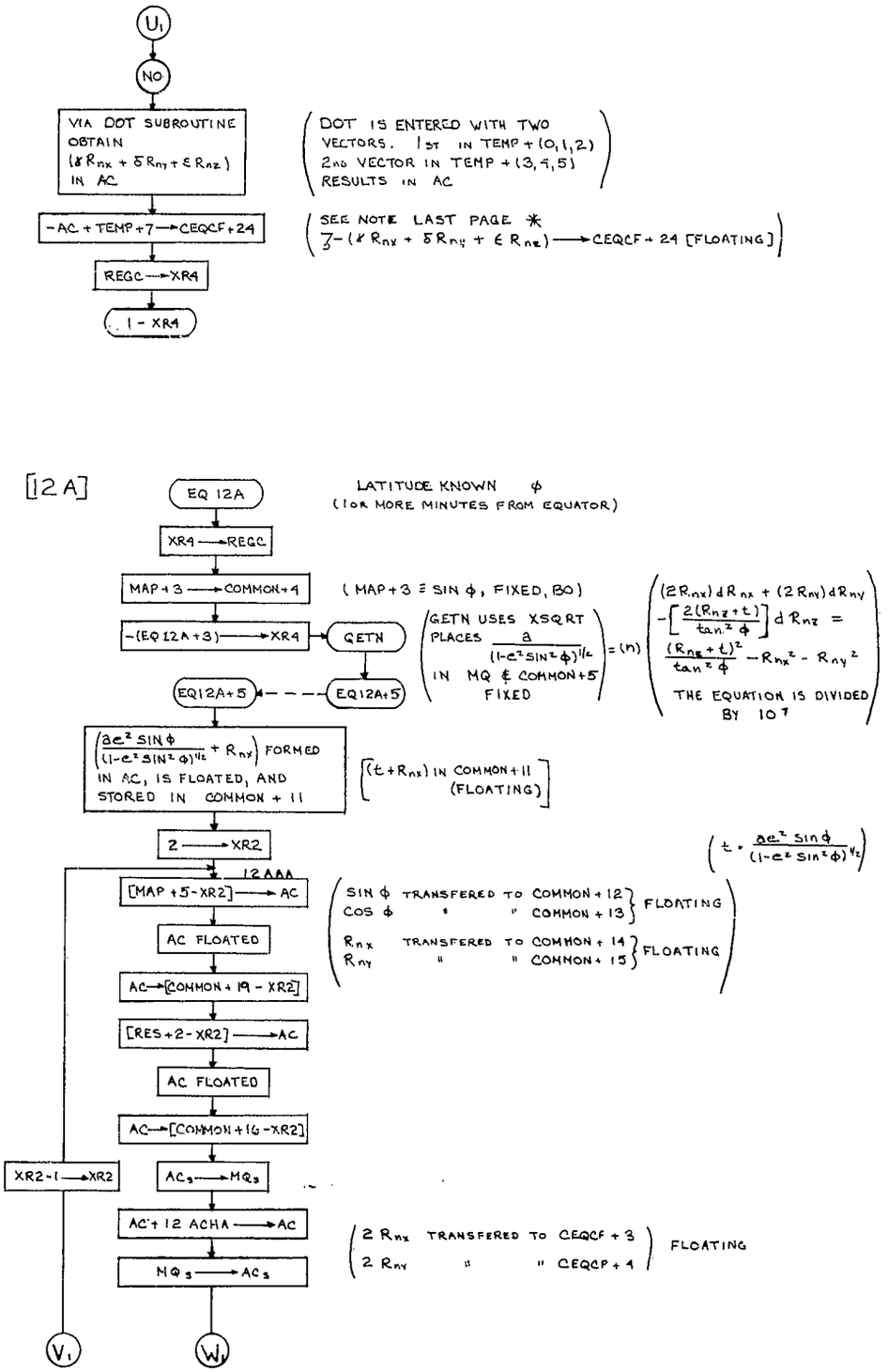

S1
T1
MFLAM
[CEQCF+24-XR1]*[CEQCF+24-XR2]+[MATRX-XR4]→[MATRX-XR4]
XR4) 1
NO
YES
XR4-1→XR4
XR2-1→XR2
XR2) †
YES
NO
XR2+6→XR2
XR1-1→XR1
XR1)**
YES
NO
COMMON+2D→XR2
XR1+6→XR1
MATRIX STORAGE, ORDER IS ASCENDING
(ZERO ODB ARE FORGOTTEN IN THE BOOKING)
EQUATION VALUE VECTOR IN ASCENDING ORDER
OFF DIAGONAL
[A]T × [A]
6×1 1×6 6×6
PLACED INTO (NON ZERO) ODBs FOR 1 ROW

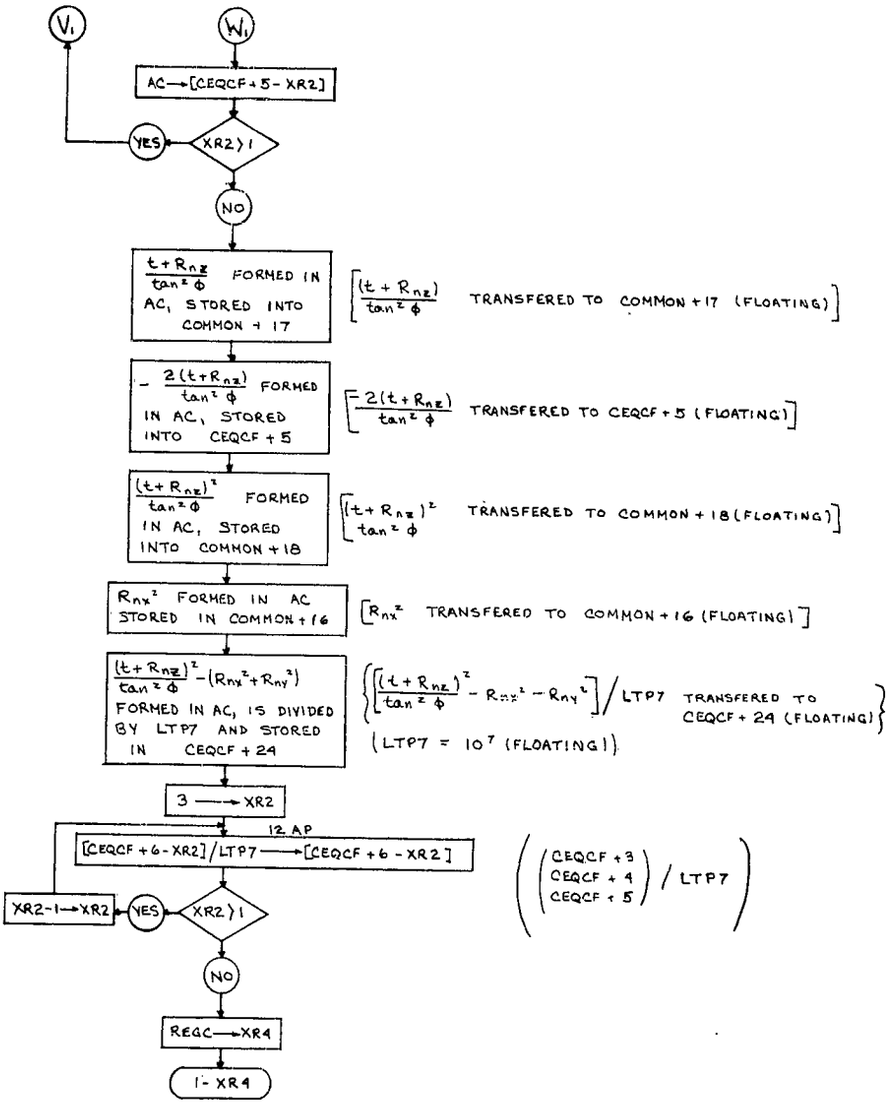
[11]


EQ 11
LONGITUDE KNOWN (λ)
XR4→REGC
SIN λ IS FLOATED AND STORED IN CEQCF+3
(SIN λ IN CEQCF+3 [FLOATING]) = α
SIN λ dnRx - COS λ d RnY = Y COS λ - X SIN λ
OR α d Rnx - β d Rny = β Rny - α Rnx
COS λ IS FLOATED AND STORED IN CEQCF+4 AS (-COS)
(-COS λ IN CEQCF+4 [FLOATING] = -β
Y COS λ → AWAY
(Y COS λ IN AWAY [FIXED] B25)
B25
-X SIN λ → AC
Y COS λ - X SIN λ → AC
(Y COS λ - X SIN λ) IS FLOATED AND STORED IN CEQCF+24
((Y COS λ - X SIN λ) IN CEQCF+24 (FLOATING))
REGC → XR4
1 - XR4

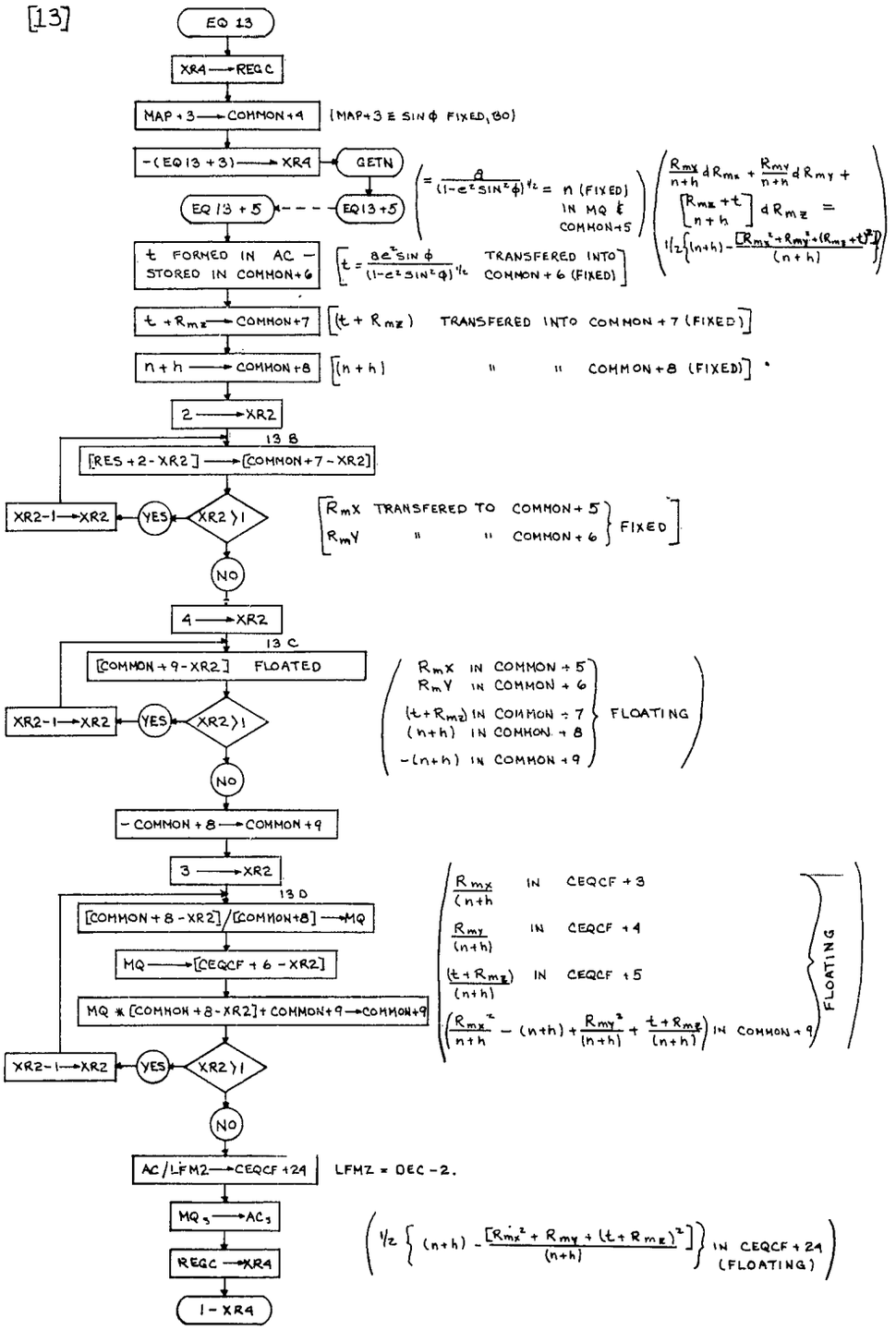
[12]

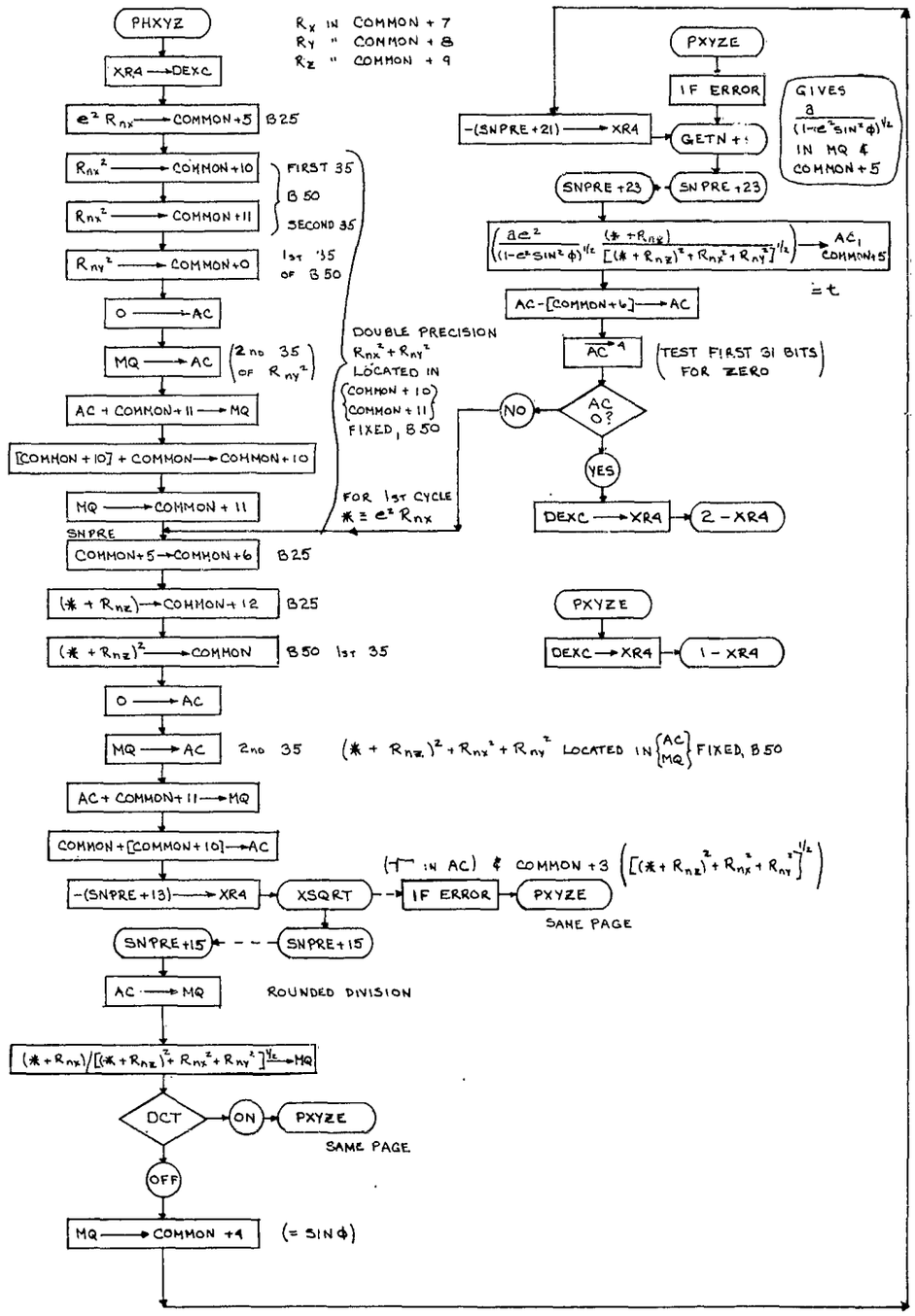

EQ 12
LONGITUDE (λ)
LATITUDE (φ)
KNOWN
(FLOATING DONE VIA FLOAT SUBROUTINE)
XR4 → REGC
[γ dR_nx + δ dR_ny + ε dR_nz = ζ - (γR_nx + δR_ny + εR_nz)]
COS λ |SIN φ| → AC
AC FLOATED AND STORED IN CEQCF+3
(COS λ |SIN φ| IN CEQCF+3 [FLOATING]) = γ
SIN λ |SIN φ| → AC
AC FLOATED AND STORED IN CEQCF+4
(SIN λ |SIN φ| IN CEQCF+4 [FLOATING]) = δ
MAP → AC
(φ IN RADIANS FIXED B3 IN MAP)
AC +
YES
NO
NONEG.
MAP+4 → AC
(MAP+4 ≡ COS φ, FIXED, B0)
AC FLOATED AND STORED IN CEQCF+5
(-COS φ IN CEQCF+5 [FLOATING])
(THE ALGEBRAIC SIGN OF THE COSINE IS TAKEN AS THE OPPOSITE OF φ)
YESPOS
-(MAP+4) → AC
AC FLOATED AND STORED IN CEQCF+5
(-COS φ IN CEQCF+5 [FLOATING])
ε
(1-e² SIN² φ) REPLACES AC & MQ - IS √ VIA XSQRT AND THEN FLOATED VIA FLOAT RESULTS TRANSFERED INTO TEMP+6
((1-e² SIN² φ)^1/2 IN TEMP+6 [FLOATING])
ae² SIN φ COS φ IN AC IS FLOATED, STORED INTO AC
(ae² SIN φ COS φ IN (AC) [FLOATING])
AC F/TEMP+6 → TEMP+7
((ae² SIN φ COS φ / (1-e² SIN² φ)^1/2 IN TEMP+7 [FLOATING]) = ζ*
(IN NORTHERN LATITUDES (TEMP+7) MUST BE MADE II FOR IT TO WORK IN SOUTHERN LATITUDES)
γ → TEMP
δ → TEMP+1
ε → TEMP+2
3 → XR2
12 PQ
[RES+3-XR2] → AC
FLOAT THE AC
(X FLOATED AND TRANSFERED TO TEMP+3
Y " " " TEMP+4
Z " " " TEMP+5)
XR2-1 → XR2
AC → [TEMP+6-XR2]
YES
XR1 > 1
U_i

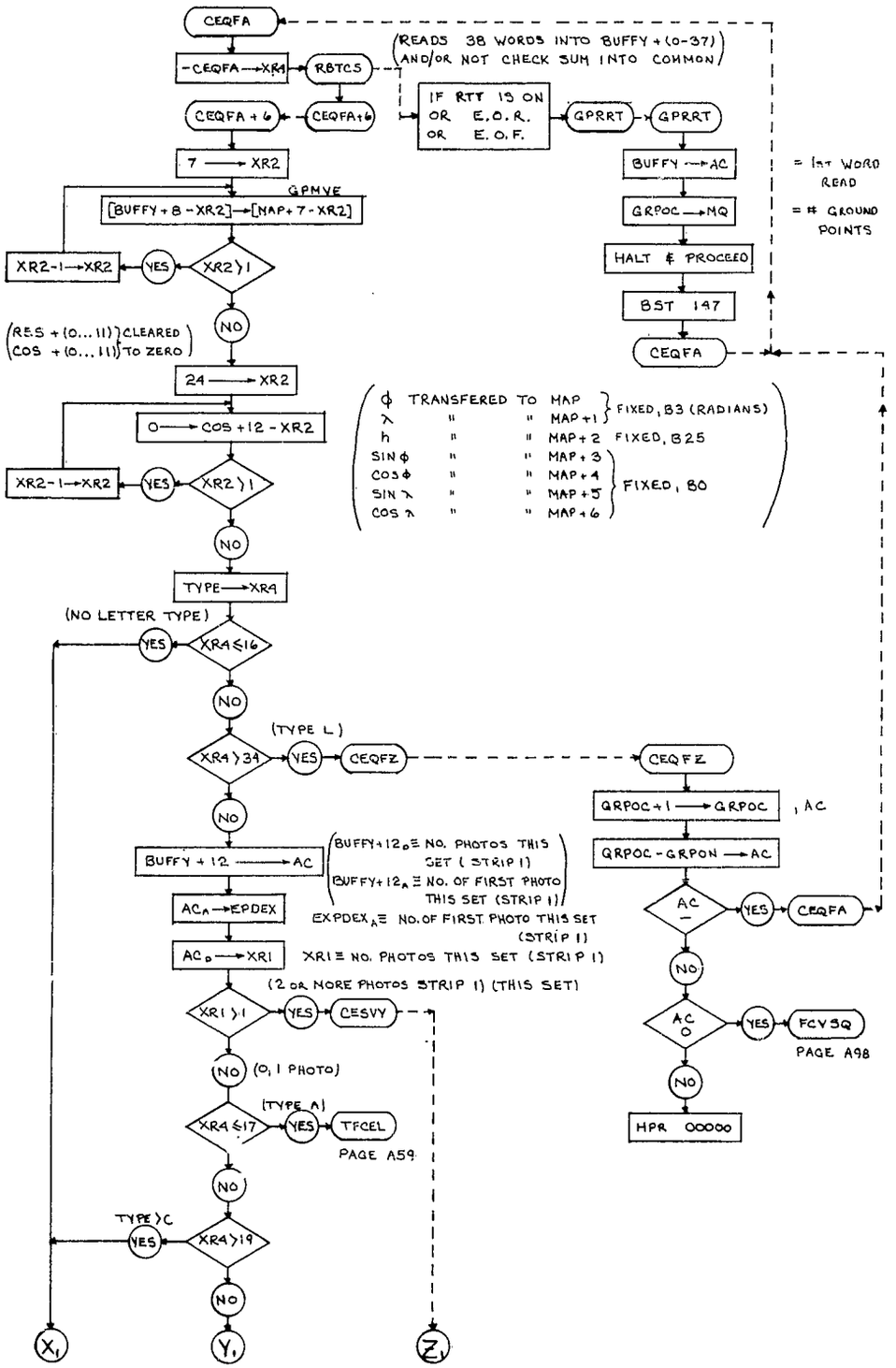

U1
NO
VIA DOT SUBROUTINE OBTAIN (γ Rnx + δ Rny + ε Rnz) IN AC
DOT IS ENTERED WITH TWO VECTORS. 1ST IN TEMP + (0,1,2) 2ND VECTOR IN TEMP + (3,4,5) RESULTS IN AC
-AC + TEMP+7 → CEQCF+24
SEE NOTE LAST PAGE *
3 - (γ Rnx + δ Rny + ε Rnz) → CEQCF + 24 [FLOATING]
REGC → XR4
1 - XR4
[12 A]
EQ 12A
LATITUDE KNOWN φ
(1 OR MORE MINUTES FROM EQUATOR)
XR4 → REGC
MAP+3 → COMMON+4
(MAP+3 ≡ SIN φ, FIXED, BO)
-(EQ 12A+3) → XR4
QETN
GETN USES XSQRT PLACES a/(1-e² SIN² φ)^1/2 = (n) IN MQ & COMMON+5 FIXED
(2Rnx) dRnx + (2Rny) dRny - [2(Rnz+t)/tan² φ] dRnz = (Rnz+t)²/tan² φ - Rnx² - Rny²
THE EQUATION IS DIVIDED BY 10⁷
EQ12A+5
EQ12A+5
(ae² SIN φ / (1-e² SIN² φ)^1/2 + Rnx) FORMED IN AC, IS FLOATED, AND STORED IN COMMON + 11
[(t+Rnx) IN COMMON+11 (FLOATING)]
(t = ae² sin φ / (1-e² sin² φ)^1/2)
2 → XR2
12AAA
[MAP +5-XR2] → AC
SIN φ TRANSFERED TO COMMON+12
COS φ " " COMMON+13
FLOATING
AC FLOATED
Rnx TRANSFERED TO COMMON+14
Rny " " COMMON+15
FLOATING
AC → [COMMON+19 - XR2]
[RES+2-XR2] → AC
AC FLOATED
AC → [COMMON+16 -XR2]
XR2-1 → XR2
AC3 → MQ3
AC+12 ACHA → AC
2 Rnx TRANSFERED TO CEQCF+3
2 Rny " " CEQCF+4
FLOATING
MQ3 → AC3
V1
W1

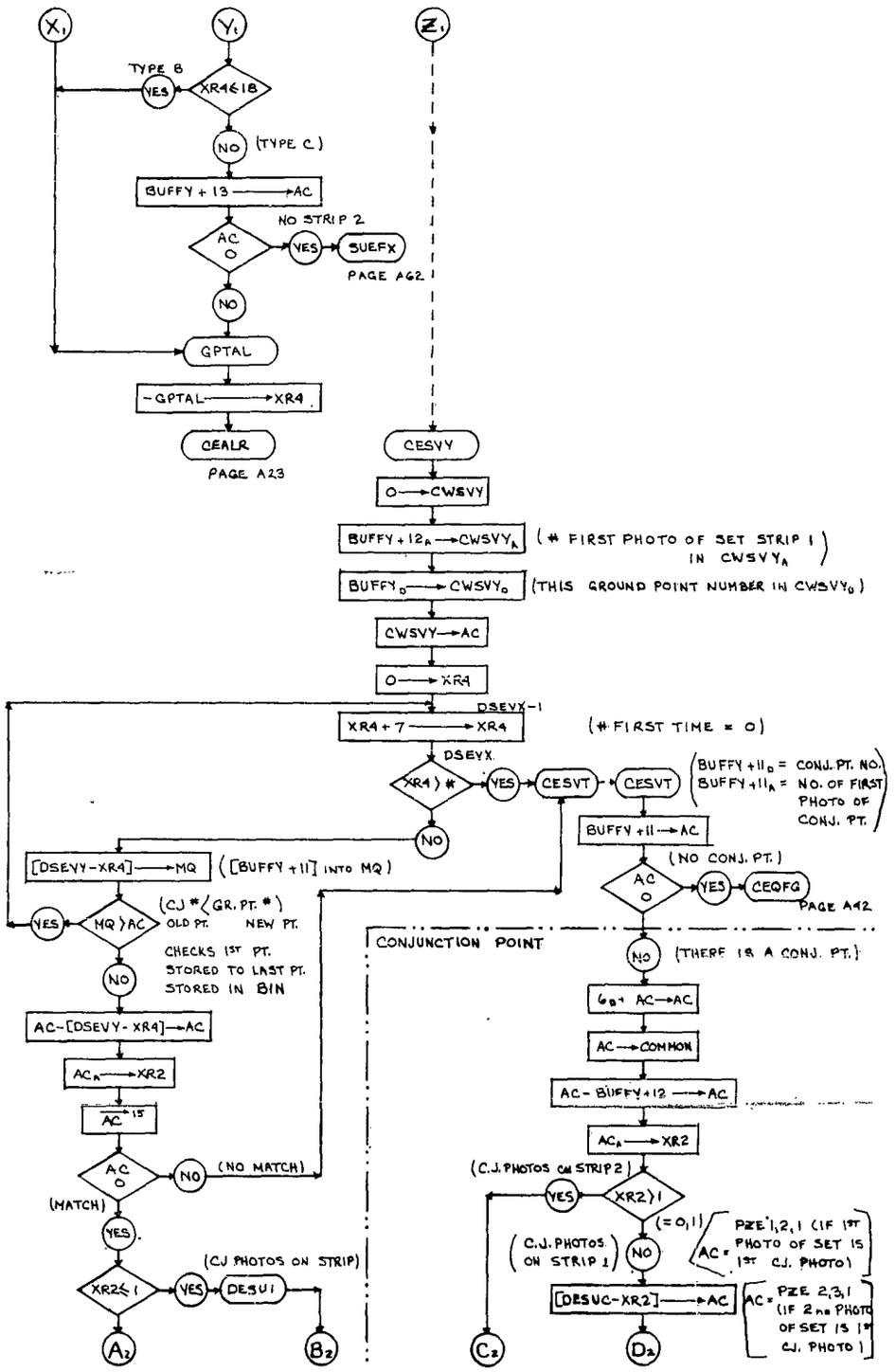

V_1
W_1
AC → [CEQCF + 5 - XR2]
XR2 > 1
YES
NO
$\frac{t+R_{nz}}{\tan^2\phi}$ FORMED IN AC, STORED INTO COMMON + 17
$\left[\frac{(t+R_{nz})}{\tan^2\phi}\right.$ TRANSFERED TO COMMON + 17 (FLOATING)]
$-\frac{2(t+R_{nz})}{\tan^2\phi}$ FORMED IN AC, STORED INTO CEQCF + 5
$\left[-\frac{2(t+R_{nz})}{\tan^2\phi}\right.$ TRANSFERED TO CEQCF + 5 (FLOATING)]
$\frac{(t+R_{nz})^2}{\tan^2\phi}$ FORMED IN AC, STORED INTO COMMON + 18
$\left[\frac{(t+R_{nz})^2}{\tan^2\phi}\right.$ TRANSFERED TO COMMON + 18 (FLOATING)]
R_{nx}^2 FORMED IN AC STORED IN COMMON + 16
[R_{nx}^2 TRANSFERED TO COMMON + 16 (FLOATING)]
$\frac{(t+R_{nz})^2}{\tan^2\phi} - (R_{nx}^2 + R_{ny}^2)$ FORMED IN AC, IS DIVIDED BY LTP7 AND STORED IN CEQCF + 24
$\left\{\left[\frac{(t+R_{nz})^2}{\tan^2\phi} - R_{nz}^2 - R_{ny}^2\right] / \text{LTP7}\right.$ TRANSFERED TO CEQCF + 24 (FLOATING)$\}$
(LTP7 = 10^7 (FLOATING))
3 → XR2
12 AP
[CEQCF + 6 - XR2] / LTP7 → [CEQCF + 6 - XR2]
$\left(\begin{pmatrix}\text{CEQCF + 3}\\ \text{CEQCF + 4}\\ \text{CEQCF + 5}\end{pmatrix} / \text{LTP7}\right)$
XR2 - 1 → XR2
YES
XR2 > 1
NO
REGC → XR4
1 - XR4

[13]

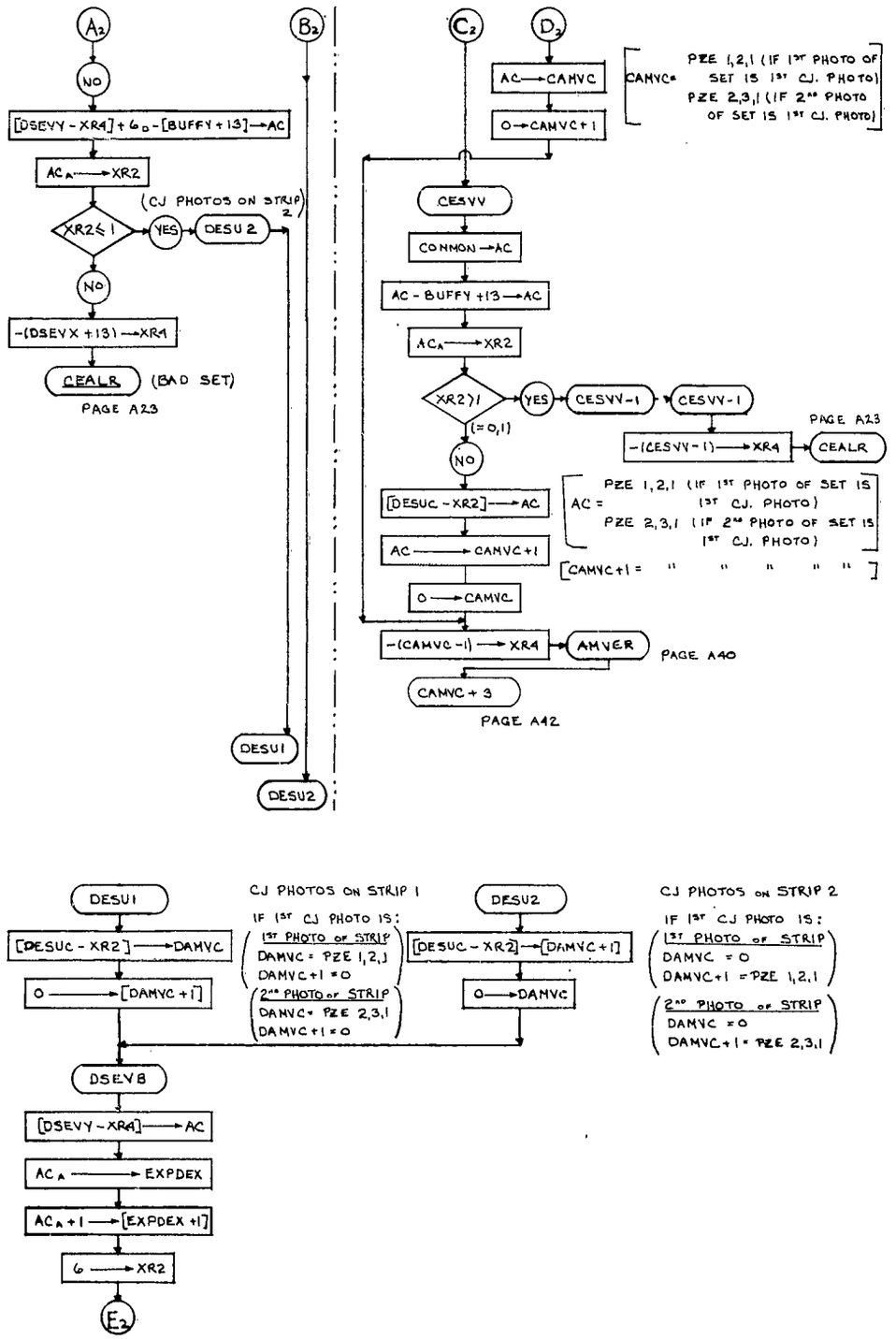

EQ 13
XR4 → REQC
MAP + 3 → COMMON + 4
(MAP+3 ≡ SIN φ FIXED, 30)
-(EQ13 + 3) → XR4
GETN
EQ13 + 5
EQ13 + 5
$= \frac{a}{(1-e^2 \sin^2 \phi)^{1/2}} = n$ (FIXED) IN MQ & COMMON+5
$\frac{R_{mx}}{n+h} dR_{mx} + \frac{R_{my}}{n+h} dR_{my} + \left[\frac{R_{mz}+t}{n+h}\right] dR_{mz} = \frac{1}{2}\left\{(n+h) - \frac{[R_{mx}^2 + R_{my}^2 + (R_{mz}+t)^2]}{(n+h)}\right\}$
t FORMED IN AC — STORED IN COMMON+6
$\left[t = \frac{ae^2 \sin \phi}{(1-e^2 \sin^2 \phi)^{1/2}}\right.$ TRANSFERED INTO COMMON + 6 (FIXED)]
t + Rmz → COMMON+7
[(t + Rmz) TRANSFERED INTO COMMON + 7 (FIXED)]
n + h → COMMON+8
[(n + h) " " COMMON + 8 (FIXED)]
2 → XR2
13 B
[RES + 2 - XR2] → [COMMON + 7 - XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
[RmX TRANSFERED TO COMMON + 5
RmY " " COMMON + 6 } FIXED]
4 → XR2
13 C
[COMMON + 9 - XR2] FLOATED
XR2 > 1
YES
XR2-1 → XR2
NO
RmX IN COMMON + 5
RmY IN COMMON + 6
(t + Rmz) IN COMMON + 7
(n+h) IN COMMON + 8
-(n+h) IN COMMON + 9
} FLOATING
- COMMON + 8 → COMMON + 9
3 → XR2
13 D
[COMMON + 8 - XR2] / [COMMON+8] → MQ
MQ → [CEQCF + 6 - XR2]
MQ * [COMMON + 8 - XR2] + COMMON+9 → COMMON+9
XR2 > 1
YES
XR2-1 → XR2
NO
$\frac{R_{mx}}{(n+h}$ IN CEQCF + 3
$\frac{R_{my}}{(n+h)}$ IN CEQCF + 4
$\frac{(t+R_{mz})}{(n+h)}$ IN CEQCF + 5
$\left(\frac{R_{mx}^2}{n+h} - (n+h) + \frac{R_{my}^2}{(n+h)} + \frac{t+R_{mz}}{(n+h)}\right)$ IN COMMON + 9
} FLOATING
AC / LFM2 → CEQCF + 24
LFMZ = DEC -2.
MQ5 → AC5
REQC → XR4
1 - XR4
$\left(\frac{1}{2}\left\{(n+h) - \frac{[R_{mx}^2 + R_{my} + (t+R_{mz})^2]}{(n+h)}\right\}\right)$ IN CEQCF + 24 (FLOATING)

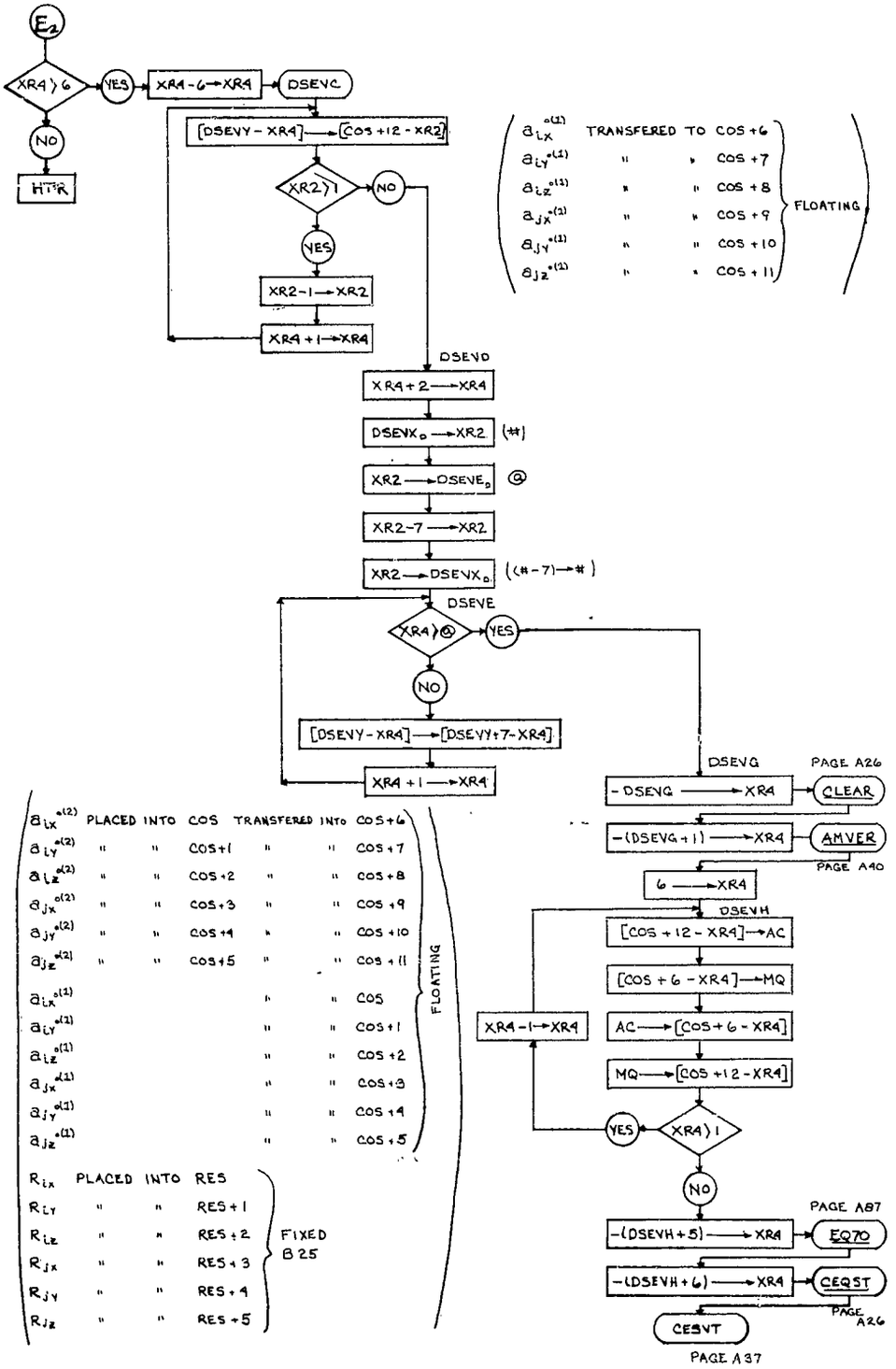

PHXYZ
R_x IN COMMON + 7
R_y " COMMON + 8
R_z " COMMON + 9
XR4 → DEXC
$e^2 R_{nx}$ → COMMON+5
B25
R_{nx}^2 → COMMON+10
FIRST 35
B 50
R_{nx}^2 → COMMON+11
SECOND 35
R_{ny}^2 → COMMON+0
1st 35 OF B 50
0 → AC
MQ → AC
2nd 35 OF R_{ny}^2
AC + COMMON+11 → MQ
[COMMON + 10] + COMMON → COMMON+10
MQ → COMMON + 11
DOUBLE PRECISION $R_{nx}^2 + R_{ny}^2$ LOCATED IN {COMMON + 10, COMMON + 11} FIXED, B 50
FOR 1st CYCLE $* \equiv e^2 R_{nx}$
SNPRE
COMMON+5 → COMMON+6
B25
$(* + R_{nz})$ → COMMON+12
B25
$(* + R_{nz})^2$ → COMMON
B50 1st 35
0 → AC
MQ → AC
2nd 35
$(* + R_{nz})^2 + R_{nx}^2 + R_{ny}^2$ LOCATED IN {AC, MQ} FIXED, B 50
AC + COMMON+11 → MQ
COMMON + [COMMON+10] → AC
$(\sqrt{\ }$ IN AC) & COMMON +3 $\left([(* + R_{nz})^2 + R_{nx}^2 + R_{ny}^2]^{1/2}\right)$
-(SNPRE+13) → XR4
XSQRT
IF ERROR
PXYZE
SAME PAGE
SNPRE+15
SNPRE+15
AC → MQ
ROUNDED DIVISION
$(* + R_{nx})/[(* + R_{nz})^2 + R_{nx}^2 + R_{ny}^2]^{1/2}$ → MQ
DCT
ON
PXYZE
SAME PAGE
OFF
MQ → COMMON +4
(= SIN φ)
PXYZE
IF ERROR
GIVES $\frac{a}{(1-e^2 \sin^2\phi)^{1/2}}$ IN MQ & COMMON+5
-(SNPRE+21) → XR4
GETN +1
SNPRE+23
SNPRE+23
$\left(\frac{ae^2}{(1-e^2\sin^2\phi)^{1/2}} \frac{(* + R_{nz})}{[(* + R_{nz})^2 + R_{nx}^2 + R_{ny}^2]^{1/2}}\right)$ → AC, COMMON+5
≐ t
AC - [COMMON+6] → AC
$\overrightarrow{AC}^4$
(TEST FIRST 31 BITS FOR ZERO)
AC 0?
NO
YES
DEXC → XR4
2 - XR4
PXYZE
DEXC → XR4
1 - XR4

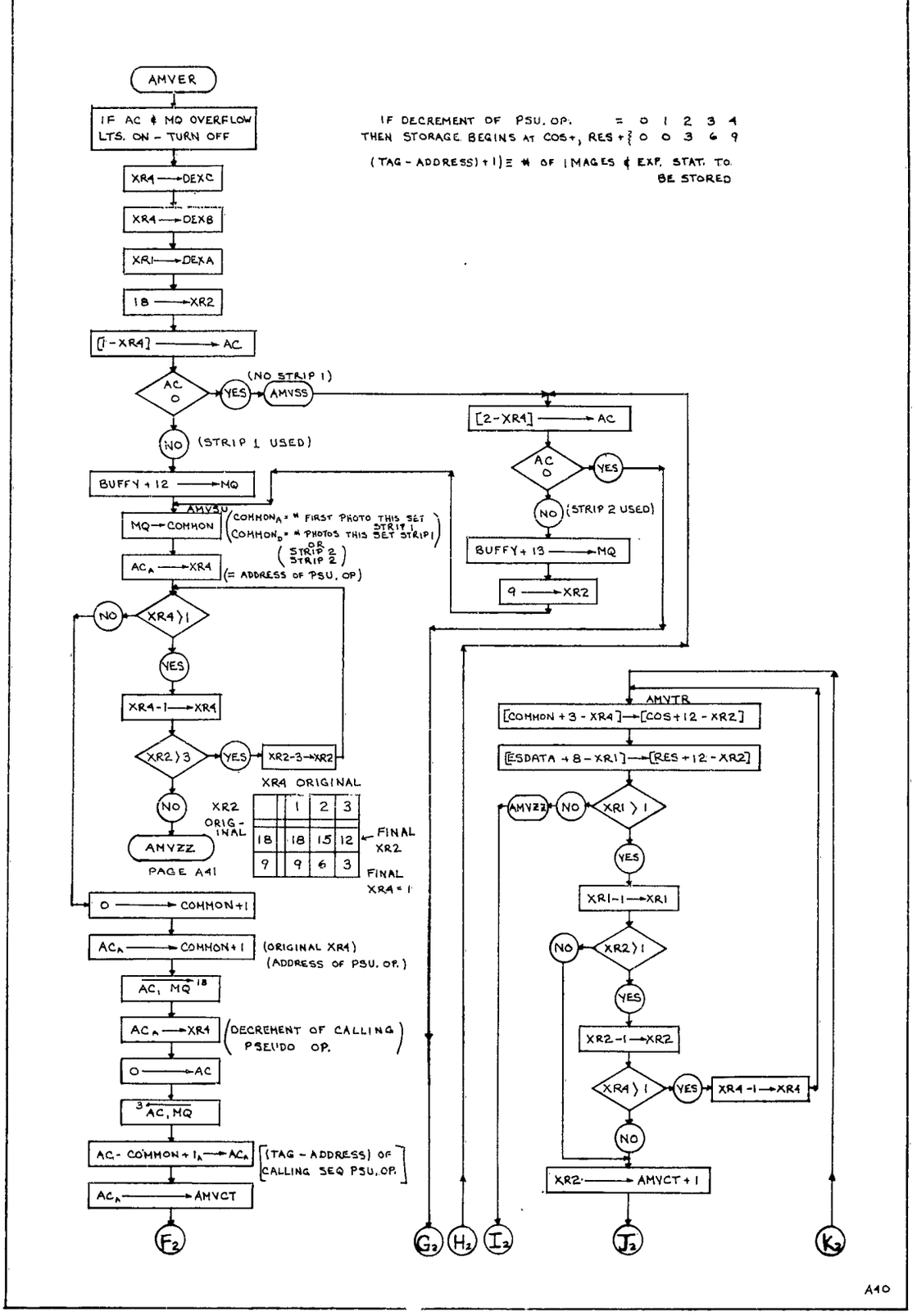

CEQFA
-CEQFA → XR4
RBTC5
(READS 38 WORDS INTO BUFFY + (0-37) AND/OR NOT CHECK SUM INTO COMMON)
CEQFA + 6
CEQFA+6
IF RTT IS ON OR E.O.R. OR E.O.F.
GPRRT
GPRRT
BUFFY → AC
= 1ST WORD READ
GRPOC → MQ
= # GROUND POINTS
HALT & PROCEED
BST 147
CEQFA
7 → XR2
GPMVE
[BUFFY + 8 - XR2] → [MAP + 7 - XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
(RES + (0...11) CLEARED, COS + (0...11) TO ZERO)
24 → XR2
0 → COS + 12 - XR2
XR2 > 1
YES
XR2-1 → XR2
NO
φ TRANSFERED TO MAP
λ " " MAP+1
FIXED, B3 (RADIANS)
h " " MAP+2 FIXED, B25
SIN φ " " MAP+3
COS φ " " MAP+4
SIN λ " " MAP+5
COS λ " " MAP+6
FIXED, B0
TYPE → XR4
(NO LETTER TYPE)
XR4 ≤ 16
YES
NO
(TYPE L)
XR4 > 34
YES
CEQFZ
CEQFZ
QRPOC + 1 → QRPOC
, AC
QRPOC - GRPON → AC
AC −
YES
CEQFA
NO
AC 0
YES
FCV3Q
PAGE A98
NO
HPR 00000
NO
BUFFY + 12 → AC
BUFFY+12D ≡ NO. PHOTOS THIS SET (STRIP 1)
BUFFY+12A ≡ NO. OF FIRST PHOTO THIS SET (STRIP 1)
ACA → EPDEX
EXPDEXA ≡ NO. OF FIRST PHOTO THIS SET (STRIP 1)
ACD → XR1
XR1 ≡ NO. PHOTOS THIS SET (STRIP 1)
(2 OR MORE PHOTOS STRIP 1) (THIS SET)
XR1 > 1
YES
CESVY
NO
(0, 1 PHOTO)
(TYPE A)
XR4 ≤ 17
YES
TFCEL
PAGE A59
NO
TYPE > C
YES
XR4 > 19
NO
X1
Y1
Z1



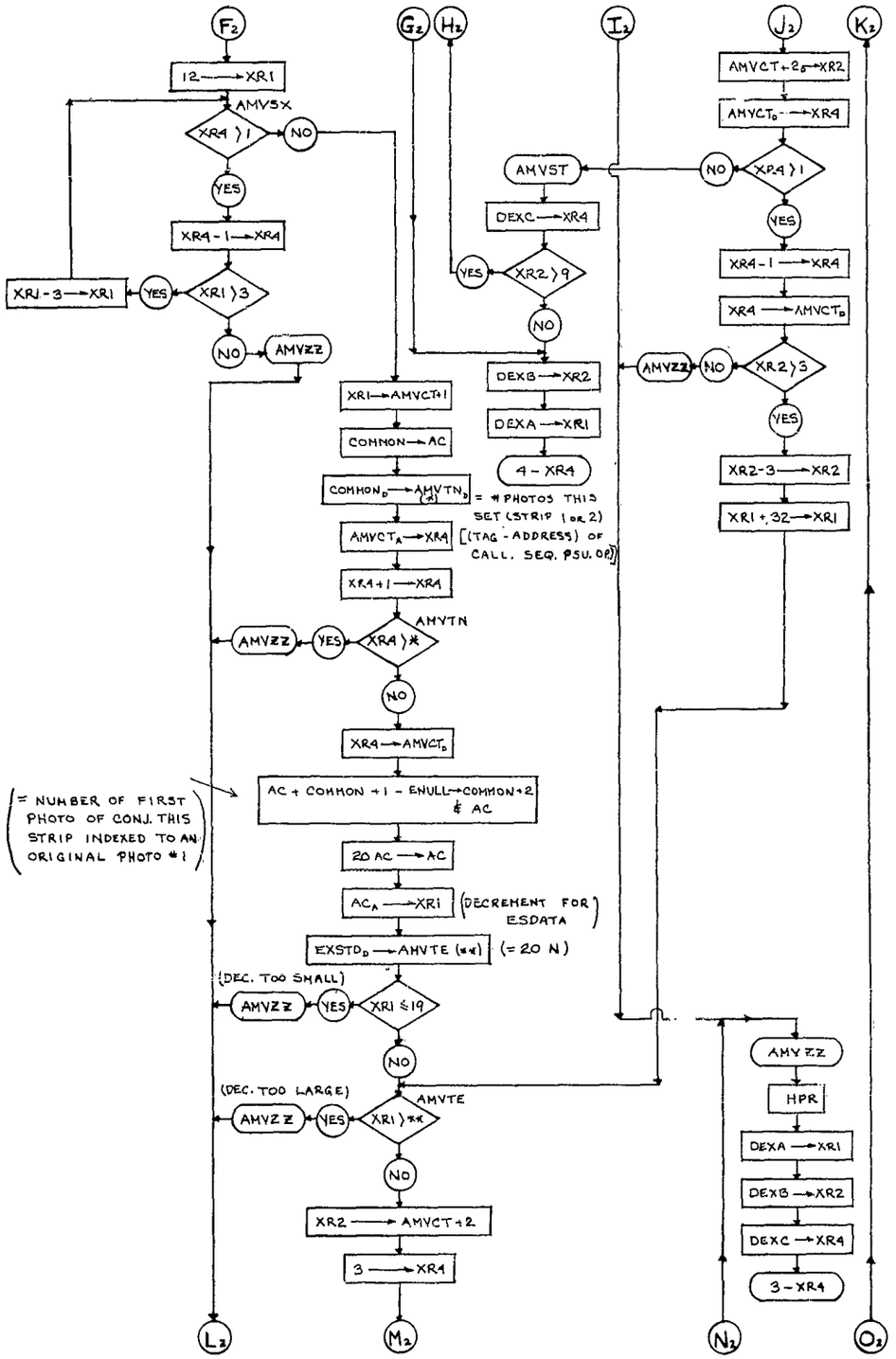
X1
Y1
Z1
TYPE B
YES
XR4≤18
NO
(TYPE C)
BUFFY + 13 → AC
NO STRIP 2
AC 0
YES
SUEFX
PAGE A62
NO
GPTAL
-GPTAL → XR4
CEALR
PAGE A23
CESVY
0 → CWSVY
BUFFY + 12A → CWSVYA
(# FIRST PHOTO OF SET STRIP 1 IN CWSVYA)
BUFFY0 → CWSVY0
(THIS GROUND POINT NUMBER IN CWSVY0)
CWSVY → AC
0 → XR4
DSEVX-1
XR4 + 7 → XR4
(# FIRST TIME = 0)
DSEVX
XR4 > #
YES
CESVT
CESVT
(BUFFY + 11D = CONJ. PT. NO.
BUFFY + 11A = NO. OF FIRST PHOTO OF CONJ. PT.)
NO
BUFFY + 11 → AC
(NO CONJ. PT.)
AC 0
YES
CEQFG
PAGE A42
[DSEVY-XR4] → MQ
([BUFFY + 11] INTO MQ)
(CJ # < GR. PT. #)
YES
MQ > AC
OLD PT.
NEW PT.
CHECKS 1ST PT.
STORED TO LAST PT.
STORED IN BIN
NO
AC-[DSEVY-XR4] → AC
ACA → XR2
AC 15
AC 0
NO
(NO MATCH)
(MATCH)
YES
XR2≤1
YES
DESU1
(CJ PHOTOS ON STRIP)
A2
B2
CONJUNCTION POINT
NO
(THERE IS A CONJ. PT.)
6B + AC → AC
AC → COMMON
AC - BUFFY + 12 → AC
ACA → XR2
(C.J. PHOTOS ON STRIP 2)
YES
XR2 > 1
(= 0, 1)
(C.J. PHOTOS ON STRIP 1)
NO
AC = PZE 1,2,1 (IF 1ST PHOTO OF SET IS 1ST CJ. PHOTO)
[DESUC-XR2] → AC
AC = PZE 2,3,1 (IF 2ND PHOTO OF SET IS 1ST CJ. PHOTO)
C2
D2


A2
NO
[DSEVY - XR4] + 6D - [BUFFY + 13] → AC
ACA → XR2
XR2 ≤ 1
YES
DESU 2
(CJ PHOTOS ON STRIP 2)
NO
-(DSEVX + 13) → XR4
CEALR
(BAD SET)
PAGE A23
B2
DESU1
DESU2
C2
D2
AC → CAMVC
0 → CAMVC + 1
CAMVC = PZE 1,2,1 (IF 1ST PHOTO OF SET IS 1ST CJ. PHOTO)
PZE 2,3,1 (IF 2ND PHOTO OF SET IS 1ST CJ. PHOTO)
CESVV
COMMON → AC
AC - BUFFY + 13 → AC
ACA → XR2
XR2 > 1
YES
CESVV - 1
CESVV - 1
(= 0,1)
-(CESVV - 1) → XR4
CEALR
PAGE A23
NO
[DESUC - XR2] → AC
AC = PZE 1,2,1 (IF 1ST PHOTO OF SET IS 1ST CJ. PHOTO)
PZE 2,3,1 (IF 2ND PHOTO OF SET IS 1ST CJ. PHOTO)
AC → CAMVC + 1
[CAMVC + 1 = " " " " "]
0 → CAMVC
-(CAMVC - 1) → XR4
AMVER
PAGE A40
CAMVC + 3
PAGE A42
DESU1
[DESUC - XR2] → DAMVC
0 → [DAMVC + 1]
CJ PHOTOS ON STRIP 1
IF 1ST CJ PHOTO IS:
1ST PHOTO OF STRIP
DAMVC = PZE 1,2,1
DAMVC + 1 = 0
2ND PHOTO OF STRIP
DAMVC = PZE 2,3,1
DAMVC + 1 = 0
DESU2
[DESUC - XR2] → [DAMVC + 1]
0 → DAMVC
CJ PHOTOS ON STRIP 2
IF 1ST CJ PHOTO IS:
1ST PHOTO OF STRIP
DAMVC = 0
DAMVC + 1 = PZE 1,2,1
2ND PHOTO OF STRIP
DAMVC = 0
DAMVC + 1 = PZE 2,3,1
DSEV8
[DSEVY - XR4] → AC
ACA → EXPDEX
ACA + 1 → [EXPDEX + 1]
6 → XR2
E2

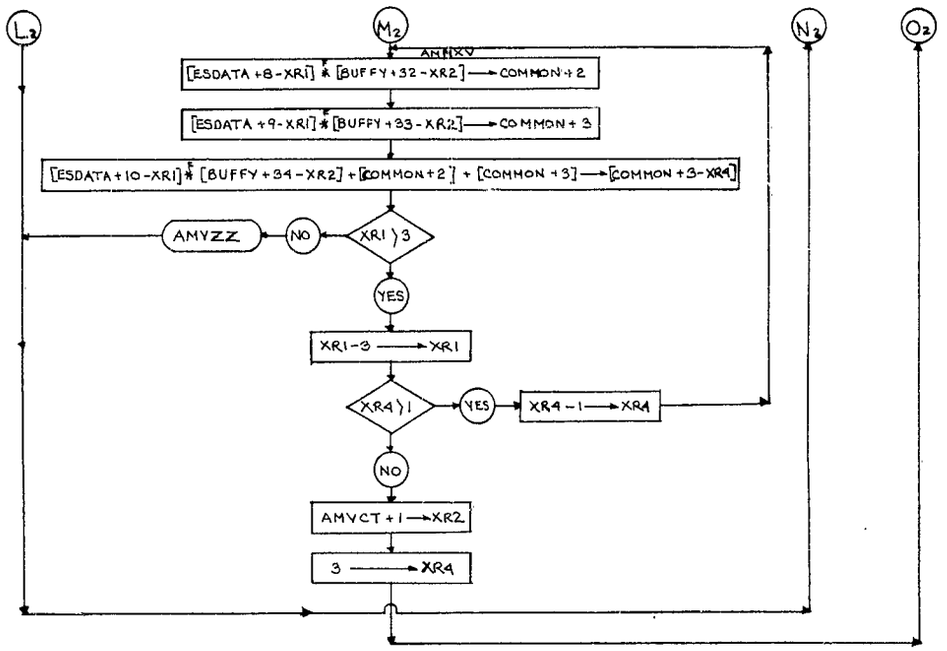

E2
XR4 > 6
YES
NO
HTR
XR4 - 6 → XR4
DSEVC
[DSEVY - XR4] → [COS + 12 - XR2]
XR2 > 1
NO
YES
XR2 - 1 → XR2
XR4 + 1 → XR4
DSEVD
XR4 + 2 → XR4
DSEVX0 → XR2 (#)
XR2 → DSEVE0 @
XR2 - 7 → XR2
XR2 → DSEVX0 ((# - 7) → #)
DSEVE
XR4 > @
YES
NO
[DSEVY - XR4] → [DSEVY + 7 - XR4]
XR4 + 1 → XR4
DSEVG
PAGE A26
- DSEVG → XR4
CLEAR
- (DSEVG + 1) → XR4
AMVER
PAGE A40
6 → XR4
DSEVH
[COS + 12 - XR4] → AC
[COS + 6 - XR4] → MQ
AC → [COS + 6 - XR4]
MQ → [COS + 12 - XR4]
XR4 - 1 → XR4
YES
XR4 > 1
NO
PAGE A87
- (DSEVH + 5) → XR4
EQ70
- (DSEVH + 6) → XR4
CEQST
PAGE A26
CESVT
PAGE A37
a_ix^o(1) TRANSFERED TO COS + 6
a_iy^o(1) " " COS + 7
a_iz^o(1) " " COS + 8
a_jx^o(1) " " COS + 9
a_jy^o(1) " " COS + 10
a_jz^o(1) " " COS + 11
FLOATING
a_ix^o(2) PLACED INTO COS TRANSFERED INTO COS + 6
a_iy^o(2) " " COS + 1 " " COS + 7
a_iz^o(2) " " COS + 2 " " COS + 8
a_jx^o(2) " " COS + 3 " " COS + 9
a_jy^o(2) " " COS + 4 " " COS + 10
a_jz^o(2) " " COS + 5 " " COS + 11
a_ix^o(1) " " COS
a_iy^o(1) " " COS + 1
a_iz^o(1) " " COS + 2
a_jx^o(1) " " COS + 3
a_jy^o(1) " " COS + 4
a_jz^o(1) " " COS + 5
FLOATING
R_ix PLACED INTO RES
R_iy " " RES + 1
R_iz " " RES + 2
R_jx " " RES + 3
R_jy " " RES + 4
R_jz " " RES + 5
FIXED
B 25

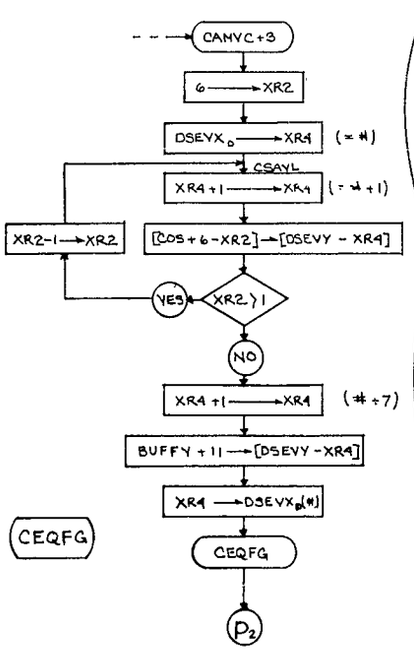

AMVER
IF AC & MQ OVERFLOW LTS. ON - TURN OFF
XR4 → DEXC
XR4 → DEXB
XR1 → DEXA
18 → XR2
[1 - XR4] → AC
AC 0
YES
(NO STRIP 1)
AMVSS
NO
(STRIP 1 USED)
BUFFY + 12 → MQ
AMVSU
MQ → COMMON
COMMON_A = # FIRST PHOTO THIS SET STRIP 1
COMMON_D = # PHOTOS THIS SET STRIP 1 OR STRIP 2 OR STRIP 2
AC_A → XR4
(= ADDRESS OF PSU. OP)
XR4 > 1
NO
YES
XR4 - 1 → XR4
XR2 > 3
YES
XR2 - 3 → XR2
NO
AMVZZ
PAGE A41
XR4 ORIGINAL
XR2 ORIGINAL
FINAL XR2
FINAL XR4 = 1
0 → COMMON + 1
AC_A → COMMON + 1
(ORIGINAL XR4)
(ADDRESS OF PSU. OP.)
AC, MQ 18
AC_A → XR4
(DECREMENT OF CALLING PSEUDO OP.)
0 → AC
3 AC, MQ
AC - COMMON + 1_A → AC_A
(TAG - ADDRESS) OF CALLING SEQ PSU. OP.
AC_A → AMVCT
F2
IF DECREMENT OF PSU. OP. = 0 1 2 3 4
THEN STORAGE BEGINS AT COS+, RES+ 0 0 3 6 9
(TAG - ADDRESS) + 1) ≡ # OF IMAGES & EXP. STAT. TO BE STORED
[2 - XR4] → AC
AC 0
YES
NO
(STRIP 2 USED)
BUFFY + 13 → MQ
9 → XR2
AMVTR
[COMMON + 3 - XR4] → [COS + 12 - XR2]
[ESDATA + 8 - XR1] → [RES + 12 - XR2]
AMVZZ
NO
XR1 > 1
YES
XR1 - 1 → XR1
NO
XR2 > 1
YES
XR2 - 1 → XR2
XR4 > 1
YES
XR4 - 1 → XR4
NO
XR2 → AMVCT + 1
G2
H2
I2
J2
K2

A40


F2
12 → XR1
AMVSX
XR4 > 1
NO
YES
XR4 - 1 → XR4
XR1 - 3 → XR1
YES
XR1 > 3
NO
AMVZZ
G2
H2
XR1 → AMVCT+1
COMMON → AC
COMMOND → AMVTND
= # PHOTOS THIS SET (STRIP 1 OR 2) [(TAG - ADDRESS) OF CALL. SEQ. PSU. 0E]
AMVCTA → XR4
XR4 + 1 → XR4
AMVTN
AMVZZ
YES
XR4 > *
NO
XR4 → AMVCTD
AC + COMMON + 1 - ENULL → COMMON + 2 & AC
(= NUMBER OF FIRST PHOTO OF CONJ. THIS STRIP INDEXED TO AN ORIGINAL PHOTO #1)
20 AC → AC
ACA → XR1
(DECREMENT FOR ESDATA)
EXSTDD → AMVTE (**)
(= 20 N)
(DEC. TOO SMALL)
AMVZZ
YES
XR1 ≤ 19
NO
(DEC. TOO LARGE)
AMVTE
AMVZZ
YES
XR1 > **
NO
XR2 → AMVCT+2
3 → XR4
L2
M2
I2
AMVST
DEXC → XR4
YES
XR2 > 9
NO
DEXB → XR2
DEXA → XR1
4 - XR4
J2
AMVCT+25 → XR2
AMVCTD → XR4
NO
XR4 > 1
YES
XR4 - 1 → XR4
XR4 → AMVCTD
AMVZZ
NO
XR2 > 3
YES
XR2 - 3 → XR2
XR1 + 32 → XR1
K2
AMVZZ
HPR
DEXA → XR1
DEXB → XR2
DEXC → XR4
3 - XR4
N2
O2

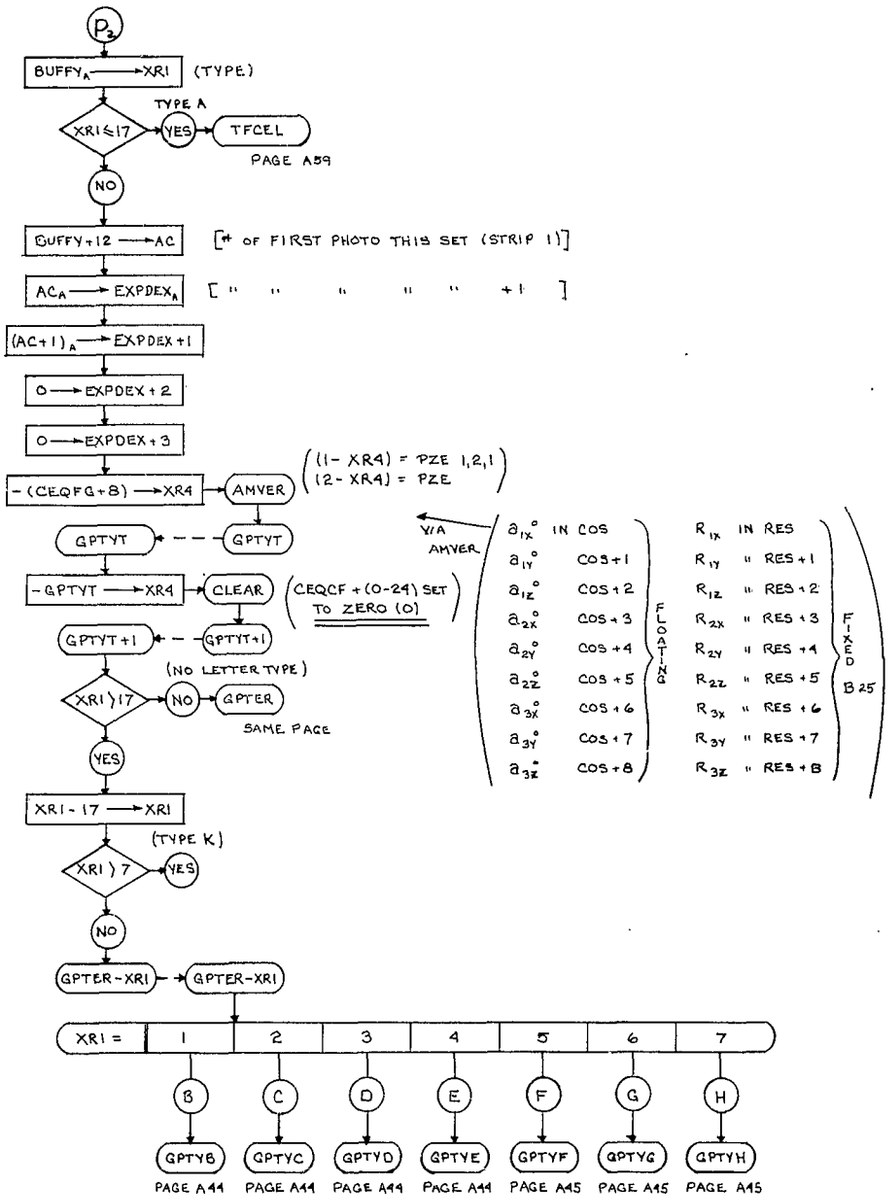
A41

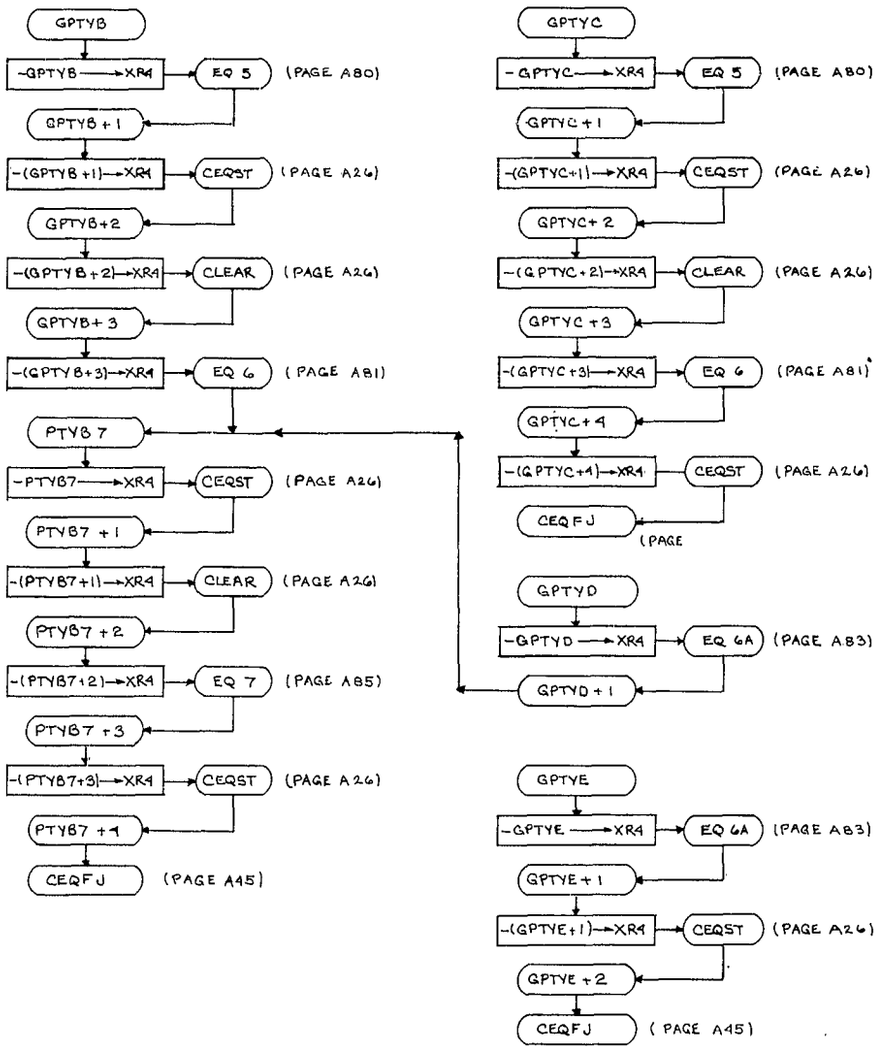


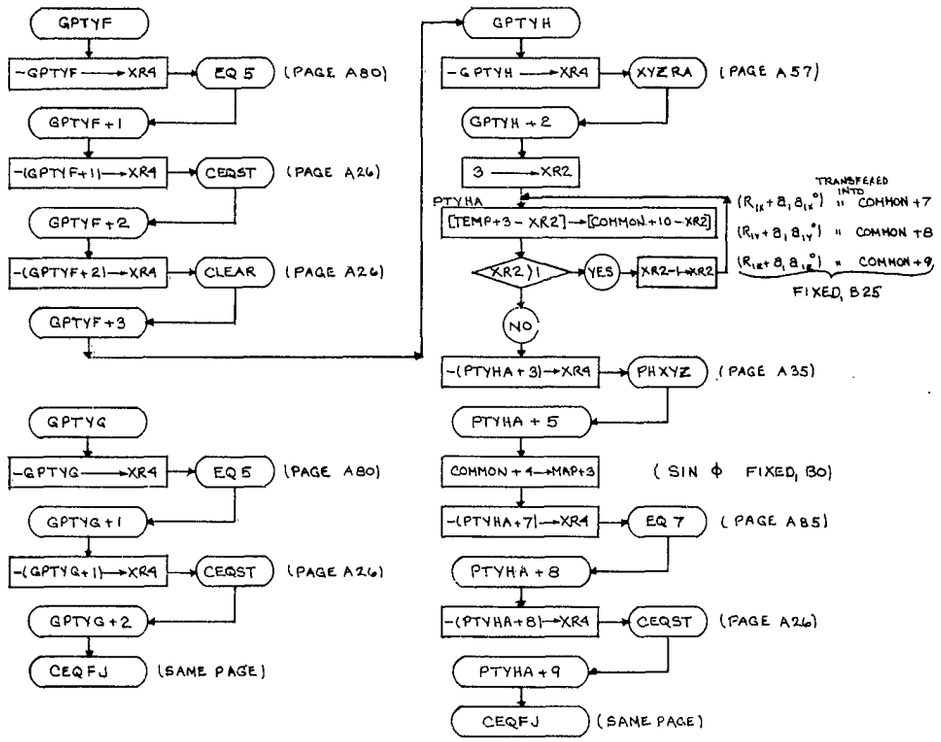


a_{ix}°	IN	COS	(i = 1 or 2, j = 2 or 3)	R_{ix}	IN	RES	FIXED, B25
a_{iy}°	"	COS + 1		R_{iy}	"	RES+1	
a_{iz}°	"	COS + 2	FLOATING	R_{iz}	"	RES+2	
a_{jx}°	"	COS + 3		R_{jx}	"	RES+3	
a_{jy}°	"	COS + 4		R_{jy}	"	RES+4	
a_{jz}°	"	COS + 5		R_{jz}	"	RES+5	

a_{ix}°	IN	DSEVY - (# + 1)	(i = 1 or 2, j = 2 or 3)	JUST STORES A_1 & A_2 IN BIN
a_{iy}°	"	DSEVY - (# + 2)		
a_{iz}°	"	DSEVY - (# + 3)	FLOATING	
a_{jx}°	"	DSEVY - (# + 4)		
a_{jy}°	"	DSEVY - (# + 5)		
a_{jz}°	"	DSEVY - (# + 6)		
BUFFY+11	"	DSEVY - (# + 7) (INT)		

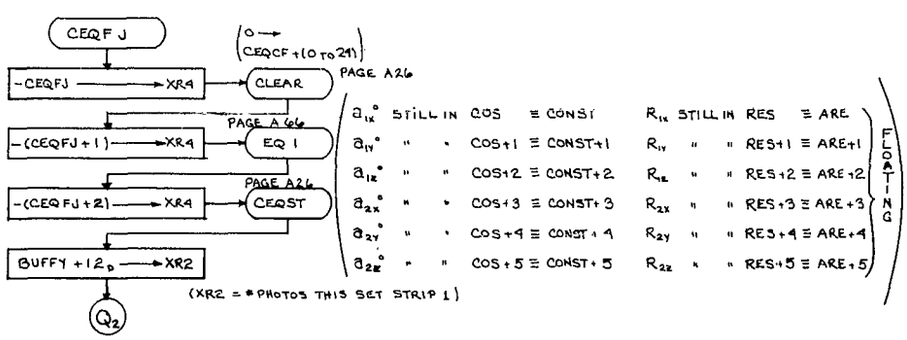

P3
BUFFY_A → XR1 (TYPE)
XR1 ≤ 17
TYPE A
YES
TFCEL
PAGE A59
NO
BUFFY+12 → AC
[# OF FIRST PHOTO THIS SET (STRIP 1)]
AC_A → EXPDEX_A
[" " " " " +1]
(AC+1)_A → EXPDEX+1
0 → EXPDEX+2
0 → EXPDEX+3
-(CEQFG+8) → XR4
AMVER
((1- XR4) = PZE 1,2,1
(2- XR4) = PZE)
GPTYT
GPTYT
-GPTYT → XR4
CLEAR
(CEQCF+(0-24) SET TO ZERO (0))
GPTYT+1
GPTYT+1
(NO LETTER TYPE)
XR1 > 17
NO
GPTER
SAME PAGE
YES
XR1 - 17 → XR1
(TYPE K)
XR1 > 7
YES
NO
GPTER-XR1
GPTER-XR1
XR1 =
1
2
3
4
5
6
7
B
C
D
E
F
G
H
GPTYB
GPTYC
GPTYD
GPTYE
GPTYF
GPTYG
GPTYH
PAGE A44
PAGE A44
PAGE A44
PAGE A44
PAGE A45
PAGE A45
PAGE A45
V/A AMVER
a1x° IN COS
a1y° COS+1
a1z° COS+2
a2x° COS+3
a2y° COS+4
a2z° COS+5
a3x° COS+6
a3y° COS+7
a3z° COS+8
FLOATING
R1x IN RES
R1y " RES+1
R1z " RES+2
R2x " RES+3
R2y " RES+4
R2z " RES+5
R3x " RES+6
R3y " RES+7
R3z " RES+8
FIXED
B25

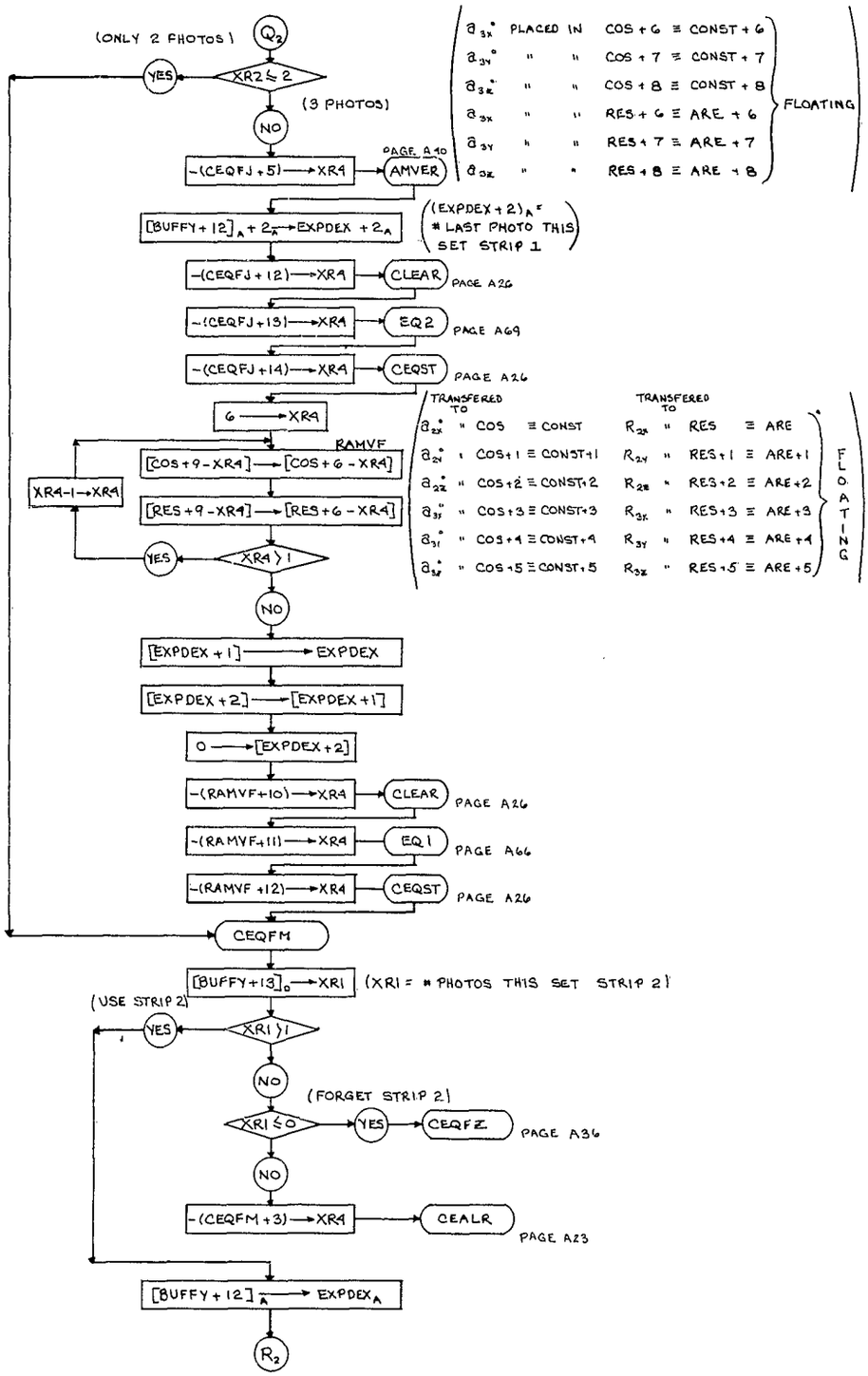

GPTYB
-GPTYB → XR4
EQ 5
(PAGE A80)
GPTYB + 1
-(GPTYB +1) → XR4
CEQST
(PAGE A26)
GPTYB+2
-(GPTYB+2) → XR4
CLEAR
(PAGE A26)
GPTYB+3
-(GPTYB+3) → XR4
EQ 6
(PAGE A81)
PTYB 7
-PTYB7 → XR4
CEQST
(PAGE A26)
PTYB7 +1
-(PTYB7+1) → XR4
CLEAR
(PAGE A26)
PTYB7 +2
-(PTYB7+2) → XR4
EQ 7
(PAGE A85)
PTYB7 +3
-(PTYB7+3) → XR4
CEQST
(PAGE A26)
PTYB7 +4
CEQFJ
(PAGE A45)
GPTYC
-GPTYC → XR4
EQ 5
(PAGE A80)
GPTYC + 1
-(GPTYC+1) → XR4
CEQST
(PAGE A26)
GPTYC+ 2
-(GPTYC+2) → XR4
CLEAR
(PAGE A26)
GPTYC +3
-(GPTYC+3) → XR4
EQ 6
(PAGE A81)
GPTYC+4
-(GPTYC+4) → XR4
CEQST
(PAGE A26)
CEQFJ
(PAGE
GPTYD
-GPTYD → XR4
EQ 6A
(PAGE A83)
GPTYD + 1
GPTYE
-GPTYE → XR4
EQ 6A
(PAGE A83)
GPTYE + 1
-(GPTYE+1) → XR4
CEQST
(PAGE A26)
GPTYE +2
CEQFJ
(PAGE A45)

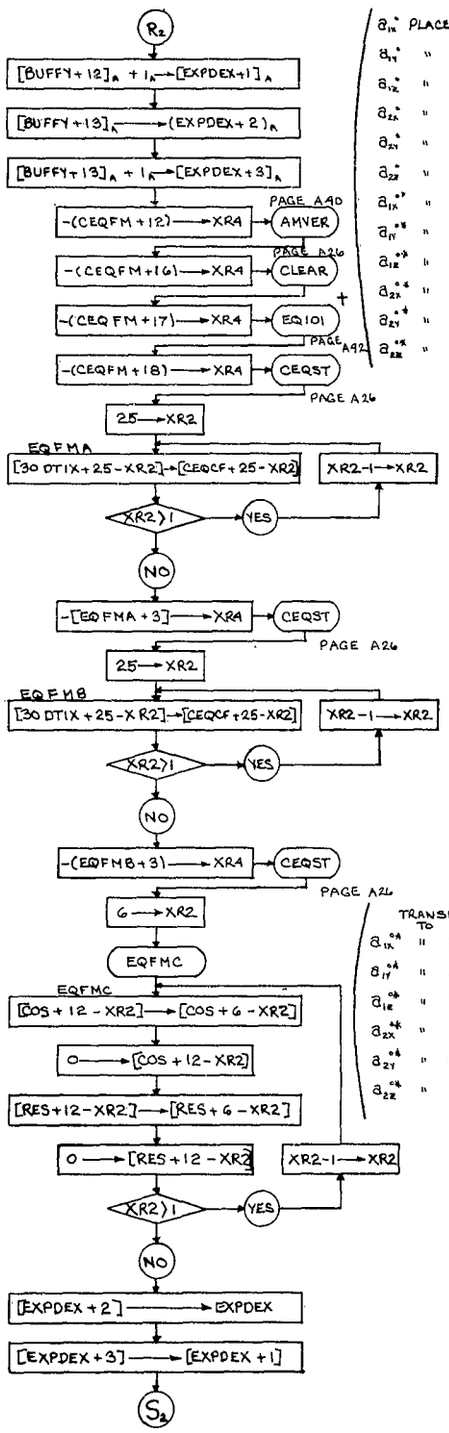


SUMMARY

TYPE	KNOWNS	EQUATIONS
B	ϕ, λ, h	5, 6, 7
	UNEQUAL VALUE	
C	ϕ, λ	5, 6
D	ϕ, h	6A, 7
E	ϕ	6A
F	λ, h	5, (XYZRA, PHXYZ) 7
G	λ	5
H	h	(XYZRA, PHXYZ) 7




(ONLY 2 PHOTOS)
Q_2
YES
XR2 ≤ 2
(3 PHOTOS)
NO
-(CEQFJ+5) → XR4
PAGE A40
AMVER
a_{3X}° PLACED IN COS+6 ≡ CONST+6
a_{3Y}° " " COS+7 ≡ CONST+7
a_{3Z}° " " COS+8 ≡ CONST+8
a_{3X} " " RES+6 ≡ ARE+6
a_{3Y} " " RES+7 ≡ ARE+7
a_{3Z} " " RES+8 ≡ ARE+8
FLOATING
[BUFFY+12]$_A$ + 2_A → EXPDEX + 2_A
(EXPDEX+2)$_A$ = # LAST PHOTO THIS SET STRIP 1
-(CEQFJ+12) → XR4
CLEAR
PAGE A26
-(CEQFJ+13) → XR4
EQ2
PAGE A69
-(CEQFJ+14) → XR4
CEQST
PAGE A26
6 → XR4
RAMVF
[COS+9-XR4] → [COS+6-XR4]
XR4-1 → XR4
[RES+9-XR4] → [RES+6-XR4]
YES
XR4 > 1
NO
TRANSFERED TO
a_{2X}° " COS ≡ CONST
a_{2Y}° " COS+1 ≡ CONST+1
a_{2Z}° " COS+2 ≡ CONST+2
a_{3Y}° " COS+3 ≡ CONST+3
a_{3Z}° " COS+4 ≡ CONST+4
a_{3X}° " COS+5 ≡ CONST+5
TRANSFERED TO
R_{2X} " RES ≡ ARE
R_{2Y} " RES+1 ≡ ARE+1
R_{2Z} " RES+2 ≡ ARE+2
R_{3X} " RES+3 ≡ ARE+3
R_{3Y} " RES+4 ≡ ARE+4
R_{3Z} " RES+5 ≡ ARE+5
FLOATING
[EXPDEX+1] → EXPDEX
[EXPDEX+2] → [EXPDEX+1]
0 → [EXPDEX+2]
-(RAMVF+10) → XR4
CLEAR
PAGE A26
-(RAMVF+11) → XR4
EQ1
PAGE A66
-(RAMVF+12) → XR4
CEQST
PAGE A26
CEQFM
[BUFFY+13]$_0$ → XR1
(XR1 = # PHOTOS THIS SET STRIP 2)
(USE STRIP 2)
YES
XR1 > 1
NO
(FORGET STRIP 2)
XR1 ≤ 0
YES
CEQFZ
PAGE A36
NO
-(CEQFM+3) → XR4
CEALR
PAGE A23
[BUFFY+12]$_A$ → EXPDEX$_A$
R_2

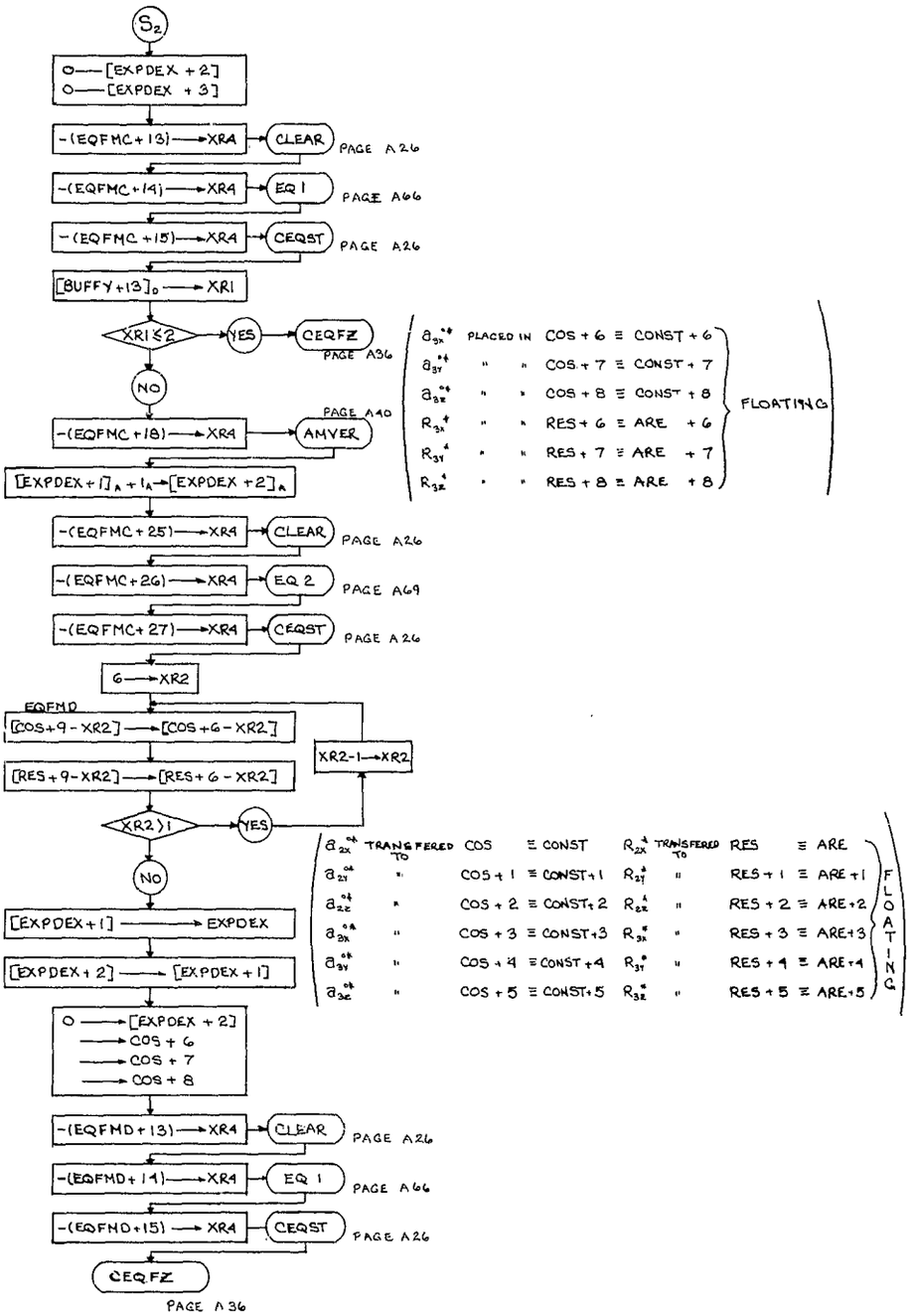


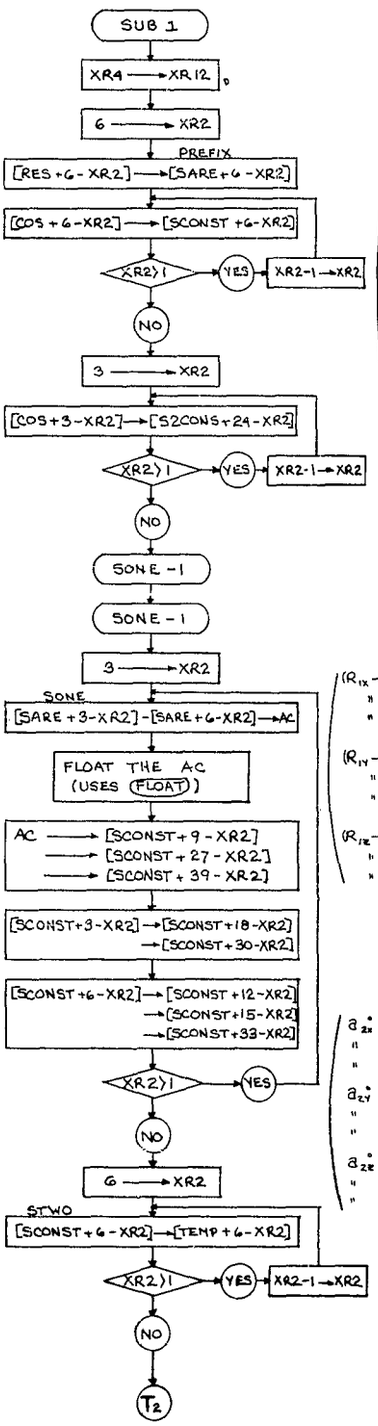
a_{1x}^{*}	PLACED IN	COS	≡ CONST	R_{1x}	PLACED IN	RES	≡ ARE	FLOATING
a_{1y}^{*}	"	COS+1	≡ CONST+1	R_{1y}	"	RES+1	≡ ARE+1	
a_{1z}^{*}	"	COS+2	≡ CONST+2	R_{1z}	"	RES+2	≡ ARE+2	
a_{2x}^{*}	"	COS+3	≡ CONST+3	R_{2y}	"	RES+3	≡ ARE+3	
a_{2y}^{*}	"	COS+4	≡ CONST+4	R_{2x}	"	RES+4	≡ ARE+4	
a_{2z}^{*}	"	COS+5	≡ CONST+5	R_{2z}	"	RES+5	≡ ARE+5	
a_{1x}^{*+}	"	COS+6	≡ CONST+6	R_{1x}^{*}	"	RES+6	≡ ARE+6	
a_{1y}^{*+}	"	COS+7	≡ CONST+7	R_{1y}^{*}	"	RES+7	≡ ARE+7	
a_{1z}^{*+}	"	COS+8	≡ CONST+8	R_{1z}^{*}	"	RES+8	≡ ARE+8	
a_{2x}^{*+}	"	COS+9	≡ CONST+9	R_{2x}^{*}	"	RES+9	≡ ARE+9	
a_{2y}^{*+}	"	COS+10	≡ CONST+10	R_{2y}^{*}	"	RES+10	≡ ARE+10	
a_{2z}^{*+}	"	COS+11	≡ CONST+11	R_{2z}^{*}	"	RES+11	≡ ARE+11	

+ (COMPUTES EQUATIONS 101, 102, 103)

a_{1x}^{o*}	TRANSFERED TO	COS	≡ CONST	R_{1x}^{*}	TRANSFERED TO	RES	≡ ARE	FLOATING
a_{1y}^{o*}	"	COS+1	≡ CONST+1	R_{1y}^{*}	"	RES+1	≡ ARE+1	
a_{1z}^{o*}	"	COS+2	≡ CONST+2	R_{1z}^{*}	"	RES+2	≡ ARE+2	
a_{2x}^{o*}	"	COS+3	≡ CONST+3	R_{2x}^{*}	"	RES+3	≡ ARE+3	
a_{2y}^{o*}	"	COS+4	≡ CONST+4	R_{2y}^{*}	"	RES+4	≡ ARE+4	
a_{2z}^{o*}	"	COS+5	≡ CONST+5	R_{2z}^{*}	"	RES+5	≡ ARE+5	

[0 PLACED IN COS+(6 TO 11) & RES+(6 TO 11)]


S2
0 — [EXPDEX + 2]
0 — [EXPDEX + 3]
-(EQFMC+13) → XR4
CLEAR
PAGE A26
-(EQFMC+14) → XR4
EQ 1
PAGE A66
-(EQFMC+15) → XR4
CEQST
PAGE A26
[BUFFY+13]0 → XR1
XR1 ≤ 2
YES
CEQFZ
PAGE A36
NO
-(EQFMC+18) → XR4
AMVER
PAGE A40
[EXPDEX+1]A + 1A → [EXPDEX+2]A
-(EQFMC+25) → XR4
CLEAR
PAGE A26
-(EQFMC+26) → XR4
EQ 2
PAGE A69
-(EQFMC+27) → XR4
CEQST
PAGE A26
6 → XR2
EQFMD
[COS+9-XR2] → [COS+6-XR2]
[RES+9-XR2] → [RES+6-XR2]
XR2-1 → XR2
XR2 > 1
YES
NO
[EXPDEX+1] → EXPDEX
[EXPDEX+2] → [EXPDEX+1]
0 → [EXPDEX + 2]
→ COS + 6
→ COS + 7
→ COS + 8
-(EQFMD+13) → XR4
CLEAR
PAGE A26
-(EQFMD+14) → XR4
EQ 1
PAGE A66
-(EQFMD+15) → XR4
CEQST
PAGE A26
CEQFZ
PAGE A36
PLACED IN COS + 6 ≡ CONST + 6
" " COS + 7 ≡ CONST + 7
" " COS + 8 ≡ CONST + 8
" " RES + 6 ≡ ARE + 6
" " RES + 7 ≡ ARE + 7
" " RES + 8 ≡ ARE + 8
FLOATING
TRANSFERED TO COS ≡ CONST
" COS + 1 ≡ CONST + 1
" COS + 2 ≡ CONST + 2
" COS + 3 ≡ CONST + 3
" COS + 4 ≡ CONST + 4
" COS + 5 ≡ CONST + 5
TRANSFERED TO RES ≡ ARE
" RES + 1 ≡ ARE + 1
" RES + 2 ≡ ARE + 2
" RES + 3 ≡ ARE + 3
" RES + 4 ≡ ARE + 4
" RES + 5 ≡ ARE + 5
FLOATING



R_{1X}	TRANSFERED TO	SARE	FIXED, B25
R_{1Y}	"	SARE + 1	
R_{1Z}	"	SARE + 2	
R_{2X}	"	SARE + 3	
R_{2Y}	"	SARE + 4	
R_{2Z}	"	SARE + 5	
a_{1X}°	"	S2CONS + 21	FLOATING
a_{1Y}°	"	S2CONS + 22	
a_{1Z}°	"	S2CONS + 23	

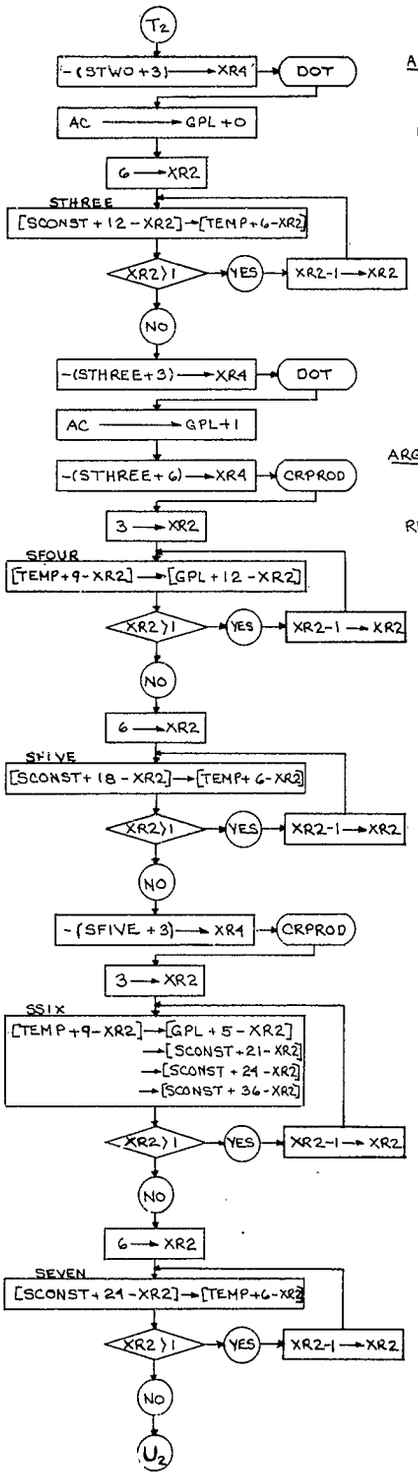
a_{1X}°	TRANSFERED TO	SCONST	FLOATING
a_{1Y}°	"	SCONST + 1	
a_{1Z}°	"	SCONST + 2	
a_{2X}°	"	SCONST + 3	
a_{2Y}°	"	SCONST + 4	
a_{2Z}°	"	SCONST + 5	

$(R_{1X} - R_{2X})$	STORED IN	SCONST + 6	FLOATING
"	"	SCONST + 24	
"	"	SCONST + 36	
$(R_{1Y} - R_{2Y})$	"	SCONST + 7	
"	"	SCONST + 25	
"	"	SCONST + 37	
$(R_{1Z} - R_{2Z})$	"	SCONST + 8	
"	"	SCONST + 26	
"	"	SCONST + 38	

$$= \begin{pmatrix} B_{1X} \\ B_{1Y} \\ B_{1Z} \end{pmatrix}$$

a_{2Z}°	PLACED INTO	SCONST + 9	FLOATING
"	"	SCONST + 12	
"	"	SCONST + 30	
a_{2Y}°	"	SCONST + 10	
"	"	SCONST + 13	
"	"	SCONST + 31	
a_{2Z}°	"	SCONST + 11	
"	"	SCONST + 14	
"	"	SCONST + 32	

a_{1X}°	PLACED INTO	SCONST + 15	FLOATING
"	"	SCONST + 27	
a_{1Y}°	"	SCONST + 16	
"	"	SCONST + 28	
a_{1Z}°	"	SCONST + 17	
"	"	SCONST + 29	



ARGUMENT

1st VECTOR IN TEMP + (0,1,2)
2nd VECTOR IN TEMP + (3,4,5)
RESULTS — IN AC, FLOATING } FLOATING

[$(\bar{A}_1^\circ \cdot \bar{A}_2^\circ)$ IN GPL+0 (FLOATING)]

[$(\bar{B}_1 \cdot \bar{A}_2^\circ$ IN GPL+1 (FLOATING)]

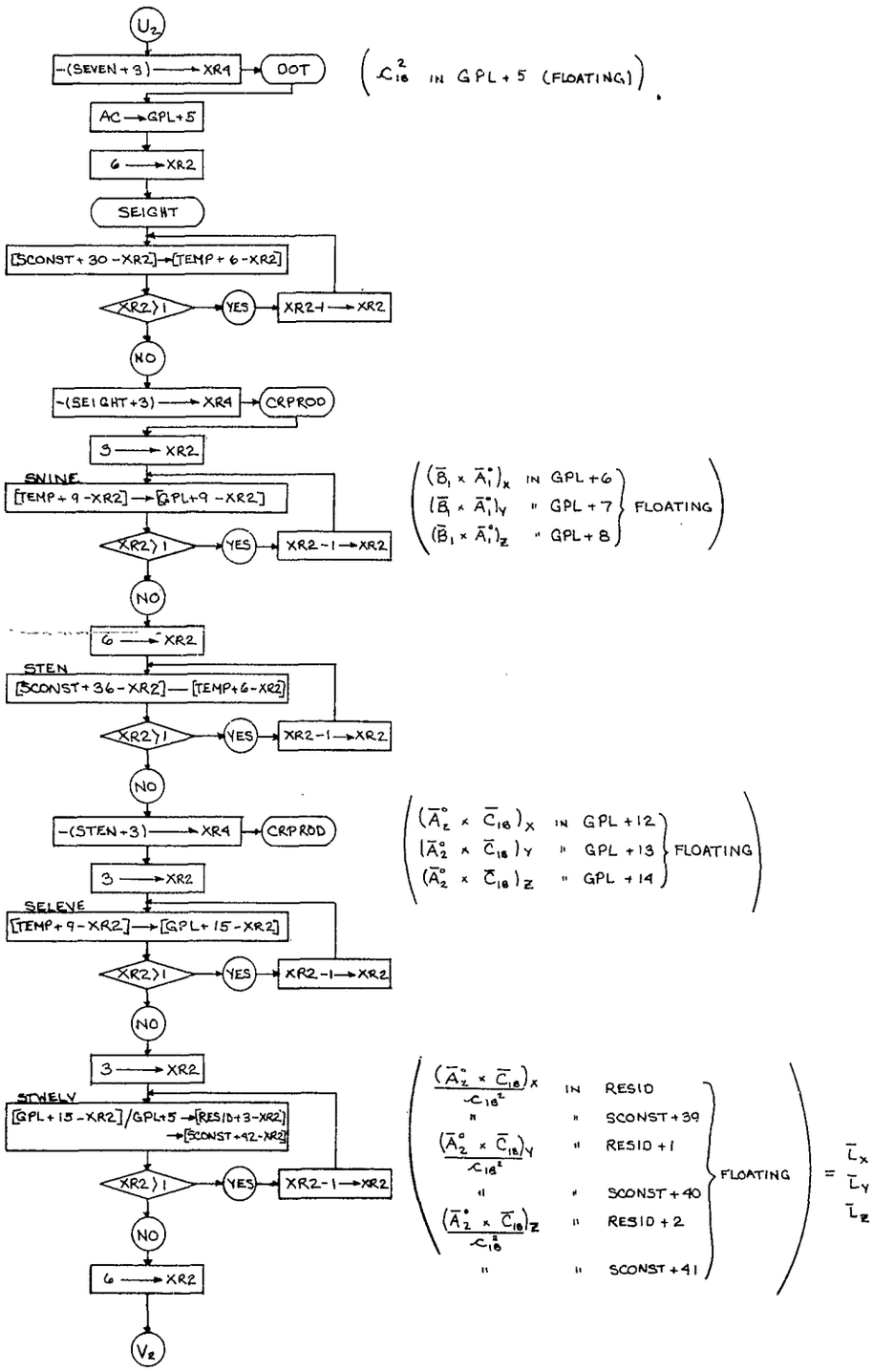
ARGUMENT

1st VECTOR IN TEMP+(0,1,2)
2nd VECTOR IN TEMP + (3,4,5)
RESULTANT VECTOR IN TEMP+(6,7,8) } FLOATING

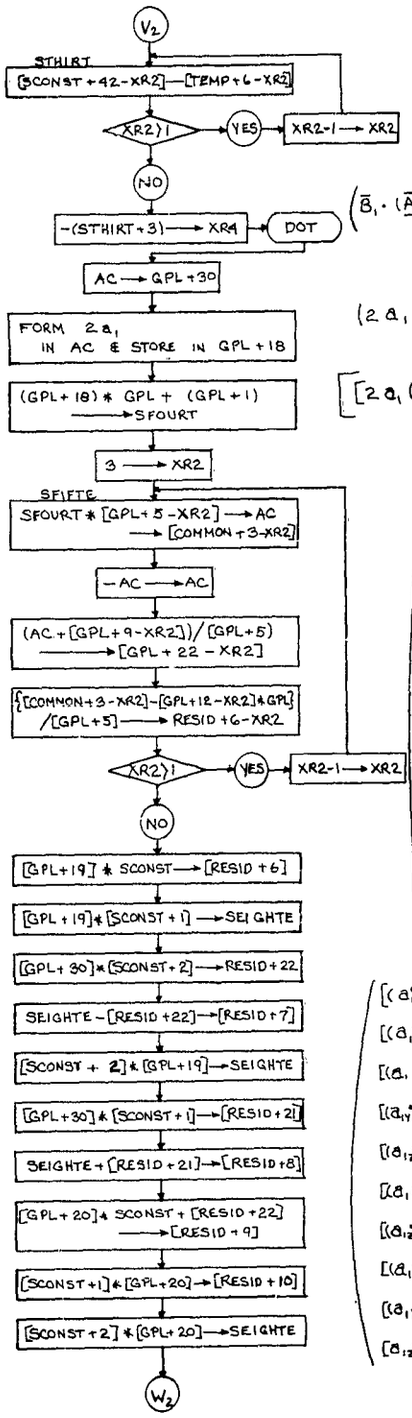
$(\bar{B}_1 \times \bar{A}_2^\circ)_x$ IN GPL+9
$(\bar{B}_1 \times \bar{A}_2^\circ)_y$ IN GPL+10 } FLOATING
$(\bar{B}_1 \times \bar{A}_2^\circ)_z$ IN GPL+11

$(\bar{A}_2^\circ \times \bar{A}_1^\circ)_x$ IN GPL+2
" " SCONST+18
" " SCONST+21
" " SCONST+33
$(\bar{A}_2^\circ \times \bar{A}_1^\circ)_y$ " GPL+3
" " SCONST+19
" " SCONST+22
" " SCONST+34
$(\bar{A}_2^\circ \times \bar{A}_1^\circ)_z$ " GPL+4
" " SCONST+20
" " SCONST+23
" " SCONST+35
} FLOATING

$= C_{18X}$, C_{18Y}, C_{18Z}


U2
-(SEVEN+3) → XR4
DOT
(C18² IN GPL+5 (FLOATING))
AC → GPL+5
6 → XR2
SEIGHT
[SCONST+30-XR2] → [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
-(SEIGHT+3) → XR4
CRPROD
3 → XR2
SNINE
[TEMP+9-XR2] → [GPL+9-XR2]
XR2>1
YES
XR2-1 → XR2
NO
((B̄1 × Ā1°)X IN GPL+6
(B̄1 × Ā1°)Y " GPL+7
(B̄1 × Ā1°)Z " GPL+8) FLOATING
6 → XR2
STEN
[SCONST+36-XR2] — [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
-(STEN+3) → XR4
CRPROD
3 → XR2
SELEVE
[TEMP+9-XR2] → [GPL+15-XR2]
XR2>1
YES
XR2-1 → XR2
NO
((Ā2° × C̄18)X IN GPL+12
(Ā2° × C̄18)Y " GPL+13
(Ā2° × C̄18)Z " GPL+14) FLOATING
3 → XR2
STWELV
[GPL+15-XR2]/GPL+5 → [RESID+3-XR2]
→ [SCONST+42-XR2]
XR2>1
YES
XR2-1 → XR2
NO
6 → XR2
V2
((Ā2° × C̄18)X / C18² IN RESID
" " SCONST+39
(Ā2° × C̄18)Y / C18² " RESID+1
" " SCONST+40
(Ā2° × C̄18)Z / C18² " RESID+2
" " SCONST+41) FLOATING = L̄X L̄Y L̄Z

A51



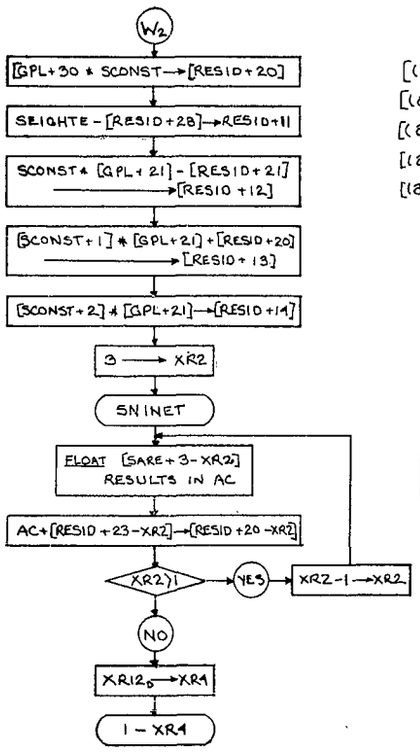
$$\left(\bar{B}_1 \cdot \frac{(\bar{A}_2^{\circ} \times \bar{C}_{18})}{c_{18}^2} \text{ IN GPL + 30 (FLOATING)} \equiv a_1\right)$$

$$(2a_1 \text{ IN GPL + 18}) \text{ (FLOATING)}$$

$$\left[\left[2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})\right] \text{ IN SFOURT (FLOATING)}\right].$$

$$\left(\begin{array}{ll}
\left.\begin{array}{l}
\{[2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18X}\} \text{ IN COMMON + 0} \\
\{[2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18Y}\} \text{ " COMMON + 1} \\
\{[2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18Z}\} \text{ " COMMON + 2}
\end{array}\right\} \text{FLOATING} & \\
\left.\begin{array}{ll}
\dfrac{(\bar{B}_1 \times \bar{A}_1^{\circ})_X - [2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18X}}{c_{18}^2} \text{ IN GPL+19} & = G_X \\
\dfrac{(\bar{B}_1 \times \bar{A}_1^{\circ})_Y - [2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18Y}}{c_{18}^2} \text{ IN GPL+20} & G_Y \\
\dfrac{(\bar{B}_1 \times \bar{A}_1^{\circ})_Z - [2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18Z}}{c_{18}^2} \text{ IN GPL+21} & G_Z
\end{array}\right\} \text{FLOATING} & \\
\dfrac{[2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18X} - (\bar{B}_1 \times \bar{A}_2^{\circ})_X (\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ})}{c_{18}^2} \text{ IN RESID+3} & = P_X \\
\dfrac{[2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18Y} - (\bar{B}_1 \times \bar{A}_2^{\circ})_Y (\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ})}{c_{18}^2} \text{ IN RESID + 4} & P_Y \\
\dfrac{[2a_1(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) + (\bar{B}_1 \cdot \bar{A}_2^{\circ})]\, C_{18Z} - (\bar{B}_1 \times \bar{A}_2^{\circ})_Z (\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ})}{c_{18}^2} \text{ IN RESID+5} & P_Z
\end{array}\right) \text{FLOATING}$$

$$\left(\begin{array}{ll}
[(a_{1X}^{\circ} G_X) & \text{IN RESID + 6 (FLOATING)}] \\
[(a_{1Y}^{\circ} G_X) & \text{" SEIGHTE (FLOATING)}] \\
[(a_1 a_{1Z}^{\circ}) & \text{" RESID + 22 (FLOATING)}] \\
[(a_{1Y}^{\circ} G_X - a_1 a_{1Z}^{\circ}) & \text{IN RESID + 7 (FLOATING)}] \\
[(a_{1Z}^{\circ} G_X) & \text{REPLACES SEIGHTE (FLOATING)}] \\
[(a_1 a_{1Y}^{\circ}) & \text{IN RESID + 21 (FLOATING)}] \\
[(a_{1Z}^{\circ} G_X + a_1 a_{1Y}^{\circ}) & \text{IN RESID + 8 (FLOATING)}] \\
[(a_{1X}^{\circ} G_Y + a_1 a_{1Z}^{\circ}) & \text{" RESID+9 (FLOATING)}] \\
[(a_{1Y}^{\circ} G_Y) & \text{" RESID+10 (FLOATING)}] \\
[a_{1Z}^{\circ} G_Y) & \text{" SEIGHTE (FLOATING)}]
\end{array}\right)$$



$[(a_1 a_{1x}^{\circ})$ IN RESID + 20 (FLOATING)$]$

$[(a_{1z}^{\circ} G_y - a_1 a_{1x}^{\circ})$ " RESID + 11 (FLOATING)$]$

$[(a_{1x}^{\circ} G_z - a_1 a_{1y}^{\circ})$ " RESID + 12 (FLOATING)$]$

$[(a_{1y}^{\circ} G_z + a_1 a_{1x}^{\circ})$ " RESID + 13 (FLOATING)$]$

$[(a_{1z}^{\circ} G_z)$ " RESID + 14 (FLOATING)$]$

$$\left(\left. \begin{array}{ll} (R_{1x} + a_1 a_{1x}^{\circ}) & \text{IN RESID + 17} \\ (R_{1y} + a_1 a_{1y}^{\circ}) & \text{IN RESID + 18} \\ (R_{1z} + a_1 a_{1z}^{\circ}) & \text{IN RESID + 19} \end{array} \right\} \text{FLOATING} \right)$$

SUMMARY OF SUB 1

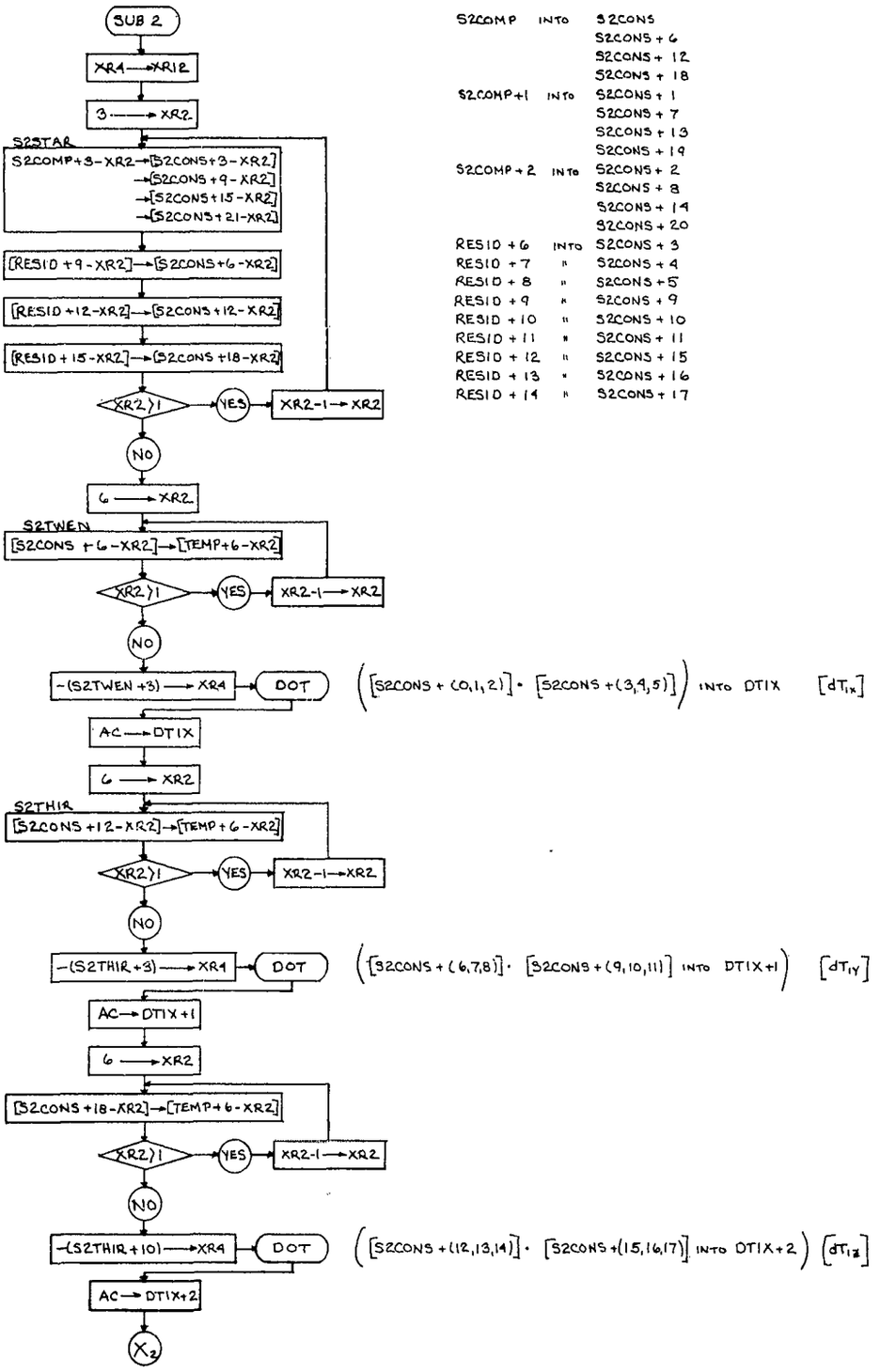
R_{1x}	IN	SARE	FIXED, B25
R_{1y}	"	SARE + 1	
R_{1z}	"	SARE + 2	
R_{2x}	"	SARE + 3	
R_{2y}	"	SARE + 4	
R_{2z}	"	SARE + 5	

FLOATING

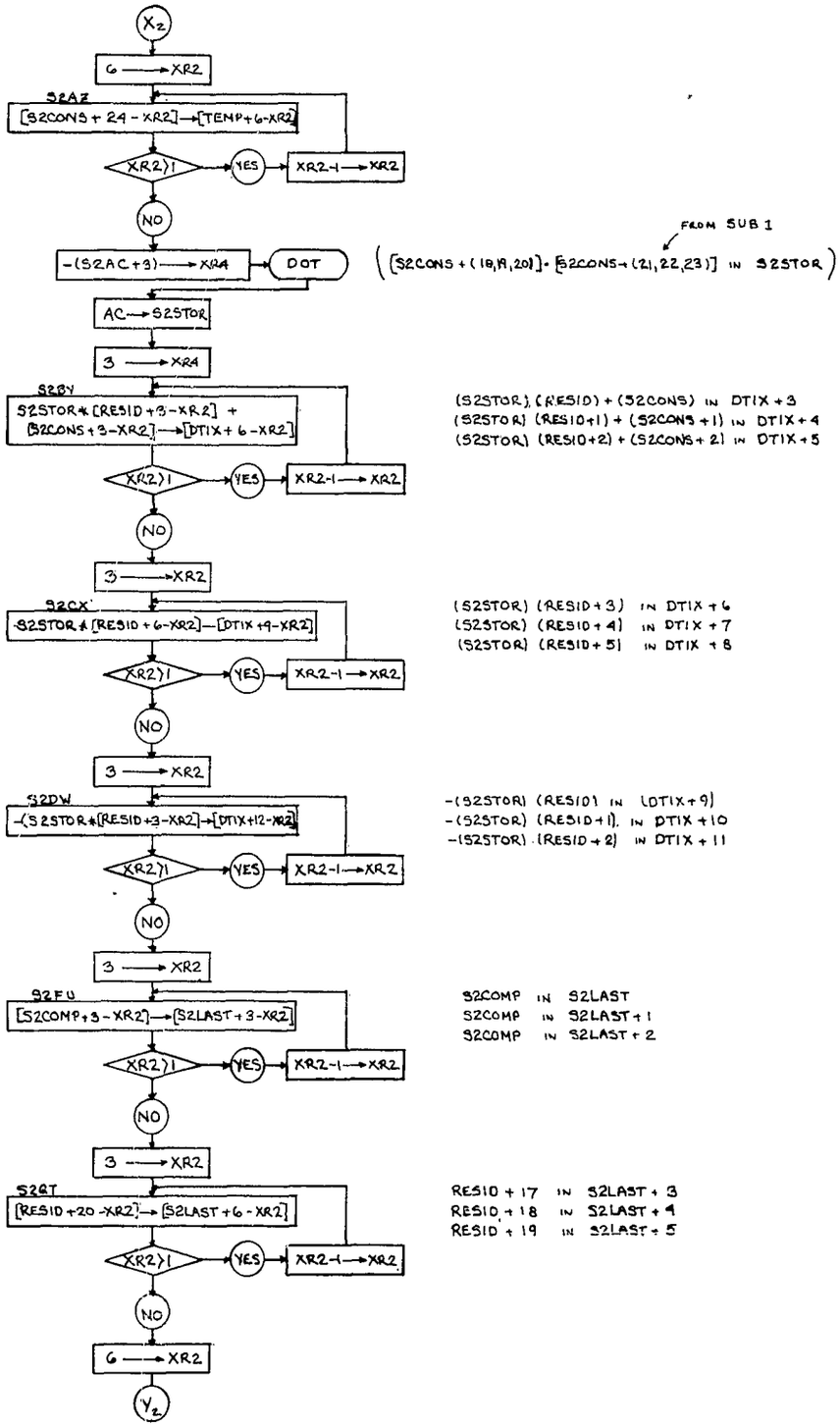
L_x	IN	RESID
L_y	"	RESID + 1
L_z	"	RESID + 2
P_x	"	RESID + 3
P_y	"	RESID + 4
P_z	"	RESID + 5
$(a_{1x}^{\circ} G_x)$	"	RESID + 6
$(a_{1y}^{\circ} G_x - a_1 a_{1z}^{\circ})$	"	RESID + 7
$(a_{1z}^{\circ} G_x + a_1 a_{1y}^{\circ})$	"	RESID + 8
$(a_{1x}^{\circ} G_y + a_1 a_{1z}^{\circ})$	"	RESID + 9
$(a_{1y}^{\circ} G_y)$	"	RESID + 10
$(a_{1z}^{\circ} G_y - a_1 a_{1x}^{\circ})$	"	RESID + 11
$(a_{1x}^{\circ} G_z - a_1 a_{1y}^{\circ})$	"	RESID + 12
$(a_{1y}^{\circ} G_z + a_1 a_{1x}^{\circ})$	"	RESID + 13
$(a_{1z}^{\circ} G_z)$	"	RESID + 14
$(R_{1x} + a_1 a_{1x}^{\circ})$	"	RESID + 17
$(R_{1y} + a_1 a_{1y}^{\circ})$	"	RESID + 18
$(R_{1z} + a_1 a_{1z}^{\circ})$	"	RESID + 19
$(a_1 a_{1x}^{\circ})$	"	RESID + 20
$(a_1 a_{1y}^{\circ})$	"	RESID + 21
$(a_1 a_{1z}^{\circ})$	"	RESID + 22

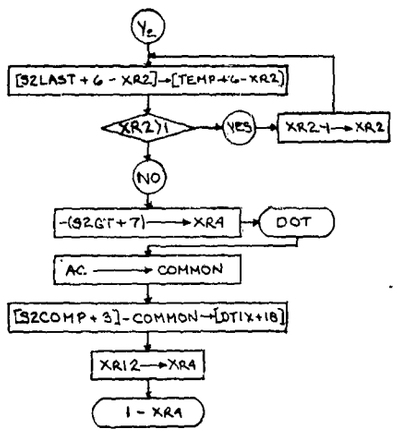
a_{1x}°	"	S2CONS + 21
a_{1y}°	"	S2CONS + 22
a_{1z}°	"	S2CONS + 23
a_{1x}°	"	SCONST
a_{1y}°	"	SCONST + 1
a_{1z}°	"	SCONST + 2
a_{2x}°	"	SCONST + 3
a_{2y}°	"	SCONST + 4
a_{2z}°	"	SCONST + 5
B_{1x}	"	SCONST + 6
B_{1y}	"	SCONST + 7
B_{1z}	"	SCONST + 8
a_{2x}°	"	SCONST + 9
a_{2y}°	"	SCONST + 10
a_{2z}°	"	SCONST + 11
a_{2x}°	"	SCONST + 12
a_{2y}°	"	SCONST + 13
a_{2z}°	"	SCONST + 14
a_{1x}°	"	SCONST + 15
a_{1y}°	"	SCONST + 16
a_{1z}°	"	SCONST + 17
C_{18x}	"	SCONST + 18
C_{18y}	"	SCONST + 19
C_{18z}	"	SCONST + 20
C_{18x}	"	SCONST + 21
C_{18y}	"	SCONST + 22
C_{18z}	"	SCONST + 23
B_{1x}	"	SCONST + 24
B_{1y}	"	SCONST + 25
B_{1z}	"	SCONST + 26
a_{1x}°	"	SCONST + 27
a_{1y}°	"	SCONST + 28
a_{1z}°	"	SCONST + 29
a_{2x}°	"	SCONST + 30
a_{2y}°	"	SCONST + 31
a_{2z}°	"	SCONST + 32
C_{18x}	"	SCONST + 33
C_{18y}	"	SCONST + 34
C_{18z}	"	SCONST + 35
B_{1x}	"	SCONST + 36
B_{1y}	"	SCONST + 37
B_{1z}	"	SCONST + 38
L_x	"	SCONST + 39
L_y	"	SCONST + 40
L_z	"	SCONST + 41

$(\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ})$	IN	GPL
$(\bar{B}_1 \cdot \bar{A}_2^{\circ})$	"	GPL + 1
C_{18x}	"	GPL + 2
C_{18y}	"	GPL + 3
C_{18z}	"	GPL + 4
$-C_{18}^{2}$	"	GPL + 5
$(\bar{B}_1 \cdot \bar{A}_1^{\circ})_x$	"	GPL + 6
$(\bar{B}_1 \cdot \bar{A}_1^{\circ})_y$	"	GPL + 7
$(\bar{B}_1 \cdot \bar{A}_1^{\circ})_z$	"	GPL + 8
$(\bar{B}_1 \cdot \bar{A}_2^{\circ})_x$	"	GPL + 9
$(\bar{B}_1 \cdot \bar{A}_2^{\circ})_y$	"	GPL + 10
$(\bar{B}_1 \cdot \bar{A}_2^{\circ})_z$	"	GPL + 11
$(\bar{A}_2^{\circ} \times \bar{C}_{18})_x$	"	GPL + 12
$(\bar{A}_2^{\circ} \times \bar{C}_{18})_y$	"	GPL + 13
$(\bar{A}_2^{\circ} \times \bar{C}_{18})_z$	"	GPL + 14
$2a_1$	IN	GPL + 18
G_x	"	GPL + 19
G_y	"	GPL + 20
G_z	"	GPL + 21
a_1	IN	GPL + 30



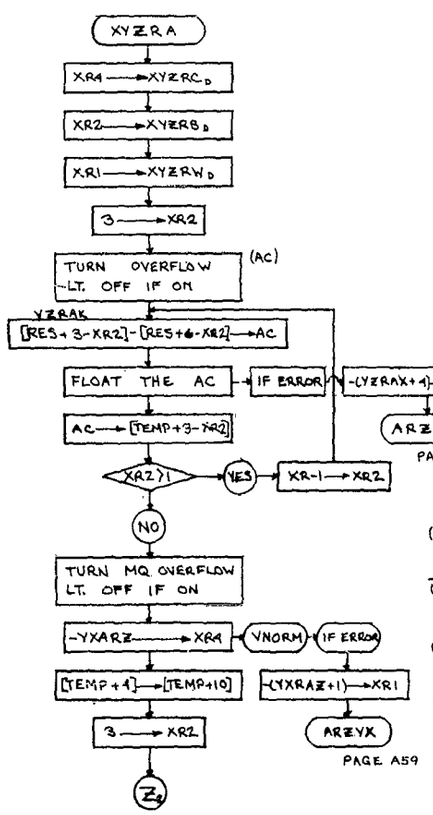
S2COMP	INTO	S2CONS
		S2CONS + 6
		S2CONS + 12
		S2CONS + 18
S2COMP+1	INTO	S2CONS + 1
		S2CONS + 7
		S2CONS + 13
		S2CONS + 19
S2COMP + 2	INTO	S2CONS + 2
		S2CONS + 8
		S2CONS + 14
		S2CONS + 20
RESID + 6	INTO	S2CONS + 3
RESID + 7	"	S2CONS + 4
RESID + 8	"	S2CONS + 5
RESID + 9	"	S2CONS + 9
RESID + 10	"	S2CONS + 10
RESID + 11	"	S2CONS + 11
RESID + 12	"	S2CONS + 15
RESID + 13	"	S2CONS + 16
RESID + 14	"	S2CONS + 17


X2
6 → XR2
S2AZ
[S2CONS + 24 - XR2] → [TEMP + 6 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
- (S2AC + 3) → XR4
DOT
FROM SUB 1
([S2CONS + (18,19,20)] · [S2CONS + (21,22,23)] IN S2STOR)
AC → S2STOR
3 → XR4
S2BY
S2STOR * [RESID + 3 - XR2] +
[S2CONS + 3 - XR2] → [DTIX + 6 - XR2]
(S2STOR) (RESID) + (S2CONS) IN DTIX + 3
(S2STOR) (RESID + 1) + (S2CONS + 1) IN DTIX + 4
(S2STOR) (RESID + 2) + (S2CONS + 2) IN DTIX + 5
XR2 > 1
YES
XR2 - 1 → XR2
NO
3 → XR2
S2CX
S2STOR * [RESID + 6 - XR2] — [DTIX + 9 - XR2]
(S2STOR) (RESID + 3) IN DTIX + 6
(S2STOR) (RESID + 4) IN DTIX + 7
(S2STOR) (RESID + 5) IN DTIX + 8
XR2 > 1
YES
XR2 - 1 → XR2
NO
3 → XR2
S2DW
- (S2STOR * [RESID + 3 - XR2] → [DTIX + 12 - XR2]
- (S2STOR) (RESID) IN (DTIX + 9)
- (S2STOR) (RESID + 1) IN DTIX + 10
- (S2STOR) (RESID + 2) IN DTIX + 11
XR2 > 1
YES
XR2 - 1 → XR2
NO
3 → XR2
S2EU
[S2COMP + 3 - XR2] → [S2LAST + 3 - XR2]
S2COMP IN S2LAST
S2COMP IN S2LAST + 1
S2COMP IN S2LAST + 2
XR2 > 1
YES
XR2 - 1 → XR2
NO
3 → XR2
S2ET
[RESID + 20 - XR2] → [S2LAST + 6 - XR2]
RESID + 17 IN S2LAST + 3
RESID + 18 IN S2LAST + 4
RESID + 19 IN S2LAST + 5
XR2 > 1
YES
XR2 - 1 → XR2
NO
6 → XR2
Y2



[S2COMP + (0,1,2)] · [RESID + (17,18,19)] IN COMMON

S2COMP + 3 - COMMON IN DT1X + 18



$(R_{1X} - R_{2X}) = (\bar{B}_{1X})$ IN TEMP + 0 (FLOATING)

$(R_{1Y} - R_{2Y}) = (\bar{B}_{1Y})$ " TEMP + 1 "

$(R_{1Z} - R_{2Z}) = (\bar{B}_{1Z})$ " TEMP + 2 "

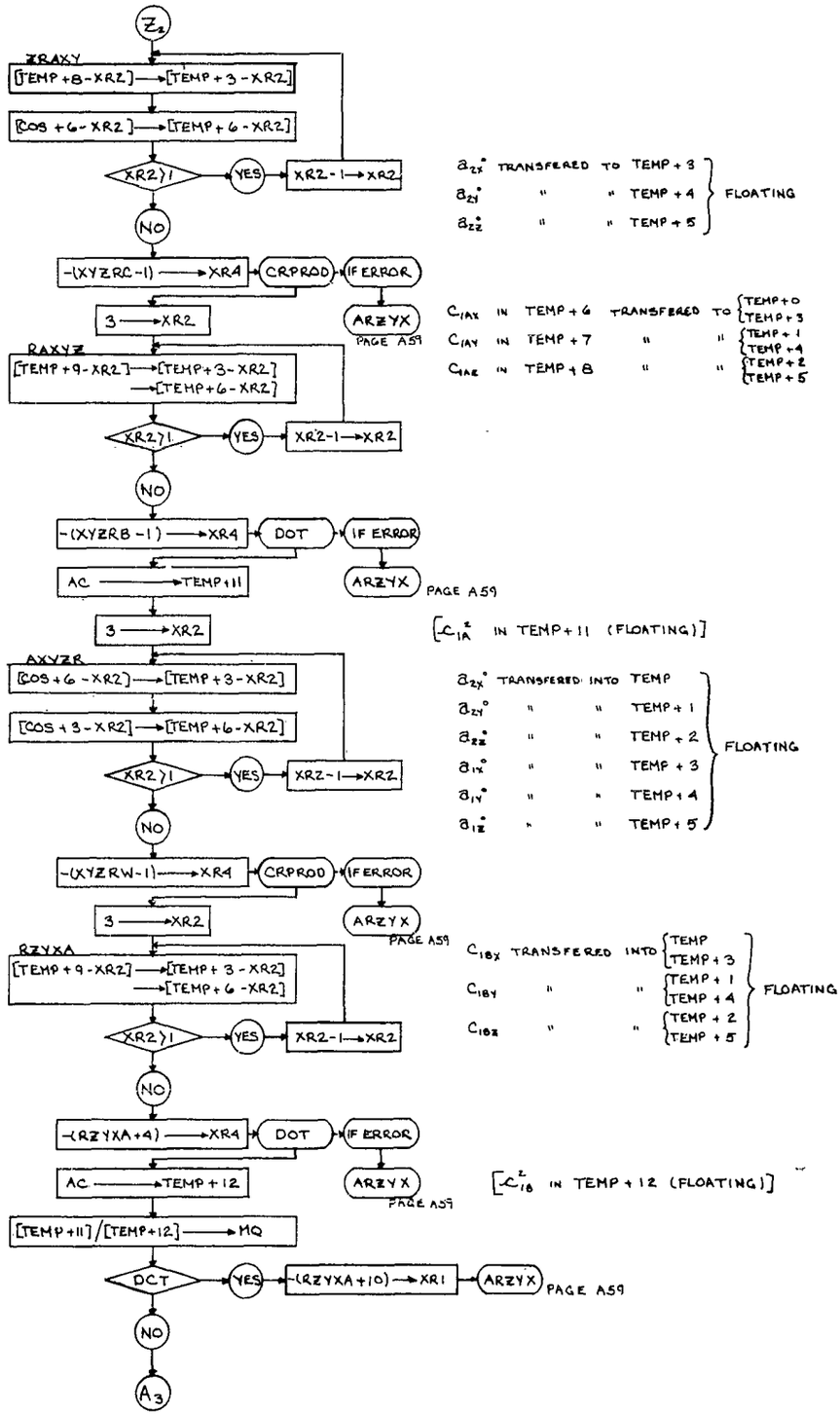
$(\bar{B}_{1X}^2 + \bar{B}_{1Y}^2 + \bar{B}_{1Z}^2)^{1/2}$ IN TEMP + 4 TRANSFERED TO TEMP + 10

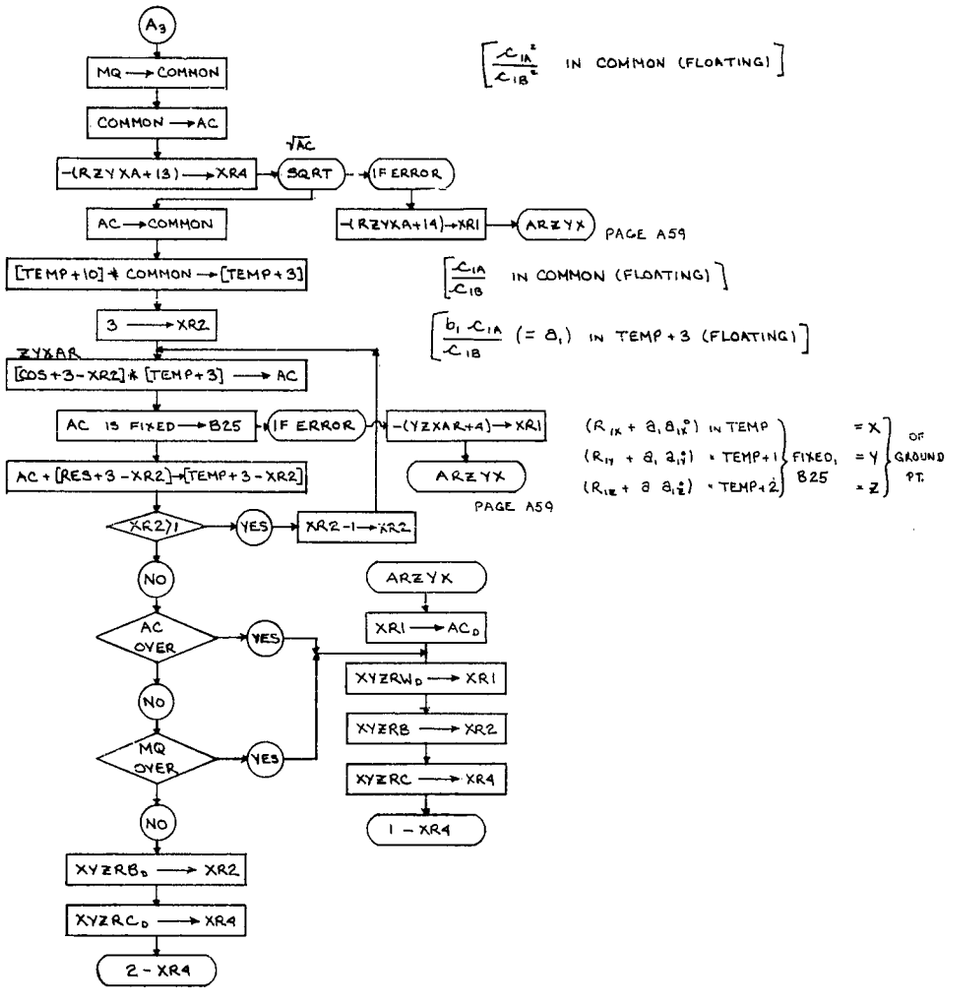
$\dfrac{\bar{B}_{1X}}{(\bar{B}_{1X}^2 + \bar{B}_{1Y}^2 + \bar{B}_{1Z}^2)^{1/2}}$ IN TEMP + 5 " " TEMP $= b_{1X}^*$

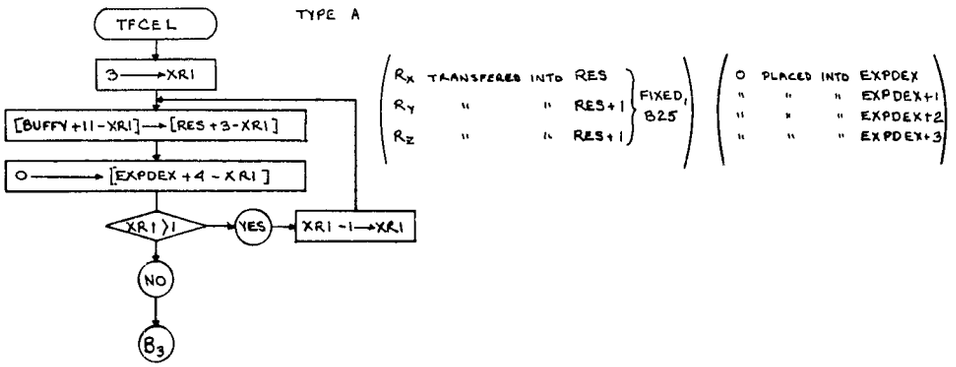
$\dfrac{\bar{B}_{1Y}}{(\bar{B}_{1X}^2 + \bar{B}_{1Y}^2 + \bar{B}_{1Z}^2)^{1/2}}$ IN TEMP + 6 TRANSFERED TO TEMP + 1 $= b_{1Y}^*$

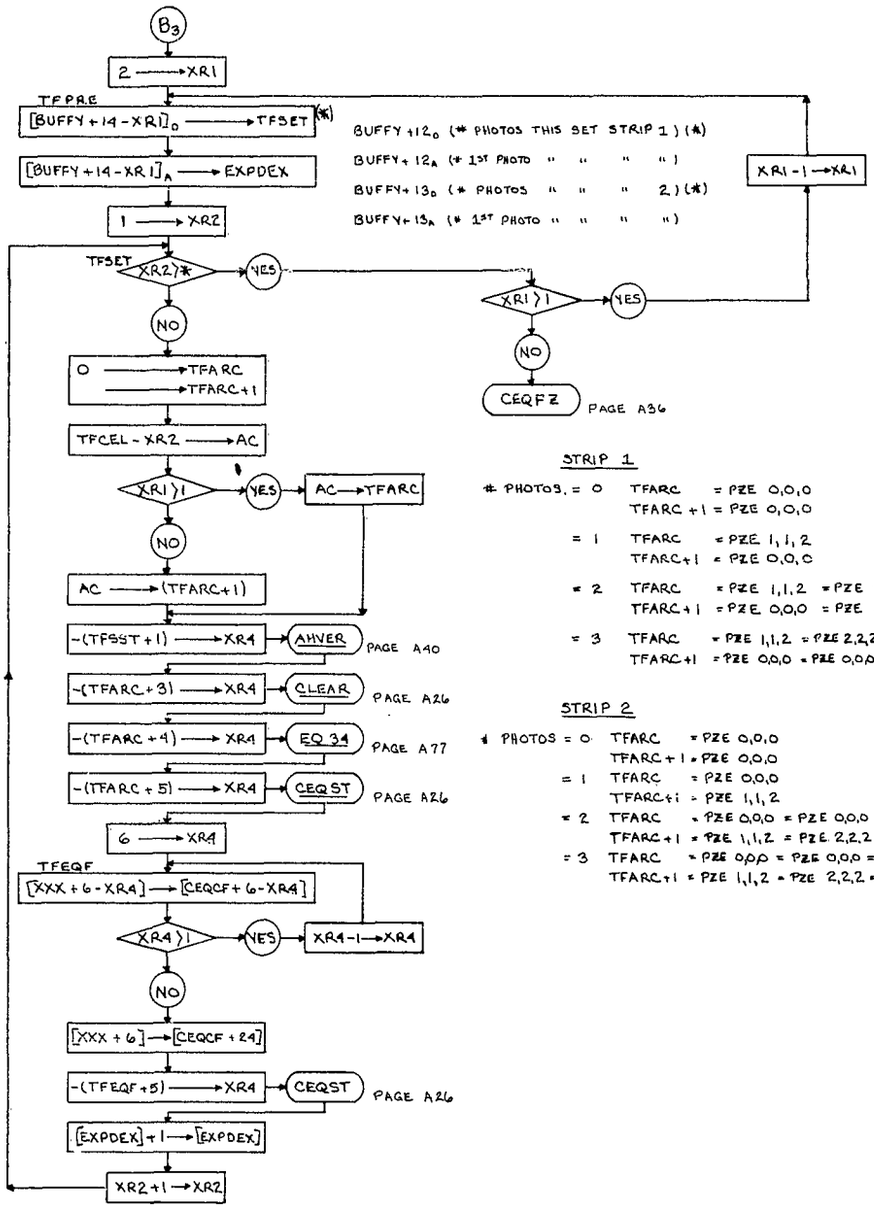
$\dfrac{\bar{B}_{1Z}}{(\bar{B}_{1X}^2 + \bar{B}_{1Y}^2 + \bar{B}_{1Z}^2)^{1/2}}$ IN TEMP + 7 " " TEMP + 2 $= b_{1Z}^*$

FLOATING


Z2
ZRAXY
[TEMP+8-XR2] → [TEMP+3-XR2]
[COS+6-XR2] → [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
-(XYZRC-1) → XR4
CRPROD
IF ERROR
3 → XR2
ARZYX
PAGE A59
RAXYZ
[TEMP+9-XR2] → [TEMP+3-XR2]
→ [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
-(XYZRB-1) → XR4
DOT
IF ERROR
AC → TEMP+11
ARZYX
PAGE A59
3 → XR2
AXYZR
[COS+6-XR2] → [TEMP+3-XR2]
[COS+3-XR2] → [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
-(XYZRW-1) → XR4
CRPROD
IF ERROR
3 → XR2
ARZYX
PAGE A59
RZYXA
[TEMP+9-XR2] → [TEMP+3-XR2]
→ [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
-(RZYXA+4) → XR4
DOT
IF ERROR
AC → TEMP+12
ARZYX
PAGE A59
[TEMP+11]/[TEMP+12] → MQ
DCT
YES
-(RZYXA+10) → XR1
ARZYX
PAGE A59
NO
A3
a_{2X}° TRANSFERED TO TEMP+3
a_{2Y}° " " TEMP+4
a_{2Z}° " " TEMP+5
FLOATING
C_{1AX} IN TEMP+6 TRANSFERED TO TEMP+0, TEMP+3
C_{1AY} IN TEMP+7 " " TEMP+1, TEMP+4
C_{1AZ} IN TEMP+8 " " TEMP+2, TEMP+5
[C_{1A}^{2} IN TEMP+11 (FLOATING)]
a_{2X}° TRANSFERED INTO TEMP
a_{2Y}° " " TEMP+1
a_{2Z}° " " TEMP+2
a_{1X}° " " TEMP+3
a_{1Y}° " " TEMP+4
a_{1Z}° " " TEMP+5
FLOATING
C_{1BX} TRANSFERED INTO TEMP, TEMP+3
C_{1BY} " " TEMP+1, TEMP+4
C_{1BZ} " " TEMP+2, TEMP+5
FLOATING
[C_{1B}^{2} IN TEMP+12 (FLOATING)]


A3
MQ → COMMON
COMMON → AC
-(RZYXA+13) → XR4
√AC
SQRT
IF ERROR
AC → COMMON
-(RZYXA+14) → XR1
ARZYX
PAGE A59
[TEMP+10] * COMMON → [TEMP+3]
3 → XR2
ZYXAR
[COS+3-XR2] * [TEMP+3] → AC
AC IS FIXED → B25
IF ERROR
-(YZXAR+4) → XR1
ARZYX
PAGE A59
AC + [RES+3-XR2] → [TEMP+3-XR2]
XR2 > 1
YES
XR2 -1 → XR2
NO
AC OVER
YES
NO
MQ OVER
YES
NO
XYZRB0 → XR2
XYZRC0 → XR4
2 - XR4
ARZYX
XR1 → AC0
XYZRW0 → XR1
XYZRB → XR2
XYZRC → XR4
1 - XR4
[C1A²/C1B² IN COMMON (FLOATING)]
[C1A/C1B IN COMMON (FLOATING)]
[b1 C1A/C1B (= a1) IN TEMP+3 (FLOATING)]
(R1X + a1 a1X°) IN TEMP
(R1Y + a1 a1Y°) " TEMP+1
(R1Z + a a1Z°) " TEMP+2
FIXED, B25
= X
= Y
= Z
OF GROUND PT.


TYPE A
TFCEL
3 → XR1
[BUFFY+11-XR1] → [RES+3-XR1]
0 → [EXPDEX+4-XR1]
XR1 > 1
YES
XR1 -1 → XR1
NO
B3
Rx TRANSFERES INTO RES
Ry " " RES+1
Rz " " RES+1
FIXED, B25
0 PLACED INTO EXPDEX
" " " EXPDEX+1
" " " EXPDEX+2
" " " EXPDEX+3



STRIP 1

# PHOTOS = 0	TFARC	= PZE 0,0,0
	TFARC + 1	= PZE 0,0,0
= 1	TFARC	= PZE 1,1,2
	TFARC + 1	= PZE 0,0,0
= 2	TFARC	= PZE 1,1,2 = PZE 2,2,2
	TFARC + 1	= PZE 0,0,0 = PZE 0,0,0
= 3	TFARC	= PZE 1,1,2 = PZE 2,2,2 = PZE 3,3,2
	TFARC + 1	= PZE 0,0,0 = PZE 0,0,0 = PZE 0,0,0

STRIP 2

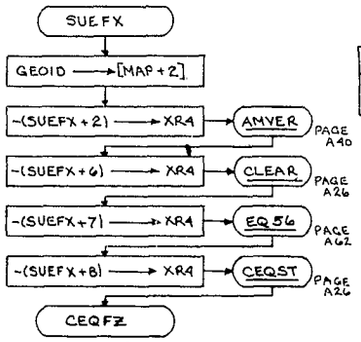
# PHOTOS = 0	TFARC	= PZE 0,0,0
	TFARC + 1	= PZE 0,0,0
= 1	TFARC	= PZE 0,0,0
	TFARC + 1	= PZE 1,1,2
= 2	TFARC	= PZE 0,0,0 = PZE 0,0,0
	TFARC + 1	= PZE 1,1,2 = PZE 2,2,2
= 3	TFARC	= PZE 0,0,0 = PZE 0,0,0 = PZE 0,0,0
	TFARC + 1	= PZE 1,1,2 = PZE 2,2,2 = PZE 3,3,2

INITIALIZATION FOR ENTRY INTO EQ 34

a_{1x}°	TRANSFERED	INTO	COS+3	a_{2x}°	TRANSFERED	INTO	COS+3	a_{3x}°	TRANSFERED	INTO	COS+3	FLOATING
a_{1y}°	"	"	COS+4	a_{2y}°	"	"	COS+4	a_{3y}°	"	"	COS+4	
a_{1z}°	"	"	COS+5	a_{2z}°	"	"	COS+5	a_{3z}°	"	"	COS+5	
R_x	"	"	RES+0	R_x	"	"	RES	R_x	"	"	RES	FIXED, B25
R_y	"	"	RES+1	R_y	"	"	RES+1	R_y	"	"	RES+1	
R_z	"	"	RES+2	R_z	"	"	RES+2	R_z	"	"	RES+2	
R_{1x}	"	"	RES+3	R_{2x}	"	"	RES+3	R_{3x}	"	"	RES+3	
R_{1y}	"	"	RES+4	R_{2y}	"	"	RES+4	R_{3y}	"	"	RES+4	
R_{1z}	"	"	RES+5	R_{2z}	"	"	RES+5	R_{3z}	"	"	RES+5	

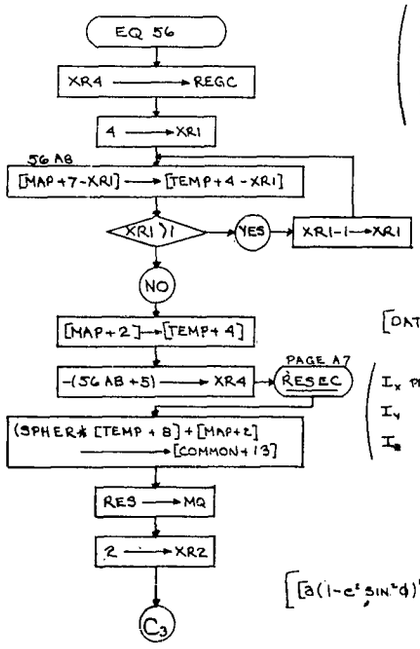
$a_{1x}^{\circ *}$	"	"	COS+3	$a_{2x}^{\circ *}$	"	"	COS+3	$a_{3x}^{\circ *}$	"	"	COS+3	FLOATING
$a_{1y}^{\circ *}$	"	"	COS+4	$a_{2y}^{\circ *}$	"	"	COS+4	$a_{3y}^{\circ *}$	"	"	COS+4	
$a_{1z}^{\circ *}$	"	"	COS+5	$a_{2z}^{\circ *}$	"	"	COS+5	$a_{3z}^{\circ *}$	"	"	COS+5	
R_x	"	"	RES	R_x	"	"	RES	R_x	"	"	RES	FIXED, B25
R_y	"	"	RES+1	R_y	"	"	RES+1	R_y	"	"	RES+1	
R_z	"	"	RES+2	R_z	"	"	RES+2	R_z	"	"	RES+2	
R_{1x}^{*}	"	"	RES+3	R_{2x}^{*}	"	"	RES+3	R_{3x}^{*}	"	"	RES+3	
R_{1y}^{*}	"	"	RES+4	R_{2y}^{*}	"	"	RES+4	R_{3y}^{*}	"	"	RES+4	
R_{1z}^{*}	"	"	RES+5	R_{2z}^{*}	"	"	RES+5	R_{3z}^{*}	"	"	RES+5	

TYPE C 1 PHOTO STRIP 1 0 PHOTOS STRIP 2



[(DATUM PLACED INTO MAP + 2)
(i.e. DATUM TAKES THE PLACE OF h)
(FIXED, B25)] (= G)

a_{1X}°	PLACED	INTO	COS	FLOATING
a_{1Y}°	"	"	COS + 1	
a_{1Z}°	"	"	COS + 2	
R_{1X}	"	"	RES	FIXED, B25
R_{1Y}	"	"	RES + 1	
R_{1Z}	"	"	RES + 2	



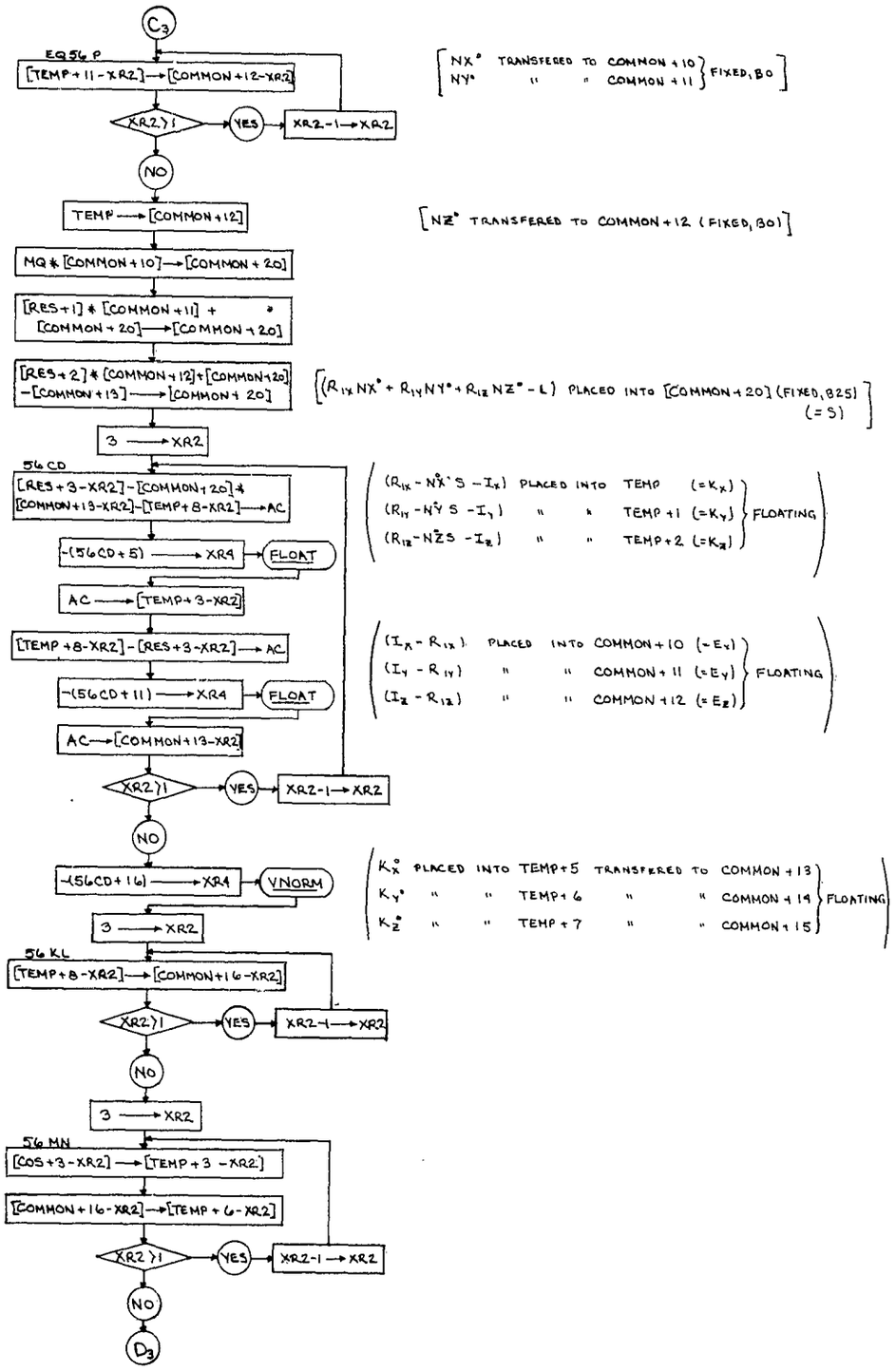
SIN ϕ	TRANSFERED	TO	TEMP	(= N Z°) FIXED, 80
COS ϕ	"	"	TEMP + 1	
SIN λ	"	"	TEMP + 2	
COS λ	"	"	TEMP + 3	

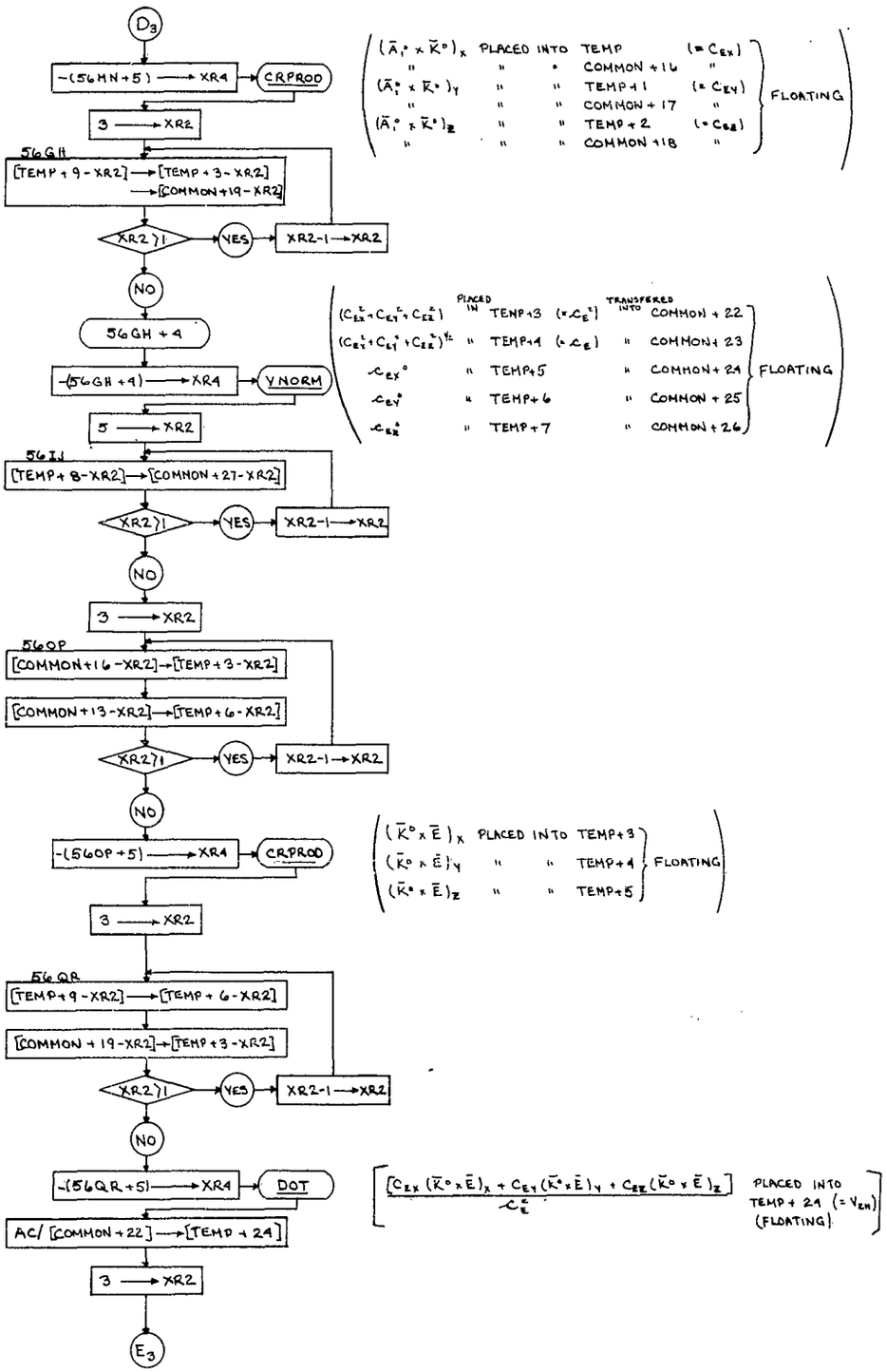
[DATUM TRANSFERED TO TEMP+4 (FIXED, B25)]

I_X	PLACED	INTO	TEMP+5	FIXED, B25	$(1-e^2\sin^2\phi)^{1/2}$	PLACED IN	TEMP+8 FIXED, 80
I_Y	"	"	TEMP+6		$(\cos\phi\cos\lambda)$	" "	TEMP+9
I_Z	"	"	TEMP+7		$(\cos\phi\sin\lambda)$	" "	TEMP+10

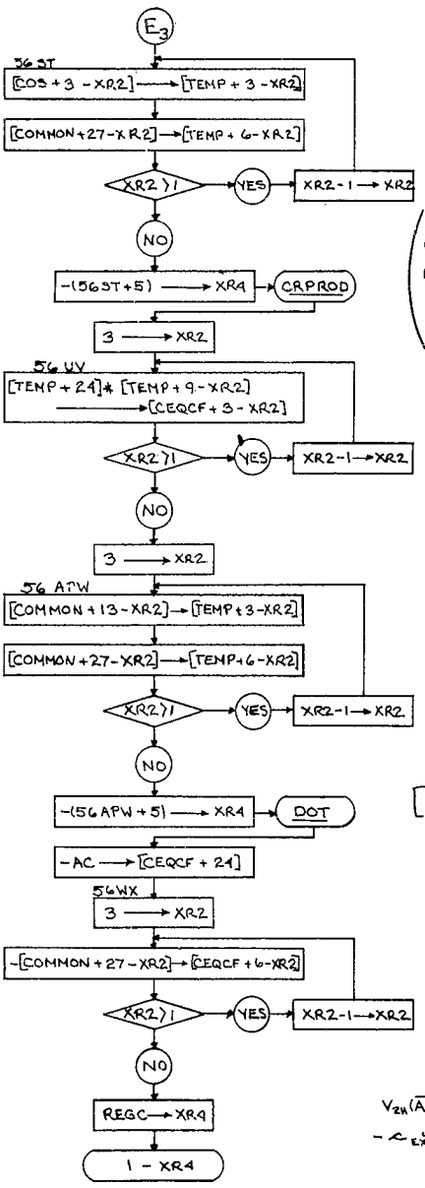
(= N X°)
(= N Y°)

[$[a(1-e^2\sin^2\phi)^{1/2}+G]$ PLACED IN COMMON + 13 (FIXED, B25)] (= L)


C3
EQ56 P
[TEMP+11-XR2] → [COMMON+12-XR2]
XR2>1
YES
XR2-1 → XR2
NO
TEMP → [COMMON+12]
MQ * [COMMON+10] → [COMMON+20]
[RES+1] * [COMMON+11] + [COMMON+20] → [COMMON+20]
[RES+2] * [COMMON+12] + [COMMON+20] − [COMMON+13] → [COMMON+20]
3 → XR2
56 CD
[RES+3-XR2] − [COMMON+20] * [COMMON+13-XR2] − [TEMP+8-XR2] → AC
−(56CD+5) → XR4
FLOAT
AC → [TEMP+3-XR2]
[TEMP+8-XR2] − [RES+3-XR2] → AC
−(56CD+11) → XR4
FLOAT
AC → [COMMON+13-XR2]
XR2>1
YES
XR2-1 → XR2
NO
−(56CD+16) → XR4
VNORM
3 → XR2
56 KL
[TEMP+8-XR2] → [COMMON+16-XR2]
XR2>1
YES
XR2-1 → XR2
NO
3 → XR2
56 MN
[COS+3-XR2] → [TEMP+3-XR2]
[COMMON+16-XR2] → [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
D3
[NX° TRANSFERED TO COMMON+10
NY° " " COMMON+11 } FIXED, B0]
[NZ° TRANSFERED TO COMMON+12 (FIXED, B0)]
[(R1X NX° + R1Y NY° + R1Z NZ° − L) PLACED INTO [COMMON+20] (FIXED, B25) (= S)]
(R1X − NX° S − IX) PLACED INTO TEMP (= KX)
(R1Y − NY° S − IY) " " TEMP+1 (= KY)
(R1Z − NZ° S − IZ) " " TEMP+2 (= KZ)
} FLOATING
(IX − R1X) PLACED INTO COMMON+10 (= EX)
(IY − R1Y) " " COMMON+11 (= EY)
(IZ − R1Z) " " COMMON+12 (= EZ)
} FLOATING
KX° PLACED INTO TEMP+5 TRANSFERED TO COMMON+13
KY° " " TEMP+6 " " COMMON+14
KZ° " " TEMP+7 " " COMMON+15
} FLOATING


D3
-(56MN+5) → XR4
CRPROD
3 → XR2
56GH
[TEMP+9-XR2] → [TEMP+3-XR2]
→ [COMMON+19-XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
56GH+4
-(56GH+4) → XR4
VNORM
5 → XR2
56IJ
[TEMP+8-XR2] → [COMMON+27-XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
3 → XR2
56OP
[COMMON+16-XR2] → [TEMP+3-XR2]
[COMMON+13-XR2] → [TEMP+6-XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
-(56OP+5) → XR4
CRPROD
3 → XR2
56QR
[TEMP+9-XR2] → [TEMP+6-XR2]
[COMMON+19-XR2] → [TEMP+3-XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
-(56QR+5) → XR4
DOT
AC/ [COMMON+22] → [TEMP+24]
3 → XR2
E3
(Ā1° × K̄°)x PLACED INTO TEMP (= CEX)
" " " COMMON+16 "
(Ā1° × K̄°)y " " TEMP+1 (= CEY)
" " " COMMON+17 "
(Ā1° × K̄°)z " " TEMP+2 (= CEZ)
" " " COMMON+18 "
FLOATING
(CEX² + CEY² + CEZ²) PLACED IN TEMP+3 (= CE²) TRANSFERED INTO COMMON+22
(CEX² + CEY² + CEZ²)^1/2 " TEMP+4 (= CE) " COMMON+23
CEX° " TEMP+5 " COMMON+24
CEY° " TEMP+6 " COMMON+25
CEZ° " TEMP+7 " COMMON+26
FLOATING
(K̄° × Ē)x PLACED INTO TEMP+3
(K̄° × Ē)y " " TEMP+4
(K̄° × Ē)z " " TEMP+5
FLOATING
[CEX (K̄° × Ē)x + CEY (K̄° × Ē)y + CEZ (K̄° × Ē)z] / CE²
PLACED INTO TEMP+24 (= VCM)
(FLOATING)

A64



$(\bar{A}_1^\circ \times \bar{C}_E^\circ)_X$ PLACED INTO TEMP + 6
$(\bar{A}_1^\circ \times \bar{C}_E^\circ)_Y$ " " TEMP + 7
$(\bar{A}_1^\circ \times \bar{C}_E^\circ)_Z$ " " TEMP + 8
} FLOATING

$V_{2H}(\bar{A}_1^\circ \times \bar{C}_E^\circ)_X$ PLACED INTO CEQCF
$V_{2H}(\bar{A}_1^\circ \times \bar{C}_E^\circ)_Y$ " " CEQCF + 1
$V_{2H}(\bar{A}_1^\circ \times \bar{C}_E^\circ)_Z$ " " CEQCF + 2
} FLOATING

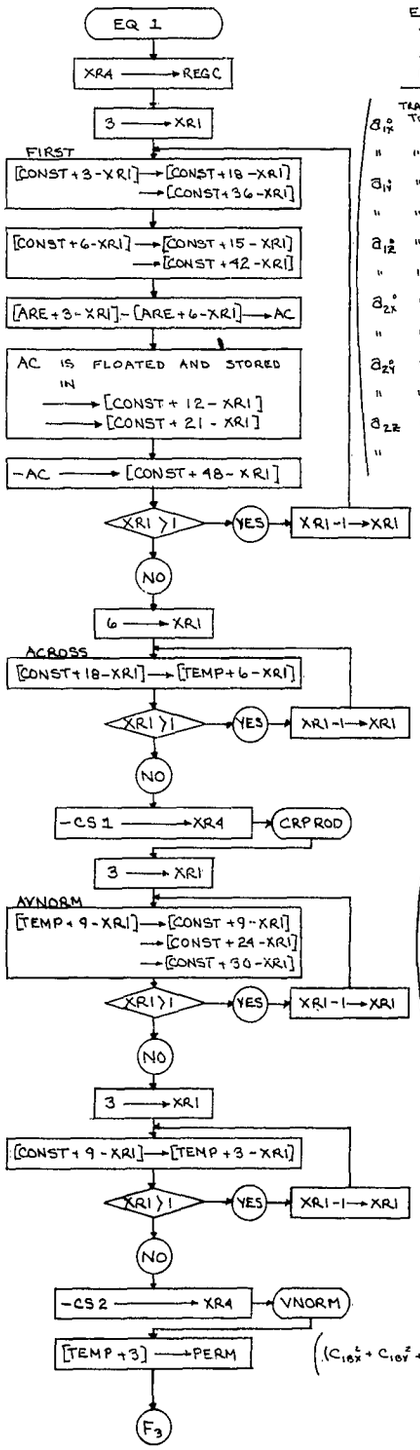
$[(-E_X \mathcal{C}_{EX}^\circ - E_Y \mathcal{C}_{EY}^\circ - E_Z \mathcal{C}_{EZ}^\circ)$ PLACED INTO CEQCF + 24 (FLOATING)$]$

$-\mathcal{C}_{EX}^\circ$ PLACED INTO CEQCF + 3
$-\mathcal{C}_{EY}^\circ$ " " CEQCF + 4
$-\mathcal{C}_{EZ}^\circ$ " " CEQCF + 5
} FLOATING

$$V_{2H}(\bar{A}_N^\circ \times \bar{C}_E^\circ)_X \, dT_{NX} + V_{2H}(\bar{A}_N^\circ \times \bar{C}_E^\circ)_Y \, dT_{NY} + V_{2H}(\bar{A}_N^\circ \times \bar{C}_E^\circ)_Z \, dT_{NZ}$$
$$- \mathcal{C}_{EX}^\circ \, dR_{NX} - \mathcal{C}_{EY}^\circ \, dR_{NY} - \mathcal{C}_{EZ}^\circ \, dR_{NZ}$$
$$= (-E_X \mathcal{C}_{EX}^\circ - E_Y \mathcal{C}_{EY}^\circ - E_Z \mathcal{C}_{EZ}^\circ)$$

$V_{2H}(\bar{A}_1^\circ \times \bar{C}_E^\circ)_X$ PLACED INTO CEQCF
$V_{2H}(\bar{A}_1^\circ \times \bar{C}_E^\circ)_Y$ " " CEQCF + 1
$V_{2H}(\bar{A}_1^\circ \times \bar{C}_E^\circ)_Z$ " " CEQCF + 2
$-\mathcal{C}_{EX}^\circ$ " " CEQCF + 3
$-\mathcal{C}_{EY}^\circ$ " " CEQCF + 4
$-\mathcal{C}_{EZ}^\circ$ " " CEQCF + 5
$(-E_X \mathcal{C}_{EX}^\circ - E_Y \mathcal{C}_{EY}^\circ - E_Z \mathcal{C}_{EZ}^\circ)$ " " CEQCF + 24
} FLOATING

EQUATION 1 IS EMPLOYED FOR 4 PHOTO. PAIRS (1,2 STRIP 1; 2,3 " 2; 1,2 STRIP 1; 2,3 " 2). THE COMMENTS IN THE FOLLOWING DIAGRAM ARE FOR (1,2 STRIP 1), HOWEVER, THE OTHER PAIRS WOULD FOLLOW THE SAME PATTERN



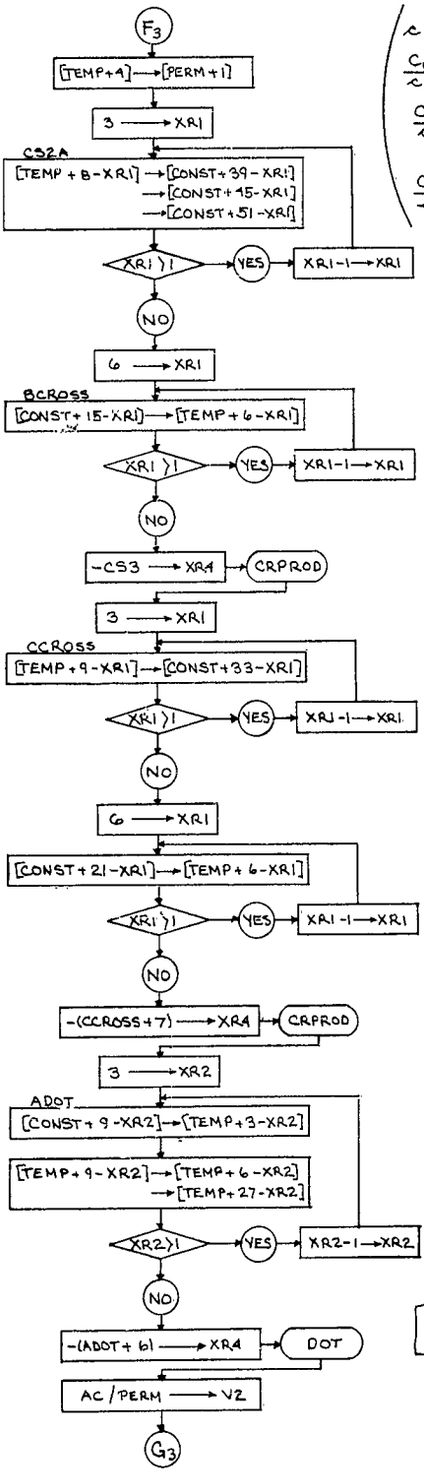
a_{1X}°	TRANSFERED TO	CONST+15		$(R_{1X}-R_{2X})$	PLACED INTO	CONST+9	$(=\bar{B}_{1X})$
"	"	CONST+33		"	"	CONST+18	
a_{1Y}°	"	CONST+16		$(R_{1Y}-R_{2Y})$	"	CONST+10	$(=\bar{B}_{1Y})$
"	"	CONST+34		"	"	CONST+19	
a_{1Z}°	"	CONST+17	FLOATING	$(R_{1Z}-R_{2Z})$	"	CONST+11	$(=\bar{B}_{1Z})$
"	"	CONST+35		"	"	CONST+20	
a_{2X}°	"	CONST+12		$-(R_{1X}-R_{2X})$	"	CONST+45	$(=-\bar{B}_{1X})$
"	"	CONST+39		$-(R_{1Y}-R_{2Y})$	"	CONST+46	$(=-\bar{B}_{1Y})$
a_{2Y}°	"	CONST+13		$-(R_{1Z}-R_{2Z})$	"	CONST+47	$(=-\bar{B}_{1Z})$
"	"	CONST+40					
a_{2Z}	"	CONST+14					
"	"	CONST+41					

FLOATING

$(\bar{A}_2^{\circ} \times \bar{A}_1^{\circ})_X$	IN	TEMP+6	TRANSFERED TO	CONST+6			$=(C_{18Y})$
"	"	"	"	CONST+21			
"	"	"	"	CONST+27			
$(\bar{A}_2^{\circ} \times \bar{A}_1^{\circ})_Y$	"	TEMP+7	"	CONST+7	FLOATING		$=(C_{18Y})$
"	"	"	"	CONST+22			
"	"	"	"	CONST+28			
$(\bar{A}_2^{\circ} \times \bar{A}_1^{\circ})_Z$	"	TEMP+8	"	CONST+8			$=(C_{18Z})$
"	"	"	"	CONST+23			
"	"	"	"	CONST+29			

$((C_{18X}^{\circ} + C_{18Y}^{2} + C_{18Z}^{2})$ PLACED INTO TEMP+3 $(=C_{18}^{2})$ TRANSFERED TO PERM (FLOATING))

A66



$\mathcal{C}_{18}$ PLACED INTO TEMP+4 TRANSFERED TO PERM+1

$\frac{C_{18x}}{\mathcal{C}_{18}}$ " " TEMP+5 $(=\mathcal{C}_{18x}^{\circ})$ " " CONST+36, CONST+42, CONST+48

$\frac{C_{18y}}{\mathcal{C}_{18}}$ " " TEMP+6 $(=\mathcal{C}_{18y}^{\circ})$ " " CONST+37, CONST+43, CONST+49

$\frac{C_{18z}}{\mathcal{C}_{18}}$ " " TEMP+7 $(=\mathcal{C}_{18z}^{\circ})$ " " CONST+38, CONST+44, CONST+50

FLOATING

$(\bar{B}_1 \times \bar{A}_2^{\circ})_x$ PLACED INTO TEMP+6 TRANSFERED TO CONST+30

$(\bar{B}_1 \times \bar{A}_2^{\circ})_y$ " " TEMP+7 " CONST+31

$(\bar{B}_1 \times \bar{A}_2^{\circ})_z$ " " TEMP+8 " CONST+32

FLOATING

$(\bar{A}_1^{\circ} \times \bar{B}_1)_x$ PLACED INTO TEMP+6 TRANSFERED TO TEMP+3

" " " " " CONST+24

$(\bar{A}_1^{\circ} \times \bar{B}_1)_y$ " " TEMP+7 " TEMP+4

" " " " " CONST+25

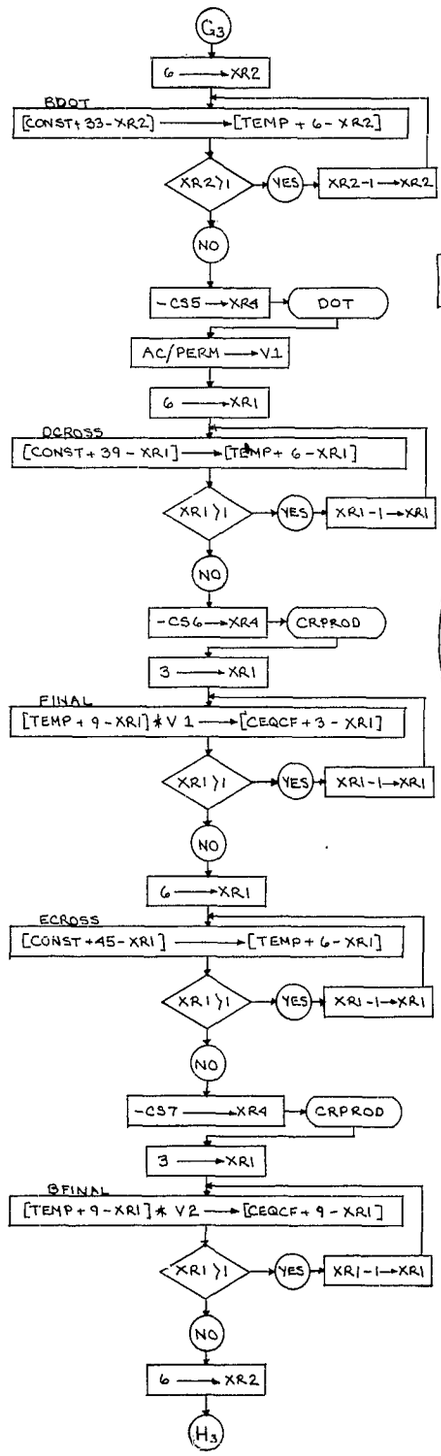
$(\bar{A}_1^{\circ} \times \bar{B}_1)_z$ " " TEMP+8 " TEMP+5

" " " " " CONST+26

FLOATING

$\left[\frac{\bar{C}_{18} \cdot (\bar{A}_1^{\circ} \times \bar{B}_1)}{\mathcal{C}_{18}^{2}}\right]$ PLACED INTO V2 (FLOATING) $(=V_2)$

A67



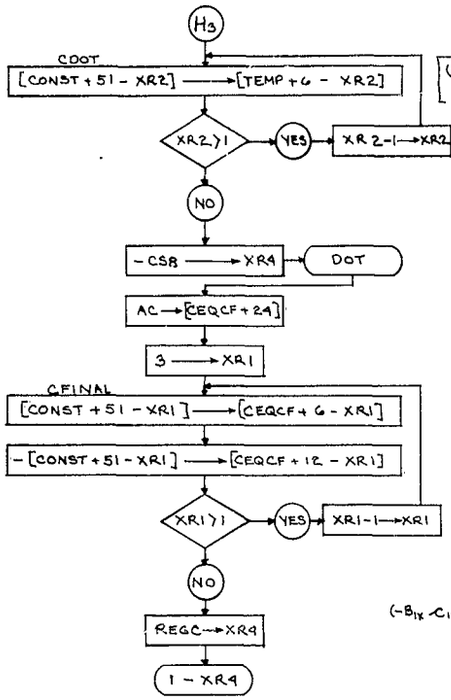
$\left[\dfrac{\bar{C}_{16} \cdot (\bar{B}_1 \times \bar{A}_2^\circ)}{-C_{16}^\circ}\right.$ PLACED INTO V1 (= V_1) (FLOATING) $\left.\right]$

$(A_1^\circ \times \bar{C}_{16}^\circ)_x$ PLACED INTO TEMP + 6
$(A_1^\circ \times \bar{C}_{16}^\circ)_y$ " " TEMP + 7
$(A_1^\circ \times \bar{C}_{16}^\circ)_z$ " " TEMP + 8
} FLOATING

$V_1(\bar{A}_1^\circ \times \bar{C}_{16}^\circ)_x$ PLACED INTO CEQCF
$V_1(\bar{A}_1^\circ \times \bar{C}_{16}^\circ)_y$ " " CEQCF + 1
$V_1(\bar{A}_1^\circ \times \bar{C}_{16}^\circ)_z$ " " CEQCF + 2
} FLOATING

$(\bar{A}_2^\circ \times \bar{C}_{16}^\circ)_x$ PLACED INTO TEMP + 6
$(\bar{A}_2^\circ \times \bar{C}_{16}^\circ)_y$ " " TEMP + 7
$(\bar{A}_2^\circ \times \bar{C}_{16}^\circ)_z$ " " TEMP + 8
} FLOATING

$V_2(\bar{A}_2^\circ \times \bar{C}_{16}^\circ)_x$ PLACED INTO CEQCF + 6
$V_2(\bar{A}_2^\circ \times \bar{C}_{16}^\circ)_y$ " " CEQCF + 7
$V_2(\bar{A}_2^\circ \times \bar{C}_{16}^\circ)_z$ " " CEQCF + 8
} FLOATING

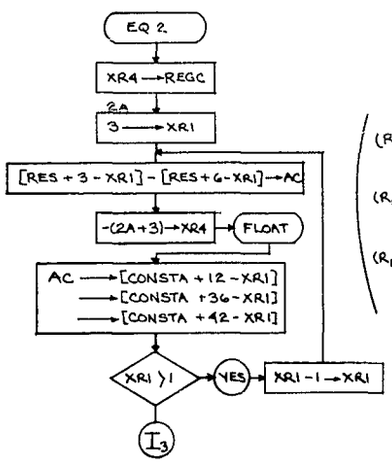


$\left[(-B_{1x}\mathcal{C}_{18x}^{\circ} - B_{1y}\mathcal{C}_{18y}^{\circ} - B_{1z}\mathcal{C}_{18z}^{\circ})\right.$ PLACED IN CEQCF + 24 (FLOATING) $\left.\right]$

$(= -q_0)$ $(= dq)$ $\left(\text{FROM } q_{REAL} = q_0 + dq = 0 \quad \therefore\ dq = -q_0\right)$

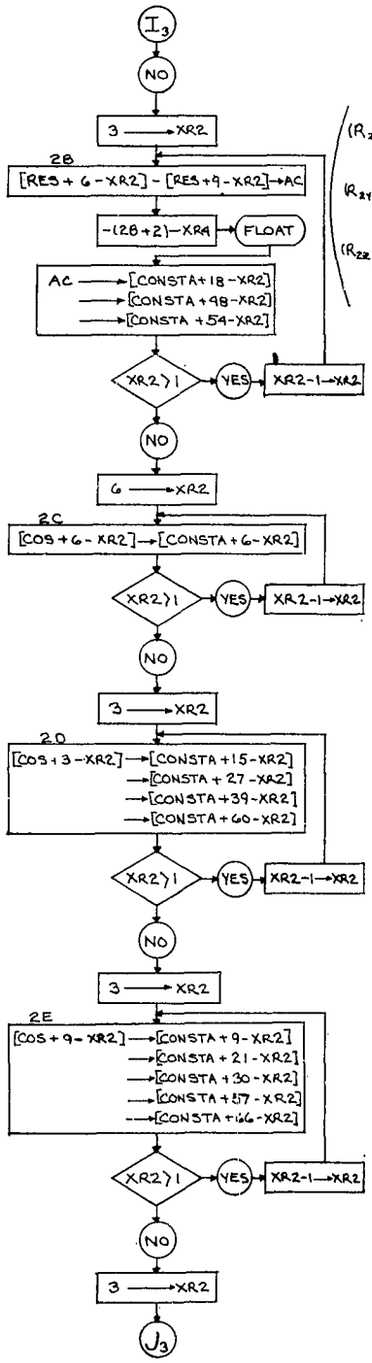
$V_1(\bar{A}_1^{\circ} \times \bar{C}_{18}^{\circ})_x$	TRANSFERED	INTO	CEQCF
$V_1(\bar{A}_1^{\circ} \times \bar{C}_{18}^{\circ})_y$	"	"	CEQCF + 1
$V_1(\bar{A}_1^{\circ} \times \bar{C}_{18}^{\circ})_z$	"	"	CEQCF + 2
$\mathcal{C}_{18x}^{\circ}$	"	"	CEQCF + 3
$\mathcal{C}_{18y}^{\circ}$	"	"	CEQCF + 4
$\mathcal{C}_{18z}^{\circ}$	"	"	CEQCF + 5
$V_2(\bar{A}_2^{\circ} \times C_{18}^{\circ})_x$	"	"	CEQCF + 6
$V_2(\bar{A}_2^{\circ} \times C_{18}^{\circ})_y$	"	"	CEQCF + 7
$V_2(\bar{A}_2^{\circ} \times C_{18}^{\circ})_z$	"	"	CEQCF + 8
$-\mathcal{C}_{18x}^{\circ}$	"	"	CEQCF + 9
$-\mathcal{C}_{18y}^{\circ}$	"	"	CEQCF + 10
$-\mathcal{C}_{18z}^{\circ}$	"	"	CEQCF + 11
$(-B_{1x}\mathcal{C}_{18x}^{\circ} - B_{1y}\mathcal{C}_{18y}^{\circ} - B_{1z}\mathcal{C}_{18z}^{\circ}$	"	"	CEQCF + 24

$$V_1(\bar{A}_1^{\circ} \times \bar{C}_{18}^{\circ})_x\, dT_{1x} + V_1(\bar{A}_1^{\circ} \times \bar{C}_{18}^{\circ})_y\, dT_{1y} + V_1(\bar{A}_1^{\circ} \times \bar{C}_{18}^{\circ})_z\, dT_{1z} + \mathcal{C}_{18x}^{\circ}\, dR_{1x} + \mathcal{C}_{18y}^{\circ}\, dR_{1y} + \mathcal{C}_{18z}^{\circ}\, dR_{1z}$$
$$+ V_2(\bar{A}_2^{\circ} \times \bar{C}_{18}^{\circ})_x\, dT_{2x} + V_2(\bar{A}_2^{\circ} \times \bar{C}_{18}^{\circ})_y\, dT_{2y} + V_2(\bar{A}_2^{\circ} \times \bar{C}_{18}^{\circ})_z\, dT_{2z} - \mathcal{C}_{18x}^{\circ}\, dR_{2x} - \mathcal{C}_{18y}^{\circ}\, dR_{2y} - \mathcal{C}_{18z}^{\circ}\, dR_{2z}$$
$$= dq = -q_0 = (-B_{1x}\mathcal{C}_{18x}^{\circ} - B_{1y}\mathcal{C}_{18y}^{\circ} - B_{1z}\mathcal{C}_{18z}^{\circ})$$



$(R_{1x} - R_{2x})$	PLACED	INTO	CONSTA + 9	$(= B_{1x})$
"	"	"	CONSTA + 33	
"	"	"	CONSTA + 39	
$(R_{1y} - R_{2y})$	"	"	CONSTA + 10	$(= B_{1y})$
"	"	"	CONSTA + 34	
"	"	"	CONSTA + 40	
$(R_{1z} - R_{2z})$	"	"	CONSTA + 11	$(= B_{1z})$
"	"	"	CONSTA + 35	
"	"	"	CONSTA + 41	

FLOATING



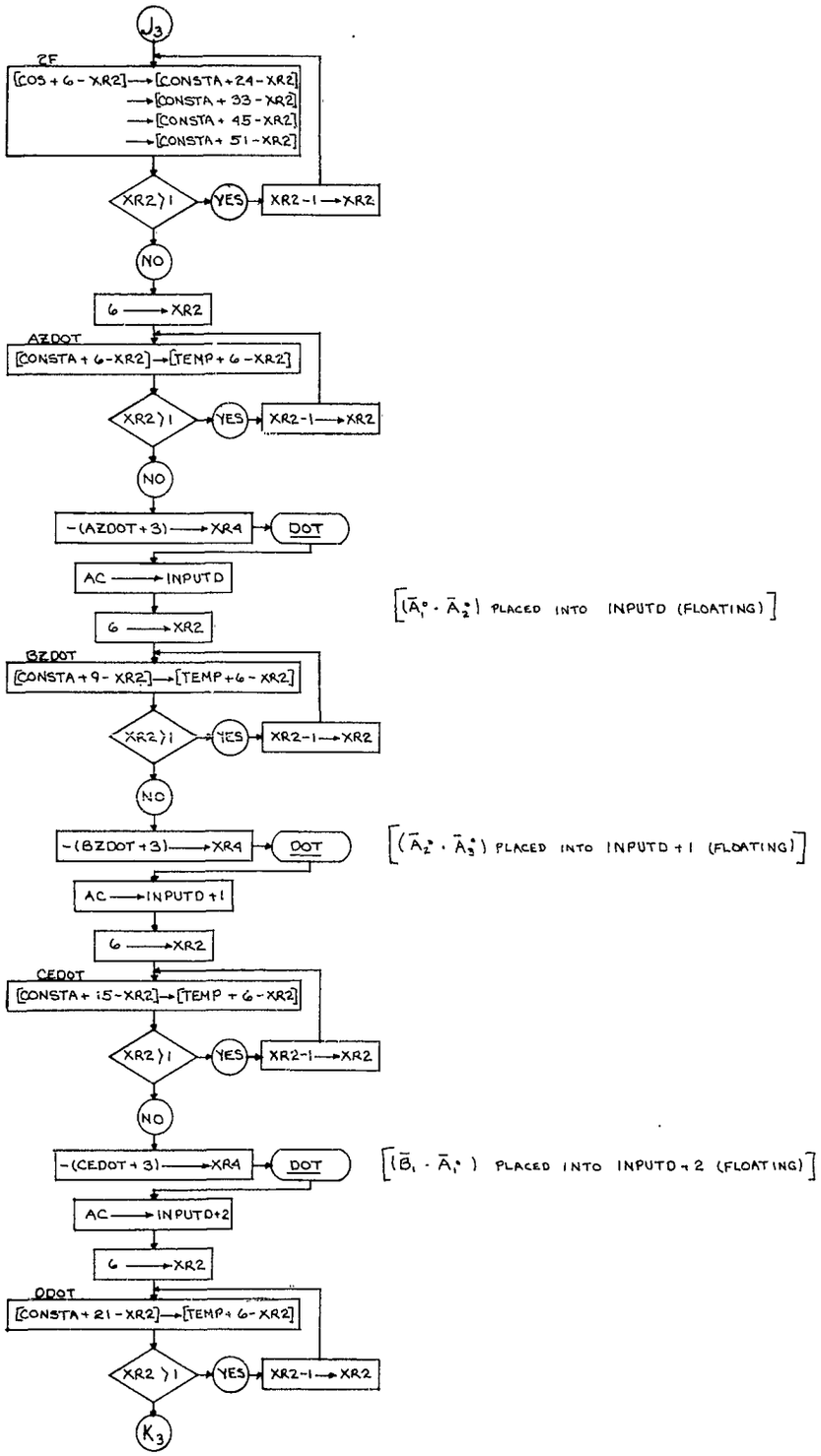
$(R_{2x} - R_{3x})$	PLACED	INTO	CONSTA + 15	$(= B_{2x})$
"	"	"	CONSTA + 45	
"	"	"	CONSTA + 51	
$(R_{2y} - R_{3y})$	"	"	CONSTA + 16	$(= B_{2y})$
"	"	"	CONSTA + 46	
"	"	"	CONSTA + 52	
$(R_{2z} - R_{3z})$	"	"	CONSTA + 17	$(= B_{2z})$
"	"	"	CONSTA + 47	
"	"	"	CONSTA + 53	

FLOATING

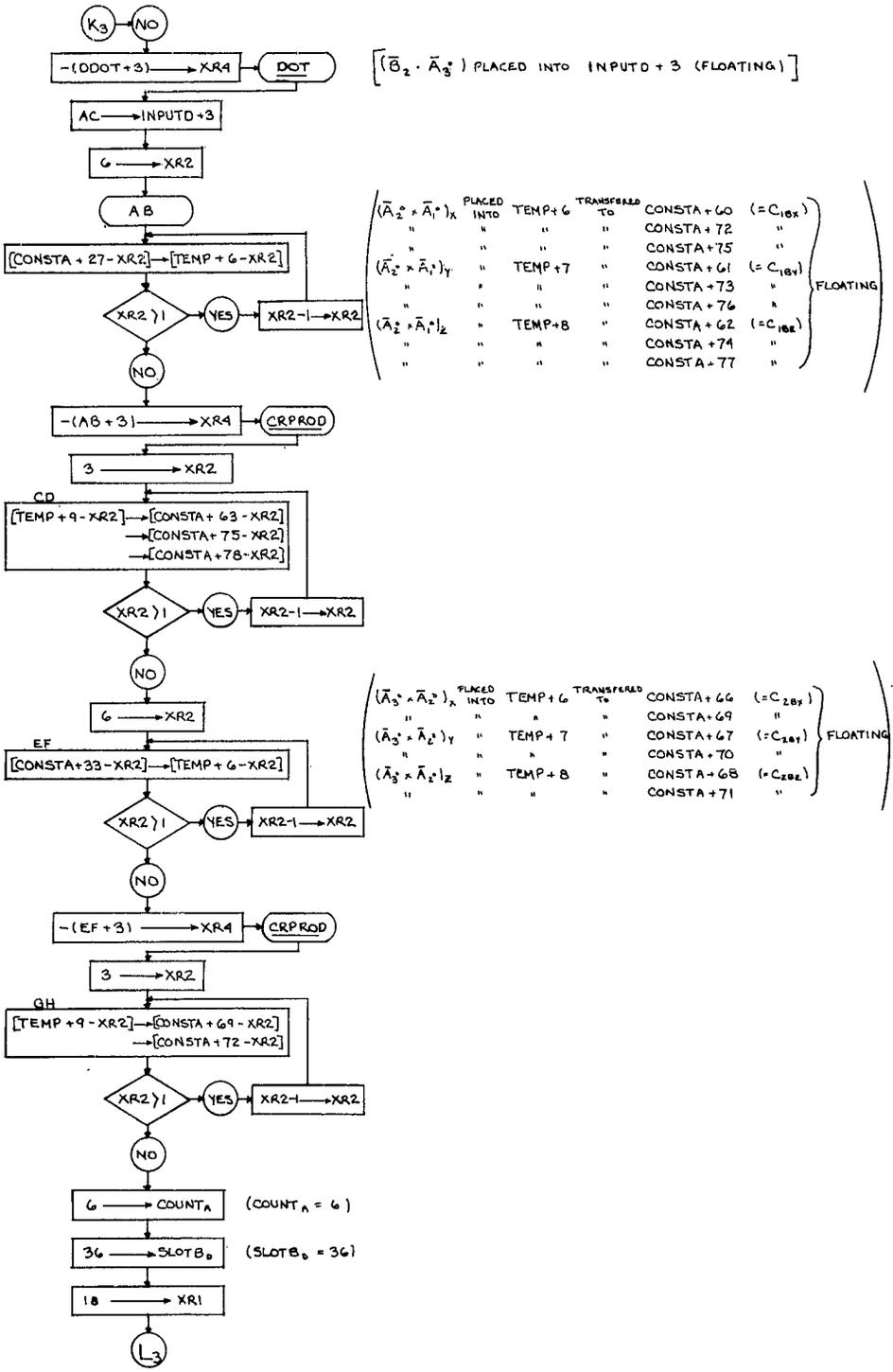
a_{1x}°	TRANSFERED	INTO	CONSTA
"	"	"	CONSTA + 12
"	"	"	CONSTA + 24
"	"	"	CONSTA + 36
"	"	"	CONSTA + 57
a_{1y}°	"	"	CONSTA + 1
"	"	"	CONSTA + 13
"	"	"	CONSTA + 25
"	"	"	CONSTA + 37
"	"	"	CONSTA + 58
a_{1z}°	"	"	CONSTA + 2
"	"	"	CONSTA + 14
"	"	"	CONSTA + 26
"	"	"	CONSTA + 38
"	"	"	CONSTA + 59
a_{2x}°	"	"	CONSTA + 3
"	"	"	CONSTA + 21
"	"	"	CONSTA + 30
"	"	"	CONSTA + 42
"	"	"	CONSTA + 48
a_{2y}°	"	"	CONSTA + 4
"	"	"	CONSTA + 22
"	"	"	CONSTA + 31
"	"	"	CONSTA + 43
"	"	"	CONSTA + 49
a_{2z}°	"	"	CONSTA + 5
"	"	"	CONSTA + 23
"	"	"	CONSTA + 32
"	"	"	CONSTA + 44
"	"	"	CONSTA + 50
a_{3x}°	"	"	CONSTA + 6
"	"	"	CONSTA + 18
"	"	"	CONSTA + 27
"	"	"	CONSTA + 54
"	"	"	CONSTA + 63
a_{3y}°	"	"	CONSTA + 7
"	"	"	CONSTA + 19
"	"	"	CONSTA + 28
"	"	"	CONSTA + 55
"	"	"	CONSTA + 64
a_{3z}°	"	"	CONSTA + 8
"	"	"	CONSTA + 20
"	"	"	CONSTA + 29
"	"	"	CONSTA + 56
"	"	"	CONSTA + 65

FLOATING

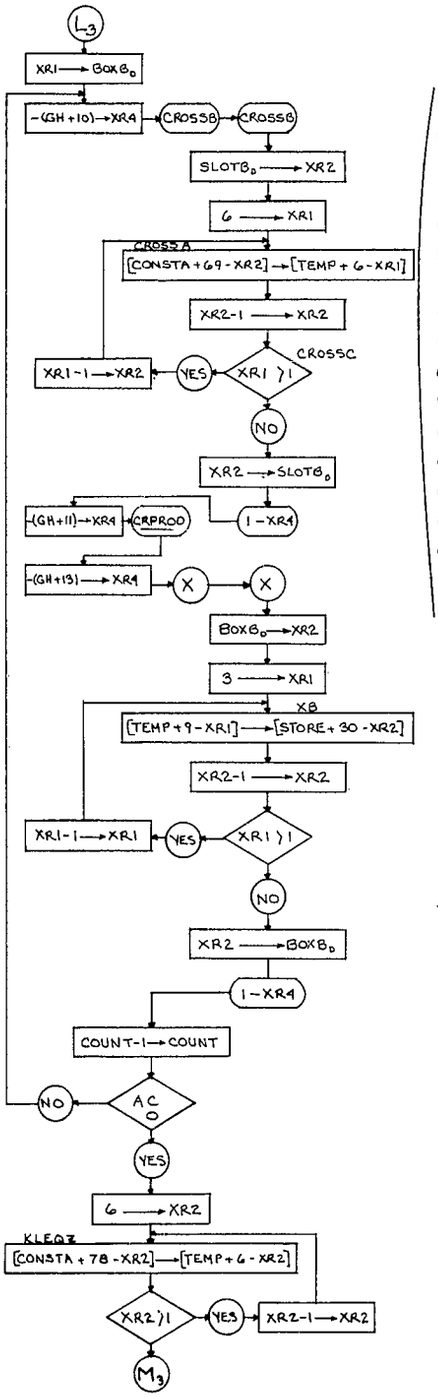
A70


J3
ZF
[COS + 6 - XR2] → [CONSTA + 24 - XR2]
→ [CONSTA + 33 - XR2]
→ [CONSTA + 45 - XR2]
→ [CONSTA + 51 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
6 → XR2
AZDOT
[CONSTA + 6 - XR2] → [TEMP + 6 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
- (AZDOT + 3) → XR4
DOT
AC → INPUTD
[(Ā1° · Ā2°) PLACED INTO INPUTD (FLOATING)]
6 → XR2
BZDOT
[CONSTA + 9 - XR2] → [TEMP + 6 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
- (BZDOT + 3) → XR4
DOT
[(Ā2° · Ā3°) PLACED INTO INPUTD + 1 (FLOATING)]
AC → INPUTD + 1
6 → XR2
CEDOT
[CONSTA + 15 - XR2] → [TEMP + 6 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
- (CEDOT + 3) → XR4
DOT
[(B̄1 · Ā1°) PLACED INTO INPUTD + 2 (FLOATING)]
AC → INPUTD + 2
6 → XR2
ODOT
[CONSTA + 21 - XR2] → [TEMP + 6 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
K3

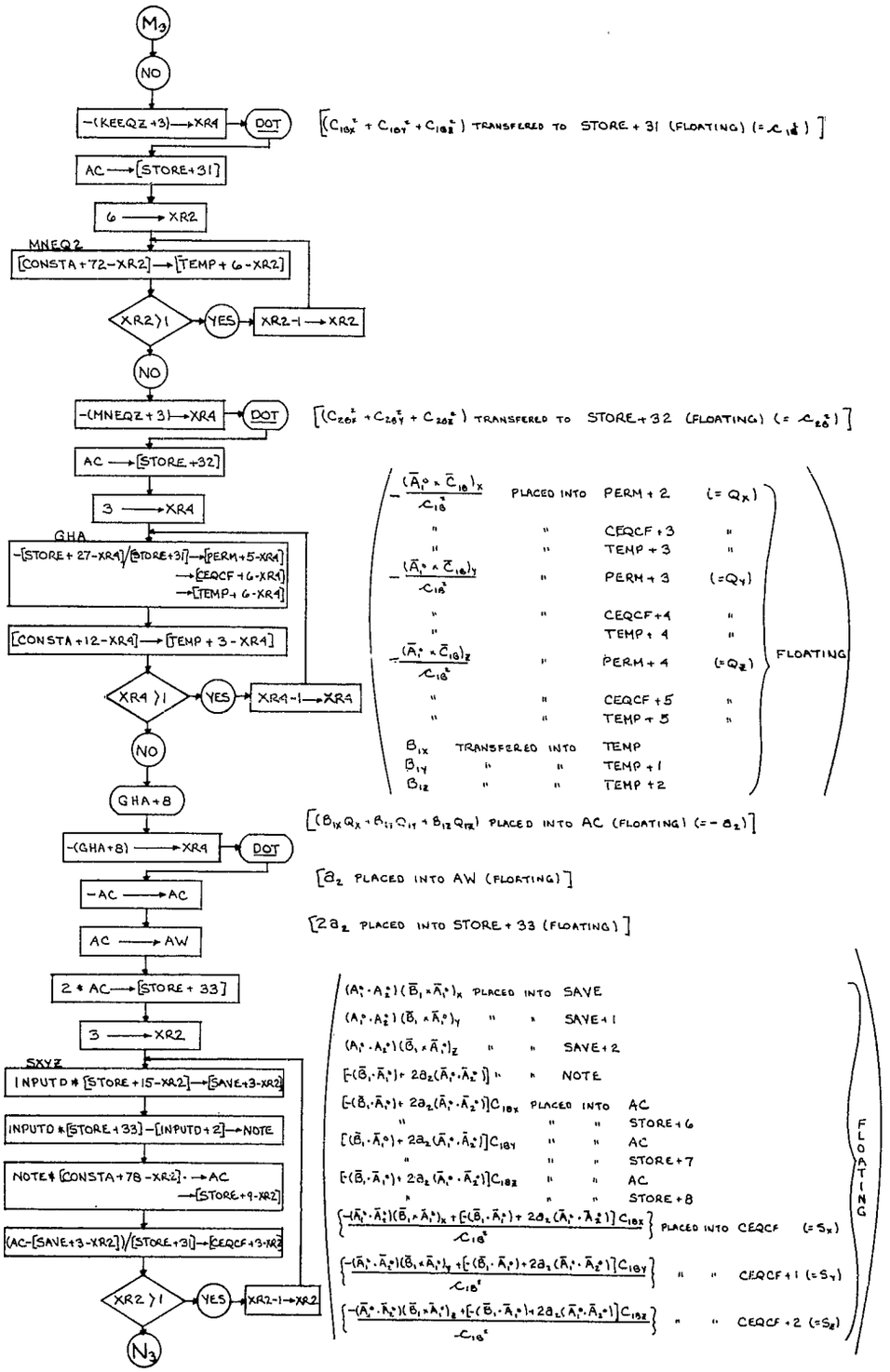
A71

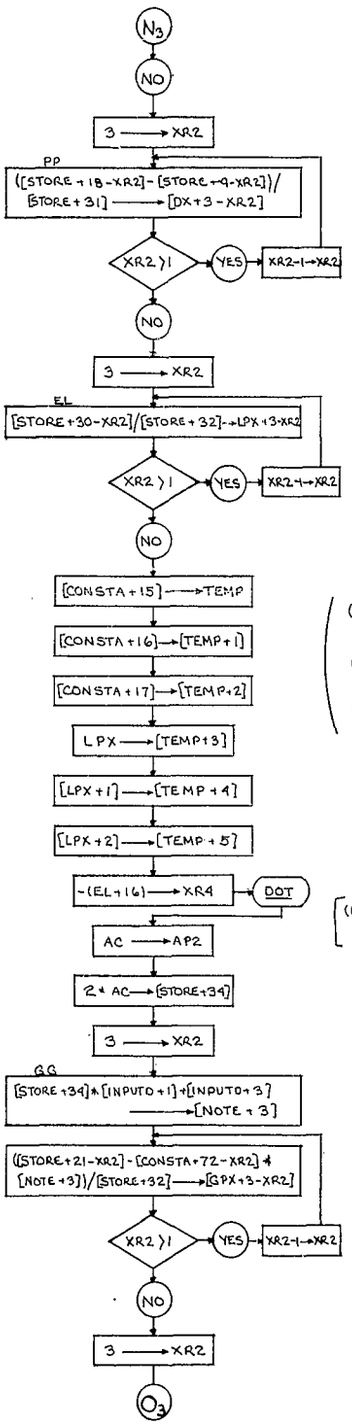

K3
NO
-(DDOT+3) → XR4
DOT
[(B̄2 · Ā3°) PLACED INTO INPUTD + 3 (FLOATING)]
AC → INPUTD+3
6 → XR2
AB
[CONSTA + 27 - XR2] → [TEMP + 6 - XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
-(AB+3) → XR4
CRPROD
3 → XR2
CD
[TEMP + 9 - XR2] → [CONSTA + 63 - XR2]
→ [CONSTA + 75 - XR2]
→ [CONSTA + 78 - XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
6 → XR2
EF
[CONSTA+33-XR2] → [TEMP + 6 - XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
-(EF+3) → XR4
CRPROD
3 → XR2
GH
[TEMP + 9 - XR2] → [CONSTA + 69 - XR2]
→ [CONSTA + 72 - XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
6 → COUNTA
(COUNTA = 6)
36 → SLOTBb
(SLOTBb = 36)
18 → XR1
L3
(Ā2° × Ā1°)x PLACED INTO TEMP+6 TRANSFERED TO CONSTA+60 (=C16x)
" " " " CONSTA+72 "
" " " " CONSTA+75 "
(Ā2° × Ā1°)y " TEMP+7 " CONSTA+61 (=C16y)
" " " " CONSTA+73 "
" " " " CONSTA+76 "
(Ā2° × Ā1°)z " TEMP+8 " CONSTA+62 (=C16z)
" " " " CONSTA+74 "
" " " " CONSTA+77 "
FLOATING
(Ā3° × Ā2°)x PLACED INTO TEMP+6 TRANSFERED TO CONSTA+66 (=C26x)
" " " " CONSTA+69 "
(Ā3° × Ā2°)y " TEMP+7 " CONSTA+67 (=C26y)
" " " " CONSTA+70 "
(Ā3° × Ā2°)z " TEMP+8 " CONSTA+68 (=C26z)
" " " " CONSTA+71 "
FLOATING

AT2



$(\bar{B}_1 \times \bar{A}_1^*)_x$	PLACED INTO	TEMP+6	TRANSFERED TO	STORE+12	FLOATING
$(\bar{B}_1 \times \bar{A}_1^*)_y$	"	TEMP+7	"	STORE+13	
$(\bar{B}_1 \times \bar{A}_1^*)_z$	"	TEMP+8	"	STORE+14	
$(\bar{B}_1 \times \bar{A}_2^*)_x$	"	TEMP+6	"	STORE+15	
$(\bar{B}_1 \times \bar{A}_2^*)_y$	"	TEMP+7	"	STORE+16	
$(\bar{B}_1 \times \bar{A}_2^*)_z$	"	TEMP+8	"	STORE+17	
$(\bar{B}_2 \times \bar{A}_2^*)_x$	"	TEMP+6	"	STORE+18	
$(\bar{B}_2 \times \bar{A}_2^*)_y$	"	TEMP+7	"	STORE+19	
$(\bar{B}_2 \times \bar{A}_2^*)_z$	"	TEMP+8	"	STORE+20	
$(\bar{B}_2 \times \bar{A}_3^*)_x$	"	TEMP+6	"	STORE+21	
$(\bar{B}_2 \times \bar{A}_3^*)_y$	"	TEMP+7	"	STORE+22	
$(\bar{B}_2 \times \bar{A}_3^*)_z$	"	TEMP+8	"	STORE+23	
$(\bar{A}_1^* \times \bar{C}_{10})_x$	"	TEMP+6	"	STORE+24	
$(\bar{A}_1^* \times \bar{C}_{10})_y$	"	TEMP+7	"	STORE+25	
$(\bar{A}_1^* \times \bar{C}_{10})_z$	"	TEMP+8	"	STORE+26	
$(\bar{A}_3^* \times \bar{C}_{20})_x$	"	TEMP+6	"	STORE+27	
$(\bar{A}_3^* \times \bar{C}_{20})_y$	"	TEMP+7	"	STORE+28	
$(\bar{A}_3^* \times \bar{C}_{20})_z$	"	TEMP+8	"	STORE+29	


M3
NO
-(KEEQZ+3)→XR4
DOT
[(C18X* + C18Y* + C18Z*) TRANSFERED TO STORE + 31 (FLOATING) (= 𝒞18*)]
AC→[STORE+31]
6→XR2
MNEQ2
[CONSTA+72-XR2]→[TEMP+6-XR2]
XR2>1
YES
XR2-1→XR2
NO
-(MNEQZ+3)→XR4
DOT
[(C26F* + C26Y* + C26Z*) TRANSFERED TO STORE+32 (FLOATING) (= 𝒞26*)]
AC→[STORE+32]
3→XR4
GHA
-[STORE+27-XR4]/[STORE+31]→[PERM+5-XR4]
→[CEQCF+6-XR4]
→[TEMP+6-XR4]
[CONSTA+12-XR4]→[TEMP+3-XR4]
XR4>1
YES
XR4-1→XR4
NO
GHA+8
-(GHA+8)→XR4
DOT
-AC→AC
AC→AW
2*AC→[STORE+33]
3→XR2
SXYZ
INPUTD*[STORE+15-XR2]→[SAVE+3-XR2]
INPUTD*[STORE+33]-[INPUTD+2]→NOTE
NOTE*[CONSTA+78-XR2]→AC
→[STORE+9-XR2]
(AC-[SAVE+3-XR2])/[STORE+31]→[CEQCF+3-XR2]
XR2>1
YES
XR2-1→XR2
N3
PLACED INTO PERM+2 (= QX)
" " CEQCF+3 "
" " TEMP+3 "
PLACED INTO PERM+3 (=QY)
" " CEQCF+4 "
" TEMP+4 "
" PERM+4 (=QZ)
" " CEQCF+5 "
" " TEMP+5 "
B1X TRANSFERED INTO TEMP
B1Y " " TEMP+1
B1Z " " TEMP+2
FLOATING
[(B1XQX + B1YQY + B1ZQZ) PLACED INTO AC (FLOATING) (= -aZ)]
[aZ PLACED INTO AW (FLOATING)]
[2aZ PLACED INTO STORE+33 (FLOATING)]
PLACED INTO SAVE
" " SAVE+1
" " SAVE+2
" " NOTE
PLACED INTO AC
" " STORE+6
" " AC
" " STORE+7
" " AC
" " STORE+8
PLACED INTO CEQCF (=SX)
" " CEQCF+1 (=SY)
" " CEQCF+2 (=SZ)
FLOATING



$$\left(\begin{array}{l}\left\{\dfrac{(\bar{B}_1 \times \bar{A}_2^\circ)_x - [-(\bar{B}_1 \cdot \bar{A}_1^\circ) + 2a_2(\bar{A}_1^\circ \cdot \bar{A}_2^\circ)]\,C_{18x}}{\mathcal{C}_{18}^2}\right\} \text{ PLACED INTO } DX \quad (= O_x) \\ \left\{\dfrac{(\bar{B}_1 \times \bar{A}_2^\circ)_y - [-(\bar{B}_1 \cdot \bar{A}_1^\circ) + 2a_2(\bar{A}_1^\circ \cdot \bar{A}_2^\circ)]\,C_{18y}}{\mathcal{C}_{18}^2}\right\} \quad " \quad " \quad DX+1 \quad (= O_y) \\ \left\{\dfrac{(\bar{B}_1 \times \bar{A}_2^\circ)_z - [-(\bar{B}_1 \cdot \bar{A}_1^\circ) + 2a_2(\bar{A}_1^\circ \cdot \bar{A}_2^\circ)]\,C_{18z}}{\mathcal{C}_{18}^2}\right\} \quad " \quad " \quad DX+2 \quad (= O_z)\end{array}\right\} \text{FLOATING}\Bigg)$$

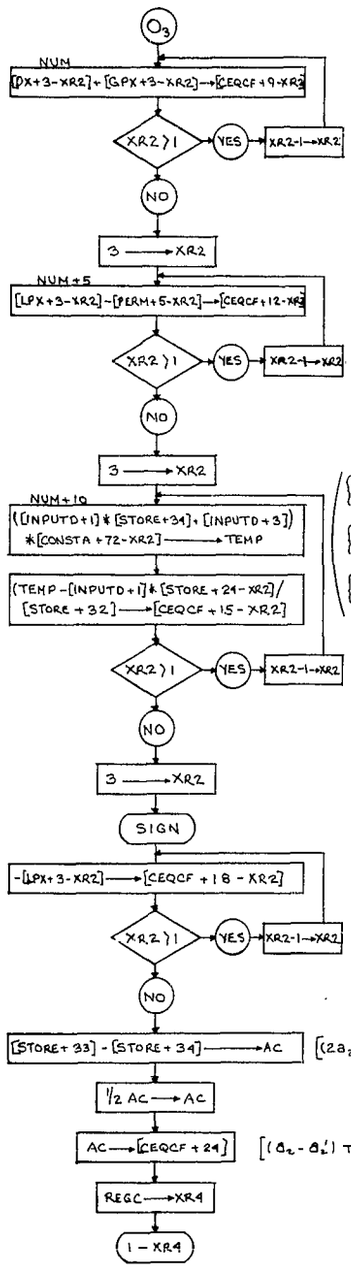
$$\left(\begin{array}{l}\dfrac{(\bar{A}_3^\circ \times \bar{C}_{20})_x}{\mathcal{C}_{20}^2} \text{ PLACED INTO } LPX \quad (= L'_x) \\ \dfrac{(\bar{A}_3^\circ \times \bar{C}_{20})_y}{\mathcal{C}_{20}^2} \quad " \quad " \quad LPX+1 \quad (= L'_y) \\ \dfrac{(\bar{A}_3^\circ \times \bar{C}_{20})_z}{\mathcal{C}_{20}^2} \quad " \quad " \quad LPX+2 \quad (= L'_z)\end{array}\right\} \text{FLOATING}\Bigg)$$

$$\left[\begin{array}{l}(B_{2x} L'_x + B_{2y} L'_y + B_{2z} L'_z) \text{ PLACED INTO } AC \quad (= a'_2) \\ \quad " \quad " \quad AP2 \quad "\end{array}\right\} \text{FLOATING}\Bigg]$$

$(2a'_2$ PLACED INTO STORE + 34, FLOATING$)$

$$\left\{[2a'(\bar{A}_2^\circ \cdot \bar{A}_3^\circ) + (\bar{B}_2 \cdot \bar{A}_3^\circ)]\right\} \text{ PLACED INTO } NOTE+3 \text{ (FLOATING)}$$

$$\left(\begin{array}{l}\left\{\dfrac{(\bar{B}_2 \times \bar{A}_2^\circ)_x - [(\bar{B}_2 \cdot \bar{A}_3^\circ) + 2a'_2(\bar{A}_2^\circ \cdot \bar{A}_3^\circ)]\,C_{20x}}{\mathcal{C}_{20}^2}\right\} \text{ PLACED INTO } GPX \quad (= O'_x) \\ \left\{\dfrac{(\bar{B}_2 \times \bar{A}_2^\circ)_y - [(\bar{B}_2 \cdot \bar{A}_3^\circ) + 2a'_2(\bar{A}_2^\circ \cdot \bar{A}_3^\circ)]\,C_{20y}}{\mathcal{C}_{20}^2}\right\} \quad " \quad " \quad GPX+1 \quad (= O'_y) \\ \left\{\dfrac{(\bar{B}_2 \times \bar{A}_2^\circ)_z - [(\bar{B}_2 \cdot \bar{A}_3^\circ) + 2a'_2(\bar{A}_2^\circ \cdot \bar{A}_3^\circ)]\,C_{20z}}{\mathcal{C}_{20}^2}\right\} \quad " \quad " \quad GPX+2 \quad (= O'_z)\end{array}\right\} \text{FLOATING}\Bigg)$$



$(O_x - O_x')$ PLACED INTO CEQCF + 6
$(O_y - O_y')$ " " CEQCF + 7
$(O_z - O_z')$ " " CEQCF + 8
} FLOATING

$(L_x' - Q_x)$ PLACED INTO CEQCF + 9
$(L_y' - Q_y)$ " " CEQCF + 10
$(L_z' - Q_z)$ " " CEQCF + 11
} FLOATING

$$\left\{\frac{[(\bar{B}_2\cdot\bar{A}_3^*) + 2a_2'(\bar{A}_2^*\cdot\bar{A}_3^*)]C_{20x} - (\bar{B}_2\times\bar{A}_3^*)_x(\bar{A}_2^*\cdot\bar{A}_3^*)}{c_{20}^2}\right\}$$ PLACED INTO CEQCF+12 $(=P_x')$

$$\left\{\frac{[(\bar{B}_2\cdot\bar{A}_3^*) + 2a_2'(\bar{A}_2^*\cdot\bar{A}_3^*)]C_{20y} - (\bar{B}_2\times\bar{A}_3^*)_y(\bar{A}_2^*\cdot\bar{A}_3^*)}{c_{20}^2}\right\}$$ " CEQCF +13 $(=P_y')$

$$\left\{\frac{[(\bar{B}_2\cdot\bar{A}_3^*) + 2a_2'(\bar{A}_2^*\cdot\bar{A}_3^*)]C_{20z} - (\bar{B}_2\times\bar{A}_3^*)_z(\bar{A}_2^*\cdot\bar{A}_3^*)}{c_{20}^2}\right\}$$ " CEQCF +14 $(=P_z')$

} FLOATING

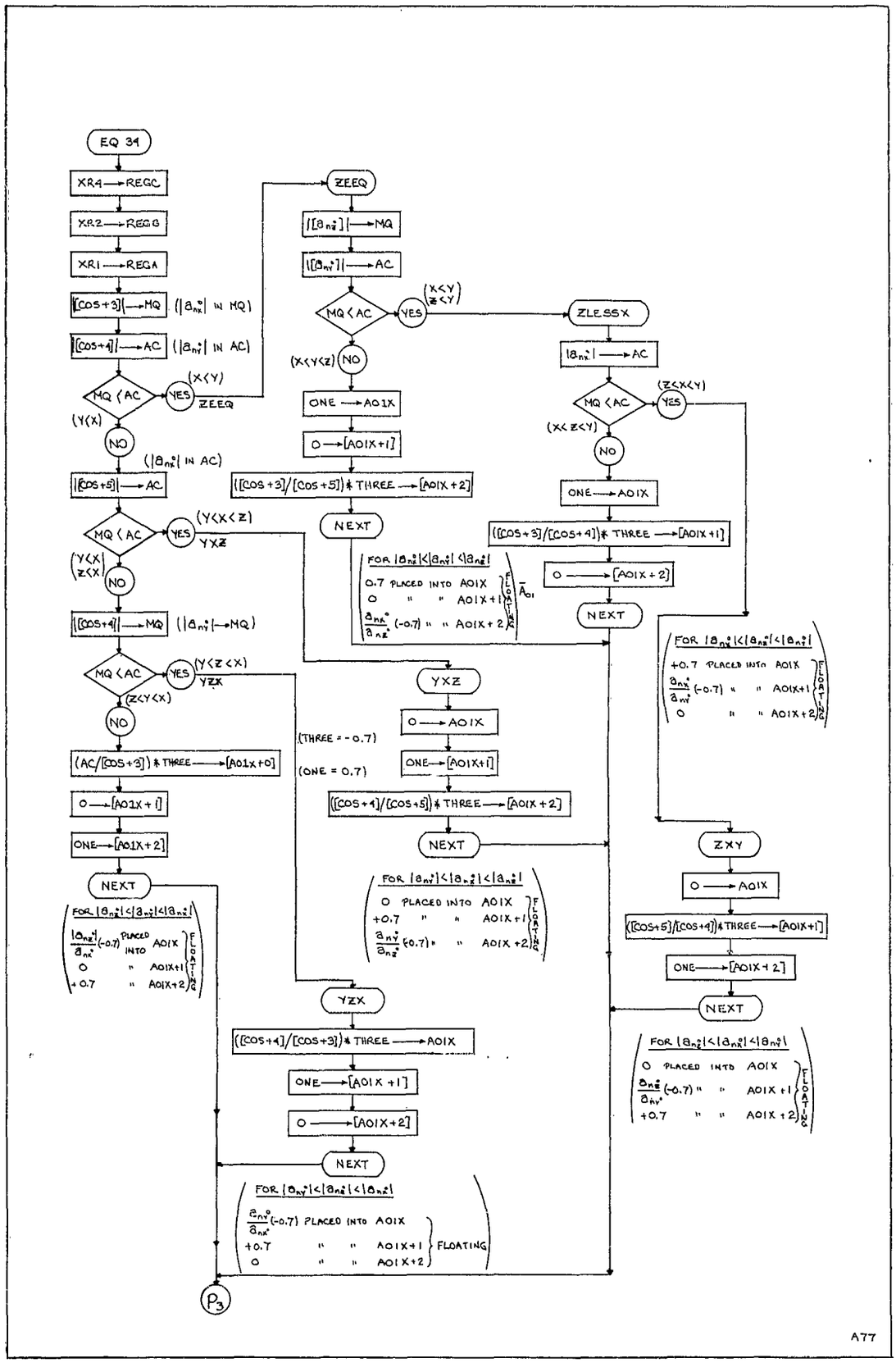
$-L_x'$ TRANSFERED INTO CEQCF + 15
$-L_y'$ " " CEQCF + 16
$-L_z'$ " " CEQCF + 17
} FLOATING

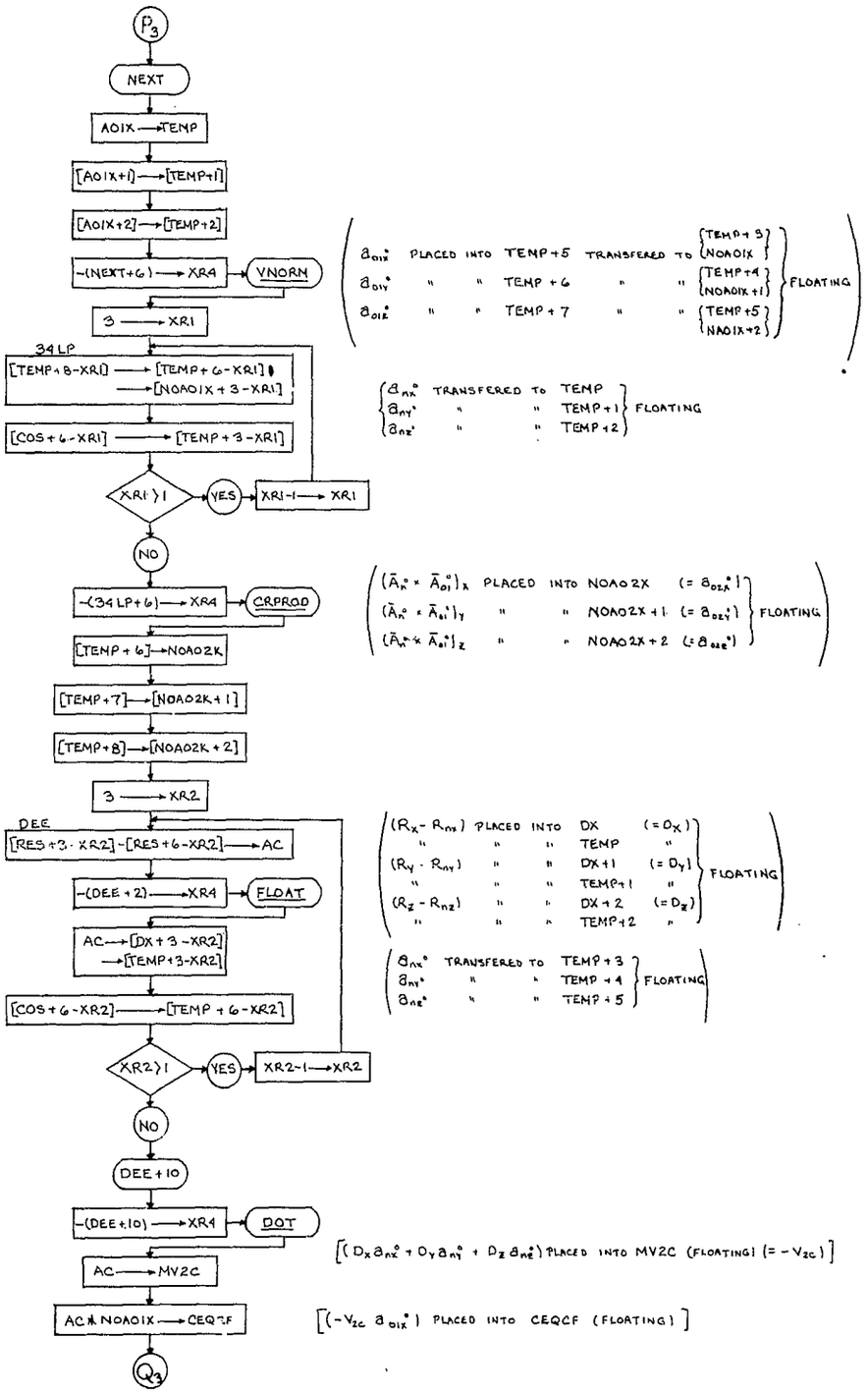
$[(2a_2 - 2a_2')$ PLACED INTO AC (FLOATING)$]$

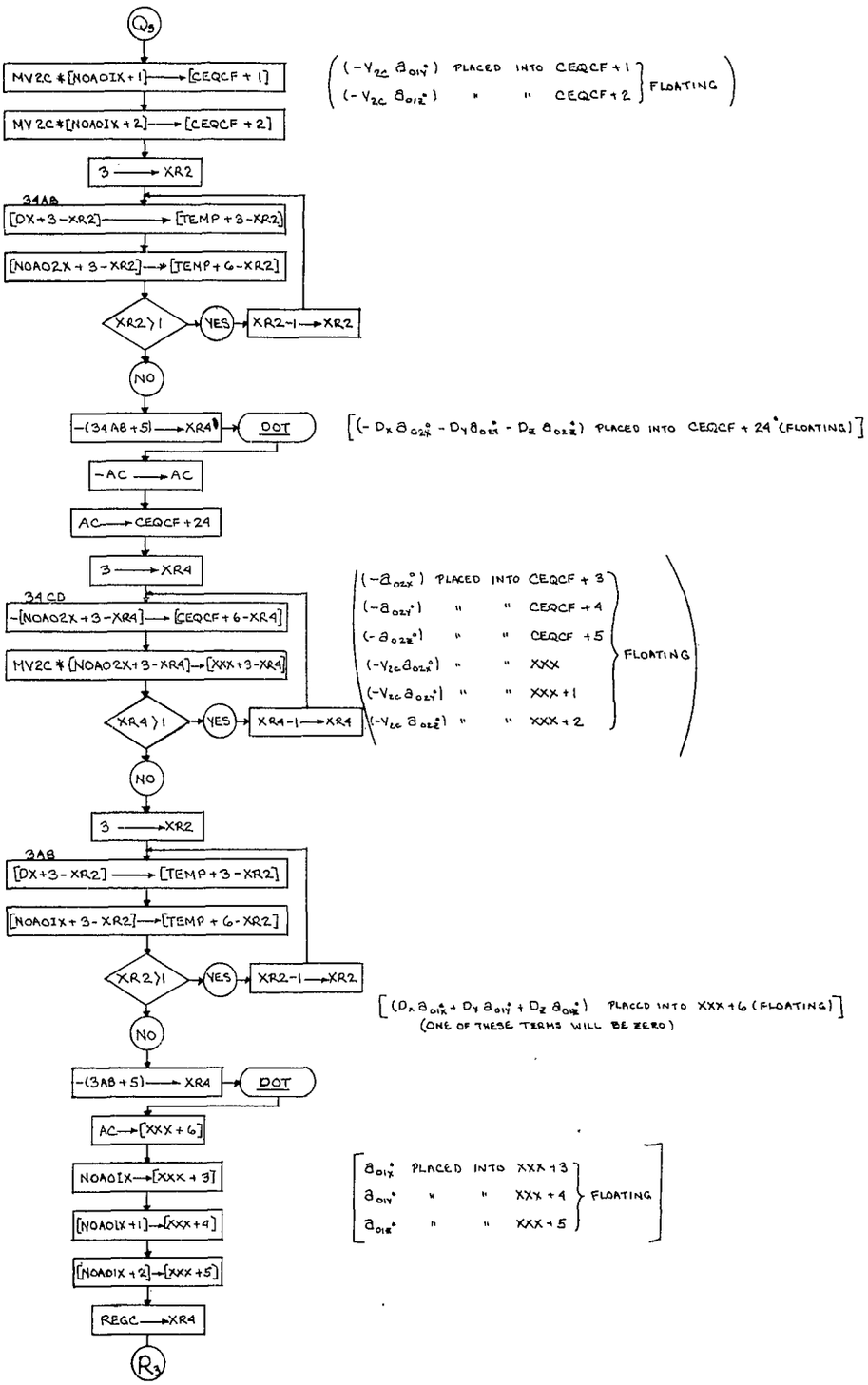
$[(a_2 - a_2')$ TRANSFERED INTO CEQCF + 24 (FLOATING)$]$

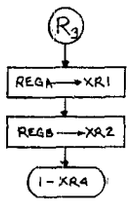
S_x	IN	CEQCF
S_y	"	CEQCF + 1
S_z	"	CEQCF + 2
Q_x	"	CEQCF + 3
Q_y	"	CEQCF + 4
Q_z	"	CEQCF + 5
$(O_x - O_x')$	"	CEQCF + 6
$(O_y - O_y')$	"	CEQCF + 7
$(O_z - O_z')$	"	CEQCF + 8
$(L_x' - Q_x)$	"	CEQCF + 9
$(L_y' - Q_y)$	"	CEQCF + 10
$(L_z' - Q_z)$	"	CEQCF + 11
P_x'	"	CEQCF + 12
P_y'	"	CEQCF + 13
P_z'	"	CEQCF + 14
$-L_x'$	"	CEQCF + 15
$-L_y'$	"	CEQCF + 16
$-L_z'$	"	CEQCF + 17
$(a_2 - a_2')$	"	CEQCF + 24

$$S_x dT_{1x} + S_y dT_{1y} + S_z dT_{1z} + Q_x dR_{1x} + Q_y dR_{1y} + Q_z dR_{1z}$$
$$+(O_x - O_x')dT_{2x} + (O_y - O_y')dT_{2y} + (O_z - O_z')dT_{2z} + (L_x' - Q_x)dR_{2x} + (L_y' - Q_y)dR_{2y} + (L_z' - Q_z)dR_{2z}$$
$$+ P_x dT_{3x} + P_y dT_{3y} + P_z dT_{3z} + (-L_x')dR_{3x} + (-L_y')dR_{3y} + (-L_z')dR_{3z}$$
$$= a_2 - a_2'$$


EQ 34
XR4 → REGC
XR2 → REGB
XR1 → REGA
|[COS+3]| → MQ
(|a_nx°| IN MQ)
|[COS+4]| → AC
(|a_ny°| IN AC)
MQ < AC
YES
(X<Y)
ZEEQ
(Y<X)
NO
(|a_nx°| IN AC)
|[COS+5]| → AC
MQ < AC
YES
(Y<X<Z)
YXZ
(Y<X, Z<X)
NO
|[COS+4]| → MQ
(|a_ny°| → MQ)
MQ < AC
YES
(Y<Z<X)
YZX
(Z<Y<X)
NO
([COS+3]/[COS+4]) * THREE → [A01X+0]
0 → [A01X+1]
ONE → [A01X+2]
NEXT
FOR |a_nz°|<|a_ny°|<|a_nx°|
|a_nz°|/a_nx° (-0.7) PLACED INTO A01X
0 " A01X+1
+0.7 " A01X+2
FLOATING
ZEEQ
|[a_nz°]| → MQ
|[a_ny°]| → AC
MQ < AC
YES
(X<Y, Z<Y)
ZLESSX
(X<Y<Z)
NO
ONE → A01X
0 → [A01X+1]
([COS+3]/[COS+5]) * THREE → [A01X+2]
NEXT
FOR |a_nz°|<|a_ny°|<|a_nx°|
0.7 PLACED INTO A01X
0 " " A01X+1
a_nx°/a_nz° (-0.7) " " A01X+2
FLOATING
Ā_01
YXZ
0 → A01X
ONE → [A01X+1]
(THREE = -0.7)
(ONE = 0.7)
([COS+4]/[COS+5]) * THREE → [A01X+2]
NEXT
FOR |a_ny°|<|a_nz°|<|a_nx°|
0 PLACED INTO A01X
+0.7 " " A01X+1
a_ny°/a_nz° (-0.7) " " A01X+2
FLOATING
YZX
([COS+4]/[COS+3]) * THREE → A01X
ONE → [A01X+1]
0 → [A01X+2]
NEXT
FOR |a_ny°|<|a_nz°|<|a_nx°|
a_ny°/a_nx° (-0.7) PLACED INTO A01X
+0.7 " " A01X+1
0 " " A01X+2
FLOATING
P3
|a_nx°| → AC
MQ < AC
YES
(Z<X<Y)
(X<Z<Y)
NO
ONE → A01X
([COS+3]/[COS+4]) * THREE → [A01X+1]
0 → [A01X+2]
NEXT
FOR |a_nx°|<|a_nz°|<|a_ny°|
+0.7 PLACED INTO A01X
a_nx°/a_ny° (-0.7) " " A01X+1
0 " " A01X+2
FLOATING
ZXY
0 → A01X
([COS+5]/[COS+4]) * THREE → [A01X+1]
ONE → [A01X+2]
NEXT
FOR |a_nz°|<|a_nx°|<|a_ny°|
0 PLACED INTO A01X
a_nz°/a_ny° (-0.7) " " A01X+1
+0.7 " " A01X+2
FLOATING


P3
NEXT
A01X → TEMP
[A01X+1] → [TEMP+1]
[A01X+2] → [TEMP+2]
-(NEXT+6) → XR4
VNORM
3 → XR1
34 LP
[TEMP+8-XR1] → [TEMP+6-XR1]
→ [NOA01X+3-XR1]
[COS+6-XR1] → [TEMP+3-XR1]
XR1 > 1
YES
XR1-1 → XR1
NO
-(34 LP+6) → XR4
CRPROD
[TEMP+6] → NOA02K
[TEMP+7] → [NOA02K+1]
[TEMP+8] → [NOA02K+2]
3 → XR2
DEE
[RES+3·XR2]-[RES+6-XR2] → AC
-(DEE+2) → XR4
FLOAT
AC → [DX+3-XR2]
→ [TEMP+3-XR2]
[COS+6-XR2] → [TEMP+6-XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
DEE+10
-(DEE+10) → XR4
DOT
AC → MV2C
AC → NOA01X → CEQCF
Q3
a01x° PLACED INTO TEMP+5 TRANSFERED TO {TEMP+3, NOA01X}
a01y° " " TEMP+6 " " {TEMP+4, NOA01X+1}
a01z° " " TEMP+7 " " {TEMP+5, NOA01X+2}
FLOATING
anx° TRANSFERED TO TEMP
any° " " TEMP+1
anz° " " TEMP+2
FLOATING
(Ānx° × Āo1°)x PLACED INTO NOA02X (= a02x°)
(Ānx° × Āo1°)y " " NOA02X+1 (= a02y°)
(Ānx° × Āo1°)z " " NOA02X+2 (= a02z°)
FLOATING
(Rx - Rnx) PLACED INTO DX (= Dx)
" " " TEMP "
(Ry - Rny) " " DX+1 (= Dy)
" " " TEMP+1 "
(Rz - Rnz) " " DX+2 (= Dz)
" " " TEMP+2 "
FLOATING
anx° TRANSFERED TO TEMP+3
any° " " TEMP+4
anz° " " TEMP+5
FLOATING
[(Dx anx° + Dy any° + Dz anz°) PLACED INTO MV2C (FLOATING) (= -V2c)]
[(-V2c a01x°) PLACED INTO CEQCF (FLOATING)]


Q3
MV2C *[NOAOIX+1] → [CEQCF+1]
MV2C *[NOAOIX+2] → [CEQCF+2]
(-V2C a01Y°) PLACED INTO CEQCF+1
(-V2C a01Z°) " " CEQCF+2
FLOATING
3 → XR2
3AAB
[DX+3-XR2] → [TEMP+3-XR2]
[NOAO2X+3-XR2] → [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
-(3AB+5) → XR4
DOT
[(-Dx a02X° - Dy a02Y° - Dz a02Z°) PLACED INTO CEQCF+24 (FLOATING)]
-AC → AC
AC → CEQCF+24
3 → XR4
3CD
-[NOAO2X+3-XR4] → [CEQCF+6-XR4]
MV2C * [NOAO2X+3-XR4] → [XXX+3-XR4]
(-a02X°) PLACED INTO CEQCF+3
(-a02Y°) " " CEQCF+4
(-a02Z°) " " CEQCF+5
(-V2C a02X°) " " XXX
(-V2C a02Y°) " " XXX+1
(-V2C a02Z°) " " XXX+2
FLOATING
XR4>1
YES
XR4-1 → XR4
NO
3 → XR2
3AB
[DX+3-XR2] → [TEMP+3-XR2]
[NOAOIX+3-XR2] → [TEMP+6-XR2]
XR2>1
YES
XR2-1 → XR2
NO
[(Dx a01X° + Dy a01Y° + Dz a01Z°) PLACED INTO XXX+6 (FLOATING)]
(ONE OF THESE TERMS WILL BE ZERO)
-(3AB+5) → XR4
DOT
AC → [XXX+6]
NOAOIX → [XXX+3]
[NOAOIX+1] → [XXX+4]
[NOAOIX+2] → [XXX+5]
a01X° PLACED INTO XXX+3
a01Y° " " XXX+4
a01Z° " " XXX+5
FLOATING
REGC → XR4
R3



SUMMARY EQ 3

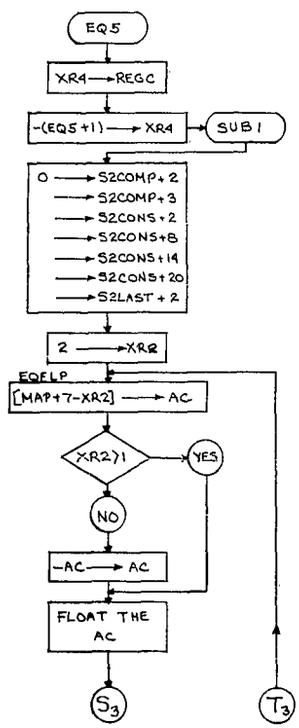
$(-V_{2c}\, a_{01x}^{\circ})$	IN	CEQCF	FLOATING
$(-V_{2c}\, a_{01y}^{\circ})$	"	CEQCF+1	
$(-V_{2c}\, a_{01z}^{\circ})$	"	CEQCF+2	
$(-a_{02x}^{\circ})$	"	CEQCF+3	
$(-a_{02y}^{\circ})$	"	CEQCF+4	
$(-a_{02z}^{\circ})$	"	CEQCF+5	
$(-D_x a_{02x}^{\circ} - D_y a_{02y}^{\circ} - D_z a_{02z}^{\circ})$	"	CEQCF+24	

$$(-V_{2c}\, a_{01x}^{\circ})\, dT_{nx} + (-V_{2c}\, a_{01y}^{\circ})\, dT_{ny} + (-V_{2c}\, a_{01z}^{\circ})\, dT_{nz} - a_{02x}^{\circ}\, dR_{nx} - a_{02y}^{\circ}\, dR_{ny} - a_{02z}^{\circ}\, dR_{nz}$$
$$= [-D_x a_{02x}^{\circ} - D_y a_{02y}^{\circ} - D_z a_{02z}^{\circ}]$$

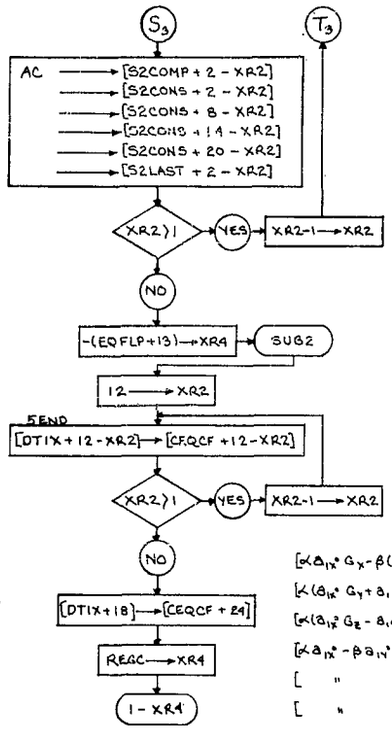
SUMMARY EQ 4

$(-V_{2c}\, a_{02x}^{\circ})$	IN	XXX	TRANSFERED	LATER	TO	CEQCF
$(-V_{2c}\, a_{02y}^{\circ})$	"	XXX+1	"	"	"	CEQCF+1
$(-V_{2c}\, a_{02z}^{\circ})$	"	XXX+2	"	"	"	CEQCF+2
a_{01x}°	"	XXX+3	"	"	"	CEQCF+3
a_{01y}°	"	XXX+4	"	"	"	CEQCF+4
a_{01z}°	"	XXX+5	"	"	"	CEQCF+5
$[D_x a_{01x}^{\circ} + D_y a_{01y}^{\circ} + D_z a_{01z}^{\circ}]$	"	XXX+6	"	"	"	CEQCF+24

$$(-V_{2c}\, a_{02x}^{\circ})\, dT_{nx} + (-V_{2c}\, a_{02y}^{\circ})\, dT_{ny} + (-V_{2c}\, a_{02z}^{\circ})\, dT_{nz}$$
$$+ a_{01x}^{\circ}\, dR_{nx} + a_{01y}^{\circ}\, dR_{ny} + a_{01z}^{\circ}\, dR_{nz}$$
$$= D_x a_{01x}^{\circ} + D_y a_{01y}^{\circ} + D_z a_{01z}^{\circ}$$



λ KNOWN



SIN λ →	S2COMP				FLOATING
	S2CONS				
	S2CONS+6				
	S2CONS+12				
	S2CONS+18				
	S2LAST				
-COS λ →	S2COMP+1				
	S2CONS+1				
	S2CONS+7				
	S2CONS+13				
	S2CONS+19				
	S2LAST+1				

$[\alpha a_{1x}^{\circ} G_x - \beta(a_{1y}^{\circ} G_x - a_1 a_{1z}^{\circ})]$	IN	DTIX	TRANSFERED	TO	CEQCF	FLOATING
$[\alpha(a_{1x}^{\circ} G_y + a_1 a_{1z}^{\circ}) - \beta(a_{1y}^{\circ} G_y)]$	"	DTIX+1	"	"	CEQCF+1	$\alpha = \sin\lambda$
$[\alpha(a_{1z}^{\circ} G_z - a_1 a_{1y}^{\circ}) - \beta(a_{1y}^{\circ} G_z + a_1 a_{1x}^{\circ})]$	"	DTIX+2	"	"	CEQCF+2	$\beta = \cos\lambda$
$[\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ}]$	"	S2STOR			———	
["] $L_x + \alpha$	"	DTIX+3	"	"	CEQCF+3	
["] $L_y - \beta$	"	DTIX+4	"	"	CEQCF+4	
["] L_z	"	DTIX+5	"	"	CEQCF+5	
["] P_x	"	DTIX+6	"	"	CEQCF+6	
["] P_y	"	DTIX+7	"	"	CEQCF+7	
["] P_z	"	DTIX+8	"	"	CEQCF+8	
["] $[-L_x]$	"	DTIX+9	"	"	CEQCF+9	
["] $[-L_y]$	"	DTIX+10	"	"	CEQCF+10	
["] $[-L_z]$	"	DTIX+11	"	"	CEQCF+11	
α	"	S2LAST			———	
$-\beta$	"	S2LAST+1			———	
0	"	S2LAST+2			———	
$(R_{1x} + a_1 a_{1x}^{\circ})$	"	S2LAST+3			———	
$(R_{1y} + a_1 a_{1y}^{\circ})$	"	S2LAST+4			———	
$(R_{1z} + a_1 a_{1z}^{\circ})$	"	S2LAST+5			———	
$[\alpha(R_{1x} + a_1 a_{1x}^{\circ}) - \beta(R_{1y} + a_1 a_{1y}^{\circ})]$	"	COMMON			———	
$[\beta(R_{1y} + a_1 a_{1y}^{\circ}) - \alpha(R_{1x} + a_1 a_{1x}^{\circ})]$	"	DTIX+18	"	"	CEQCF+24	

$$[\alpha a_{1x}^{\circ} G_x - \beta(a_{1y}^{\circ} G_x - a_1 a_{1z}^{\circ})]\, dT_{1x} + [\alpha(a_{1x}^{\circ} G_y + a_1 a_{1z}^{\circ}) - \beta a_{1y}^{\circ} G_y]\, dT_{1y} + [\alpha(a_{1x}^{\circ} G_z - a_1 a_{1y}^{\circ}) - \beta(a_{1y}^{\circ} G_z + a_1 a_{1x}^{\circ})]\, dT_{1z}$$

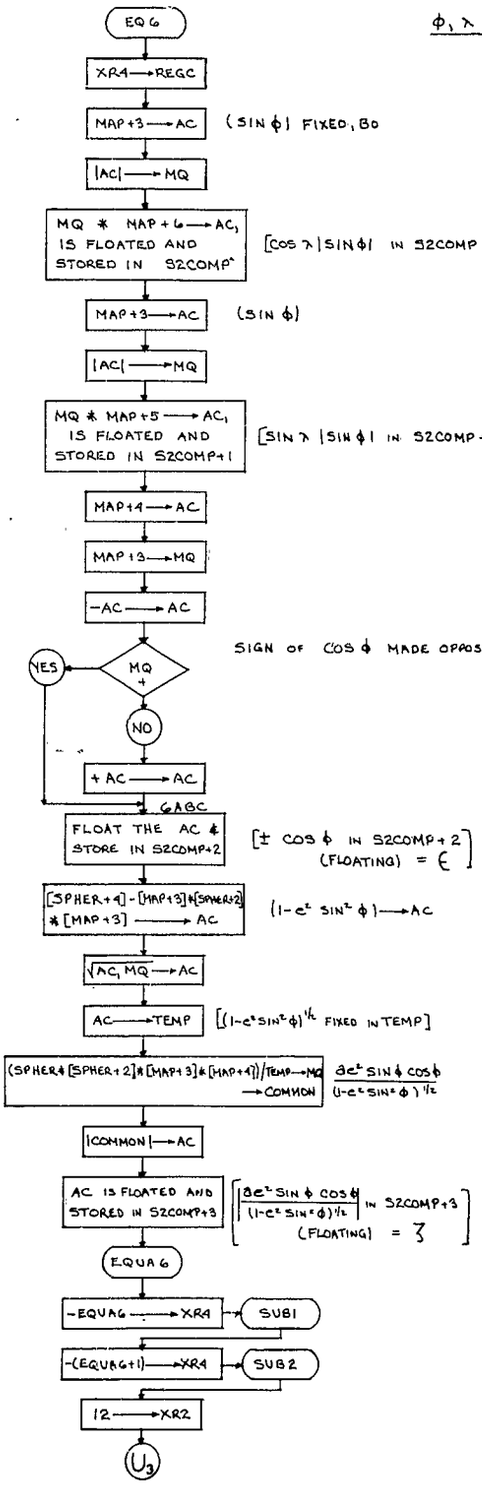
$$+[(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ}) L_x + \alpha]\, dR_{1x} + [(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ}) L_y - \beta]\, dR_{1y} + [(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ}) L_z]\, dR_{1z}$$

$$+[(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ}) P_x]\, dT_{2x} + [(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ}) P_y]\, dT_{2y} + [(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ}) P_z]\, dT_{2z}$$

$$+[(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ})(-L_x)]\, dR_{2x} + [(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ})(-L_y)]\, dR_{2y} + [(\alpha a_{1x}^{\circ} - \beta a_{1y}^{\circ})(-L_z)]\, dR_{2z}$$

$$= [\beta(R_{1y} + A_{1y}) - \alpha(R_{1x} + A_{1x})$$

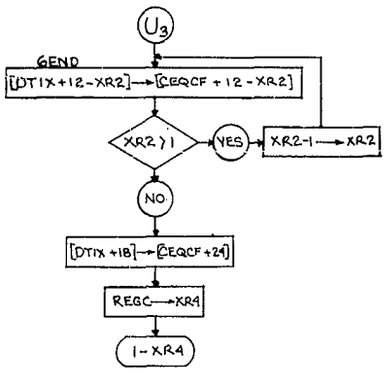
ϕ, λ KNOWN



$[(\gamma a_{1x}^{*} G_x + \delta(a_{1y}^{*} G_x - a_1 a_{1z}^{*}) + \epsilon(a_{1z}^{*} G_x + a_1 a_{1y}^{*})]$	IN	OTIX	TRANSFERED TO CEQCF
$[\gamma(a_{1z}^{*} G_y + a_1 a_{1x}^{*}) + \delta(a_{1y}^{*} G_y) + \epsilon(a_{1z}^{*} G_y - a_1 a_{1x}^{*})]$	"	OTIX+1	" CEQCF+1
$[\gamma(a_{1y}^{*} G_z - a_1 a_{1y}^{*}) + \delta(a_{1y}^{*} G_z + a_1 a_{1x}^{*}) + \epsilon(a_{1z}^{*} G_z)]$	"	OTIX+2	" CEQCF+2
$[(\gamma a_{1x}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*}) L_x + \gamma]$	"	OTIX+3	" CEQCF+3
$[(\quad " \quad) L_y + \delta]$	"	OTIX+4	" CEQCF+4
$[(\quad " \quad) L_z + \epsilon]$	"	OTIX+5	" CEQCF+5
$[(\quad " \quad) P_x]$	"	OTIX+6	" CEQCF+6
$[(\quad " \quad) P_y]$	"	OTIX+7	" CEQCF+7
$[(\quad " \quad) P_z]$	"	OTIX+8	" CEQCF+8
$[(\quad " \quad)(-L_x)]$	"	OTIX+9	" CEQCF+9
$[(\quad " \quad)(-L_y)]$	"	OTIX+10	" CEQCF+10
$[(\quad " \quad)(-L_z)]$	"	OTIX+11	" CEQCF+11
γ	"	S2LAST	——
δ	"	S2LAST+1	——
ϵ	"	S2LAST+2	——
$(R_{1x} + a_1 a_{1x}^{*})$	"	S2LAST+3	——
$(R_{1y} + a_1 a_{1y}^{*})$	"	S2LAST+4	——
$(R_{1z} + a_1 a_{1z}^{*})$	"	S2LAST+5	——
$[\gamma(R_{1x} + a_1 a_{1x}^{*}) + \delta(R_{1y} + a_1 a_{1y}^{*}) + \epsilon(R_{1z} + a_1 a_{1z}^{*})]$	"	COMMON	——
$3 - [\gamma(R_{1x} + a_1 a_{1x}^{*}) + \delta(R_{1y} + a_1 a_{1y}^{*}) + \epsilon(R_{1z} + a_1 a_{1z}^{*})]$	"	OTIX+18	" CEQCF+12

FLOATING

A82



$$[\gamma a_{1x}^{*} G_x + \delta(a_{1y}^{*} G_x - a_1 a_{1z}^{*}) + \epsilon(a_{1z}^{*} G_x + a_1 a_{1y}^{*})]\, dT_{1x} + [\gamma(a_{1x}^{*} G_y + a_1 a_{1z}^{*}) + \delta(a_{1y}^{*} G_y) + \epsilon(a_{1z}^{*} G_y - a_1 a_{1x}^{*})]\, dT_{1y} + [\gamma(a_{1x}^{*} G_z - a_1 a_{1y}^{*}) + (a_{1y}^{*} G_z + a_1 a_{1z}^{*}) + \epsilon(a_{1z}^{*} G_z)]\, dT_{1z}$$

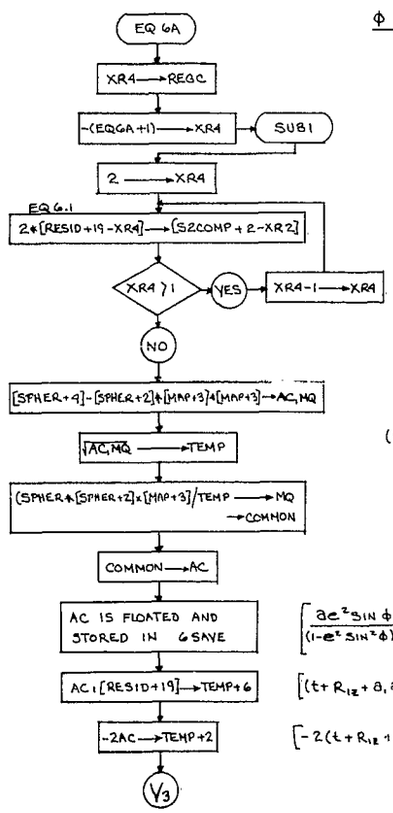
$$+ [(\gamma a_{1y}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*}) L_x + \gamma]\, dR_{1x} \quad + [(\gamma a_{1x}^{*} + \delta a_{1x}^{*} + \epsilon a_{1z}^{*}) L_y + \delta]\, dR_{1y} \quad + [(\gamma a_{1z}^{*} + \delta a_{1y}^{*} + \epsilon a_{1x}^{*}) L_z + \epsilon]\, dR_{1z}$$

$$+ [(\gamma a_{1y}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*}) P_x]\, dT_{2x} \quad + [(\gamma a_{1x}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*}) P_y]\, dT_{2y} \quad + [(\gamma a_{1x}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*}) P_z]\, dT_{2z}$$

$$+ [(\gamma a_{1x}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*})(-L_x)]\, dR_{2x} \quad + [(\gamma a_{1x}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*})(-L_y)]\, dR_{2y} \quad + [(\gamma a_{1x}^{*} + \delta a_{1y}^{*} + \epsilon a_{1z}^{*})(-L_z)]\, dR_{2z}$$

$$= \mathfrak{Z} - [\gamma(R_{1x} + a_1 a_{1x}^{*}) + \delta(R_{1y} + a_1 a_{1y}^{*}) + \epsilon(R_{1z} + a_1 a_{1z}^{*})]$$

ϕ KNOWN



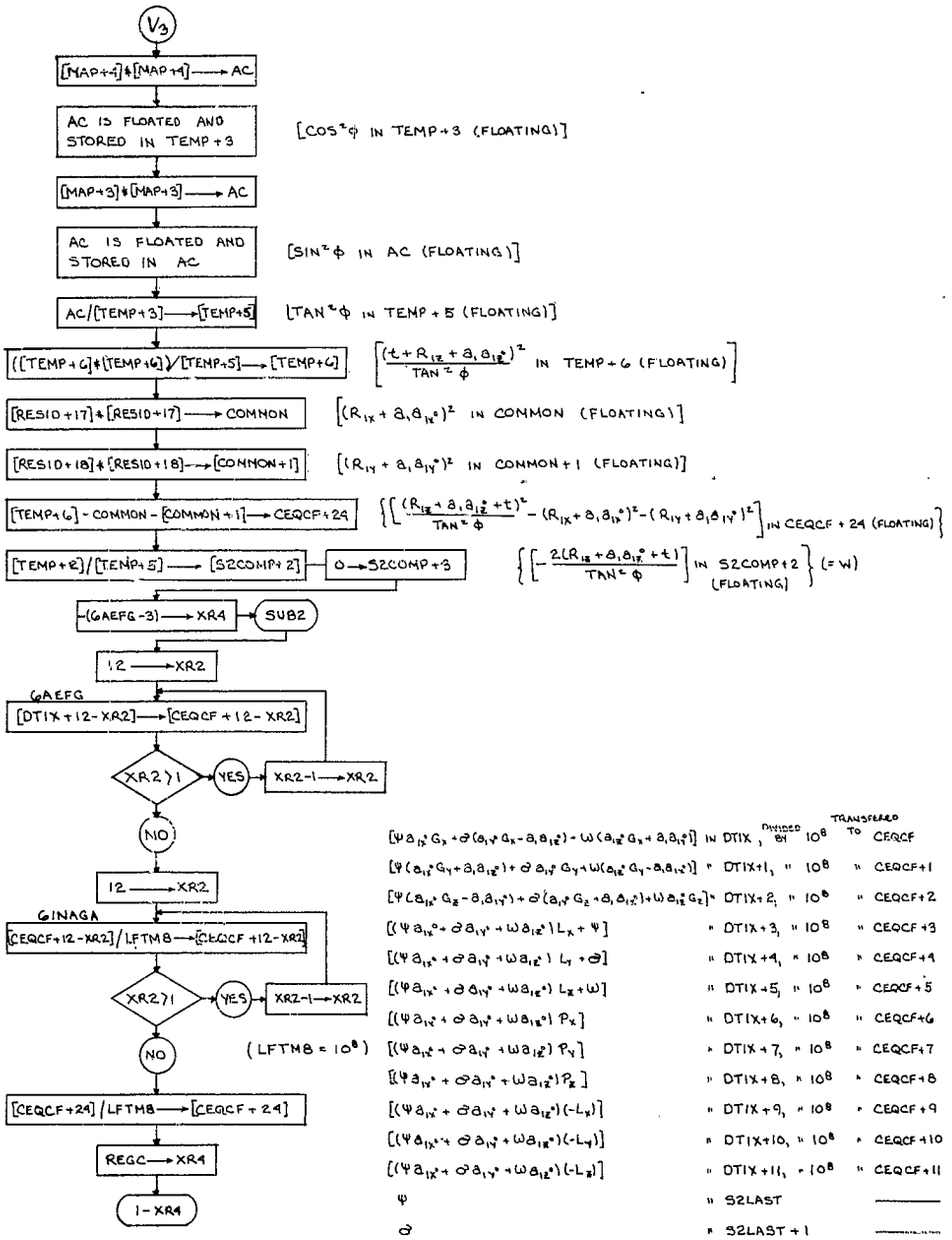
$2(R_{1x} + a_1 a_{1x}^{*})$ IN S2COMP
$2(R_{1y} + a_1 a_{1y}^{*})$ " S2COMP+1
} FLOATING $(= \psi)$ $(= \sigma)$

$(1 - e^2 \sin^2 \phi)^{1/2}$ (FIXED) IN TEMP

$\left[\dfrac{a e^2 \sin \phi}{(1 - e^2 \sin^2 \phi)^{1/2}}\right.$ IN 6SAVE (FLOATING) $\left.(= t)\right]$

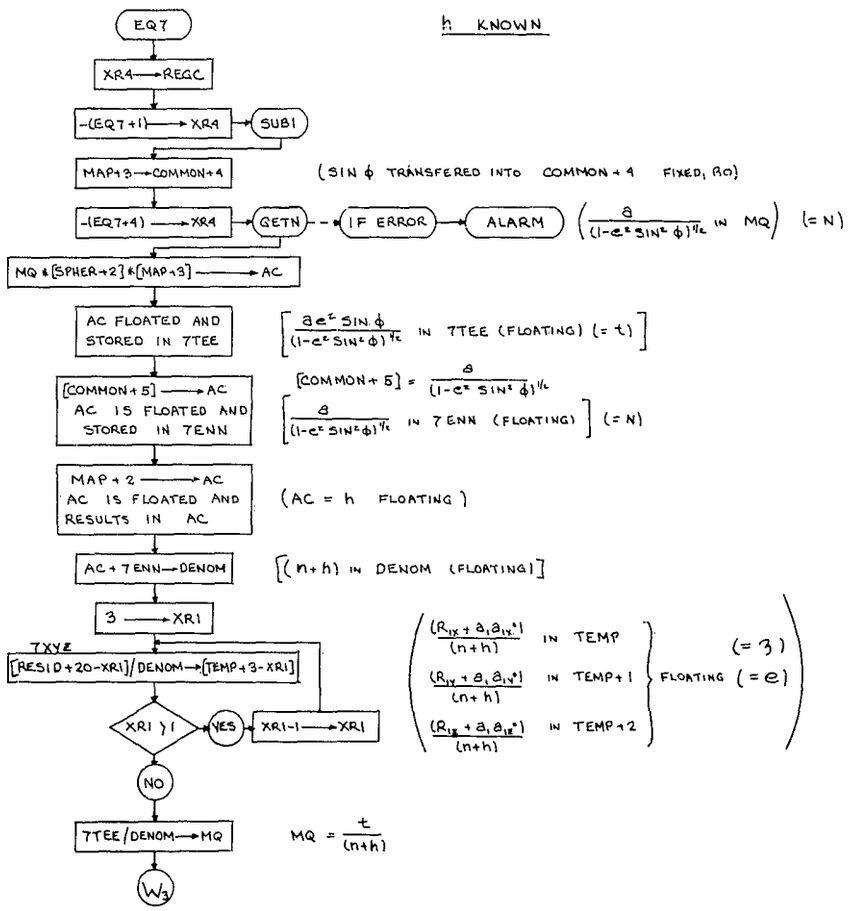
$[(t + R_{1z} + a_1 a_{1z}^{*})$ IN TEMP+6 (FLOATING)$]$

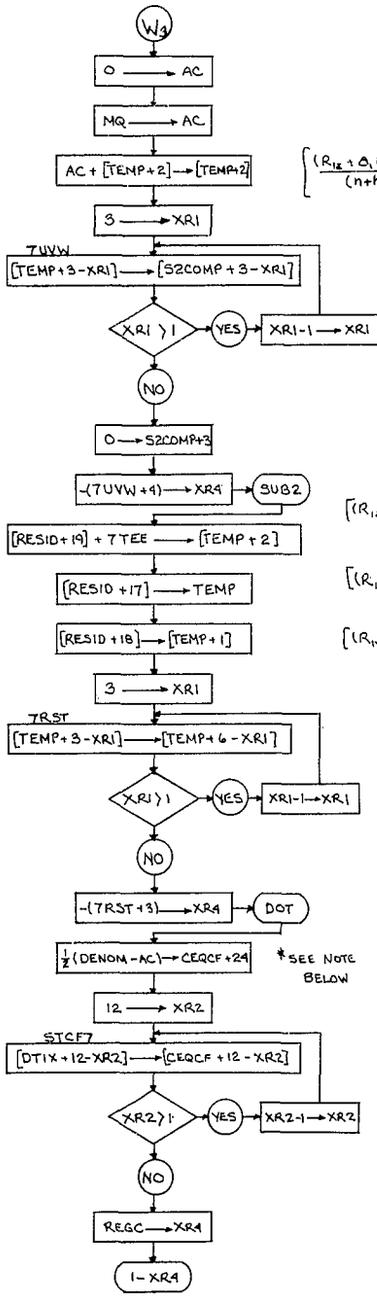
$[-2(t + R_{1z} + a_1 a_{1z}^{*})$ TEMP+2 (FLOATING)$]$



$[\psi a_{1X}^{\circ} G_X + \partial(a_{1Y}^{\circ} G_X - a_1 a_{1Z}^{\circ}) + \omega(a_{1Z}^{\circ} G_X + a_1 a_{1Y}^{\circ})]$	IN DTIX,	DIVIDED BY 10^8	TRANSFERED TO	CEQCF
$[\psi(a_{1Z}^{\circ} G_Y + a_1 a_{1Z}^{\circ}) + \partial a_{1Y}^{\circ} G_Y + \omega(a_{1Z}^{\circ} G_Y - a_1 a_{1X}^{\circ})]$	" DTIX+1,	" 10^8	"	CEQCF+1
$[\psi(a_{1Z}^{\circ} G_Z - a_1 a_{1Y}^{\circ}) + \partial(a_{1Y}^{\circ} G_Z + a_1 a_{1X}^{\circ}) + \omega a_{1Z}^{\circ} G_Z]$	" DTIX+2,	" 10^8	"	CEQCF+2
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ}) L_X + \psi]$	" DTIX+3,	" 10^8	"	CEQCF+3
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ}) L_Y + \partial]$	" DTIX+4,	" 10^8	"	CEQCF+4
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ}) L_Z + \omega]$	" DTIX+5,	" 10^8	"	CEQCF+5
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ}) P_X]$	" DTIX+6,	" 10^8	"	CEQCF+6
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ}) P_Y]$	" DTIX+7,	" 10^8	"	CEQCF+7
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ}) P_Z]$	" DTIX+8,	" 10^8	"	CEQCF+8
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ})(-L_X)]$	" DTIX+9,	" 10^8	"	CEQCF+9
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ})(-L_Y)]$	" DTIX+10,	" 10^8	"	CEQCF+10
$[(\psi a_{1X}^{\circ} + \partial a_{1Y}^{\circ} + \omega a_{1Z}^{\circ})(-L_Z)]$	" DTIX+11,	" 10^8	"	CEQCF+11
ψ	" S2LAST			———
∂	" S2LAST+1			———
ω	" S2LAST+2			———
$(R_{1X}+a_1a_{1X}^{\circ})$	" S2LAST+3			———
$(R_{1Y}+a_1a_{1Y}^{\circ})$	" S2LAST+4			———
$(R_{1Z}+a_1a_{1Z}^{\circ})$	" S2LAST+5			———
$[\psi(R_{1X}+a_1a_{1X}^{\circ})+\partial(R_{1Y}+a_1a_{1Y}^{\circ})+\omega(R_{1Z}+a_1a_{1Z}^{\circ})]$	" COMMON			———
GARBAGE	" DTIX+18			———
$\left[\frac{(R_{1Z}+a_1a_{1Z}^{\circ}+t)^2}{TAN^2\phi}-(R_{1X}+a_1a_{1X})^2-(R_{1Y}+a_1a_{1Y})^2\right]$	" CEQCF+24	" 10^8	"	CEQCF+24

$$
\begin{aligned}
&[\psi a_{1x}^{\circ} G_x + \phi (a_{1y}^{\circ} G_y - a_1 a_{1z}^{\circ}) + \omega (a_{1z}^{\circ} G_y + a_1 a_{1y}^{\circ})]\, dT_{1x} \\
&+[\psi (a_{1x}^{\circ} G_y + a_1 a_{1z}^{\circ}) + \phi\, a_{1y}^{\circ} G_y + \omega (a_{1z}^{\circ} G_y - a_1 a_{1x}^{\circ})]\, dT_{1y} \\
&+[\psi (a_{1x}^{\circ} G_z - a_1 a_{1y}^{\circ}) + \phi (a_{1y}^{\circ} G_z + a_1 a_{1x}^{\circ}) + \omega\, a_{1z}^{\circ} G_z]\, dT_{1z} \\
&+[(\psi a_{1x}^{\circ} + \phi\, a_{1y}^{\circ} + \omega\, a_{1z}^{\circ})\, L_x + \psi]\, dR_{1x} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, L_y + \phi]\, dR_{1y} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, L_z + \omega]\, dR_{1z} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, P_x]\, dT_{2x} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, P_y]\, dT_{2y} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, P_z]\, dT_{2z} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, (-L_x)\, dR_{2x} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, (-L_y)\, dR_{2y} \\
&+[(\ \text{"} \quad + \quad \text{"} \quad + \quad \text{"} \quad)\, (-L_z)\, dR_{2z} \\
&= \left[\frac{(R_{1z} + a_1 a_{1z}^{\circ} + t)^2}{\tan^2 \phi} - (R_{1x} + a_1 a_{1x}^{\circ})^2 - (R_{1y} + a_1 a_{1y}^{\circ})^2 \right]
\end{aligned}
$$





$\left[\frac{(R_{1z}+a_1a_{1z}^{\circ}+t)}{(n+h)}\right.$ REPLACES TEMP + 2 (FLOATING) $\left.(=\angle)\right]$

$\left(\begin{array}{lll} \zeta & \text{TRANSFERED TO} & \text{S2COMP} \\ \theta & \text{"} \quad \text{"} & \text{S2COMP+1} \\ \angle & \text{"} \quad \text{"} & \text{S2COMP+2} \end{array}\right\}$ FLOATING

$[(R_{1z}+a_1a_{1z}^{\circ}+t)$ IN TEMP+2] AND TRANSFERED INTO TEMP+5

$[(R_{1x}+a_1a_{1x}^{\circ})$ IN TEMP] " " " TEMP+3

$[(R_{1y}+a_1a_{1y}^{\circ})$ IN TEMP+1] " " " TEMP+4

		TRANSFERED		
$[(\zeta a_{1x}^{\circ}G_x)+\theta(a_{1y}^{\circ}G_x-a_1a_{1z}^{\circ})+\angle(a_{1z}^{\circ}G_x+a_1a_{1y}^{\circ})]$	IN	DTIX	TO	CEQCF
$[\zeta(a_{1x}^{\circ}G_y+a_1a_{1z}^{\circ})+\theta a_{1y}^{\circ}G_y+\angle(a_{1z}^{\circ}G_y-a_1a_{1x}^{\circ})]$	"	DTIX+1	"	CEQCF+1
$[\zeta(a_{1x}^{\circ}G_z-a_1a_{1y}^{\circ})+\theta(a_{1y}^{\circ}G_z+a_1a_{1x}^{\circ})+\angle(a_{1z}^{\circ}G_z)]$	"	DTIX+2	"	CEQCF+2
$[(\zeta a_{1x}^{\circ}+\theta a_{1y}^{\circ}+\angle a_{1z}^{\circ})L_x+\zeta]$	"	DTIX+3	"	CEQCF+3
$[(\text{"} + \text{"} + \text{"})L_y+\theta]$	"	DTIX+4	"	CEQCF+4
$[(\text{"} + \text{"} + \text{"})L_z+\angle]$	"	DTIX+5	"	CEQCF+5
$[(\text{"} + \text{"} + \text{"})P_x]$	"	DTIX+6	"	CEQCF+6
$[(\text{"} + \text{"} + \text{"})P_y]$	"	DTIX+7	"	CEQCF+7
$[(\text{"} + \text{"} + \text{"})P_z]$	"	DTIX+8	"	CEQCF+8
$[(\text{"} + \text{"} + \text{"})(-L_x)]$	"	DTIX+9	"	CEQCF+9
$[(\text{"} + \text{"} + \text{"})(-L_y)]$	"	DTIX+10	"	CEQCF+10
$[(\text{"} + \text{"} + \text{"})(-L_z)]$	"	DTIX+11	"	CEQCF+11
ζ	"	S2LAST		
θ	"	S2LAST+1		
$\angle$	"	S2LAST+2		
$(R_{1x}+a_1a_{1x}^{\circ})$	"	S2LAST+3		
$(R_{1y}+a_1a_{1y}^{\circ})$	"	S2LAST+4		
$(R_{1z}+a_1a_{1z}^{\circ})$	"	S2LAST+5		
$[\zeta(R_{1x}+a_1a_{1x}^{\circ})+\theta(R_{1y}+a_1a_{1y}^{\circ})+\angle(R_{1z}+a_1a_{1z}^{\circ})]$	"	COMMON		
$-[\text{"} + \text{"} + \text{"}]$	"	DTIX+18		
$\frac{1}{2}\left\{(n+h)-\frac{[(R_{1x}+a_1a_{1x}^{\circ})^2+(R_{1y}+a_1a_{1y}^{\circ})^2+(R_{1z}+a_1a_{1z}^{\circ}+t)^2]}{(n+h)}\right\}$	"	CEQCF+24		

FLOATING

* SEE ABOVE

$\left[\frac{1}{2}\left\{(n+h)-\frac{[(R_{1x}+a_1a_{1x}^{\circ})^2+(R_{1y}+a_1a_{1y}^{\circ})^2+(R_{1z}+a_1a_{1z}^{\circ}+t)^2]}{(n+h)}\right\}\right.$ IN CEQCF + 24

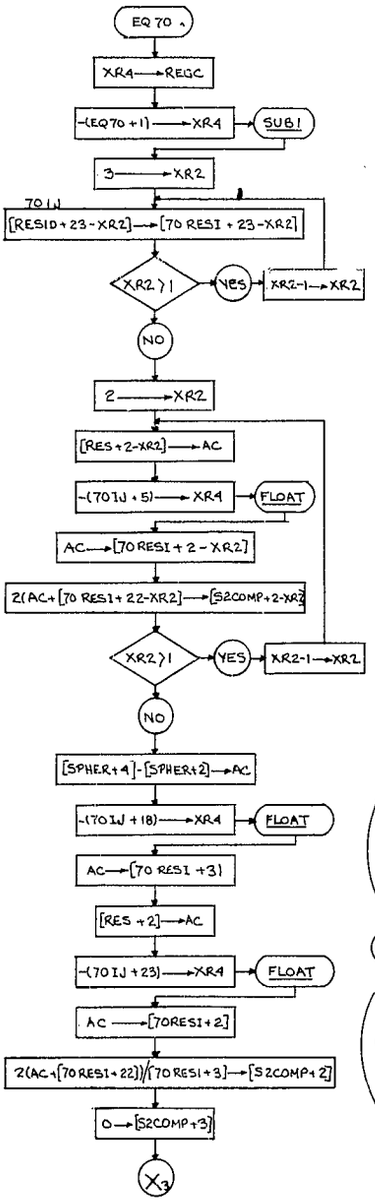
$$[(3\,a_{1x}^{*}G_x) + \Theta(a_{1y}^{*}G_y - a_1 a_{1z}) + \langle(a_{1z}^{*}G_z + a_1 a_{1x}^{*})]\,dT_{1x} + [3(a_{1x}^{*}G_y + a_1 a_{1z}) + \Theta(a_{1y}^{*}G_y) + \langle(a_{1z}^{*}G_y - a_1 a_{1x}^{*})]\,dT_{1y} + [3(a_{1x}^{*}G_z - a_1 a_{1y}^{*}) + \Theta(a_{1y}^{*}G_z + a_1 a_{1x}^{*}) + \langle(a_{1z}^{*}G_z)]\,dT_{1z}$$

$$+[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})\,L_x + 3]\,dR_{1x} \quad +[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})\,L_y + \Theta]\,dR_{1y} \quad +[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})\,L_z + \langle]\,dR_{1z}$$

$$+[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})\,P_x]\,dT_{2x} \quad +[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})\,P_y]\,dT_{2y} \quad +[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})\,P_z]\,dT_{2z}$$

$$+[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})(-L_x)]\,dR_{2x} \quad +[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})(-L_y)]\,dR_{2y} \quad +[(3\,a_{1x}^{*} + \Theta\,a_{1y}^{*} + \langle a_{1z}^{*})(-L_z)\,dR_{2z}$$

$$= 1/2\left\{(n+h) - \frac{[(R_{1x} + a_1 a_{1x}^{*})^2 + (R_{1y} + a_1 a_{1y}^{*})^2 + (R_{1z} + a_1 a_{1z}^{*} + t)^2]}{(n+h)}\right\}$$



$L_x^{(1)}$	PLACED	INTO	RESID
$L_y^{(1)}$	"	"	RESID + 1
$L_z^{(1)}$	"	"	RESID + 2
$P_x^{(1)}$	"	"	RESID + 3
$P_y^{(1)}$	"	"	RESID + 4
$P_z^{(1)}$	"	"	RESID + 5
$(a_{1x}^{*}G_x)^{(1)}$	"	"	RESID + 6
$(a_{1y}^{*}G_x - a_1 a_{1z}^{*})^{(1)}$	"	"	RESID + 7
$(a_{1z}^{*}G_x + a_1 a_{1y}^{*})^{(1)}$	"	"	RESID + 8
$(a_{1x}^{*}G_y + a_1 a_{1z}^{*})^{(1)}$	"	"	RESID + 9
$(a_{1y}^{*}G_y)^{(1)}$	"	"	RESID + 10
$(a_{1z}^{*}G_y - a_1 a_{1x}^{*})^{(1)}$	"	"	RESID + 11
$(a_{1x}^{*}G_z - a_1 a_{1y}^{*})^{(1)}$	"	"	RESID + 12
$(a_{1y}^{*}G_z - a_1 a_{1x}^{*})^{(1)}$	"	"	RESID + 13
$(a_{1z}^{*}G_z)^{(1)}$	"	"	RESID + 14
$(R_{1x} + a_1 a_{1x}^{*})^{(1)}$	"	"	RESID + 17
$(R_{1y} + a_1 a_{1y}^{*})^{(1)}$	"	"	RESID + 18
$(R_{1z} + a_1 a_{1z}^{*})^{(1)}$	"	"	RESID + 19
$(a_1 a_{1x}^{*})^{(1)}$	"	"	RESID + 20
$(a_1 a_{1y}^{*})^{(1)}$	"	"	RESID + 21
$(a_1 a_{1z}^{*})^{(1)}$	"	"	RESID + 22

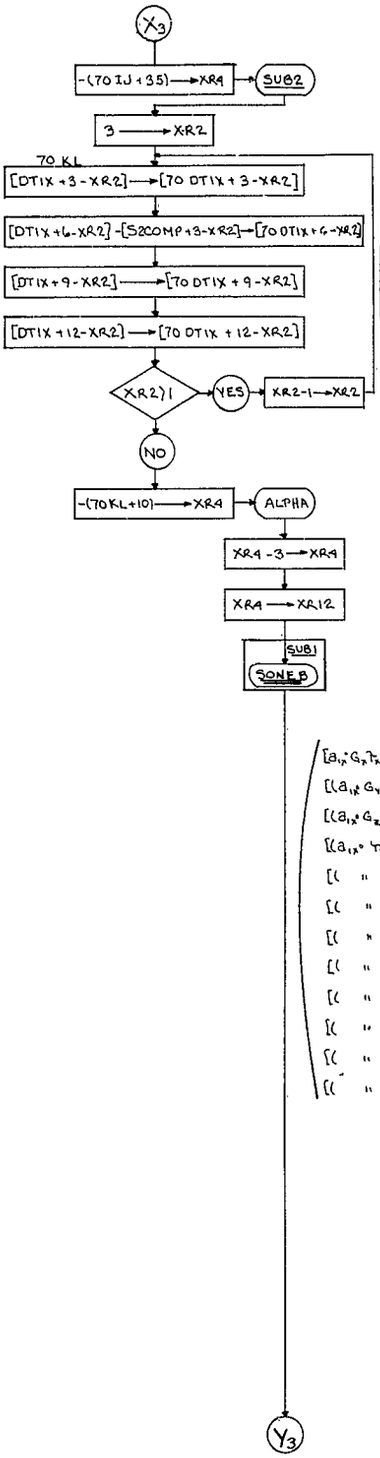
FLOATING

$(a_1 a_{1x}^{*})^{(1)}$	TRANSFERED	TO	70 RESI + 20
$(a_1 a_{1y}^{*})^{(1)}$	"	"	70 RESI + 21
$(a_1 a_{1z}^{*})^{(1)}$	"	"	70 RESI + 22

R_{1x}	PLACED	INTO	70 RESI	FLOATING
R_{1y}	"	"	70 RESI + 1	FLOATING
$2(R_{1x} + a_1 a_{1x}^{*})^{(1)}$	PLACED	INTO	S2COMP	FLOATING $(= \tau_x)$
$2(R_{1y} + a_1 a_{1y}^{*})^{(1)}$	"	"	S2COMP + 1	FLOATING $(= \tau_y)$

$((1. - e^{c})$ PLACED INTO 70 RESI + 3 (FLOATING$))$

R_{1z}	PLACED	INTO	70 RESI + 2	FLOATING.
$\frac{(2R_{1z} + a_1 a_{1z}^{*})^{(1)}}{(1. - e^{c})}$	"	"	S2COMP + 2	FLOATING. $(= \tau_z)$
0	"	"	S2COMP + 3	FLOATING.

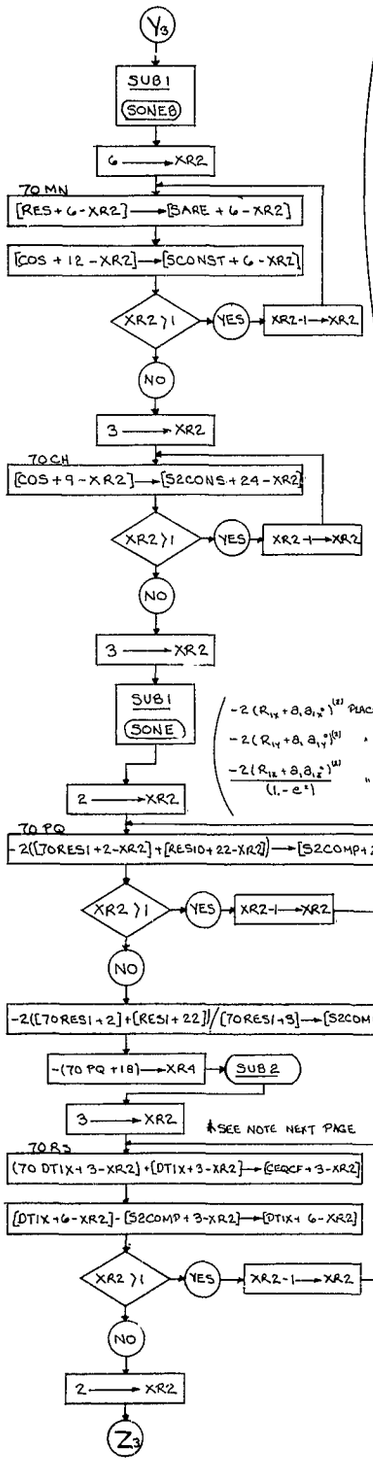


$[a_{1x}^{*} G_x \Gamma_x + (a_{1y}^{*} G_x - a_1 a_{1z}^{*}) \Gamma_y + (a_{1z}^{*} G_x + a_1 a_{1y}^{*}) \Gamma_z]^{(1)}$	PLACED	INTO	DTIX
$[(a_{1x}^{*} G_y + a_1 a_{1z}^{*}) \Gamma_x + (a_{1y}^{*} G_y) \Gamma_y + (a_{1z}^{*} G_y - a_1 a_{1x}^{*}) \Gamma_z]^{(1)}$	"	"	DTIX + 1
$[(a_{1x}^{*} G_z - a_1 a_{1y}^{*}) \Gamma_x + (a_{1y}^{*} G_z + a_1 a_{1x}^{*}) \Gamma_y + (a_{1z}^{*} G_z) \Gamma_z]^{(1)}$	"	"	DTIX + 2
$\{[a_{1x}^{*} \Gamma_x + a_{1y}^{*} \Gamma_y + a_{1z}^{*} \Gamma_z] L_x + 2(R_{1x} + a_1 a_{1x}^{*})\}^{(1)}$	"	"	DTIX + 3
$\{[a_{1x}^{*} \Gamma_x + a_{1y}^{*} \Gamma_y + a_{1z}^{*} \Gamma_z] L_y + 2(R_{1y} + a_1 a_{1y}^{*})\}^{(1)}$	"	"	DTIX + 4
$\{[a_{1x}^{*} \Gamma_x + a_{1y}^{*} \Gamma_y + a_{1z}^{*} \Gamma_z] L_z + \frac{2(R_{1y} + a_1 a_{1x}^{*})}{(1-e^2)}\}^{(1)}$	"	"	DTIX + 5
$\{[\ \ " \ + \ " \ + \ " \ ] P_x\}^{(1)}$	"	"	DTIX + 6
$\{[\ \ " \ + \ " \ + \ " \ ] P_y\}^{(1)}$	"	"	DTIX + 7
$\{[\ \ " \ + \ " \ + \ " \ ] P_z\}^{(1)}$	"	"	DTIX + 8
$\{[\ \ " \ + \ " \ + \ " \ ] (-L_x)\}^{(1)}$	"	"	DTIX + 9
$\{[\ \ " \ + \ " \ + \ " \ ] (-L_y)\}^{(1)}$	"	"	DTIX + 10
$\{[\ \ " \ + \ " \ + \ " \ ] (-L_z)\}^{(1)}$	"	"	DTIX + 11
$-[2(R_{1x} + a_1 a_{1x}^{*})^2 + 2(R_{1y} + a_1 a_{1y}^{*})^2 + \frac{2(R_{1z} + a_1 a_{1z}^{*})^2}{(1-e^2)}]^{(1)}$	"	"	DTIX + 18

FLOATING

$[a_{1x}^{*} G_x \Gamma_x + (a_{1y} G_x - a_1 a_{1z}^{*}) \Gamma_y + (a_{1z}^{*} G_x + a_1 a_{1y}^{*}) \Gamma_z]^{(1)}$	TRANSFERED	INTO	70 DTIX + 0
$[(a_{1x}^{*} G_y + a_1 a_{1z}^{*}) \Gamma_x + (a_{1y}^{*} G_y) \Gamma_y + (a_{1z}^{*} G_y - a_1 a_{1x}^{*}) \Gamma_z]^{(1)}$	"	"	70 DTIX + 1
$[(a_{1x}^{*} G_z - a_1 a_{1y}^{*}) \Gamma_x + (a_{1y}^{*} G_z + a_1 a_{1x}^{*}) \Gamma_y + a_{1z}^{*} G_z \Gamma_z]^{(1)}$	"	"	70 DTIX + 2
$[(a_{1x}^{*} \Gamma_x + a_{1y}^{*} \Gamma_y + a_{1z}^{*} \Gamma_z) L_x]^{(1)}$	PLACED	"	70 DTIX + 3
$[(\ \ " \ + \ " \ + \ " \ ) L_y]^{(1)}$	"	"	70 DTIX + 4
$[(\ \ " \ + \ " \ + \ " \ ) L_z]^{(1)}$	"	"	70 DTIX + 5
$[(\ \ " \ + \ " \ + \ " \ ) P_x]^{(1)}$	TRANSFERED	"	70 DTIX + 6
$[(\ \ " \ + \ " \ + \ " \ ) P_y]^{(1)}$	"	"	70 DTIX + 7
$[(\ \ " \ + \ " \ + \ " \ ) P_z]^{(1)}$	"	"	70 DTIX + 8
$[(\ \ " \ + \ " \ + \ " \ ) (-L_x)]^{(1)}$	"	"	70 DTIX + 9
$[(\ \ " \ + \ " \ + \ " \ ) (-L_y)]^{(1)}$	"	"	70 DTIX + 10
$[(\ \ " \ + \ " \ + \ " \ ) (-L_z)]^{(1)}$	"	"	70 DTIX + 11

FLOATING

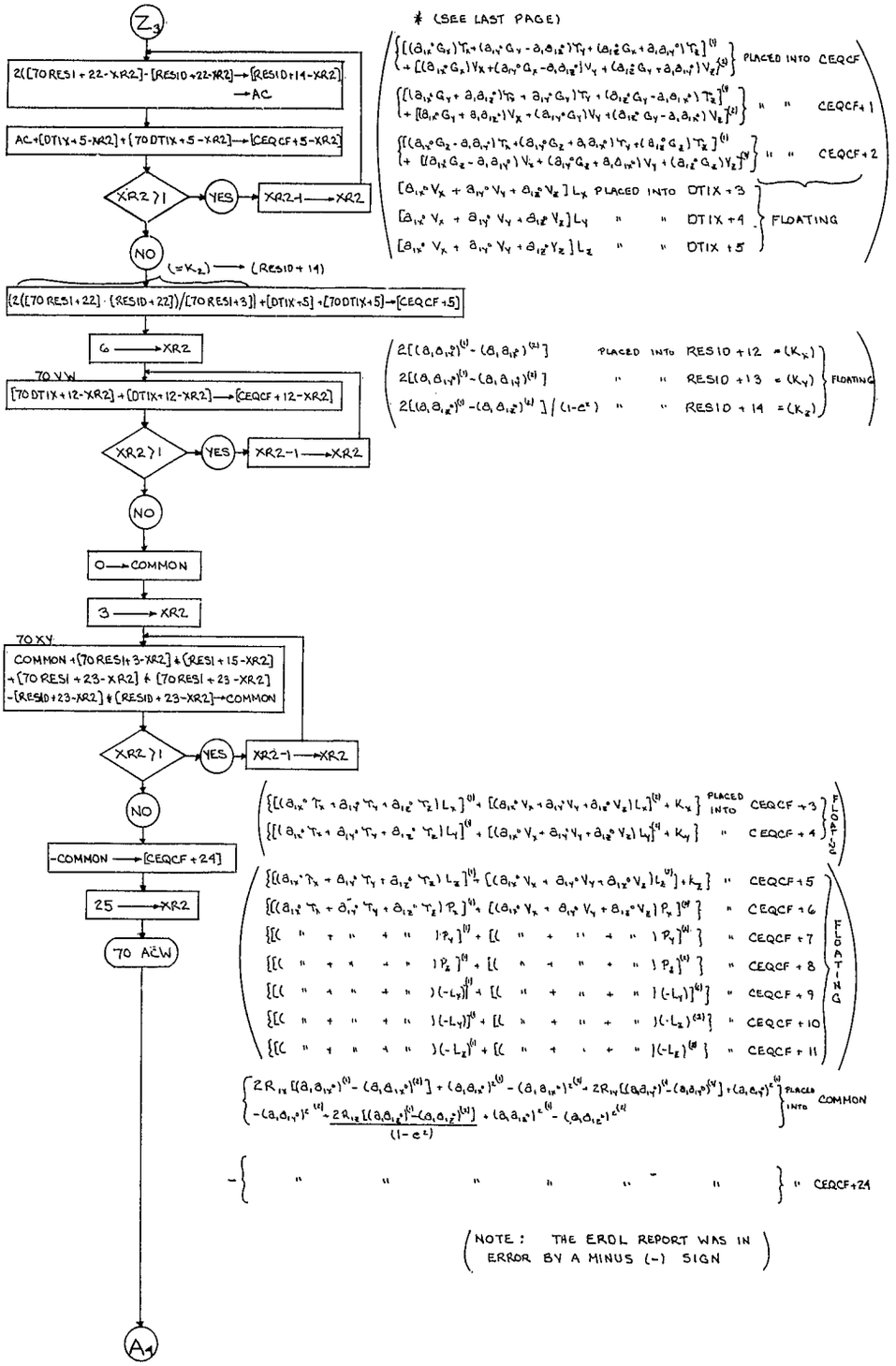


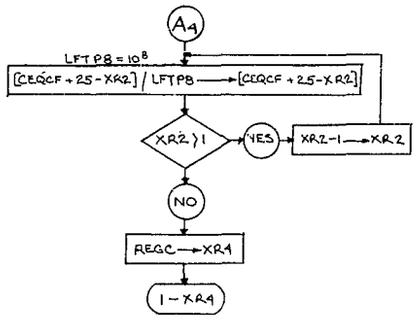
R_{ix}	TRANSFERRED INTO	SARE		FLOATING
R_{iy}	" "	SARE + 1		
R_{iz}	" "	SARE + 2		
R_{jx}	" "	SARE + 3		
R_{jy}	" "	SARE + 4		
R_{jz}	" "	SARE + 5		
$a_{ix}^{*(1)}$	" "	SCONST	AND S2CONS + 21	
$a_{iy}^{*(2)}$	" "	SCONST + 1	" S2CONS + 22	
$a_{iz}^{*(2)}$	" "	SCONST + 2	" S2CONS + 23	
$a_{jx}^{*(2)}$	" "	SCONST + 3		
$a_{jy}^{*(2)}$	" "	SCONST + 4		
$a_{jz}^{*(2)}$	" "	SCONST + 5		

$-2(R_{ix} + a_i a_{ix}^*)^{(2)}$	PLACED INTO	S2COMP	FLOATING	$(= V_x)$
$-2(R_{iy} + a_i a_{iy}^*)^{(2)}$	" "	S2COMP + 1		$(= V_y)$
$\dfrac{-2(R_{iz} + a_i a_{iz}^*)^{(2)}}{(1 - e^2)}$	" "	S2COMP + 2		$(= V_z)$

$L_x^{(2)}$	PLACED INTO	RESID	FLOATING
$L_y^{(2)}$	" "	RESID + 1	
$L_z^{(2)}$	" "	RESID + 2	
$P_x^{(2)}$	" "	RESID + 3	
$P_y^{(2)}$	" "	RESID + 4	
$P_z^{(2)}$	" "	RESID + 5	
$(a_{ix}^* G_x)^{(2)}$	" "	RESID + 6	
$(a_{iy}^* G_y - a_i a_{iz}^*)^{(2)}$	" "	RESID + 7	
$(a_{iz}^* G_y + a_i a_{iy}^*)^{(2)}$	" "	RESID + 8	
$(a_{iz}^* G_y + a_i a_{iz}^*)^{(2)}$	" "	RESID + 9	
$(a_{iy} P G_y)^{(2)}$	" "	RESID + 10	
$(a_{iz}^* G_y - a_i a_{iy}^*)^{(2)}$	" "	RESID + 11	
$(a_{iy}^* G_z - a_i a_{iy}^*)^{(2)}$	" "	RESID + 12	
$(a_{iy} P G_z + a_i a_{iz}^*)^{(2)}$	" "	RESID + 13	
$(a_{iz}^* G_z)^{(2)}$	" "	RESID + 14	
$(R_{ix} + a_i a_{ix}^*)^{(2)}$	" "	RESID + 17	
$(R_{iy} + a_i a_{iy}^*)^{(2)}$	" "	RESID + 18	
$(R_{iz} + a_i a_{iz}^*)^{(2)}$	" "	RESID + 19	
$(a_i a_{ix}^*)^{(2)}$	" "	RESID + 20	
$(a_i a_{iy}^*)^{(2)}$	" "	RESID + 21	
$(a_i a_{iz}^*)^{(2)}$	" "	RESID + 22	

$[(a_{ix}^* G_x V_x + (a_{iy}^* G_y - a_i a_{iz}^*) V_y + (a_{iz}^* G_y + a_i a_{iy}^*) N_z]^{(2)}$	PLACED INTO	DTIX	FLOATING
$[(a_{iz}^* G_y + a_i a_{iz}) V_x + (a_{iy} G_y) V_y + (a_{iz}^* G_y - a_i a_{iy}^*) N_z]^{(2)}$	" "	DTIX + 1	
$[(a_{iz}^* G_z - a_i a_{iy}) V_x + (a_{iy} G_z + a_i a_{iz}^*) V_y + (a_{iz}^* G_z) V_z]^{(2)}$	" "	DTIX + 2	
$\{[a_{ix}^* V_x + a_{iy}^* V_y + a_{iz}^* V_z] L_x - 2(R_{ix} + a_i a_{ix}^*)\}^{(2)}$	" "	DTIX + 3	
$\{[\ \text{"} + \text{"} + \text{"}\ ] L_y - 2(R_{iy} + a_i a_{iy}^*)\}^{(2)}$	" "	DTIX + 4	
$\{[\ \text{"} + \text{"} + \text{"}\ ] L_z - \dfrac{2(R_{iz} + a_i a_{iz}^*)}{(1 - e^2)}\}^{(2)}$	" "	DTIX + 5	
$\{[\ \text{"} + \text{"} + \text{"}\ ] P_x\}^{(2)}$	" "	DTIX + 6	
$\{[\ \text{"} + \text{"} + \text{"}\ ] P_y\}^{(2)}$	" "	DTIX + 7	
$\{[\ \text{"} + \text{"} + \text{"}\ ] P_z\}^{(2)}$	" "	DTIX + 8	
$\{[\ \text{"} + \text{"} + \text{"}\ ] (-L_x)\}^{(2)}$	" "	DTIX + 9	
$\{[\ \text{"} + \text{"} + \text{"}\ ] (-L_y)\}^{(2)}$	" "	DTIX + 10	
$\{[\ \text{"} + \text{"} + \text{"}\ ] (-L_z)\}^{(2)}$	" "	DTIX + 11	
$-\left[2(R_{ix} + a_i a_{ix}^*)^2 + 2(R_{iy} + a_i a_{iy}^*)^2 + \dfrac{2(R_{iz} + a_i a_{iz}^*)^2}{(1 - e^2)}\right]^2$	" "	DTIX + 18	


Z3
2([70 RESI + 22 - XR2] - [RESID + 22 - XR2]) → [RESID + 14 - XR2]
→ AC
AC + [DTIX + 5 - XR2] + [70 DTIX + 5 - XR2] → [CEQCF + 5 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
(= K2) → (RESID + 14)
{2([70 RESI + 22] · [RESID + 22])/[70 RESI + 3]} + [DTIX + 5] + [70 DTIX + 5] → [CEQCF + 5]
6 → XR2
70 VW
[70 DTIX + 12 - XR2] + [DTIX + 12 - XR2] → [CEQCF + 12 - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
0 → COMMON
3 → XR2
70 XY
COMMON + [70 RESI + 3 - XR2] & [RESI + 15 - XR2]
+ [70 RESI + 23 - XR2] & [70 RESI + 23 - XR2]
- [RESID + 23 - XR2] & [RESID + 23 - XR2] → COMMON
XR2 > 1
YES
XR2 - 1 → XR2
NO
-COMMON → [CEQCF + 24]
25 → XR2
70 ACW
A1
* (SEE LAST PAGE)
PLACED INTO CEQCF
" " CEQCF + 1
" " CEQCF + 2
PLACED INTO DTIX + 3
" " DTIX + 4
" " DTIX + 5
FLOATING
PLACED INTO RESID + 12 = (Kx)
" " RESID + 13 = (Ky)
" " RESID + 14 = (Kz)
FLOATING
PLACED INTO CEQCF + 3
" CEQCF + 4
FLOATING
" CEQCF + 5
" CEQCF + 6
" CEQCF + 7
" CEQCF + 8
" CEQCF + 9
" CEQCF + 10
" CEQCF + 11
PLACED INTO COMMON
" CEQCF + 24
(NOTE : THE ERDL REPORT WAS IN ERROR BY A MINUS (-) SIGN)



SUMMARY OF EQUATION 70

$$\{[(a_{1x}^{*}G_y)T_x + (a_{1x}^{*}G_x - a_{1}a_{1z}^{*})T_y + (a_{1z}^{*}G_y + a_{1}a_{1x}^{*})T_z]^{(t)} + [(a_{1x}^{*}G_x)V_x + (a_{1x}^{*}G_x - a_{1}a_{1z}^{*})V_y + (a_{1x}^{*}G_y + a_{1}a_{1y}^{*})V_z]^{(t)}\}/10^8$$ PLACED INTO CEQCF

$$\{[(a_{1x}^{*}G_y + a_{1}a_{1z}^{*})T_x + (a_{1x}^{*}G_y)T_y + (a_{1y}^{*}G_y - a_{1}a_{1x}^{*})T_z]^{(t)} + [(a_{1x}^{*}G_y + a_{1}a_{1z}^{*})V_x + (a_{1y}^{*}G_y)V_y + (a_{1z}^{*}G_y - a_{1}a_{1x}^{*})V_z]^{(t)}\}/10^8$$ " " CEQCF + 1

$$\{[(a_{1x}^{*}G_z - a_{1}a_{1y}^{*})T_x + (a_{1y}^{*}G_z + a_{1}a_{1x}^{*})T_y + (a_{1z}^{*}G_z)T_z]^{(t)} + [(a_{1x}^{*}G_z - a_{1}a_{1y}^{*})V_x + (a_{1y}^{*}G_z + a_{1}a_{1x}^{*})V_y + (a_{1z}^{*}G_z)V_z]^{(t)}\}/10^8$$ " " CEQCF + 2

$$\{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(L_x)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(L_x)]^{(t)} + K_x\}/10^8$$ " " CEQCF + 3

$$\{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(L_y)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(L_y)]^{(t)} + K_y\}/10^8$$ " " CEQCF + 4

$$\{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(L_z)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(L_z)]^{(t)} + K_z\}/10^8$$ " " CEQCF + 5

$$\{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(P_x)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(P_x)]^{(t)}\}/10^8$$ " " CEQCF + 6

$$\{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(P_y)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(P_y)]^{(t)}\}/10^8$$ " " CEQCF + 7

$$[[(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(P_z)]^{(t)} + [(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(P_z)]^{(t)}\}/10^8$$ " " CEQCF + 8

$$\{[(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(-L_y)]^{(t)} + [(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(-L_y)]^{(t)}\}/10^8$$ " " CEQCF + 9

$$\{[(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(-L_y)]^{(t)} + [(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(-L_y)]^{(t)}\}/10^8$$ " " CEQCF + 10

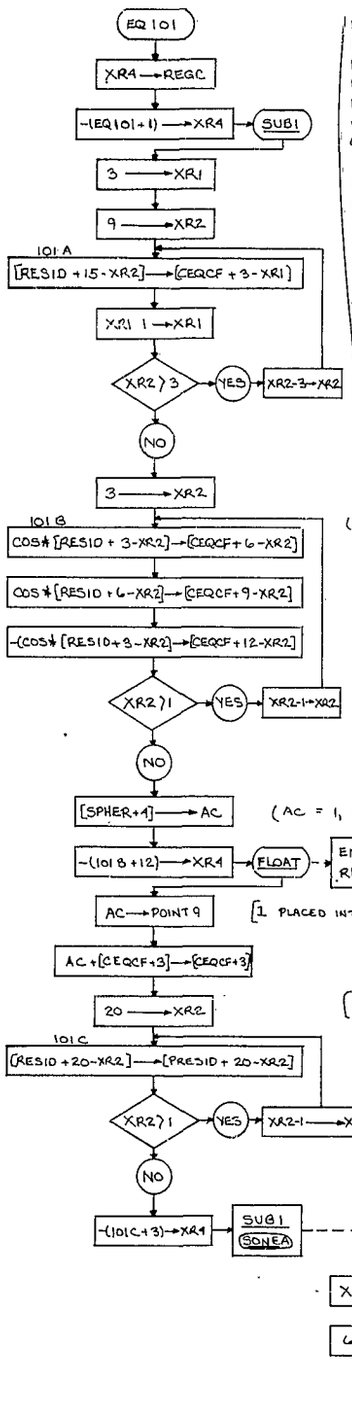
$$\{[(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(-L_z)]^{(t)} + [(\;\text{"}\; + \;\text{"}\; + \;\text{"}\;)(-L_z)]^{(t)}\}/10^8$$ " " CEQCF + 11

$$-\{2R_{1x}K_x + (a_1a_{1x}^{*})^{2(t)} - (a_1a_{1z}^{*})^{2(t)} + 2R_{1y}K_y + (a_1a_{1y}^{*})^{2(t)} - (a_1a_{1y}^{*})^{2(t)} + 2R_{1z}K_z + (a_1a_{1z}^{*})^{2(t)} - (a_1a_{1z}^{*})^{2(t)}\}/10^8$$ " " CEQCF + 24

* NOTE THE $/10^8$ WORKING FACTOR

$$\{[a_{1x}^{*}G_y T_x + (a_{1x}^{*}G_x - A_{1z})T_y + (a_{1z}^{*}G_y + A_{1y})T_z]^{(t)} + [a_{1x}^{*}G_y V_x + (a_{1x}^{*}G_x - A_{1z})V_y + (a_{1z}^{*}G_y + A_{1y})V_z]^{(t)}\}\, dT_{1x}$$
$$+ \{[a_{1y}^{*}G_y + A_{1z})T_x + a_{1y}^{*}G_y T_y + (a_{1z}^{*}G_y - A_{1x})T_z]^{(t)} + [(a_{1y}^{*}G_y + A_{1z})V_x + a_{1y}^{*}G_y V_y + (a_{1z}^{*}G_y - A_{1x})V_z]^{(t)}\}\, dT_{1y}$$
$$+ \{[a_{1z}^{*}G_z - A_{1y})T_x + (a_{1y}^{*}G_z + A_{1x})T_y + a_{1z}^{*}G_z T_z]^{(t)} + [(a_{1x}^{*}G_z - A_{1y})V_x + (a_{1y}^{*}G_z + A_{1x})V_y + a_{1z}^{*}G_z V_z]^{(t)}\}\, dT_{1z}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)L_x]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)L_x]^{(t)} + K_x\}\, dR_{1x}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)L_y]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)L_y]^{(t)} + K_y\}\, dR_{1y}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)L_z]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)L_z]^{(t)} + K_z\}\, dR_{1z}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)P_x]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)P_x]^{(t)}\}\, dT_{2x}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)P_y]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)P_y]^{(t)}\}\, dT_{2y}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)P_z]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)P_z]^{(t)}\}\, dT_{2z}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(-L_x)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(-L_x)]^{(t)}\}\, dR_{2x}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(-L_y)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(-L_y)]^{(t)}\}\, dR_{2y}$$
$$+ \{[(a_{1x}^{*}T_x + a_{1y}^{*}T_y + a_{1z}^{*}T_z)(-L_z)]^{(t)} + [(a_{1x}^{*}V_x + a_{1y}^{*}V_y + a_{1z}^{*}V_z)(-L_z)]^{(t)}\}\, dR_{2z}$$

$$= -\{R_{1x}K_x + (A_{1y})^{2(t)} - (A_{1z})^{2(t)} + R_{1y}K_y + (A_{1y})^{2(t)} - (A_{1y})^{2(t)} + R_{1z}K_z + (A_{1z})^{2(t)} - (A_{1z})^{2(t)}\}$$



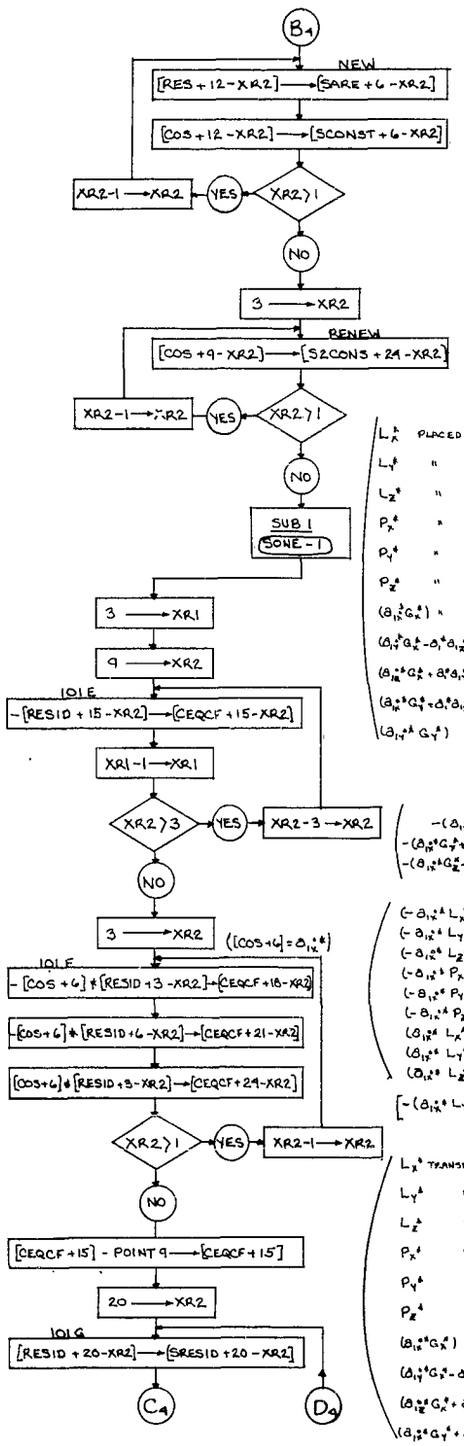
L_x	IN	RESID			TRANSFERED TO	PRESID +
L_y	"	RESID + 1			" "	PRESID + 1
L_z	"	RESID + 2			" "	PRESID + 2
P_x	"	RESID + 3			" "	PRESID + 3
P_y	"	RESID + 4			" "	PRESID + 4
P_z	"	RESID + 5			" "	PRESID + 5
$(a_{1x}° G_x)$	"	RESID + 6	TRANSFERED INTO	CEQCF	" "	PRESID + 6
$(a_{1y}° G_x - a_1 a_{1z}°)$	"	RESID + 7			" "	PRESID + 7
$(a_{1z}° G_x + a_1 a_{1y}°)$	"	RESID + 8			" "	PRESID + 8
$(a_{1x}° G_y + a_1 a_{1z}°)$	"	RESID + 9	"	CEQCF + 1	" "	PRESID + 9
$(a_{1y}° G_y)$	"	RESID + 10			" "	PRESID + 10
$(a_{1z}° G_y - a_1 a_{1x}°)$	"	RESID + 11			" "	PRESID + 11
$(a_{1x}° G_z - a_1 a_{1y}°)$	"	RESID + 12	"	CEQCF + 2	" "	PRESID + 12
$(a_{1y}° G_z + a_1 a_{1z}°)$	"	RESID + 13			" "	PRESID + 13
$(a_{1z}° G_z)$	"	RESID + 14			" "	PRESID + 14
$(R_{1x} + a_1 a_{1x}°)$	"	RESID + 17			" "	PRESID + 17
$(R_{1y} + a_1 a_{1y}°)$	"	RESID + 18			" "	PRESID + 18
$(R_{1z} + a_1 a_{1z}°)$	"	RESID + 19			" "	PRESID + 19
$(a_1 a_{1x}°)$	"	RESID + 20				
$(a_1 a_{1y}°)$	"	RESID + 21				
$(a_1 a_{1z}°)$	"	RESID + 22				

FLOATING

$(\cos = a_{1x}°)$

$a_{1x}° L_x$	PLACED	INTO	CEQCF + 3	
$a_{1x}° L_y$	"	"	CEQCF + 4	
$a_{1x}° L_z$	"	"	CEQCF + 5	
$a_{1x}° P_x$	"	"	CEQCF + 6	
$a_{1x}° P_y$	"	"	CEQCF + 7	
$a_{1x}° P_z$	"	"	CEQCF + 8	
$-a_{1x}° L_x$	"	"	CEQCF + 9	
$-a_{1x}° L_y$	"	"	CEQCF + 10	
$-a_{1x}° L_z$	"	"	CEQCF + 11	

FLOATING



R_{1x}^{*}	TRANSFERED	INTO	SARE			
R_{1y}^{*}	"	"	SARE + 1			
R_{1z}^{*}	"	"	SARE + 2			
R_{2x}^{*}	"	"	SARE + 3			
R_{2y}^{*}	"	"	SARE + 4			
R_{2z}^{*}	"	"	SARE + 5			
a_{1x}^{*}	"	"	SCONST			
a_{1y}^{*}	"	"	SCONST + 1			FLOATING
a_{1z}^{*}	"	"	SCONST + 2			
a_{2x}^{*}	"	"	SCONST + 3			
a_{2y}^{*}	"	"	SCONST + 4			
a_{2z}^{*}	"	"	SCONST + 5			
a_{1x}^{*}	"	"	S2CONS + 21			
a_{1y}^{*}	"	"	S2CONS + 22			
a_{1z}^{*}	"	"	S2CONS + 23			

L_x^{*}	PLACED	IN	RESID	$(a_{1z}^{*}G_y^{*} - a_y^{*}a_{1x}^{*})$	PLACED	INTO	RESID + 11
L_y^{*}	"	"	RESID + 1	$(a_{1x}^{*}G_z^{*} - a_x^{*}a_{1y}^{*})$	"	"	RESID + 12
L_z^{*}	"	"	RESID + 2	$(a_{1y}^{*}G_z^{*} + a_z^{*}a_{1x}^{*})$	"	"	RESID + 13
P_x^{*}	"	"	RESID + 3	$(a_{1z}^{*}G_z^{*})$	"	"	RESID + 14
P_y^{*}	"	"	RESID + 4	$(R_{1x}^{*} + a_x^{*}a_{1x}^{*})$	"	"	RESID + 17
P_z^{*}	"	"	RESID + 5	$(R_{1y}^{*} + a_y^{*}a_{1y}^{*})$	"	"	RESID + 18
$(a_{1x}^{*}G_x^{*})$	"	"	RESID + 6	$(R_{1z}^{*} + a_z^{*}a_{1z}^{*})$	"	"	RESID + 19
$(a_{1y}^{*}G_x^{*} - a_x^{*}a_{1x}^{*})$	"	"	RESID + 7	$(a_x^{*}a_{1x}^{*})$	"	"	RESID + 20
$(a_{1z}^{*}G_x^{*} + a_x^{*}a_{1y}^{*})$	"	"	RESID + 8	$(a_y^{*}a_{1y}^{*})$	"	"	RESID + 21
$(a_{1x}^{*}G_y^{*} + a_y^{*}a_{1z}^{*})$	"	"	RESID + 9	$(a_z^{*}a_{1z}^{*})$	"	"	RESID + 22
$(a_{1y}^{*}G_y^{*})$	"	"	RESID + 10				

FLOATING

$-(a_{1z}^{*}G_x^{*})$	PLACED	INTO	CEQCF + 12
$-(a_{1x}^{*}G_y^{*} + a_y^{*}a_{1z}^{*})$	"	"	CEQCF + 13
$-(a_{1x}^{*}G_z^{*} - a_z^{*}a_{1y}^{*})$	"	"	CEQCF + 14

FLOATING

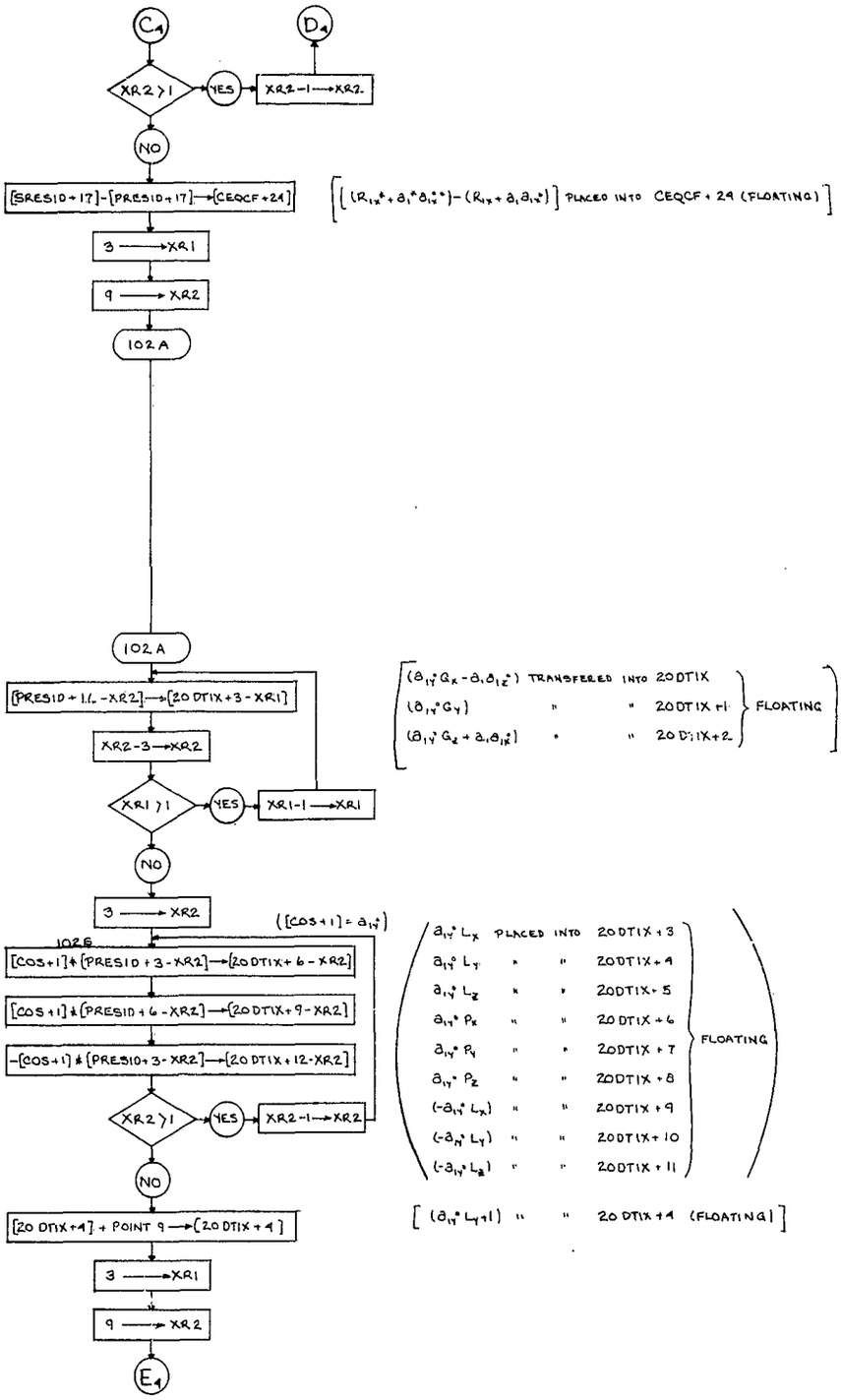
$(-a_{1x}^{*}L_x^{*})$	PLACED	INTO	CEQCF + 15
$(-a_{1x}^{*}L_y^{*})$	"	"	CEQCF + 16
$(-a_{1x}^{*}L_z^{*})$	"	"	CEQCF + 17
$(-a_{1x}^{*}P_x^{*})$	"	"	CEQCF + 18
$(-a_{1x}^{*}P_y^{*})$	"	"	CEQCF + 19
$(-a_{1x}^{*}P_z^{*})$	"	"	CEQCF + 20
$(a_{1z}^{*}L_x^{*})$	"	"	CEQCF + 21
$(a_{1z}^{*}L_y^{*})$	"	"	CEQCF + 22
$(a_{1z}^{*}L_z^{*})$	"	"	CEQCF + 23

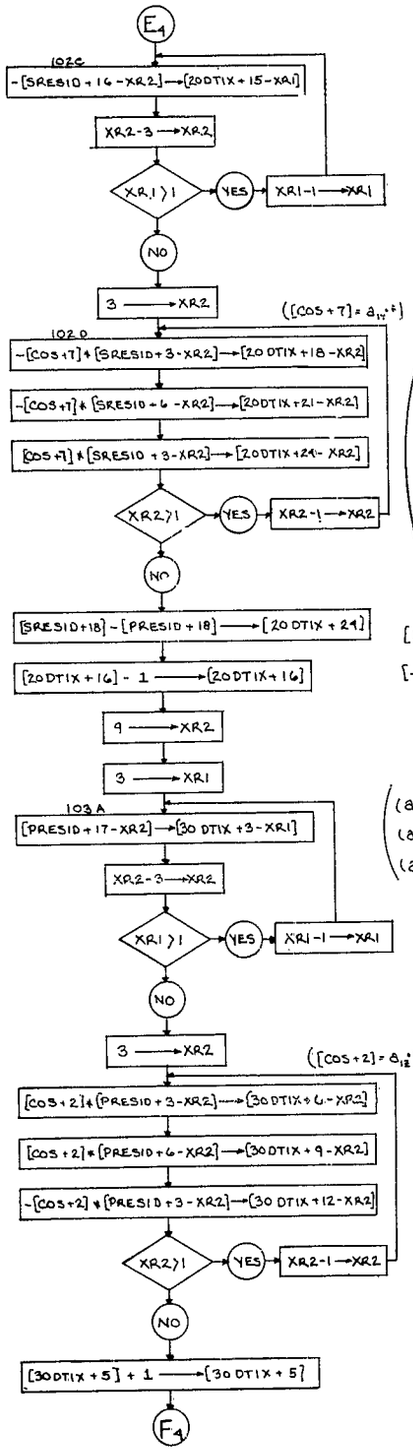
FLOATING

[$-(a_{1x}^{*}L_x^{*} + 1)$ " " CEQCF + 15 (FLOATING)]

L_x^{*}	TRANSFERED	INTO	SRESID	$(a_{1y}^{*}G_y^{*})$	TRANSFERED	INTO	SRESID + 10
L_y^{*}	"	"	SRESID + 1	$(a_{1z}^{*}G_y^{*} - a_y^{*}a_{1x}^{*})$	"	"	SRESID + 11
L_z^{*}	"	"	SRESID + 2	$(a_{1y}^{*}G_z^{*} - a_z^{*}a_{1y}^{*})$	"	"	SRESID + 12
P_x^{*}	"	"	SRESID + 3	$(a_{1y}^{*}G_z^{*} + a_1 a_{1z}^{*})$	"	"	SRESID + 13
P_y^{*}	"	"	SRESID + 4	$(a_{1z}^{*}G_z^{*})$	"	"	SRESID + 14
P_z^{*}	"	"	SRESID + 5	$(R_{1x}^{*} + a_x^{*}a_{1x}^{*})$	"	"	SRESID + 17
$(a_{1x}^{*}G_x^{*})$	"	"	SRESID + 6	$(R_{1y}^{*} + a_y^{*}a_{1y}^{*})$	"	"	SRESID + 18
$(a_{1y}^{*}G_x^{*} - a_x^{*}a_{1z}^{*})$	"	"	SRESID + 7	$(R_{1z}^{*} + a_z^{*}a_{1z}^{*})$	"	"	SRESID + 19
$(a_{1z}^{*}G_x^{*} + a_x^{*}a_{1y}^{*})$	"	"	SRESID + 8				
$(a_{1z}^{*}G_y^{*} + a_1 a_{1z}^{*})$	"	"	SRESID + 9				

FLOATING


C4
D4
XR2 > 1
YES
XR2-1 → XR2
NO
[SRESID+17]-[PRESID+17] → [CEQCF+24]
[(R1x* + a1*a1x*) - (R1x + a1a1x*)] PLACED INTO CEQCF + 24 (FLOATING)
3 → XR1
9 → XR2
102 A
102 A
[PRESID + 11 - XR2] → [20 DTIX + 3 - XR1]
(a1y* Gx - a1a1z*) TRANSFERED INTO 20DTIX
(a1y* Gy) " " 20DTIX +1
(a1y* Gz + a1a1x*) " " 20 DTIX+2
FLOATING
XR2-3 → XR2
XR1 > 1
YES
XR1-1 → XR1
NO
3 → XR2
([COS+1] = a1y*)
102B
[COS+1] * [PRESID + 3 - XR2] → [20 DTIX + 6 - XR2]
[COS+1] * [PRESID + 6 - XR2] → [20 DTIX + 9 - XR2]
-[COS+1] * [PRESID + 3 - XR2] → [20 DTIX + 12 - XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
a1y* Lx PLACED INTO 20DTIX + 3
a1y* Ly " " 20DTIX + 4
a1y* Lz " " 20DTIX + 5
a1y* Px " " 20DTIX + 6
a1y* Py " " 20DTIX + 7
a1y* Pz " " 20DTIX + 8
(-a1y* Lx) " " 20DTIX + 9
(-a1y* Ly) " " 20DTIX + 10
(-a1y* Lz) " " 20DTIX + 11
FLOATING
[20 DTIX+4] + POINT 9 → [20 DTIX + 4]
[(a1y* Ly+1) " " 20 DTIX + 4 (FLOATING)]
3 → XR1
9 → XR2
E4



$-(a_{1N}^{*}G_X^{*} - a_1^{*}a_{1Z}^{*})$	TRANSFERED	INTO	20DTIX + 12	FLOATING
$-(a_{1N}^{*}G_Y^{*})$	"	"	20DTIX + 13	
$-(a_{1N}^{*}G_Z^{*} + a_1^{*}a_{1X}^{*})$	"	"	20DTIX + 14	

$(-a_{1N}^{*}L_X^{*})$	PLACED	INTO	20DTIX + 15	FLOATING
$(-a_{1N}^{*}L_Y^{*})$	"	"	20DTIX + 16	
$(-a_{1N}^{*}L_Z^{*})$	"	"	20DTIX + 17	
$(-a_{1N}^{*}P_X^{*})$	"	"	20DTIX + 18	
$(-a_{1N}^{*}P_Y^{*})$	"	"	20DTIX + 19	
$(-a_{1N}^{*}P_Z^{*})$	"	"	20DTIX + 20	
$(a_{1N}^{*}L_X^{*})$	"	"	20DTIX + 21	
$(a_{1N}^{*}L_Y^{*})$	"	"	20DTIX + 22	
$(a_{1N}^{*}L_Z^{*})$	"	"	20DTIX + 23	

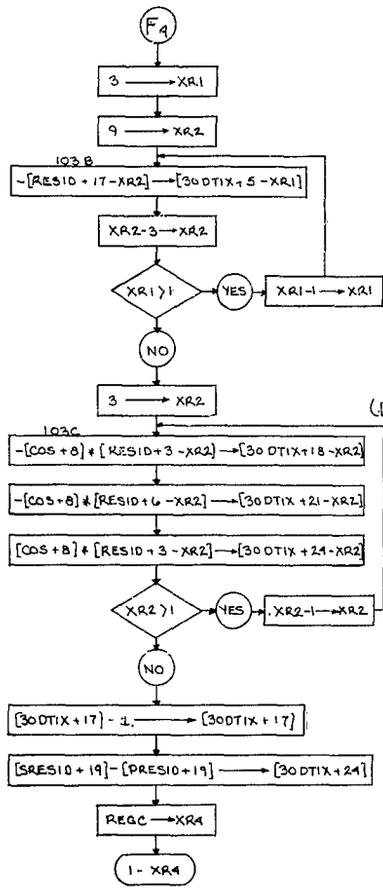
$[(R_{1N}^{*} + a_1^{*}a_{1N}^{*}) - (R_{1N} + a_1 a_{1N}^{*})$ PLACED INTO 20DTIX + 24 (FLOATING)$]$

$[-(a_{1N}^{*}L_Y^{*} + 1)$ " " 20DTIX + 16 " $]$

$(a_{1Z}^{*}G_X + a_1 a_{1N}^{*})$	TRANSFERED	INTO	30DTIX	FLOATING
$(a_{1Z}^{*}G_Y + a_1 a_{1N}^{*})$	"	"	30DTIX + 1	
$(a_{1Z}^{*}G_Z)$	"	"	30DTIX + 2	

$(a_{1Z}^{*}L_X)$	PLACED	INTO	30DTIX + 3	FLOATING
$(a_{1Z}^{*}L_Y)$	"	"	30DTIX + 4	
$(a_{1Z}^{*}L_Z)$	"	"	30DTIX + 5	
$(a_{1Z}^{*}P_X)$	"	"	30DTIX + 6	
$(a_{1Z}^{*}P_Y)$	"	"	30DTIX + 7	
$(a_{1Z}^{*}P_Z)$	"	"	30DTIX + 8	
$(-a_{1Z}^{*}L_X)$	"	"	30DTIX + 9	
$(-a_{1Z}^{*}L_Y)$	"	"	30DTIX + 10	
$(-a_{1Z}^{*}L_Z)$	"	"	30DTIX + 11	

$[(a_{1Z}^{*}L_Z + 1)$ " " 30DTIX + 5 (FLOATING)$]$



$([\cos + B] = a_{1z}^{*})$

$[-(a_{1z}^{*} G_x^{*} + a_1^{*} a_{1x}^{*})$ TRANSFERED INTO 30DTIX + 12
$-(a_{1z}^{*} G_y^{*} + a_1^{*} a_{1y}^{*})$ " " 30DTIX + 13
$-(a_{1z}^{*} G_z^{*})$ " " 30DTIX + 14] FLOATING

$(-a_{1z}^{*} L_x^{*})$ PLACED INTO 30DTIX + 15
$(-a_{1z}^{*} L_y^{*})$ " " 30DTIX + 16
$(-a_{1z}^{*} L_z^{*})$ " " 30DTIX + 17
$(-a_{1z}^{*} P_x^{*})$ " " 30DTIX + 18
$(-a_{1z}^{*} P_y^{*})$ " " 30DTIX + 19
$(-a_{1z}^{*} P_z^{*})$ " " 30DTIX + 20
$(a_{1z}^{*} L_x^{*})$ " " 30DTIX + 21
$(a_{1z}^{*} L_y^{*})$ " " 30DTIX + 22
$(a_{1z}^{*} L_z^{*})$ " " 30DTIX + 23
FLOATING

$[-(a_{1z}^{*} L_z^{*} + 1)$ " " 30DTIX + 17 (FLOATING)]

$[R_{1z}^{*} + a_1^{*} a_{1z}^{*}) - (R_{1z} + a_1 a_{1z})$ PLACED INTO 30DTIX + 24 (FLOATING)]

SUMMARY OF EQ 101

$(a_{1x}^{*} G_x)$	IN	CEQCF
$(a_{1x}^{*} G_y + a_1 a_{1z}^{*})$	"	CEQCF + 1
$(a_{1x}^{*} G_z - a_1 a_{1y}^{*})$	"	CEQCF + 2
$(a_{1x}^{*} L_x + 1.)$	"	CEQCF + 3
$(a_{1x}^{*} L_y)$	"	CEQCF + 4
$(a_{1x}^{*} L_z)$	"	CEQCF + 5
$(a_{1x}^{*} P_x)$	"	CEQCF + 6
$(a_{1x}^{*} P_y)$	"	CEQCF + 7
$(a_{1x}^{*} P_z)$	"	CEQCF + 8
$(-a_{1x}^{*} L_x)$	"	CEQCF + 9
$(-a_{1x}^{*} L_y)$	"	CEQCF + 10
$(-a_{1x}^{*} L_z)$	"	CEQCF + 11
$-(a_{1x}^{*} G_x^{*})$	"	CEQCF + 12
$-(a_{1x}^{*} G_y^{*} - a_1^{*} a_{1z}^{*})$	"	CEQCF + 13
$-(a_{1x}^{*} G_z^{*} - a_1^{*} a_{1y}^{*})$	"	CEQCF + 14
$-(a_{1x}^{*} L_x^{*} + 1.)$	"	CEQCF + 15
$(-a_{1x}^{*} L_y^{*})$	"	CEQCF + 16
$(-a_{1x}^{*} L_z^{*})$	"	CEQCF + 17
$(-a_{1x}^{*} P_x^{*})$	"	CEQCF + 18
$(-a_{1x}^{*} P_y^{*})$	"	CEQCF + 19
$(-a_{1x}^{*} P_z^{*})$	"	CEQCF + 20
$(a_{1x}^{*} L_x^{*})$	"	CEQCF + 21
$(a_{1x}^{*} L_y^{*})$	"	CEQCF + 22
$(a_{1x}^{*} L_z^{*})$	"	CEQCF + 23

FLOATING

$[(R_{1x}^{*} + a_1^{*} a_{1x}^{*}) - (R_{1x} + a_1 a_{1x})]$ IN CEQCF + 24 (FLOATING)

$$
\begin{array}{lll}
a_{1x}^{*} G_x \, dT_{1x} & + (a_{1x}^{*} G_y + a_1 a_{1z}^{*}) \, dT_{1y} & + (a_{1x}^{*} G_z - a_1 a_{1y}^{*}) \, dT_{1z} \\
+ (a_{1x}^{*} L_x + 1.) \, dR_{1x} & + (a_{1x}^{*} L_y) \, dR_{1y} & + (a_{1x}^{*} L_z) \, dR_{1z} \\
+ (a_{1x}^{*} P_x) \, dT_{2x} & + (a_{1x}^{*} P_y) \, dT_{2y} & + (a_{1x}^{*} P_z) \, dT_{2z} \\
- (a_{1x}^{*} L_x) \, dR_{2x} & - (a_{1x}^{*} L_y) \, dR_{2y} & - (a_{1x}^{*} L_z) \, dR_{2z} \\
- (a_{1x}^{*} G_x^{*}) \, dT_{1x}^{*} & (a_{1x}^{*} G_y^{*} + a_1^{*} a_{1z}^{*}) \, dT_{1y}^{*} & - (a_{1x}^{*} G_z^{*} - a_1^{*} a_{1y}^{*}) \, dT_{1z} \\
- (a_{1x}^{*} L_x^{*} + 1.) \, dR_{1x}^{*} & - (a_{1x}^{*} L_y^{*}) \, dR_{1y}^{*} & - (a_{1x}^{*} L_z^{*}) \, dR_{1z}^{*} \\
- (a_{1x}^{*} P_x^{*}) \, dT_{2x}^{*} & - (a_{1x}^{*} P_y^{*}) \, dT_{2y}^{*} & - (a_{1x}^{*} P_z^{*}) \, dT_{2z}^{*} \\
+ (a_{1x}^{*} L_x^{*}) \, dR_{2x}^{*} & + (a_{1x}^{*} L_y^{*}) \, dR_{2y}^{*} & + (a_{1x}^{*} L_z^{*}) \, dR_{2z}^{*}
\end{array}
$$

$$= R_{1x}^{*} + a_1^{*} a_{1x}^{*} - R_{1x} - a_1 a_{1x}^{*}$$

SUMMARY OF EQ 102

$(a_{1Y}^{*}G_X - a_1 a_{1Y}^{*})$	IN	20DTIX	TRANSFERED LATER INTO	CEQCF
$(a_{1Y}^{*}G_Y)$	"	20DTIX+1	"	CEQCF+1
$(a_{1Y}^{*}G_Z + a_1 a_{1Z}^{*})$	"	20DTIX+2	"	CEQCF+2
$(a_{1Y}^{*}L_X)$	"	20DTIX+3	"	CEQCF+3
$(a_{1Y}^{*}L_Y + 1.)$	"	20DTIX+4	"	CEQCF+4
$(a_{1Y}^{*}L_Z)$	"	20DTIX+5	"	CEQCF+5
$(a_{1Y}^{*}P_X)$	"	20DTIX+6	"	CEQCF+6
$(a_{1Y}^{*}P_Y)$	"	20DTIX+7	"	CEQCF+7
$(a_{1Y}^{*}P_Z)$	"	20DTIX+8	"	CEQCF+8
$(-a_{1Y}^{*}L_X)$	"	20DTIX+9	"	CEQCF+9
$(-a_{1Y}^{*}L_Y)$	"	20DTIX+10	"	CEQCF+10
$(-a_{1Y}^{*}L_Z)$	"	20DTIX+11	"	CEQCF+11
$-(a_{1Y}^{*}G_Z^{*} - a_1^{*}a_{1Z}^{*})$	"	20DTIX+12	"	CEQCF+12
$-(a_{1Y}^{*}G_Y^{*})$	"	20DTIX+13	"	CEQCF+13
$-(a_{1Y}^{*}G_X^{*} + a_1^{*}a_{1X}^{*})$	"	20DTIX+14	"	CEQCF+14
$(-a_{1Y}^{*}L_X^{*})$	"	20DTIX+15	"	CEQCF+15
$-(a_{1Y}^{*}L_Y^{*} + 1.)$	"	20DTIX+16	"	CEQCF+16
$(-a_{1Y}^{*}L_Z^{*})$	"	20DTIX+17	"	CEQCF+17
$(-a_{1Y}^{*}P_X^{*})$	"	20DTIX+18	"	CEQCF+18
$(-a_{1Y}^{*}P_Y^{*})$	"	20DTIX+19	"	CEQCF+19
$(-a_{1Y}^{*}P_Z^{*})$	"	20DTIX+20	"	CEQCF+20
$(a_{1Y}^{*}L_X^{*})$	"	20DTIX+21	"	CEQCF+21
$(a_{1Y}^{*}L_Y^{*})$	"	20DTIX+22	"	CEQCF+22
$(a_{1Y}^{*}L_Z^{*})$	"	20DTIX+23	"	CEQCF+23
$[(R_{1Y}^{*} + a_1^{*}a_{1Y}^{*}) - (R_{1Y} + a_1 a_{1Y}^{*})]$	IN	20DTIX+24	"	CEQCF+24

FLOATING

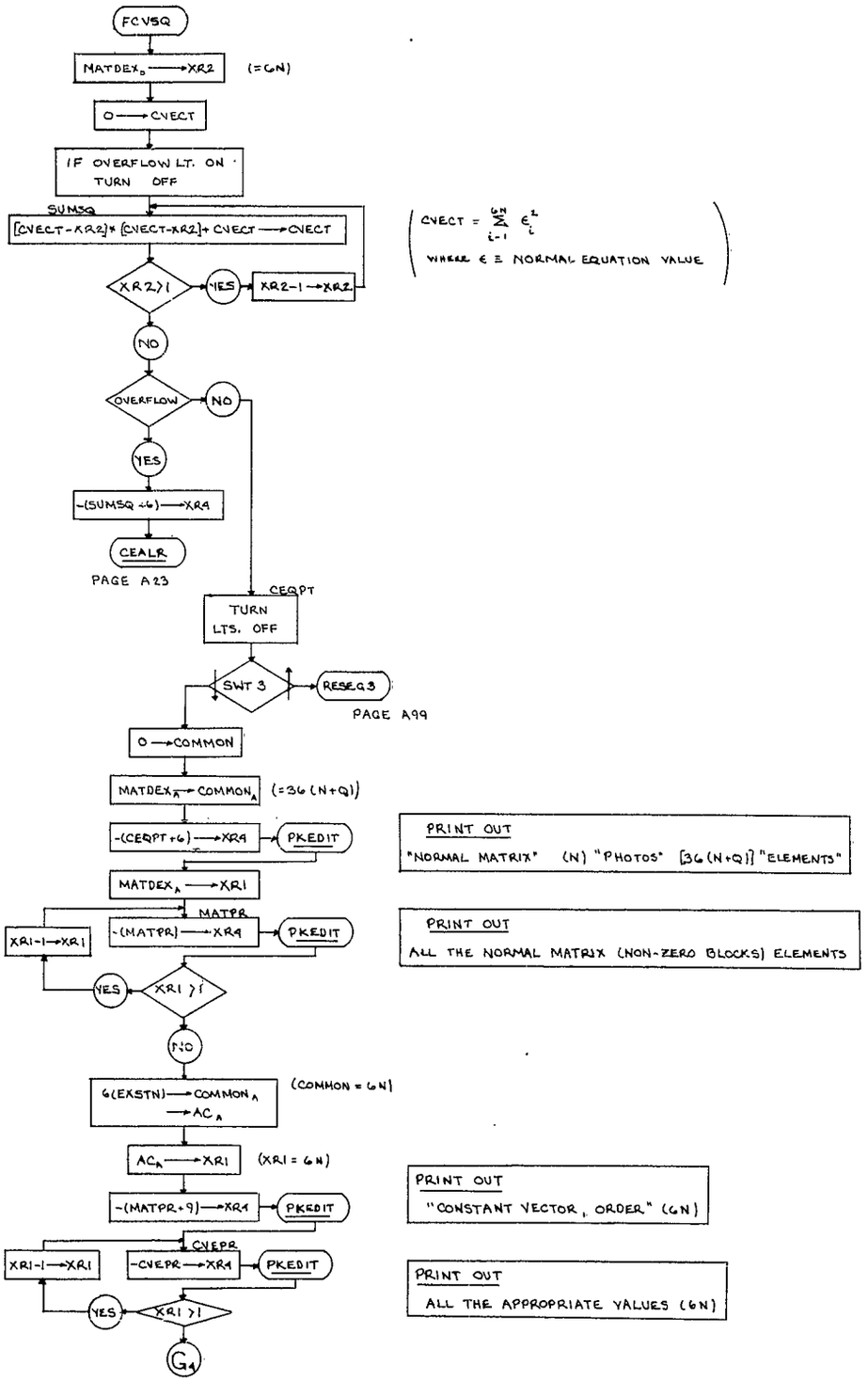
$$(a_{1Y}^{*}G_X - a_1 a_{1Z}^{*})\,dT_{1X} + (a_{1Y}^{*}G_Y)\,dT_{1Y} + (a_{1Y}^{*}G_Z + a_1 a_{1X}^{*})\,dT_{1Z}$$
$$+ (a_{1Y}^{*}L_X)\,dR_{1X} + (a_{1Y}^{*}L_Y + 1.)\,dR_{1Y} + (a_{1Y}^{*}L_Z)\,dR_{1Z}$$
$$+ (a_{1Y}^{*}P_X)\,dT_{2X} + (a_{1Y}^{*}P_Y)\,dT_{2Y} + (a_{1Y}^{*}P_Z)\,dT_{2Z}$$
$$-(a_{1Y}^{*}L_X)\,dR_{2X} \quad -(a_{1Y}^{*}L_Y)\,dR_{2Y} \quad -(a_{1Y}^{*}L_Z)\,dR_{2Z}$$
$$-(a_{1Y}^{*}G_X^{*} - a_1^{*}a_{1Z}^{*})\,dT_{1X}^{*} \quad -(a_{1Y}^{*}G_Y^{*})\,dT_{1Y}^{*} \quad -(a_{1Y}^{*}G_Z^{*} + a_1^{*}a_{1X}^{*})\,dT_{1Z}^{*}$$
$$-(a_{1Y}^{*}L_Y^{*})\,dR_{1X}^{*} \quad -(a_{1Y}^{*}L_Y^{*} + 1.)\,dR_{1Y}^{*} \quad -(a_{1Y}^{*}L_Z^{*})\,dR_{1Z}^{*}$$
$$-(a_{1Y}^{*}P_X^{*})\,dT_{2X}^{*} \quad -(a_{1Y}^{*}P_Y^{*})\,dT_{2Y}^{*} \quad -(a_{1Y}^{*}P_Z^{*})\,dT_{2Z}^{*}$$
$$+(a_{1Y}^{*}L_X^{*})\,dR_{2X}^{*} \quad +(a_{1Y}^{*}L_Y^{*})\,dR_{2Y}^{*} \quad +(a_{1Y}^{*}L_Z^{*})\,dR_{2Z}^{*}$$
$$= R_{1Y}^{*} + a_1^{*}a_{1Y}^{*} - R_{1Y} - a_1 a_{1Y}^{*}$$

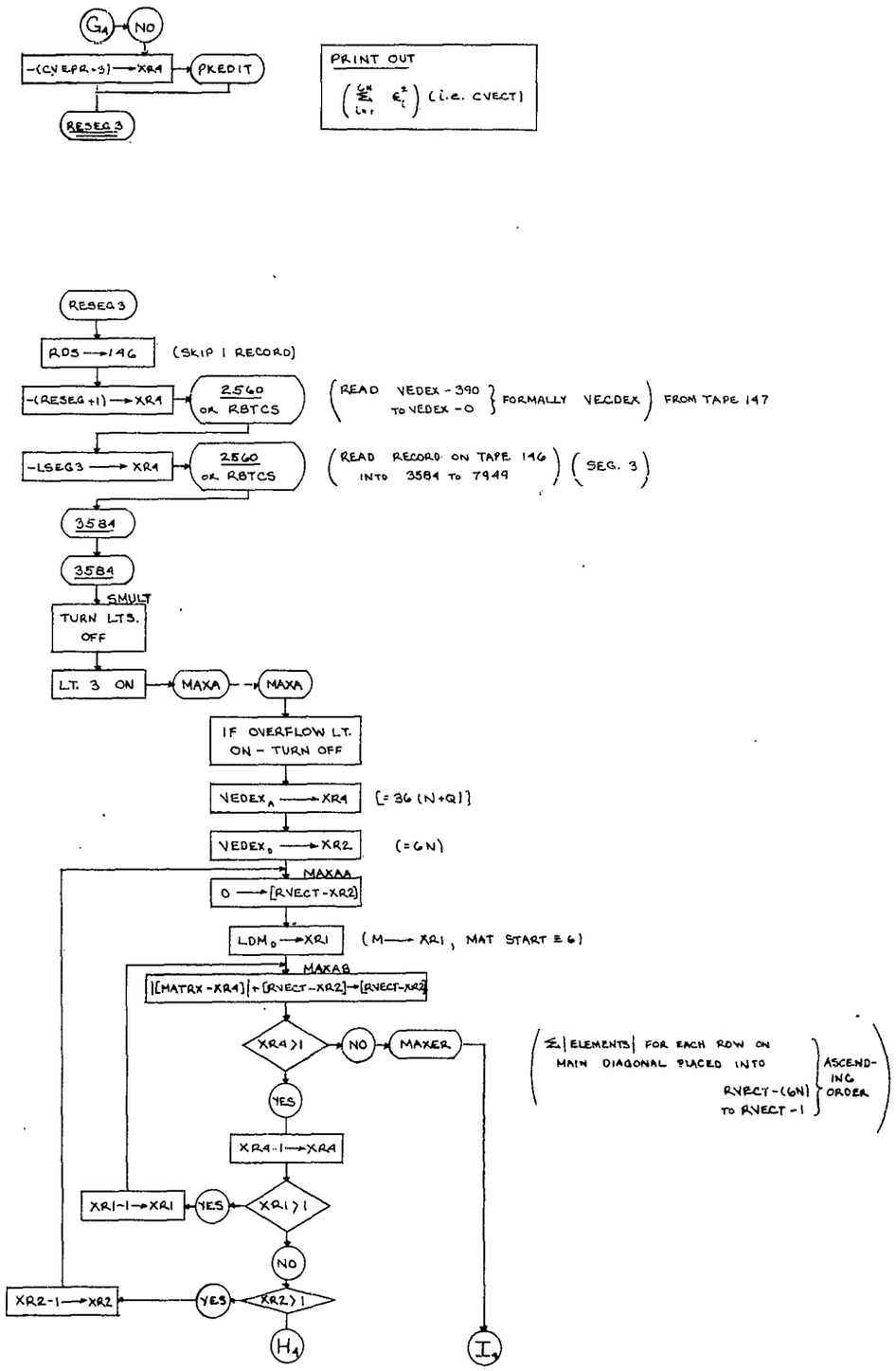
SUMMARY OF EQ 103

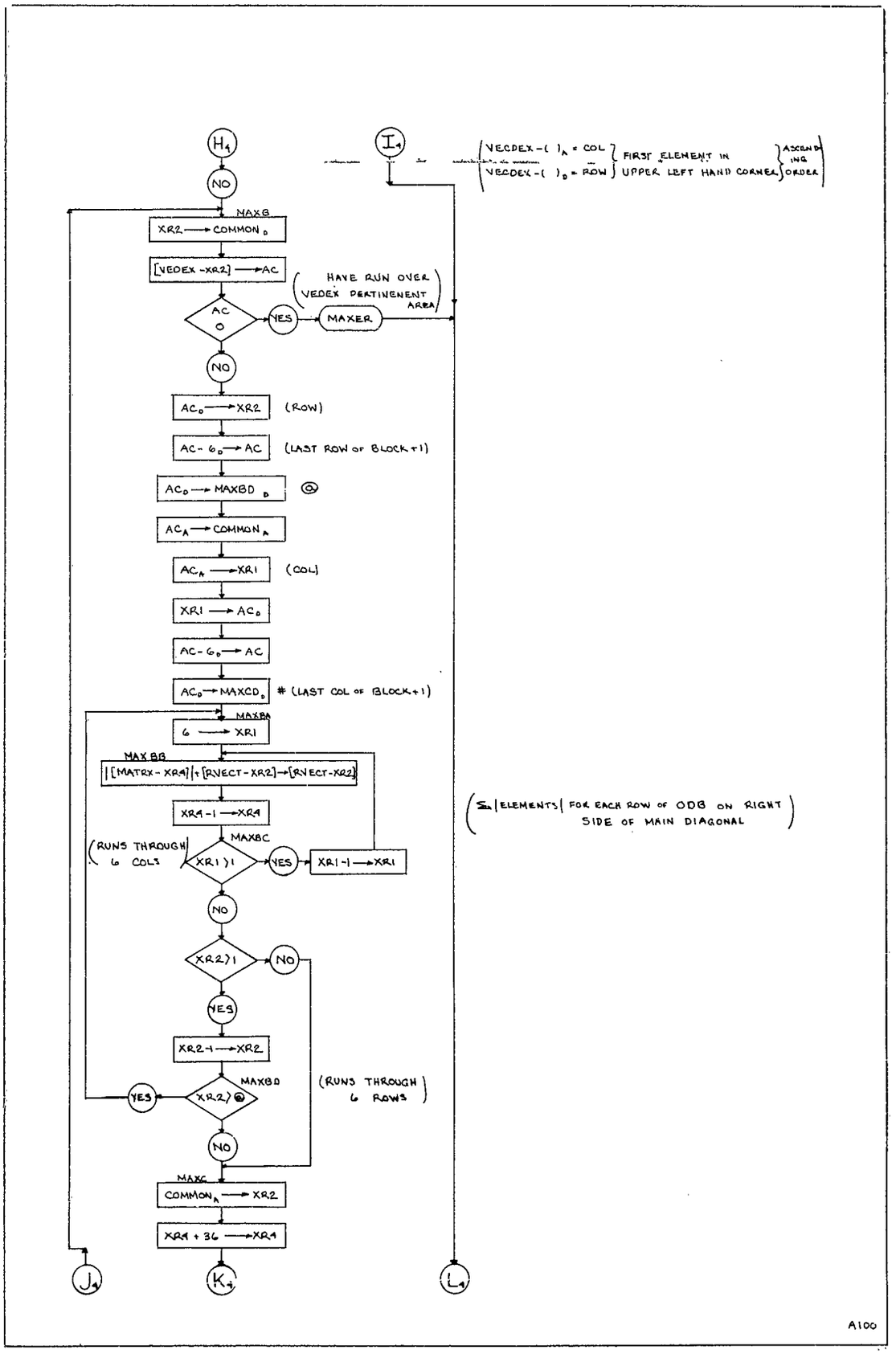
$(a_{1Z}^{*}G_X + a_1 a_{1Y}^{*})$	IN	30DTIX	TRANSFERED LATER INTO	CEQCF
$(a_{1Z}^{*}G_Y - a_1 a_{1X}^{*})$	"	30DTIX+1	"	CEQCF+1
$(a_{1Z}^{*}G_Z)$	"	30DTIX+2	"	CEQCF+2
$(a_{1Z}^{*}L_X)$	"	30DTIX+3	"	CEQCF+3
$(a_{1Z}^{*}L_Y)$	"	30DTIX+4	"	CEQCF+4
$(a_{1Z}^{*}L_Z + 1.)$	"	30DTIX+5	"	CEQCF+5
$(a_{1Z}^{*}P_X)$	"	30DTIX+6	"	CEQCF+6
$(a_{1Z}^{*}P_Y)$	"	30DTIX+7	"	CEQCF+7
$(a_{1Z}^{*}P_Z)$	"	30DTIX+8	"	CEQCF+8
$(-a_{1Z}^{*}L_X)$	"	30DTIX+9	"	CEQCF+9
$(-a_{1Z}^{*}L_Y)$	"	30DTIX+10	"	CEQCF+10
$(-a_{1Z}^{*}L_Z)$	"	30DTIX+11	"	CEQCF+11
$-(a_{1Z}^{*}G_X^{*} + a_1^{*}a_{1Y}^{*})$	"	30DTIX+12	"	CEQCF+12
$-(a_{1Z}^{*}G_Y^{*} - a_1^{*}a_{1X}^{*})$	"	30DTIX+13	"	CEQCF+13
$-(a_{1Z}^{*}G_Z^{*})$	"	30DTIX+14	"	CEQCF+14
$(-a_{1Z}^{*}L_X^{*})$	"	30DTIX+15	"	CEQCF+15
$(-a_{1Z}^{*}L_Y^{*})$	"	30DTIX+16	"	CEQCF+16
$-(a_{1Z}^{*}L_Z^{*} + 1.)$	"	30DTIX+17	"	CEQCF+17
$(-a_{1Z}^{*}P_X^{*})$	"	30DTIX+18	"	CEQCF+18
$(-a_{1Z}^{*}P_Y^{*})$	"	30DTIX+19	"	CEQCF+19
$(-a_{1Z}^{*}P_Z^{*})$	"	30DTIX+20	"	CEQCF+20
$(a_{1Z}^{*}L_X^{*})$	"	30DTIX+21	"	CEQCF+21
$(a_{1Z}^{*}L_Y^{*})$	"	30DTIX+22	"	CEQCF+22
$(a_{1Z}^{*}L_Z^{*})$	"	30DTIX+23	"	CEQCF+23
$[(R_{1Z}^{*} + a_1^{*}a_{1Z}^{*}) - (R_{1Z} + a_1 a_{1Z}^{*})]$	IN	30DTIX+24	"	CEQCF+24

FLOATING

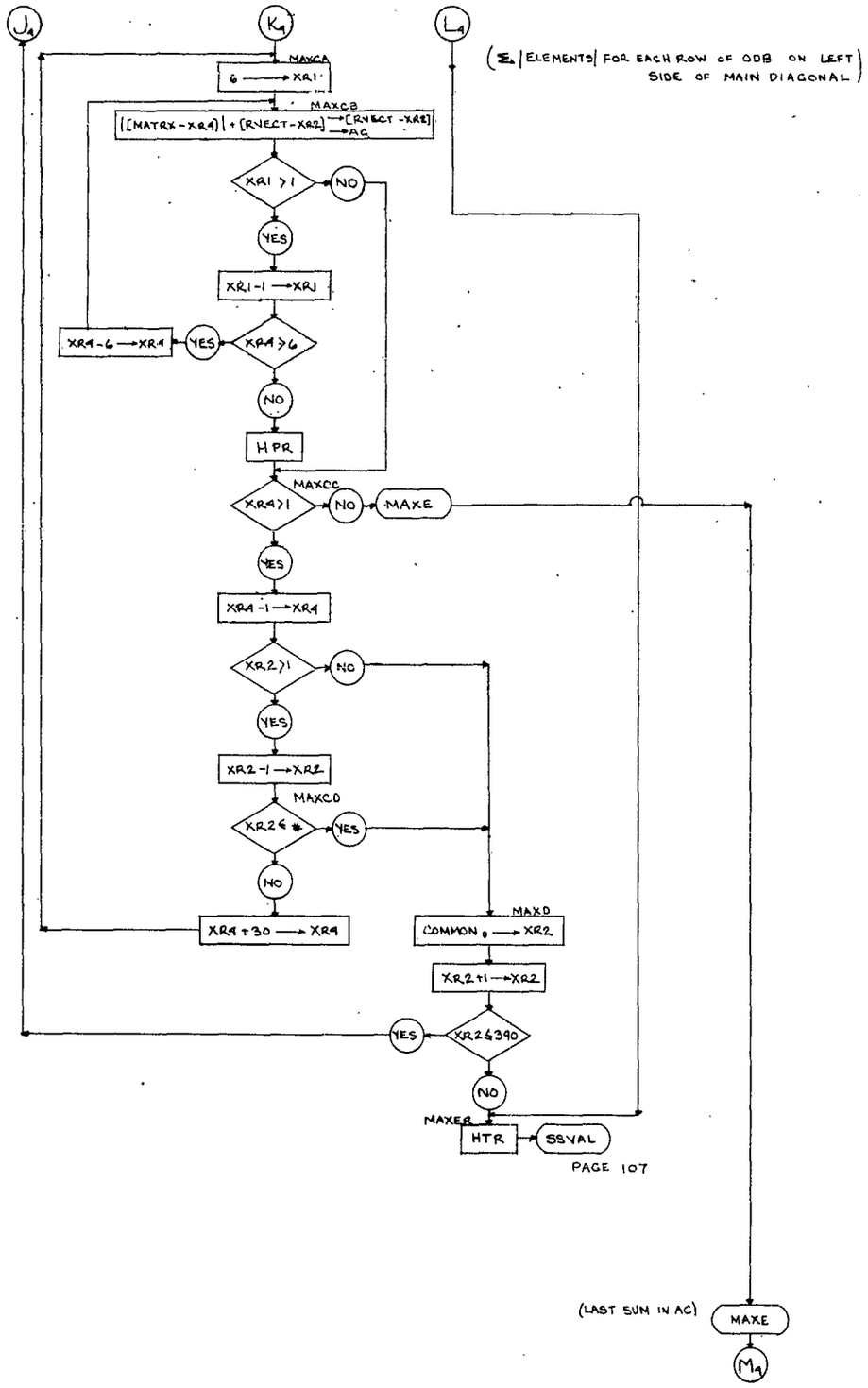
$$(a_{1Z}^{*}G_X + a_1 a_{1Y}^{*})\,dT_{1X} + (a_{1Z}^{*}G_Y - a_1 a_{1X}^{*})\,dT_{1Y} + (a_{1Z}^{*}G_Z)\,dT_{1Z}$$
$$+ (a_{1Z}^{*}L_X)\,dR_{1X} + (a_{1Z}^{*}L_Y)\,dR_{1Y} + (a_{1Z}^{*}L_Z + 1.)\,dR_{1Z}$$
$$+ (a_{1Z}^{*}P_X)\,dT_{2X} + (a_{1Z}^{*}P_Y)\,dT_{2Y} + (a_{1Z}^{*}P_Z)\,dT_{2Z}$$
$$-(a_{1Z}^{*}L_X)\,dR_{2X} \quad -(a_{1Z}^{*}L_Y)\,dR_{2Y} \quad -(a_{1Z}^{*}L_Z)\,dR_{2Z}$$
$$-(a_{1Z}^{*}G_X^{*} + a_1^{*}a_{1Y}^{*})\,dT_{1X}^{*} \quad -(a_{1Z}^{*}G_Y^{*} - a_1^{*}a_{1X}^{*})\,dT_{1Y}^{*} \quad -(a_{1Z}^{*}G_Z^{*})\,dT_{1Z}^{*}$$
$$-(a_{1Z}^{*}L_X^{*})\,dR_{1X}^{*} \quad -(a_{1Z}^{*}L_Y^{*})\,dR_{1Y}^{*} \quad -(a_{1Z}^{*}L_Z^{*} + 1.)\,dR_{1Z}^{*}$$
$$-(a_{1Z}^{*}P_X^{*})\,dT_{2X}^{*} \quad -(a_{1Z}^{*}P_Y^{*})\,dT_{2Y}^{*} \quad -(a_{1Z}^{*}P_Z^{*})\,dT_{2Z}^{*}$$
$$+(a_{1Z}^{*}L_X^{*})\,dR_{2X}^{*} \quad +(a_{1Z}^{*}L_Y^{*})\,dR_{2Y}^{*} \quad +(a_{1Z}^{*}L_Z^{*})\,dR_{2Z}^{*}$$
$$= R_{1Z}^{*} + a_1^{*}a_{1Z}^{*} - R_{1Z} - a_1 a_{1Z}^{*}$$


FCVSQ
MATDEX$_D$ → XR2
(=6N)
0 → CVECT
IF OVERFLOW LT. ON TURN OFF
SUMSQ
[CVECT-XR2]* [CVECT-XR2]+ CVECT → CVECT
XR2>1
YES
XR2-1 → XR2
NO
OVERFLOW
NO
YES
-(SUMSQ +6) → XR4
CEALR
PAGE A23
CEQPT
TURN LTS. OFF
SWT 3
RESEQ3
PAGE A99
0 → COMMON
MATDEX$_A$ → COMMON$_A$
(=36 (N+Q))
-(CEQPT+6) → XR4
PKEDIT
PRINT OUT
"NORMAL MATRIX" (N) "PHOTOS" [36 (N+Q)] "ELEMENTS"
MATDEX$_A$ → XR1
MATPR
-(MATPR) → XR4
PKEDIT
PRINT OUT
ALL THE NORMAL MATRIX (NON-ZERO BLOCKS) ELEMENTS
XR1-1 → XR1
YES
XR1 >1
NO
6(EXSTN) → COMMON$_A$
→ AC$_A$
(COMMON = 6N)
AC$_A$ → XR1
(XR1 = 6N)
-(MATPR+9) → XR4
PKEDIT
PRINT OUT
"CONSTANT VECTOR, ORDER" (6N)
CVEPR
XR1-1 → XR1
-CVEPR → XR4
PKEDIT
PRINT OUT
ALL THE APPROPRIATE VALUES (6N)
YES
XR1 >1
G4
CVECT = $\sum_{i=1}^{6N} \epsilon_i^2$
WHERE ϵ ≡ NORMAL EQUATION VALUE

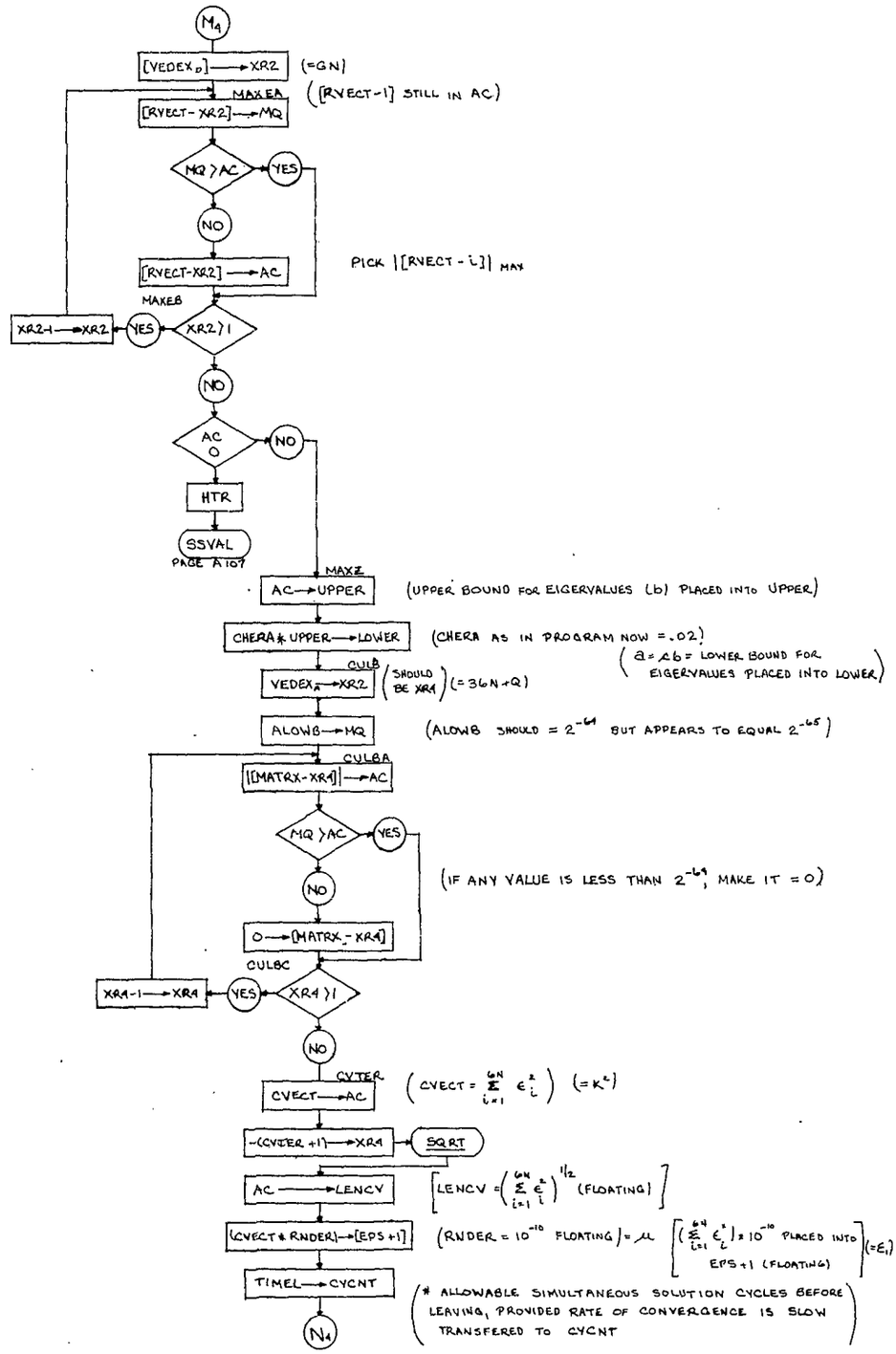

G4
NO
-(CVEPR+3) → XR4
PKEDIT
RESEG3
PRINT OUT
(i.e. CVECT)
RESEG3
RDS → 146
(SKIP 1 RECORD)
-(RESEG+1) → XR4
2560 OR RBTCS
READ VEDEX - 390 TO VEDEX - 0
FORMALLY VECDEX
FROM TAPE 147
-LSEG3 → XR4
2560 OR RBTCS
READ RECORD ON TAPE 146 INTO 3584 TO 7949
SEG. 3
3584
3584
SMULT
TURN LTS. OFF
L.T. 3 ON
MAXA
MAXA
IF OVERFLOW LT. ON - TURN OFF
VEDEX_A → XR4
[= 36 (N+Q)]
VEDEX_0 → XR2
(= 6N)
MAXAA
0 → [RVECT-XR2]
LDM_0 → XR1
(M → XR1, MAT START ≡ 6)
MAXAB
|[MATRX-XR4]| + [RVECT-XR2] → [RVECT-XR2]
XR4 > 1
NO
MAXER
YES
XR4-1 → XR4
XR1-1 → XR1
YES
XR1 > 1
NO
XR2-1 → XR2
YES
XR2 > 1
H4
I4
Σ|ELEMENTS| FOR EACH ROW ON MAIN DIAGONAL PLACED INTO RVECT-(6N) TO RVECT-1
ASCENDING ORDER


H1
I1
NO
MAXB
XR2 → COMMON D
[VEDEX - XR2] → AC
HAVE RUN OVER VEDEX PERTINENENT AREA
AC 0
YES
MAXER
NO
AC D → XR2
(ROW)
AC - 6 D → AC
(LAST ROW OF BLOCK + 1)
AC D → MAXBD D
@
AC A → COMMON A
AC A → XR1
(COL)
XR1 → AC D
AC - 6 D → AC
AC D → MAXCD D
(LAST COL OF BLOCK + 1)
MAXBA
6 → XR1
MAX BB
|[MATRX - XR4]| + [RVECT - XR2] → [RVECT - XR2]
XR4 - 1 → XR4
MAXBC
(RUNS THROUGH 6 COLS)
XR1 > 1
YES
XR1 - 1 → XR1
NO
XR2 > 1
NO
YES
XR2 - 1 → XR2
MAXBD
XR2 > @
YES
(RUNS THROUGH 6 ROWS)
NO
MAXC
COMMON A → XR2
XR4 + 36 → XR4
J1
K1
L1
VECDEX - ( )A = COL
VECDEX - ( )D = ROW
FIRST ELEMENT IN UPPER LEFT HAND CORNER
ASCENDING ORDER
(Σ |ELEMENTS| FOR EACH ROW OF ODB ON RIGHT SIDE OF MAIN DIAGONAL)

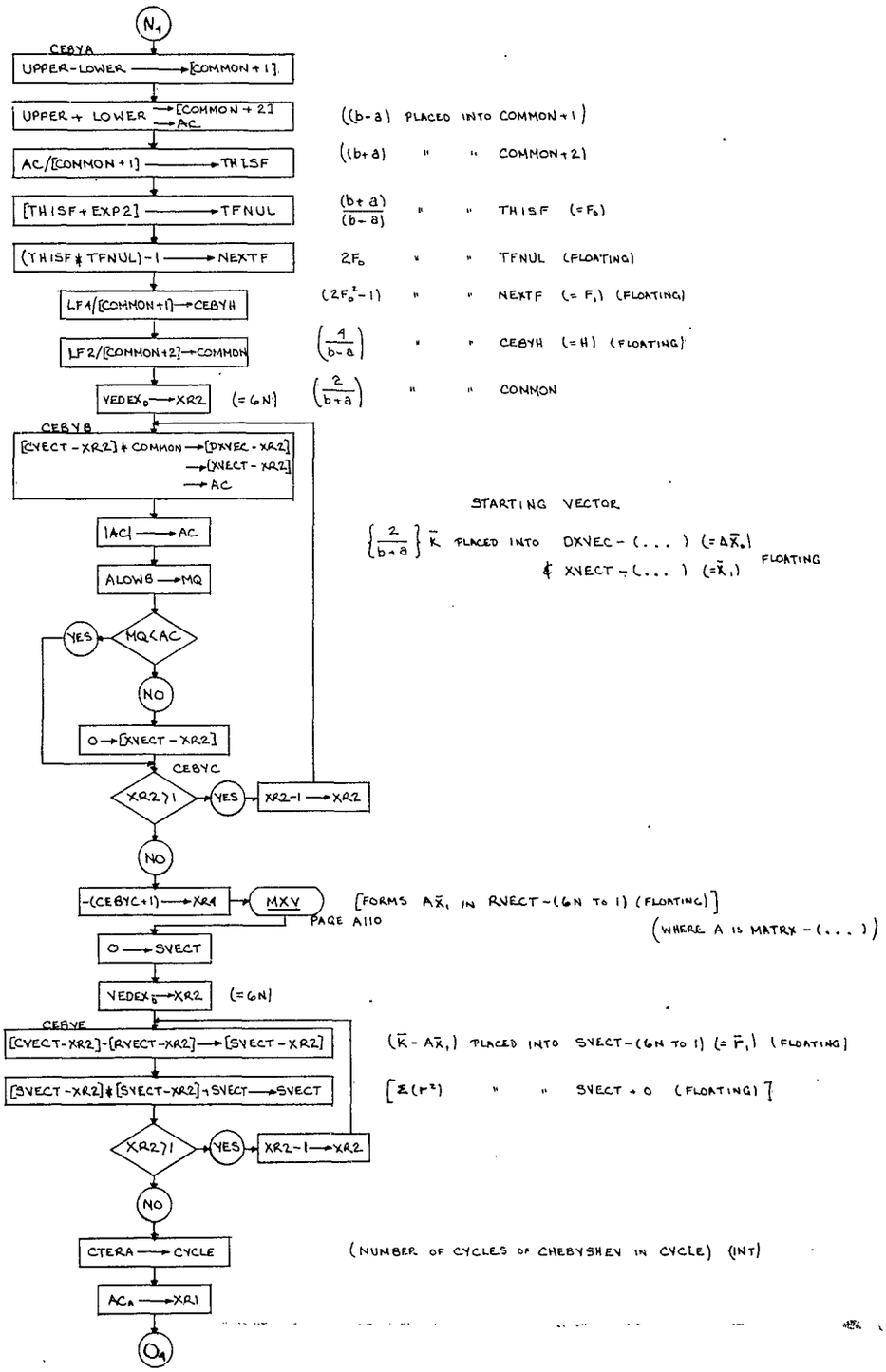
A100

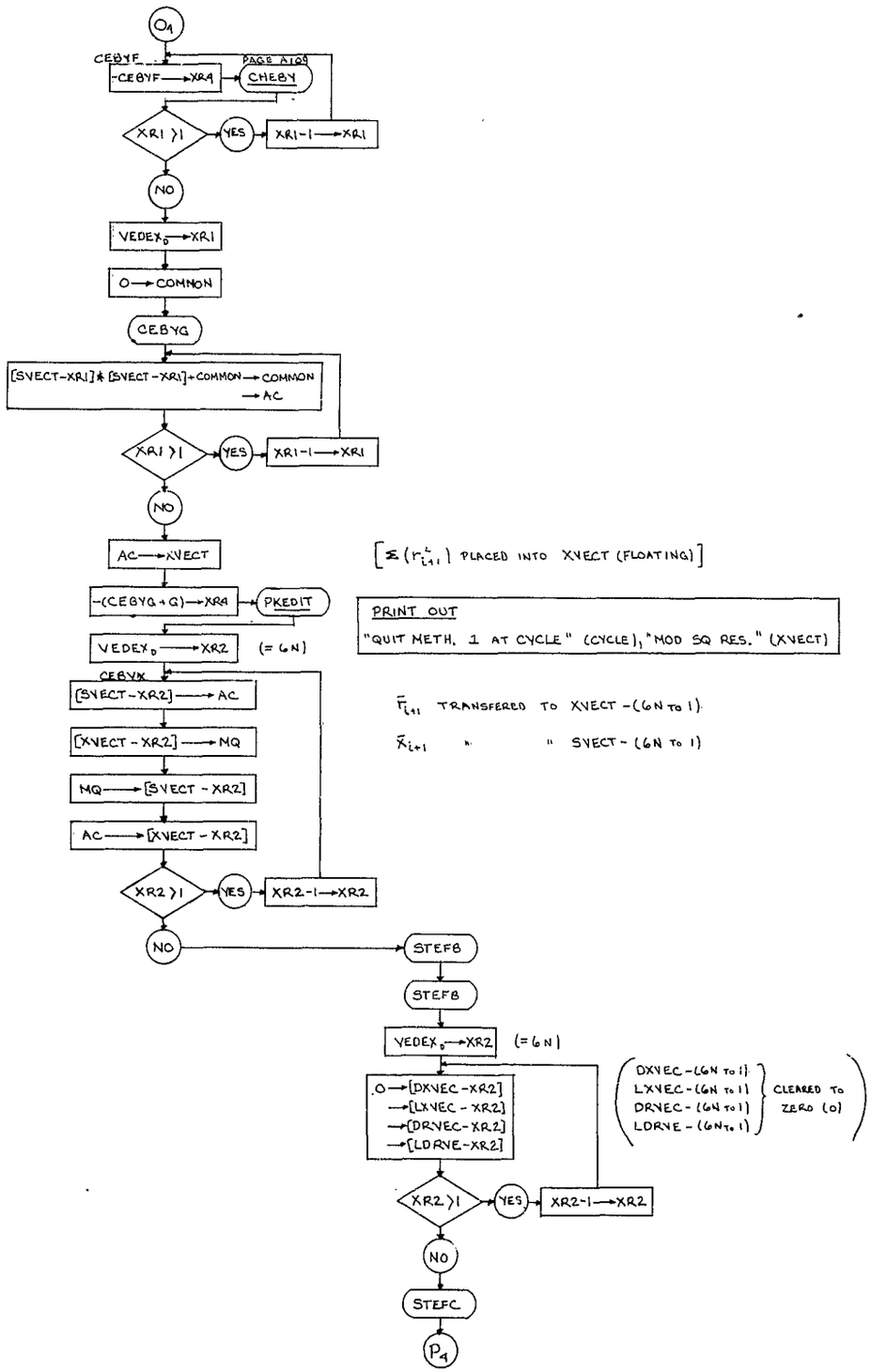

J4
K4
L4
(Σ |ELEMENTS| FOR EACH ROW OF ODB ON LEFT SIDE OF MAIN DIAGONAL)
MAXCA
6 → XR1
MAXCB
|[MATRX - XR4]| + [RVECT - XR2] → [RVECT - XR2] → AC
XR1 > 1
NO
YES
XR1 - 1 → XR1
XR4 - 6 → XR4
YES
XR4 > 6
NO
HPR
MAXCC
XR4 > 1
NO
MAXE
YES
XR4 - 1 → XR4
XR2 > 1
NO
YES
XR2 - 1 → XR2
MAXCD
XR2 ≤ *
YES
NO
XR4 + 30 → XR4
MAXD
COMMON 0 → XR2
XR2 + 1 → XR2
XR2 ≤ 390
YES
NO
MAXER
HTR
SSVAL
PAGE 107
(LAST SUM IN AC)
MAXE
M4

A101

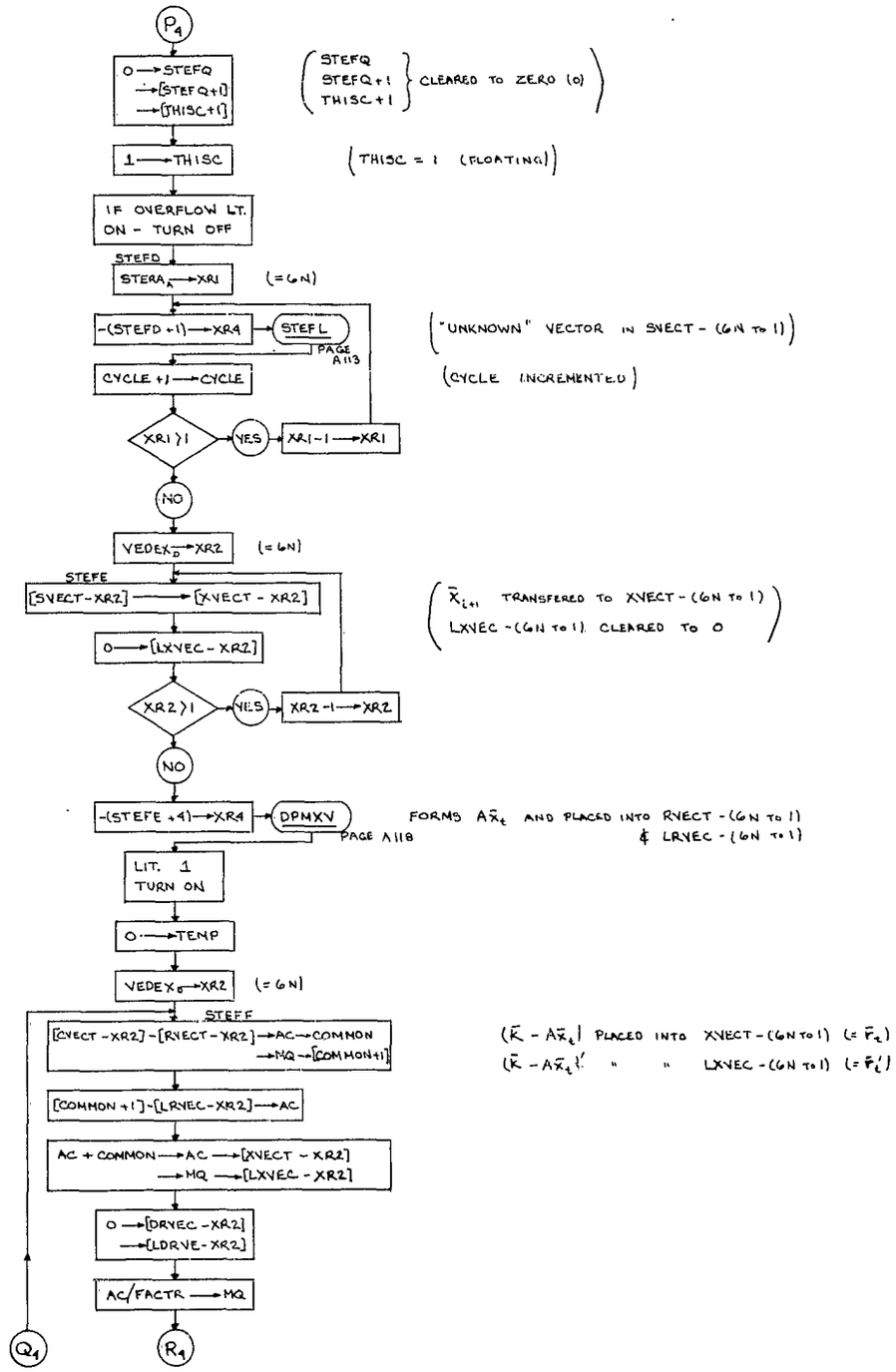

M4
[VEDEX D] → XR2
(=GN)
MAXEA
([RVECT-1] STILL IN AC)
[RVECT-XR2] → MQ
MQ > AC
YES
NO
[RVECT-XR2] → AC
PICK |[RVECT - i]| MAX
MAXEB
XR2-1 → XR2
YES
XR2 > 1
NO
AC 0
NO
HTR
SSVAL
PAGE A107
MAXZ
AC → UPPER
(UPPER BOUND FOR EIGERVALUES (b) PLACED INTO UPPER)
CHERA * UPPER → LOWER
(CHERA AS IN PROGRAM NOW = .02)
(a = ab = LOWER BOUND FOR EIGERVALUES PLACED INTO LOWER)
CULB
VEDEX A → XR2
(SHOULD BE XR4)
(= 36N+Q)
ALOWB → MQ
(ALOWB SHOULD = 2^-64 BUT APPEARS TO EQUAL 2^-65)
CULBA
|[MATRX-XR4]| → AC
MQ > AC
YES
NO
(IF ANY VALUE IS LESS THAN 2^-69, MAKE IT = 0)
0 → [MATRX - XR4]
CULBC
XR4-1 → XR4
YES
XR4 > 1
NO
CVTER
CVECT → AC
(CVECT = Σ_{i=1}^{6N} ε_i^2) (= K^2)
-(CVTER +1) → XR4
SQRT
AC → LENCV
[LENCV = (Σ_{i=1}^{6N} ε_i^2)^1/2 (FLOATING)]
(CVECT * RNDER) → [EPS +1]
(RNDER = 10^-10 FLOATING) = μ
[(Σ_{i=1}^{6N} ε_i^2) * 10^-10 PLACED INTO EPS +1 (FLOATING)] (= ε1)
TIMEL → CYCNT
(* ALLOWABLE SIMULTANEOUS SOLUTION CYCLES BEFORE LEAVING, PROVIDED RATE OF CONVERGENCE IS SLOW TRANSFERED TO CYCNT)
N4

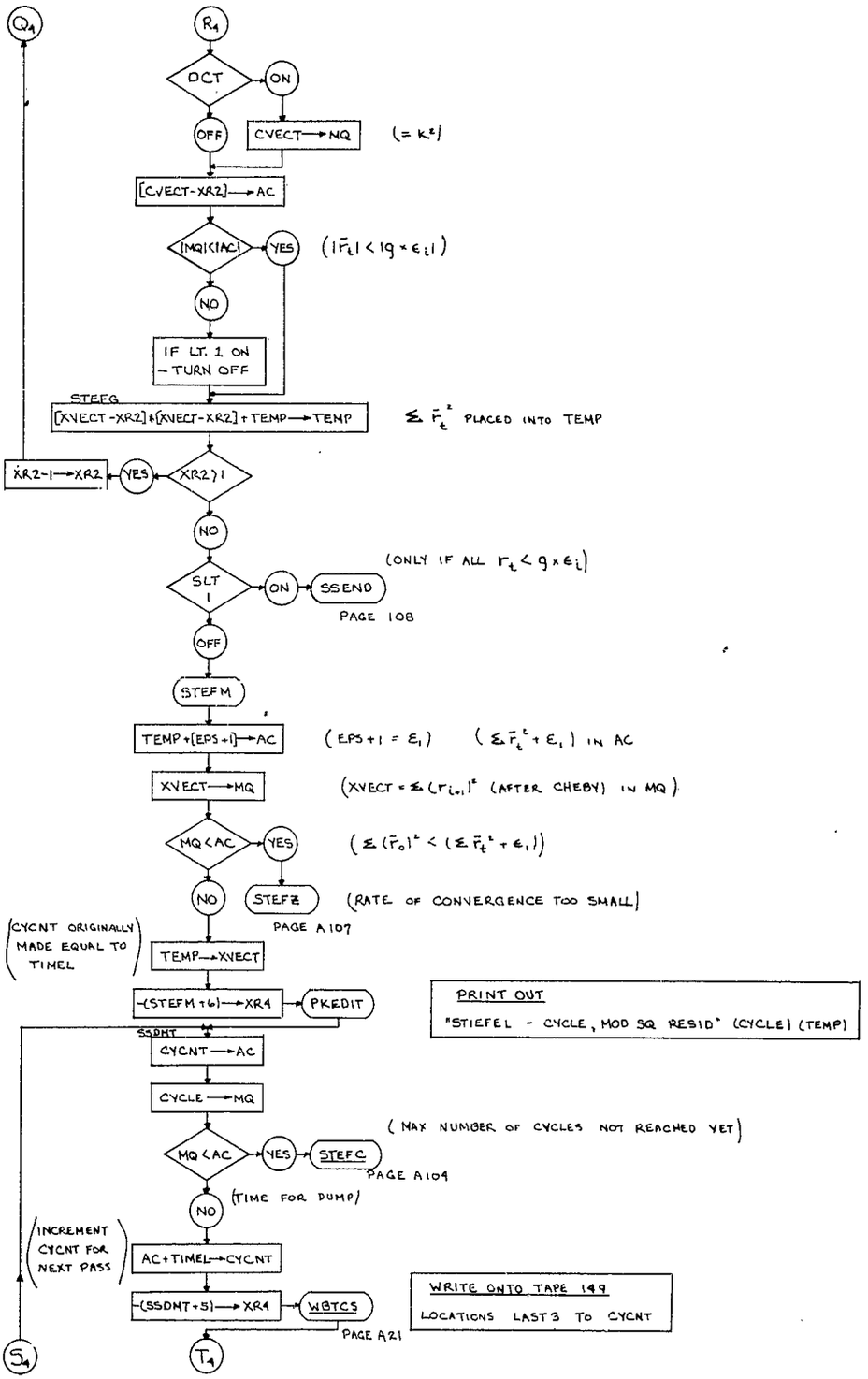
A102

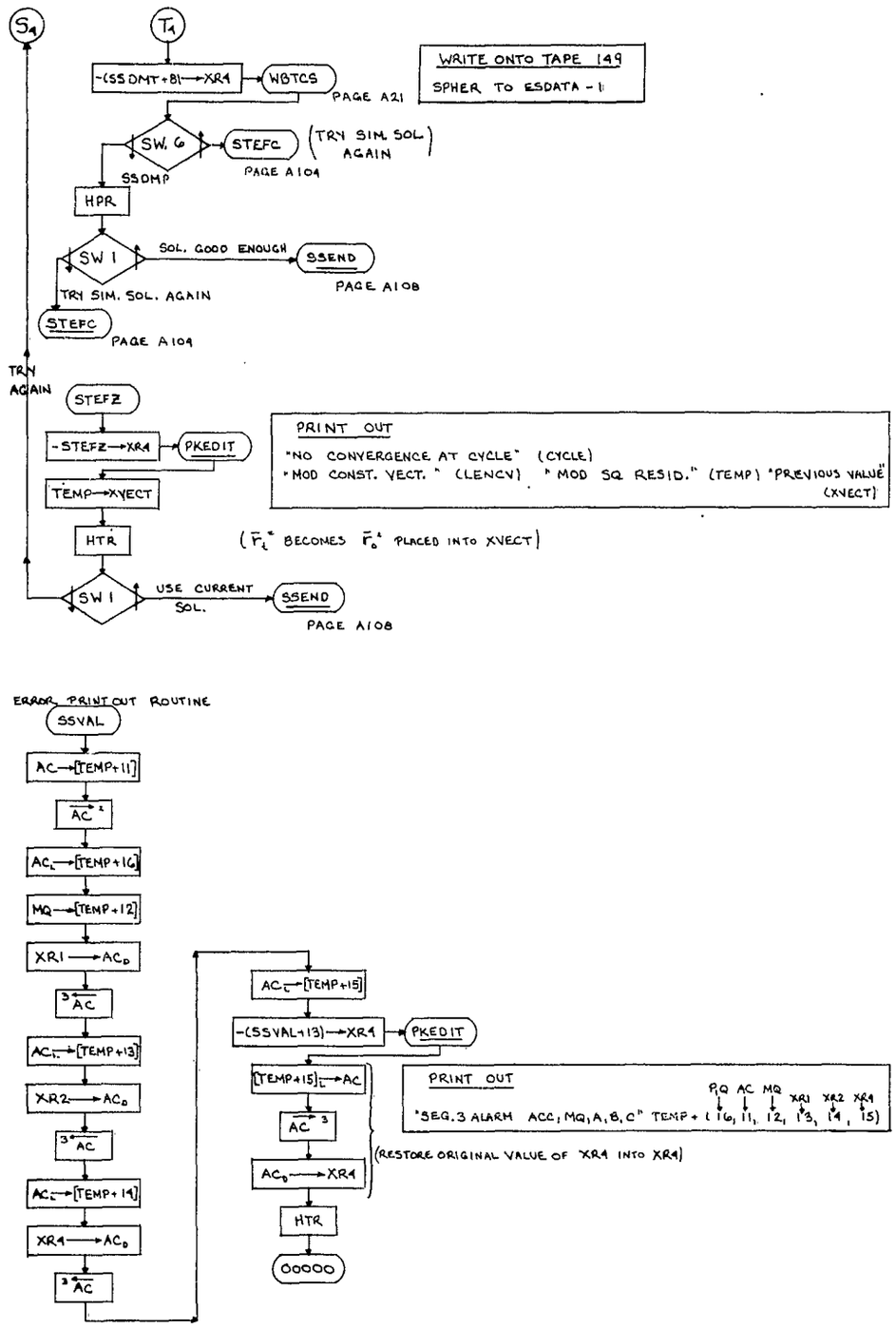

N1
CEBYA
UPPER-LOWER → [COMMON+1]
UPPER + LOWER → [COMMON+2] → AC
((b-a) PLACED INTO COMMON+1)
AC/[COMMON+1] → THISF
((b+a) " " COMMON+2)
[THISF+EXP2] → TFNUL
(b+a)/(b-a) " " THISF (=F0)
(THISF * TFNUL)-1 → NEXTF
2F0 " " TFNUL (FLOATING)
LF1/[COMMON+1] → CEBYH
(2F0²-1) " " NEXTF (= F1) (FLOATING)
LF2/[COMMON+2] → COMMON
(1/(b-a)) " " CEBYH (=H) (FLOATING)
VEDEX0 → XR2 (=6N)
(2/(b+a)) " " COMMON
CEBYB
[XVECT-XR2] * COMMON → [DXVEC-XR2] → [XVECT-XR2] → AC
STARTING VECTOR
{2/(b+a)} K̄ PLACED INTO DXVEC-(...) (=ΔX̄0)
& XVECT-(...) (=X̄1)
FLOATING
|AC| → AC
ALOW8 → MQ
MQ<AC
YES
NO
0 → [XVECT-XR2]
CEBYC
XR2>1
YES
XR2-1 → XR2
NO
-(CEBYC+1) → XR4
MXV
PAGE A110
[FORMS AX̄1 IN RVECT-(6N TO 1) (FLOATING)]
(WHERE A IS MATRX-(...))
0 → SVECT
VEDEX0 → XR2 (=6N)
CEBYE
[CVECT-XR2]-[RVECT-XR2] → [SVECT-XR2]
(K̄-AX̄1) PLACED INTO SVECT-(6N TO 1) (= F̄1) (FLOATING)
[SVECT-XR2] * [SVECT-XR2] + SVECT → SVECT
[Σ(F²) " " SVECT + 0 (FLOATING)]
XR2>1
YES
XR2-1 → XR2
NO
CTERA → CYCLE
(NUMBER OF CYCLES OF CHEBYSHEV IN CYCLE) (INT)
AC4 → XR1
O1

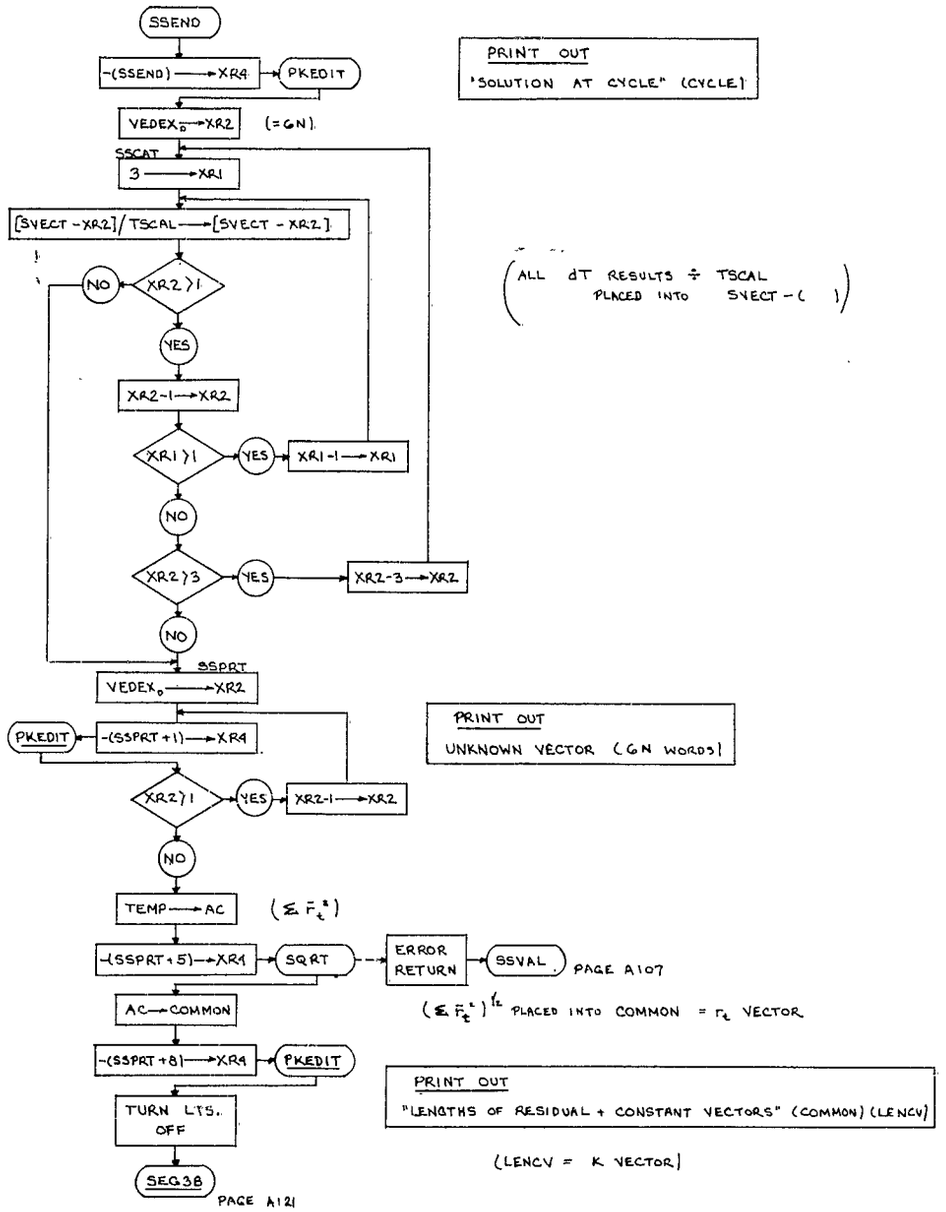

O4
CEBYF
-CEBYF → XR4
PAGE A108
CHEBY
XR1 > 1
YES
XR1-1 → XR1
NO
VEDEX0 → XR1
0 → COMMON
CEBYG
[SVECT-XR1] * [SVECT-XR1] + COMMON → COMMON
→ AC
XR1 > 1
YES
XR1-1 → XR1
NO
AC → XVECT
[Σ (r²i+1) PLACED INTO XVECT (FLOATING)]
-(CEBYG+G) → XR4
PKEDIT
PRINT OUT
"QUIT METH. 1 AT CYCLE" (CYCLE), "MOD SQ RES." (XVECT)
VEDEX0 → XR2
(= 6N)
CEBYX
[SVECT-XR2] → AC
r̄i+1 TRANSFERED TO XVECT-(6N TO 1)
x̄i+1 " " SVECT-(6N TO 1)
[XVECT-XR2] → MQ
MQ → [SVECT-XR2]
AC → [XVECT-XR2]
XR2 > 1
YES
XR2-1 → XR2
NO
STEFB
STEFB
VEDEX0 → XR2
(= 6N)
0 → [DXVEC-XR2]
→ [LXVEC-XR2]
→ [DRVEC-XR2]
→ [LDRVE-XR2]
DXVEC-(6N TO 1)
LXVEC-(6N TO 1)
DRVEC-(6N TO 1)
LDRVE-(6N TO 1)
CLEARED TO ZERO (0)
XR2 > 1
YES
XR2-1 → XR2
NO
STEFC
P4

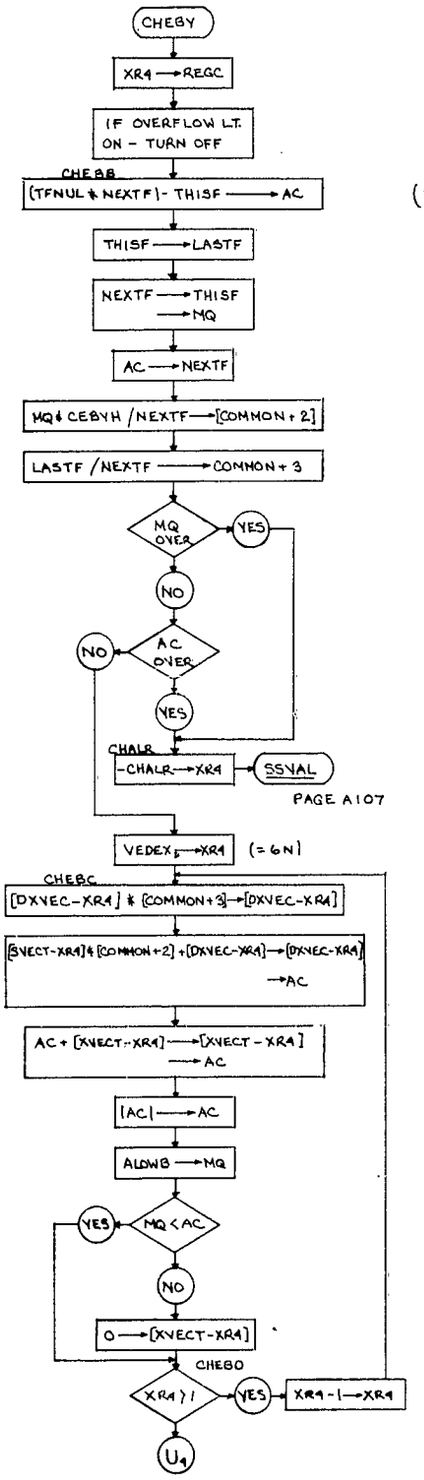
A104


P4
0 → STEFQ
→ [STEFQ+1]
→ [THISC+1]
STEFQ
STEFQ+1
THISC+1
CLEARED TO ZERO (0)
1 → THISC
(THISC = 1 (FLOATING))
IF OVERFLOW LT. ON - TURN OFF
STEFD
STERA → XR1
(= 6N)
-(STEFD+1) → XR4
STEF L
PAGE A113
("UNKNOWN" VECTOR IN SVECT - (6N TO 1))
CYCLE+1 → CYCLE
(CYCLE INCREMENTED)
XR1 > 1
YES
XR1 - 1 → XR1
NO
VEDEX5 → XR2
(= 6N)
STEFE
[SVECT - XR2] → [XVECT - XR2]
($\bar{X}_{i+1}$ TRANSFERED TO XVECT - (6N TO 1))
0 → [LXVEC - XR2]
(LXVEC - (6N TO 1) CLEARED TO 0)
XR2 > 1
YES
XR2 - 1 → XR2
NO
-(STEFE+4) → XR4
DPMXV
PAGE A118
FORMS $A\bar{x}_i$ AND PLACED INTO RVECT - (6N TO 1) & LRVEC - (6N TO 1)
LIT. 1 TURN ON
0 → TEMP
VEDEX6 → XR2
(= 6N)
STEFF
[CVECT - XR2] - [RVECT - XR2] → AC → COMMON
→ MQ → [COMMON+1]
($\bar{K} - A\bar{x}_i$) PLACED INTO XVECT - (6N TO 1) (= $\bar{F}_i$)
($\bar{K} - A\bar{x}_i$)' " " LXVEC - (6N TO 1) (= $\bar{F}_i'$)
[COMMON+1] - [LRVEC - XR2] → AC
AC + COMMON → AC → [XVECT - XR2]
→ MQ → [LXVEC - XR2]
0 → [DRVEC - XR2]
→ [LDRVE - XR2]
AC/FACTR → MQ
Q4
R4


Q1
R1
DCT
ON
OFF
CVECT→NQ
(= k²)
[CVECT-XR2]→AC
|MQ|<|AC|
YES
(|r̄t| < |g × εi|)
NO
IF LT. 1 ON
– TURN OFF
STEFG
[XVECT-XR2]+[XVECT-XR2]+TEMP→TEMP
Σ r̄t² PLACED INTO TEMP
XR2-1→XR2
YES
XR2>1
NO
(ONLY IF ALL rt < g × εi)
SLT
1
ON
SSEND
PAGE 108
OFF
STEFM
TEMP+[EPS+1]→AC
(EPS+1 = ε1)
(Σ r̄t² + ε1) IN AC
XVECT→MQ
(XVECT = Σ (ri+1)² (AFTER CHEBY) IN MQ)
MQ<AC
YES
(Σ (r̄0)² < (Σ r̄t² + ε1))
NO
STEFZ
(RATE OF CONVERGENCE TOO SMALL)
PAGE A107
(CYCNT ORIGINALLY MADE EQUAL TO TIMEL)
TEMP→XVECT
-(STEFM+6)→XR4
PKEDIT
PRINT OUT
"STIEFEL - CYCLE, MOD SQ RESID" (CYCLE) (TEMP)
SSDNT
CYCNT→AC
CYCLE→MQ
(MAX NUMBER OF CYCLES NOT REACHED YET)
MQ<AC
YES
STEFC
PAGE A109
NO
(TIME FOR DUMP)
(INCREMENT CYCNT FOR NEXT PASS)
AC+TIMEL→CYCNT
-(SSDNT+5)→XR4
WBTCS
WRITE ONTO TAPE 149
LOCATIONS LAST 3 TO CYCNT
PAGE A21
S1
T1


S4
T4
-(SSDMT+81)→XR4
WBTCS
PAGE A21
WRITE ONTO TAPE 149
SPHER TO ESDATA - 1
SW. 6
STEFC
(TRY SIM. SOL. AGAIN)
SSDMP
PAGE A104
HPR
SW 1
SOL. GOOD ENOUGH
SSEND
PAGE A108
TRY SIM. SOL. AGAIN
STEFC
PAGE A104
TRY AGAIN
STEFZ
-STEFZ→XR4
PKEDIT
PRINT OUT
"NO CONVERGENCE AT CYCLE" (CYCLE)
"MOD CONST. VECT." (LENCV) "MOD SQ RESID." (TEMP) "PREVIOUS VALUE" (XVECT)
TEMP→XVECT
HTR
(r̄ℓ* BECOMES r̄o* PLACED INTO XVECT)
SW 1
USE CURRENT SOL.
SSEND
PAGE A108
ERROR PRINT OUT ROUTINE
SSVAL
AC→[TEMP+11]
AC*2
ACL→[TEMP+16]
MQ→[TEMP+12]
XR1→ACD
3←AC
ACL→[TEMP+13]
XR2→ACD
3←AC
ACL→[TEMP+14]
XR4→ACD
3←AC
ACL→[TEMP+15]
-(SSVAL+13)→XR4
PKEDIT
[TEMP+15]L→AC
AC*3
ACD→XR4
HTR
00000
PRINT OUT
"SEQ.3 ALARM ACC; MQ, A, B, C" TEMP + (P,Q 16, AC 11, MQ 12, XR1 13, XR2 14, XR4 15)
(RESTORE ORIGINAL VALUE OF XR4 INTO XR4)


SSEND
-(SSEND) → XR4
PKEDIT
PRINT OUT
"SOLUTION AT CYCLE" (CYCLE)
VEDEX0 → XR2
(=GN)
SSCAT
3 → XR1
[SVECT - XR2] / TSCAL → [SVECT - XR2]
ALL dT RESULTS ÷ TSCAL PLACED INTO SVECT - ( )
XR2 > 1
NO
YES
XR2-1 → XR2
XR1 > 1
YES
XR1-1 → XR1
NO
XR2 > 3
YES
XR2-3 → XR2
NO
SSPRT
VEDEX0 → XR2
PKEDIT
-(SSPRT+1) → XR4
PRINT OUT
UNKNOWN VECTOR (GN WORDS)
XR2 > 1
YES
XR2-1 → XR2
NO
TEMP → AC
(Σ F_t²)
-(SSPRT+5) → XR4
SQRT
ERROR RETURN
SSVAL
PAGE A107
AC → COMMON
(Σ F_t²)^½ PLACED INTO COMMON = r_t VECTOR
-(SSPRT+8) → XR4
PKEDIT
PRINT OUT
"LENGTHS OF RESIDUAL + CONSTANT VECTORS" (COMMON) (LENCV)
TURN LTS. OFF
(LENCV = K VECTOR)
SEG3B
PAGE A121



$(2 F_0 F_i - F_{i-1})$ PLACED IN AC AND LATER TRANSFERED TO NEXTF $(= F_{i+1}$ (LATER ON))

F_0 TRANSFERED TO LASTF (WILL BE F_{i-1} LATER ON)

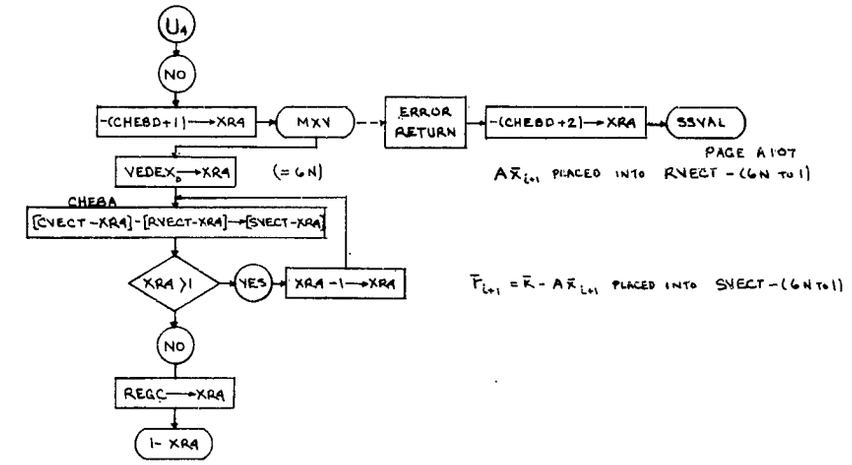
F_i " " THISF (" " F_0 " ")

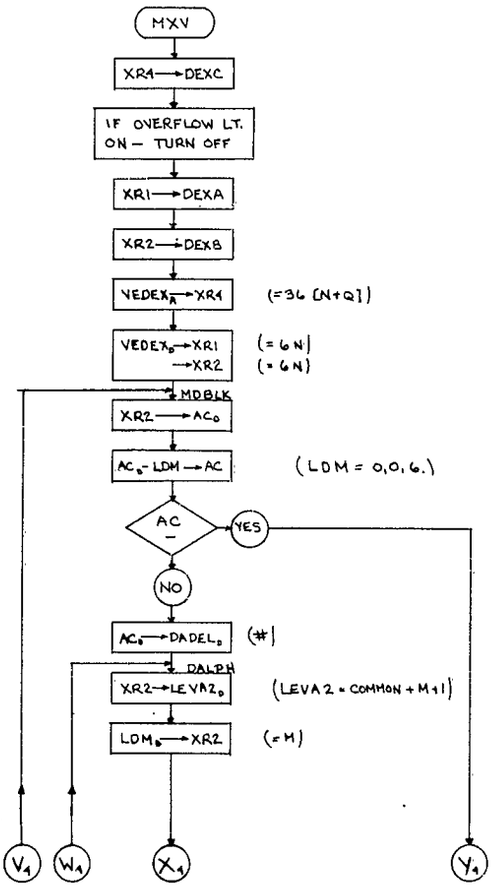
$\frac{F_i H}{F_{i+1}}$ PLACED INTO COMMON + 2

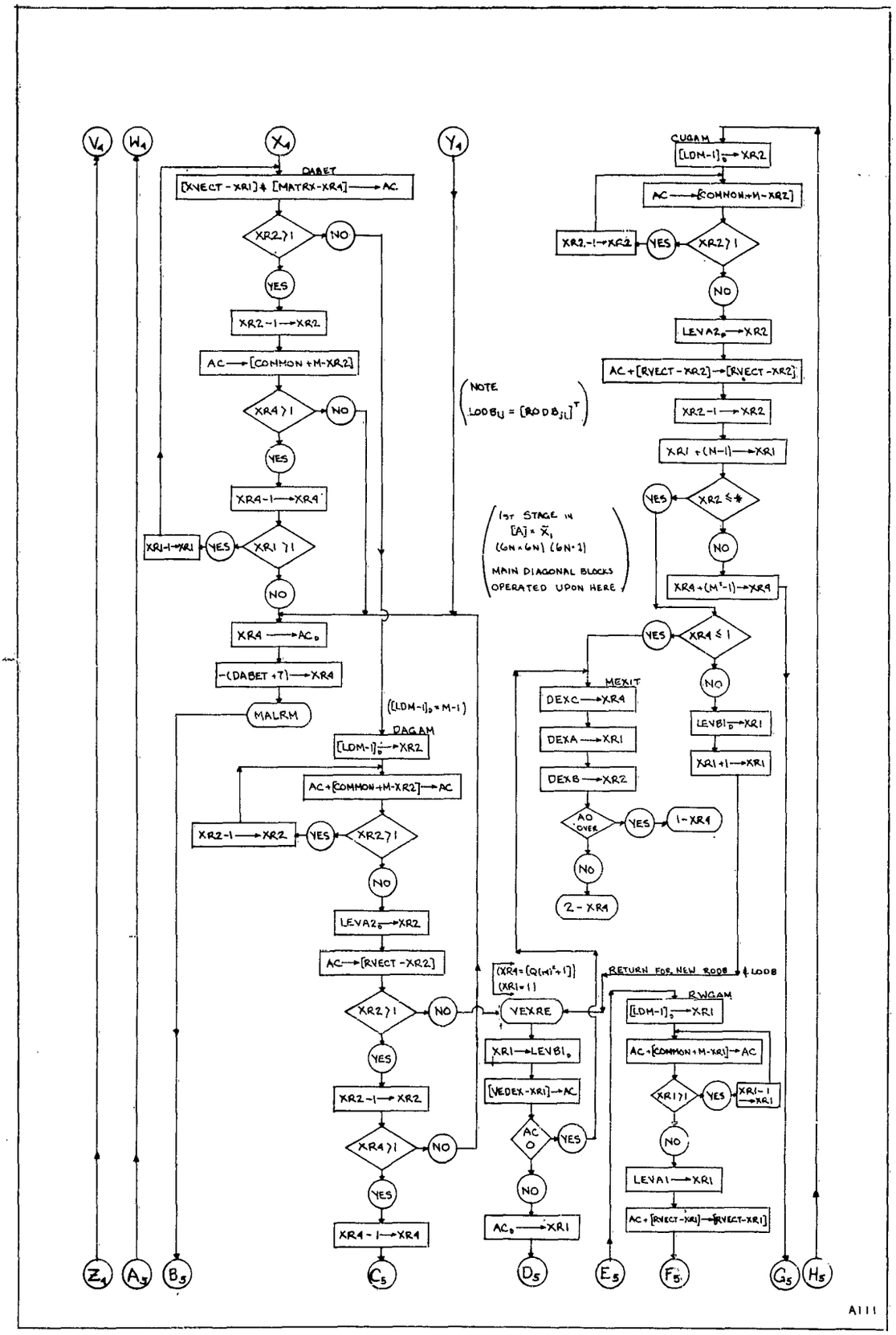
$\frac{F_{i-1}}{F_{i+1}}$ " " COMMON + 3

$\Delta \bar{X}_i = \frac{F_i H \bar{F}_i + F_{i-1} \Delta \bar{X}_{i-1}}{F_{i+1}}$ PLACED INTO DXVEC – (6N to 1)

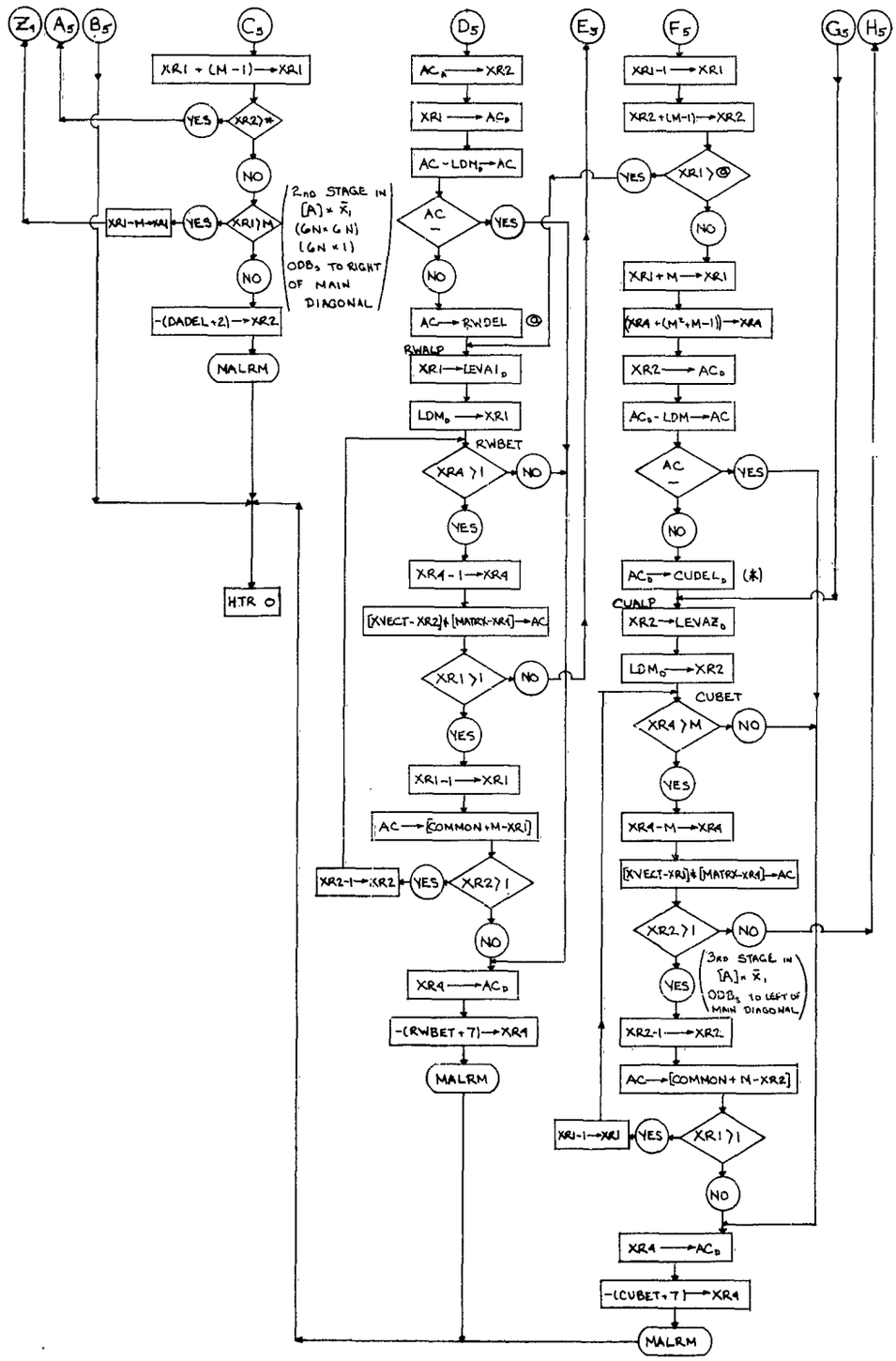
$\bar{X}_{i+1} = \bar{X}_i + \Delta \bar{X}_i$ " " XVECT – (6N to 1)

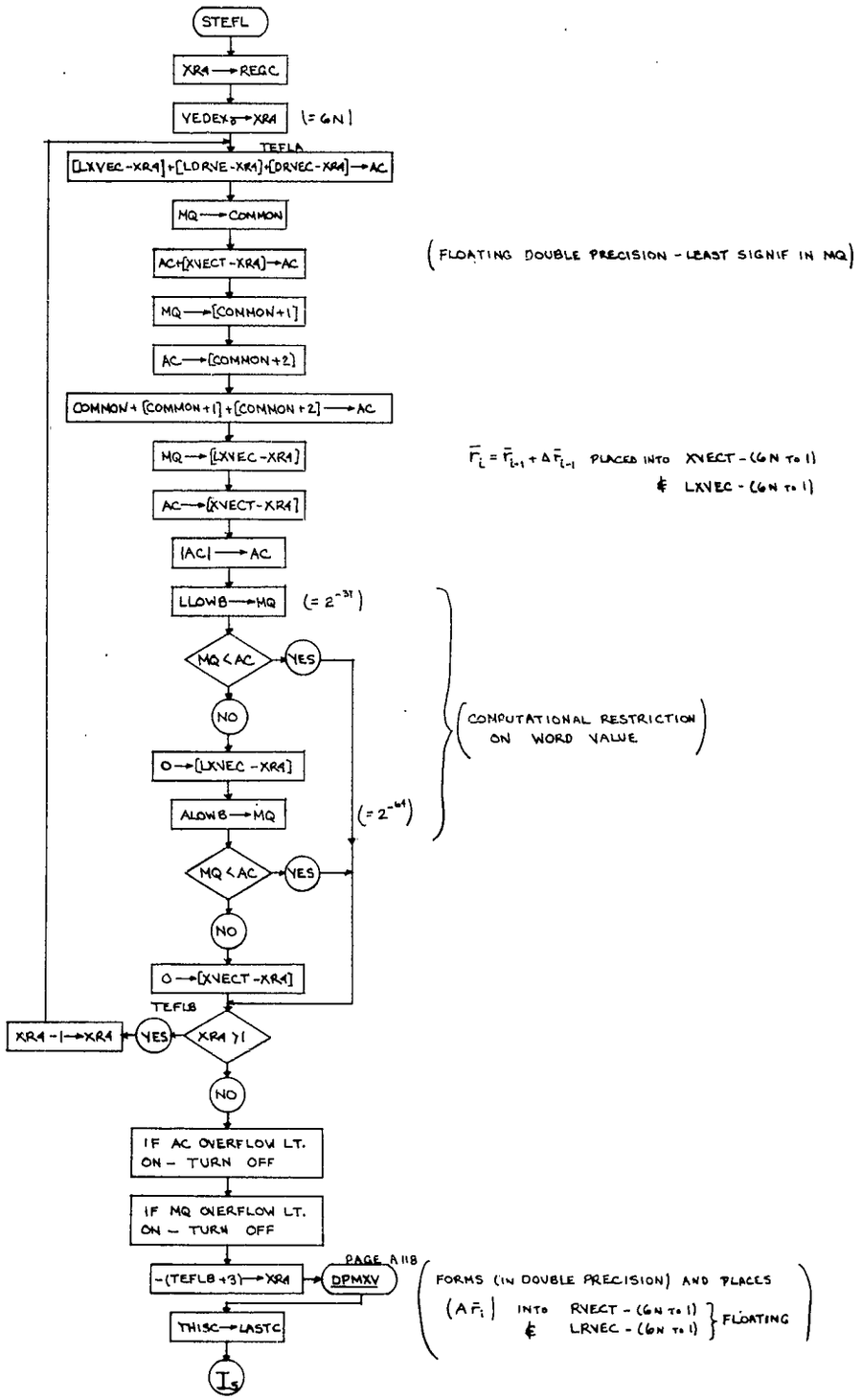

U1
NO
-(CHEBD+1)→XR4
MXV
ERROR RETURN
-(CHEBD+2)→XR4
SSVAL
PAGE A1:07
VEDEX0→XR4
(=6N)
Ax̄i+1 PLACED INTO RVECT-(6N TO 1)
CHEBA
[CVECT-XR4]-[RVECT-XR4]→[SVECT-XR4]
XR4 >1
YES
XR4-1→XR4
r̄i+1 = r̄ - Ax̄i+1 PLACED INTO SVECT-(6N TO 1)
NO
REGC→XR4
1- XR4

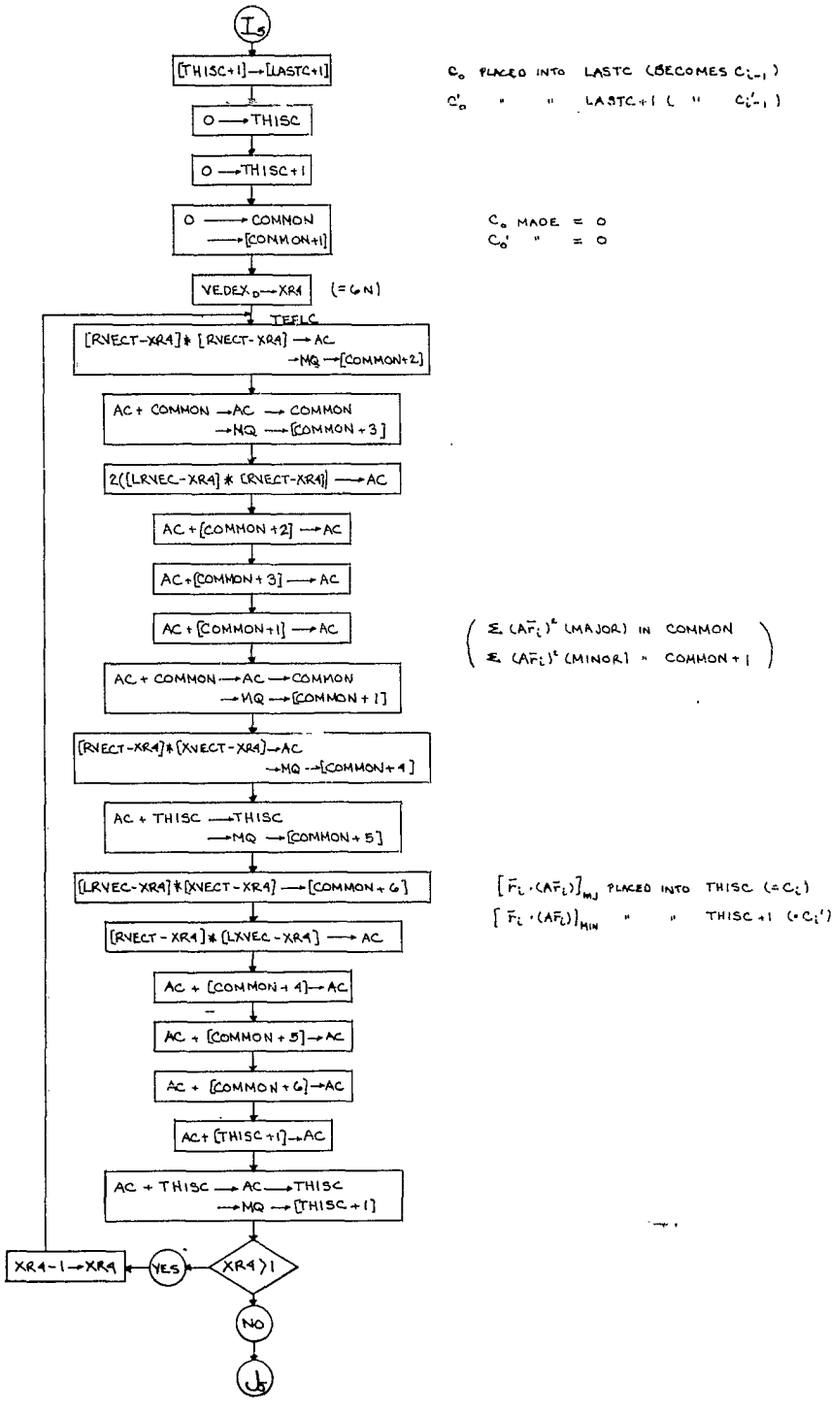

MXV
XR4→DEXC
IF OVERFLOW LT. ON — TURN OFF
XR1→DEXA
XR2→DEXB
VEDEXR→XR4
(=36 (N+Q))
VEDEX0→XR1
→XR2
(=6N)
(=6N)
MDBLK
XR2→AC0
AC0-LDM→AC
(LDM = 0,0,6.)
AC
YES
NO
AC0→DADEL0
(#)
DALPH
XR2→LEVA20
(LEVA2 = COMMON + M+1)
LDM0→XR2
(=M)
V1
W1
X1
Y1



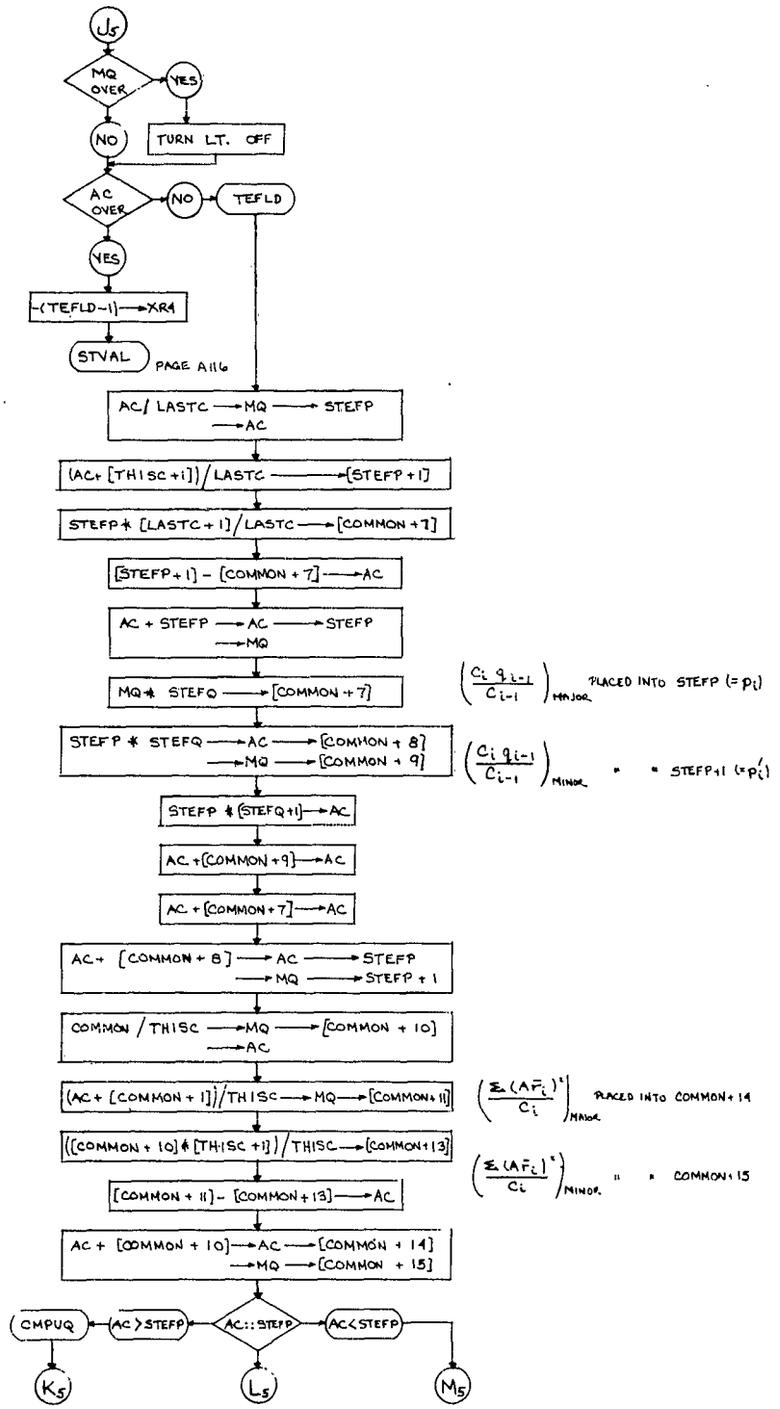
V4
W4
X4
Y4
DABET
[XVECT - XR1] & [MATRX-XR4] → AC
XR2 > 1
NO
YES
XR2 - 1 → XR2
AC → [COMMON + M-XR2]
XR4 > 1
NO
YES
XR4 - 1 → XR4
XR1 > 1
YES
XR1-1 → XR1
NO
XR4 → AC0
-(DABET + 7) → XR4
MALRM
([LDM-1]0 = M-1)
DAGAM
[LDM-1]0 → XR2
AC + [COMMON + M-XR2] → AC
XR2 > 1
YES
XR2 - 1 → XR2
NO
LEVA20 → XR2
AC → [RVECT - XR2]
XR2 > 1
NO
YES
XR2 - 1 → XR2
XR4 > 1
NO
YES
XR4 - 1 → XR4
NOTE
LODBij = [RODBji]T
1st STAGE IN
[A] × X̄1
(6N × 6N) (6N · 1)
MAIN DIAGONAL BLOCKS
OPERATED UPON HERE
CUGAM
[LDM-1]0 → XR2
AC → [COMMON + M-XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
LEVA20 → XR2
AC + [RVECT - XR2] → [RVECT - XR2]
XR2 - 1 → XR2
XR1 + (N-1) → XR1
XR2 ≤ *
YES
NO
XR4 + (M²-1) → XR4
XR4 ≤ 1
YES
NO
MEXIT
DEXC → XR4
DEXA → XR1
DEXB → XR2
AO OVER
YES
1 - XR4
NO
2 - XR4
LEVB10 → XR1
XR1 + 1 → XR1
(XR4 = [Q(M)² + 1])
(XR1 = 1)
VEXRE
XR1 → LEVB10
[VEDEX - XR1] → AC
AC 0
YES
NO
AC0 → XR1
RETURN FOR NEW RODB & LODB
RWGAM
[LDM-1]0 → XR1
AC + [COMMON + M-XR1] → AC
XR1 > 1
YES
XR1 - 1 → XR1
NO
LEVA1 → XR1
AC + [RVECT - XR1] → [RVECT - XR1]
Z4
A5
B5
C5
D5
E5
F5
G5
H5
A111

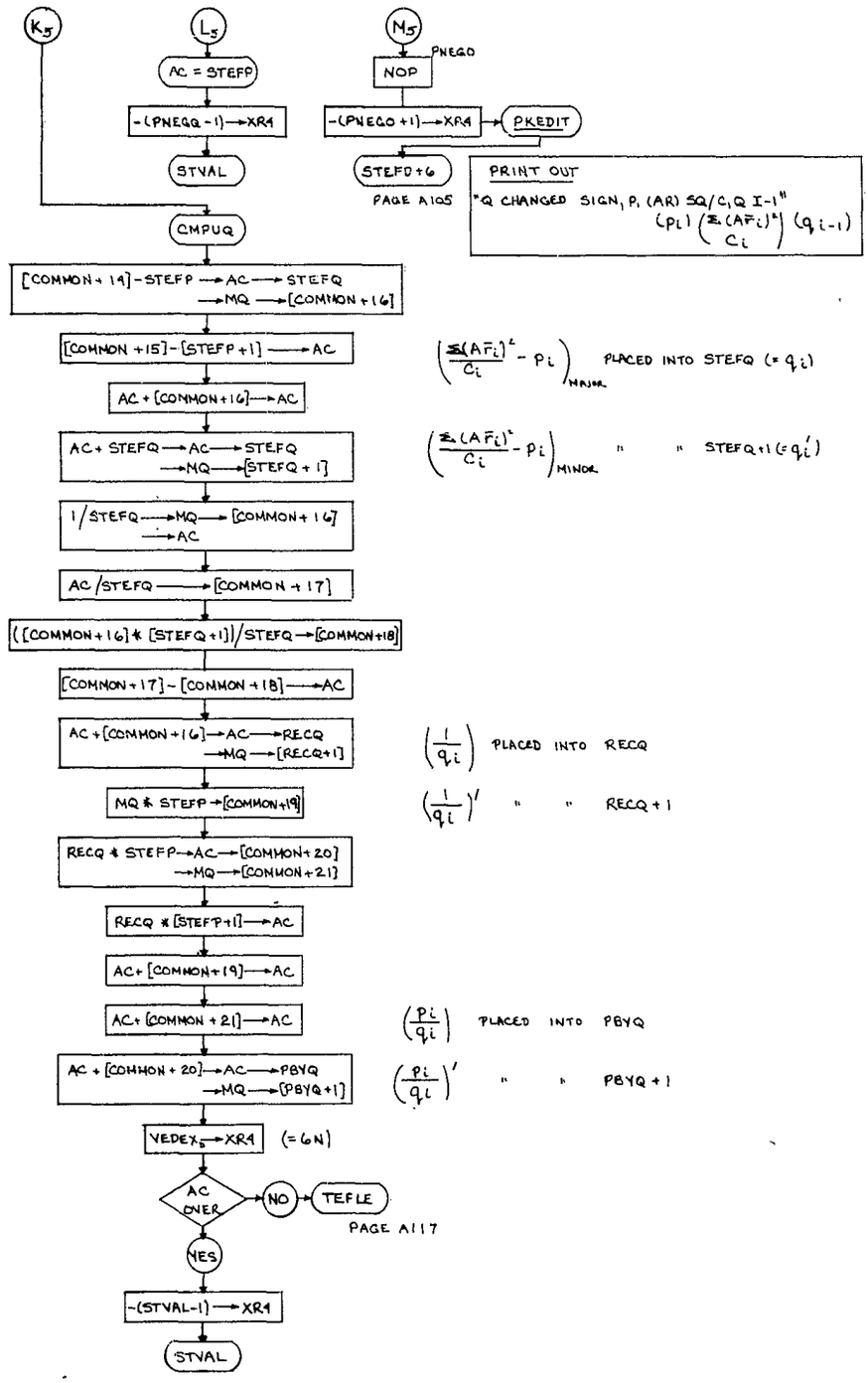

Z1
A5
B5
C5
D5
E5
F5
G5
H5
XR1 + (M-1) → XR1
XR2 > *
YES
NO
XR1 > M
XR1 - M → XR1
-(DADEL+2) → XR2
NALRM
HTR 0
2ND STAGE IN [A] × x̄i (GN × GN) (GN × 1) ODBs TO RIGHT OF MAIN DIAGONAL
AC_D → XR2
XR1 → AC_D
AC - LDM_D → AC
AC ~
AC → RWDEL
RWALP
XR1 → LEVA1_D
LDM_D → XR1
RWBET
XR4 > 1
XR4 - 1 → XR4
[XVECT-XR2] + [MATRX-XR4] → AC
XR1 > 1
XR1 - 1 → XR1
AC → [COMMON + M - XR1]
XR2 - 1 → XR2
XR2 > 1
XR4 → AC_D
-(RWBET + 7) → XR4
XR1 - 1 → XR1
XR2 + (M-1) → XR2
XR1 > ⊗
XR1 + M → XR1
(XR4 + (M² + M - 1)) → XR4
XR2 → AC_D
AC_D - LDM → AC
AC_D → CUDEL_D (*)
CUALP
XR2 → LEVAZ_D
LDM_D → XR2
CUBET
XR4 > M
XR4 - M → XR4
[XVECT-XR1] + [MATRX-XR4] → AC
3RD STAGE IN [A] × x̄i ODBs TO LEFT OF MAIN DIAGONAL
XR2 - 1 → XR2
AC → [COMMON + M - XR2]
XR1 - 1 → XR1
XR1 > 1
XR4 → AC_D
-(CUBET + 7) → XR4
A112


STEFL
XR4 → REGC
VEDEX5 → XR4
(= 6N)
TEFLA
[LXVEC - XR4] + [LDRVE - XR4] + [DRVEC - XR4] → AC
MQ → COMMON
AC + [XVECT - XR4] → AC
(FLOATING DOUBLE PRECISION - LEAST SIGNIF IN MQ)
MQ → [COMMON + 1]
AC → [COMMON + 2]
COMMON + [COMMON + 1] + [COMMON + 2] → AC
MQ → [LXVEC - XR4]
$\bar{r}_i = \bar{r}_{i-1} + \Delta\bar{r}_{i-1}$ PLACED INTO XVECT - (6N TO 1)
& LXVEC - (6N TO 1)
AC → [XVECT - XR4]
|AC| → AC
LLOW8 → MQ
(= 2^{-31})
MQ < AC
YES
NO
0 → [LXVEC - XR4]
ALOW8 → MQ
(= 2^{-64})
(CONPUTATIONAL RESTRICTION ON WORD VALUE)
MQ < AC
YES
NO
0 → [XVECT - XR4]
TEFLB
XR4 - 1 → XR4
YES
XR4 > 1
NO
IF AC OVERFLOW LT. ON – TURN OFF
IF MQ OVERFLOW LT. ON – TURN OFF
PAGE A118
-(TEFLB + 3) → XR4
DPMXV
(FORMS (IN DOUBLE PRECISION) AND PLACES
$(A\bar{r}_i)$ INTO RVECT - (6N TO 1)
& LRVEC - (6N TO 1)
FLOATING)
THISC → LASTC
I_5

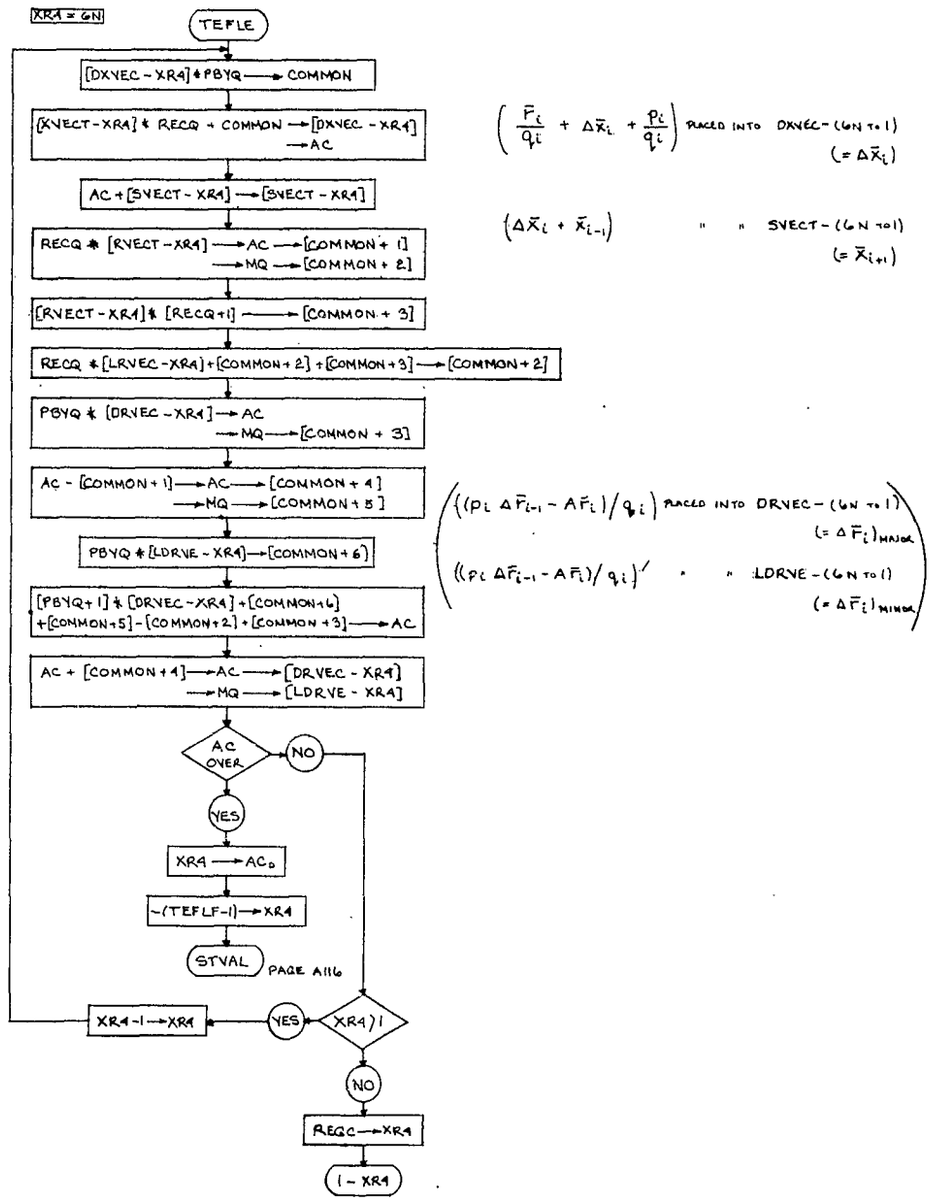

I5
[THISC+1] → [LASTC+1]
0 → THISC
0 → THISC+1
0 → COMMON
→ [COMMON+1]
VEDEX_D → XR4 (=6N)
TEFLC
[RVECT-XR4] * [RVECT-XR4] → AC
→ MQ → [COMMON+2]
AC + COMMON → AC → COMMON
→ MQ → [COMMON+3]
2([LRVEC-XR4] * [RVECT-XR4]) → AC
AC + [COMMON+2] → AC
AC + [COMMON+3] → AC
AC + [COMMON+1] → AC
AC + COMMON → AC → COMMON
→ MQ → [COMMON+1]
[RVECT-XR4] * [XVECT-XR4] → AC
→ MQ → [COMMON+4]
AC + THISC → THISC
→ MQ → [COMMON+5]
[LRVEC-XR4] * [XVECT-XR4] → [COMMON+6]
[RVECT-XR4] * [LXVEC-XR4] → AC
AC + [COMMON+4] → AC
AC + [COMMON+5] → AC
AC + [COMMON+6] → AC
AC + [THISC+1] → AC
AC + THISC → AC → THISC
→ MQ → [THISC+1]
XR4 > 1
YES
XR4-1 → XR4
NO
J5
C_0 PLACED INTO LASTC (BECOMES C_{i-1})
C_0' " " LASTC+1 (" C_{i-1}')
C_0 MADE = 0
C_0' " = 0
$\Sigma (AF_i)^2$ (MAJOR) IN COMMON
$\Sigma (AF_i)^2$ (MINOR) " COMMON+1
$[F_i \cdot (AF_i)]_{MAJ}$ PLACED INTO THISC (= C_i)
$[F_i \cdot (AF_i)]_{MIN}$ " " THISC+1 (= C_i')

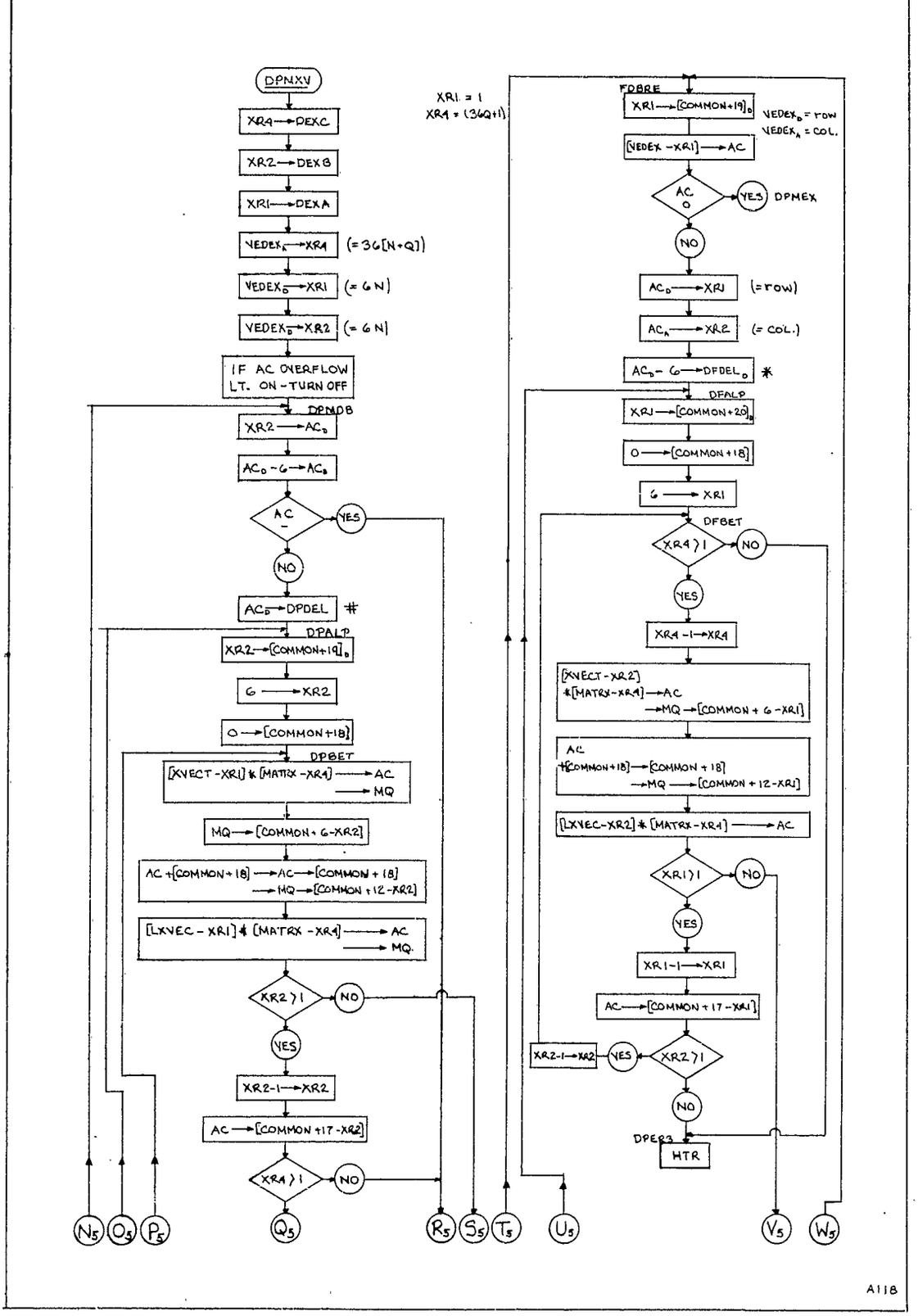
A114


J5
MQ OVER
YES
NO
TURN LT. OFF
AC OVER
NO
TEFLD
YES
-(TEFLD-1) → XR4
STVAL
PAGE A116
AC/ LASTC → MQ → STEFP
→ AC
(AC+ [THISC+1])/LASTC → [STEFP+1]
STEFP * [LASTC+1]/LASTC → [COMMON+7]
[STEFP+1] - [COMMON+7] → AC
AC + STEFP → AC → STEFP
→ MQ
MQ * STEFQ → [COMMON+7]
PLACED INTO STEFP (= p_i)
STEFP * STEFQ → AC → [COMMON+8]
→ MQ → [COMMON+9]
STEFP+1 (= p'_i)
STEFP * (STEFQ+1) → AC
AC + [COMMON+9] → AC
AC + [COMMON+7] → AC
AC+ [COMMON+8] → AC → STEFP
→ MQ → STEFP+1
COMMON / THISC → MQ → [COMMON+10]
→ AC
(AC+ [COMMON+1])/THISC → MQ → [COMMON+11]
PLACED INTO COMMON+14
([COMMON+10] * [THISC+1])/THISC → [COMMON+13]
[COMMON+11] - [COMMON+13] → AC
AC + [COMMON+10] → AC → [COMMON+14]
→ MQ → [COMMON+15]
CMPUQ
AC > STEFP
AC :: STEFP
AC < STEFP
K5
L5
M5

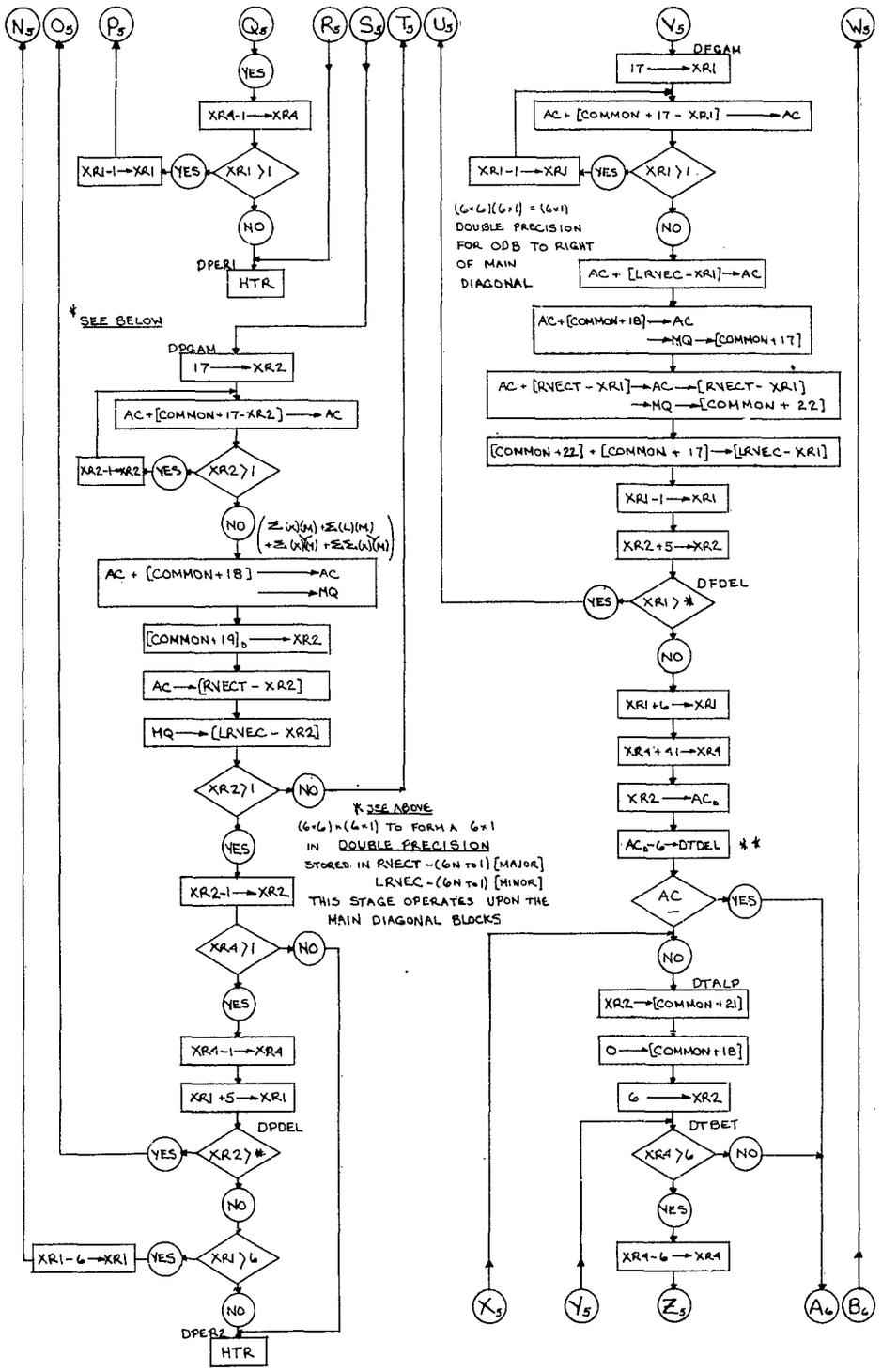

K5
L5
M5
PNEGO
AC = STEFP
NOP
-(PNEGQ-1)→XR4
-(PNEGO+1)→XR4
PKEDIT
STVAL
STEFO+6
PAGE A105
PRINT OUT
"Q CHANGED SIGN, P, (AR) SQ/C, Q I-1"
(pi) (Σ(AFi)²/Ci) (qi-1)
CMPUQ
[COMMON+19]-STEFP → AC → STEFQ
→ MQ → [COMMON+16]
[COMMON+15]-[STEFP+1] → AC
(Σ(AFi)²/Ci - pi) MINOR
PLACED INTO STEFQ (= qi)
AC+[COMMON+16] → AC
AC+STEFQ → AC → STEFQ
→ MQ → [STEFQ+1]
(Σ(AFi)²/Ci - pi) MINOR
" " STEFQ+1 (= qi')
1/STEFQ → MQ → [COMMON+16]
→ AC
AC/STEFQ → [COMMON+17]
([COMMON+16]*[STEFQ+1])/STEFQ → [COMMON+18]
[COMMON+17]-[COMMON+18] → AC
AC+[COMMON+16] → AC → RECQ
→ MQ → [RECQ+1]
(1/qi)
PLACED INTO RECQ
MQ*STEFP → [COMMON+19]
(1/qi)'
" " RECQ+1
RECQ*STEFP → AC → [COMMON+20]
→ MQ → [COMMON+21]
RECQ*[STEFP+1] → AC
AC+[COMMON+19] → AC
AC+[COMMON+21] → AC
(pi/qi)
PLACED INTO PBYQ
AC+[COMMON+20] → AC → PBYQ
→ MQ → [PBYQ+1]
(pi/qi)'
" " PBYQ+1
VEDEX5 → XR4
(=6N)
AC OVER
NO
TEFLE
PAGE A117
YES
-(STVAL-1) → XR4
STVAL

A116

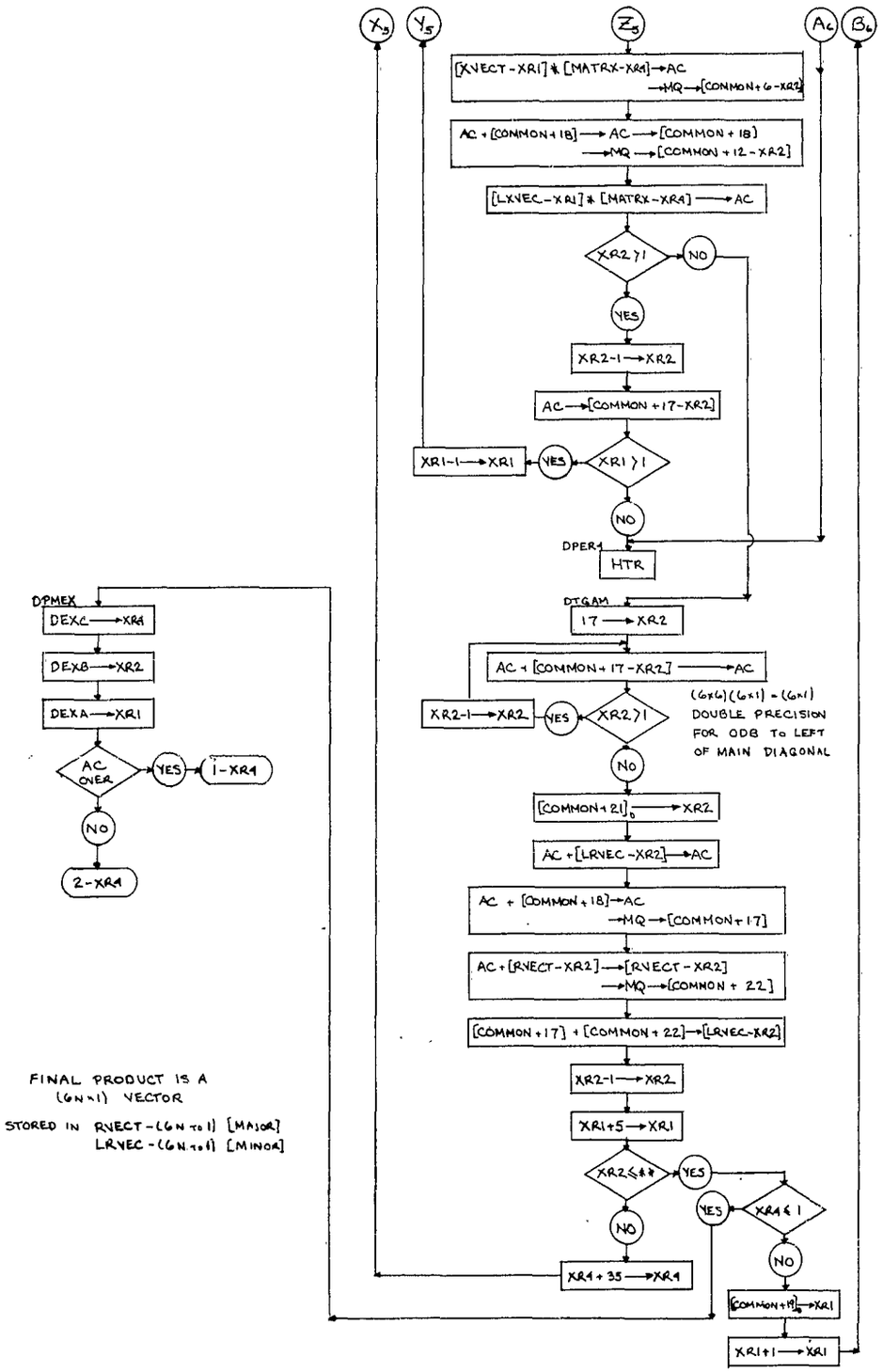

XR4 = 6N
TEFLE
[DXVEC - XR4] * PBYQ → COMMON
[XVECT - XR4] * RECQ + COMMON → [DXVEC - XR4]
→ AC
AC + [SVECT - XR4] → [SVECT - XR4]
RECQ * [RVECT - XR4] → AC → [COMMON + 1]
→ MQ → [COMMON + 2]
[RVECT - XR4] * [RECQ+1] → [COMMON + 3]
RECQ * [LRVEC - XR4] + [COMMON + 2] + [COMMON + 3] → [COMMON + 2]
PBYQ * [DRVEC - XR4] → AC
→ MQ → [COMMON + 3]
AC - [COMMON + 1] → AC → [COMMON + 4]
→ MQ → [COMMON + 5]
PBYQ * [LDRVE - XR4] → [COMMON + 6]
[PBYQ + 1] * [DRVEC - XR4] + [COMMON + 6]
+ [COMMON + 5] - [COMMON + 2] + [COMMON + 3] → AC
AC + [COMMON + 4] → AC → [DRVEC - XR4]
→ MQ → [LDRVE - XR4]
AC OVER
NO
YES
XR4 → AC0
-(TEFLF-1) → XR4
STVAL
PAGE A116
XR4 - 1 → XR4
YES
XR4 > 1
NO
REQC → XR4
1 - XR4
$\left(\frac{\bar{F}_i}{q_i} + \Delta\bar{x}_i + \frac{p_i}{q_i}\right)$ PLACED INTO DXVEC - (6N TO 1)
$(= \Delta\bar{x}_i)$
$(\Delta\bar{x}_i + \bar{x}_{i-1})$ " " SVECT - (6N TO 1)
$(= \bar{x}_{i+1})$
$((p_i \Delta\bar{F}_{i-1} - A\bar{F}_i)/q_i)$ PLACED INTO DRVEC - (6N TO 1)
$(= \Delta\bar{F}_i)_{MINOR}$
$((p_i \Delta\bar{F}_{i-1} - A\bar{F}_i)/q_i)'$ " " LDRVE - (6N TO 1)
$(= \Delta\bar{F}_i)_{MINOR}$

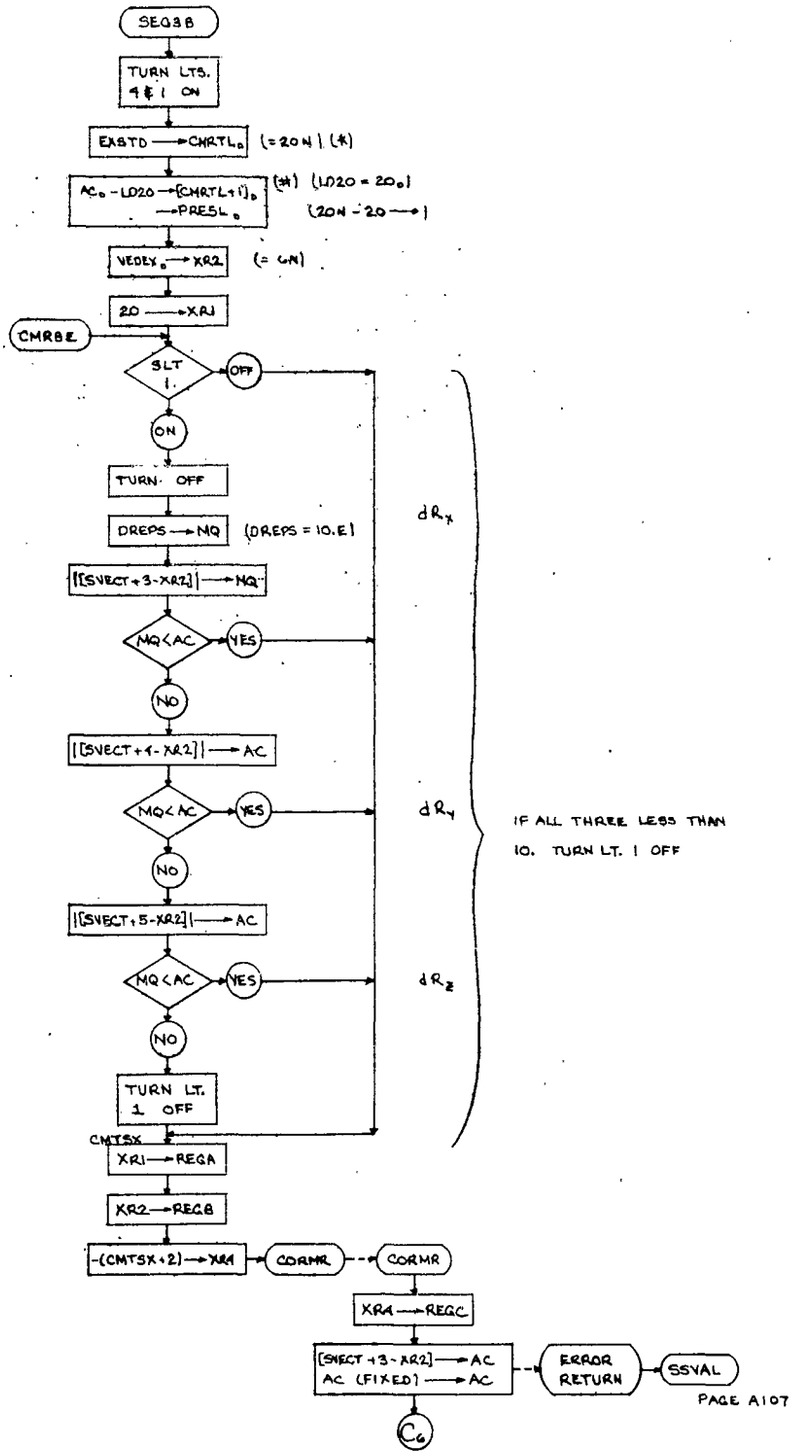

DPNXV
XR4 → DEXC
XR2 → DEXB
XR1 → DEXA
VEDEX_A → XR4 (= 36[N+Q])
VEDEX_D → XR1 (= 6N)
VEDEX_D → XR2 (= 6N)
IF AC OVERFLOW LT. ON - TURN OFF
DPNDB
XR2 → AC_D
AC_D - 6 → AC_D
AC -
YES
NO
AC_D → DPDEL #
DPALP
XR2 → [COMMON+19]_D
6 → XR2
0 → [COMMON+18]
DPBET
[XVECT - XR1] * [MATRX - XR4] → AC
→ MQ
MQ → [COMMON + 6 - XR2]
AC + [COMMON + 18] → AC → [COMMON + 18]
→ MQ → [COMMON + 12 - XR2]
[LXVEC - XR1] * [MATRX - XR4] → AC
→ MQ.
XR2 > 1
XR2 - 1 → XR2
AC → [COMMON + 17 - XR2]
XR4 > 1
N5
O5
P5
Q5
R5
S5
T5
U5
V5
W5
XR1 = 1
XR4 = (36Q+1)
DPBRE
XR1 → [COMMON+19]_D
VEDEX_D = ROW
VEDEX_A = COL.
[VEDEX - XR1] → AC
AC 0
DPMEX
AC_D → XR1 (= ROW)
AC_A → XR2 (= COL.)
AC_D - 6 → DPDEL_D *
DPALP
XR1 → [COMMON+20]_D
0 → [COMMON+18]
6 → XR1
DPBET
XR4 > 1
XR4 - 1 → XR4
[XVECT - XR2]
* [MATRX - XR4] → AC
→ MQ → [COMMON + 6 - XR1]
AC
+ [COMMON+18] → [COMMON + 18]
→ MQ → [COMMON + 12 - XR1]
[LXVEC - XR2] * [MATRX - XR4] → AC
XR1 > 1
XR1 - 1 → XR1
AC → [COMMON + 17 - XR1]
XR2 - 1 → XR2
XR2 > 1
DPER3
HTR

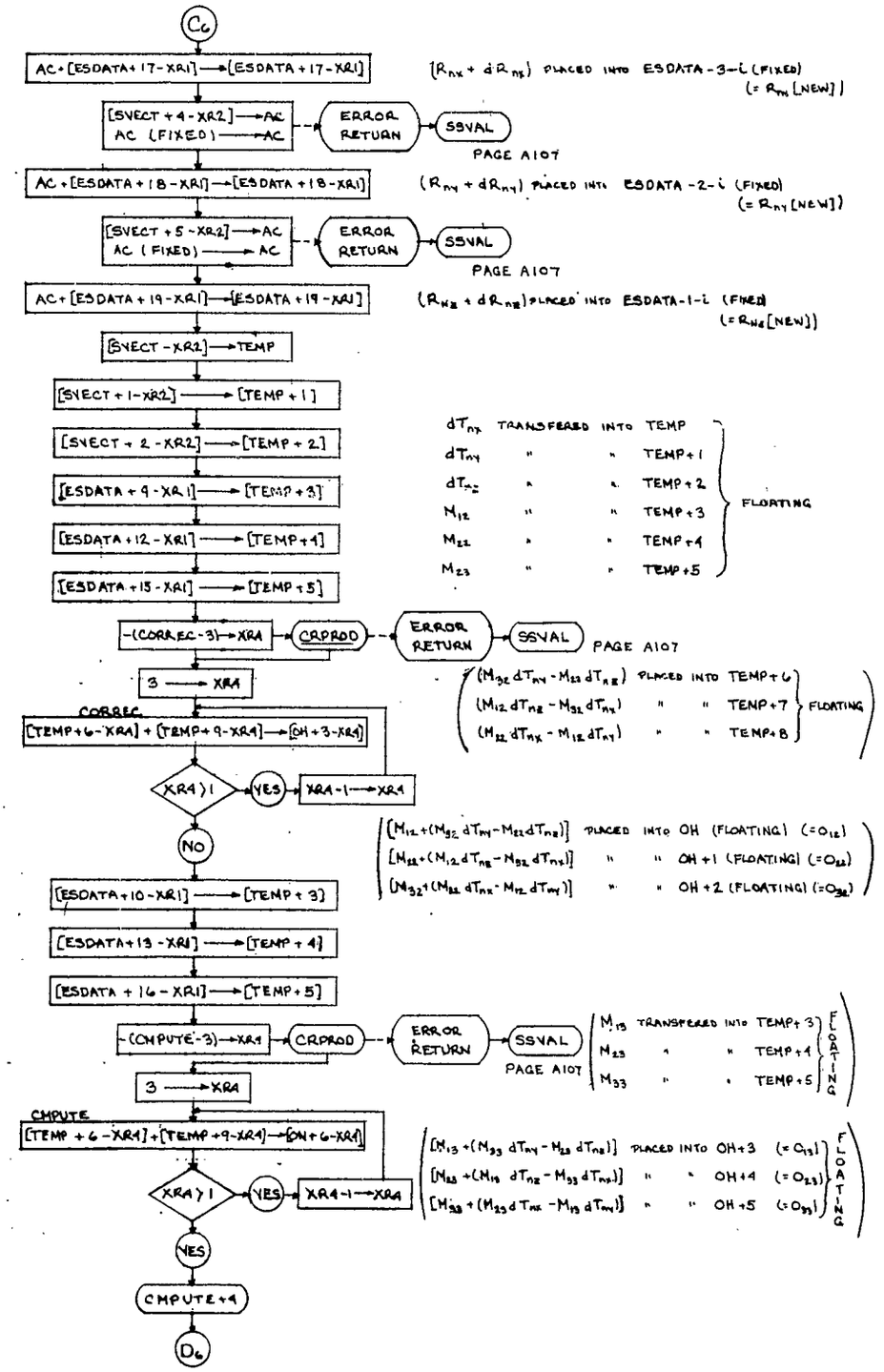
A118

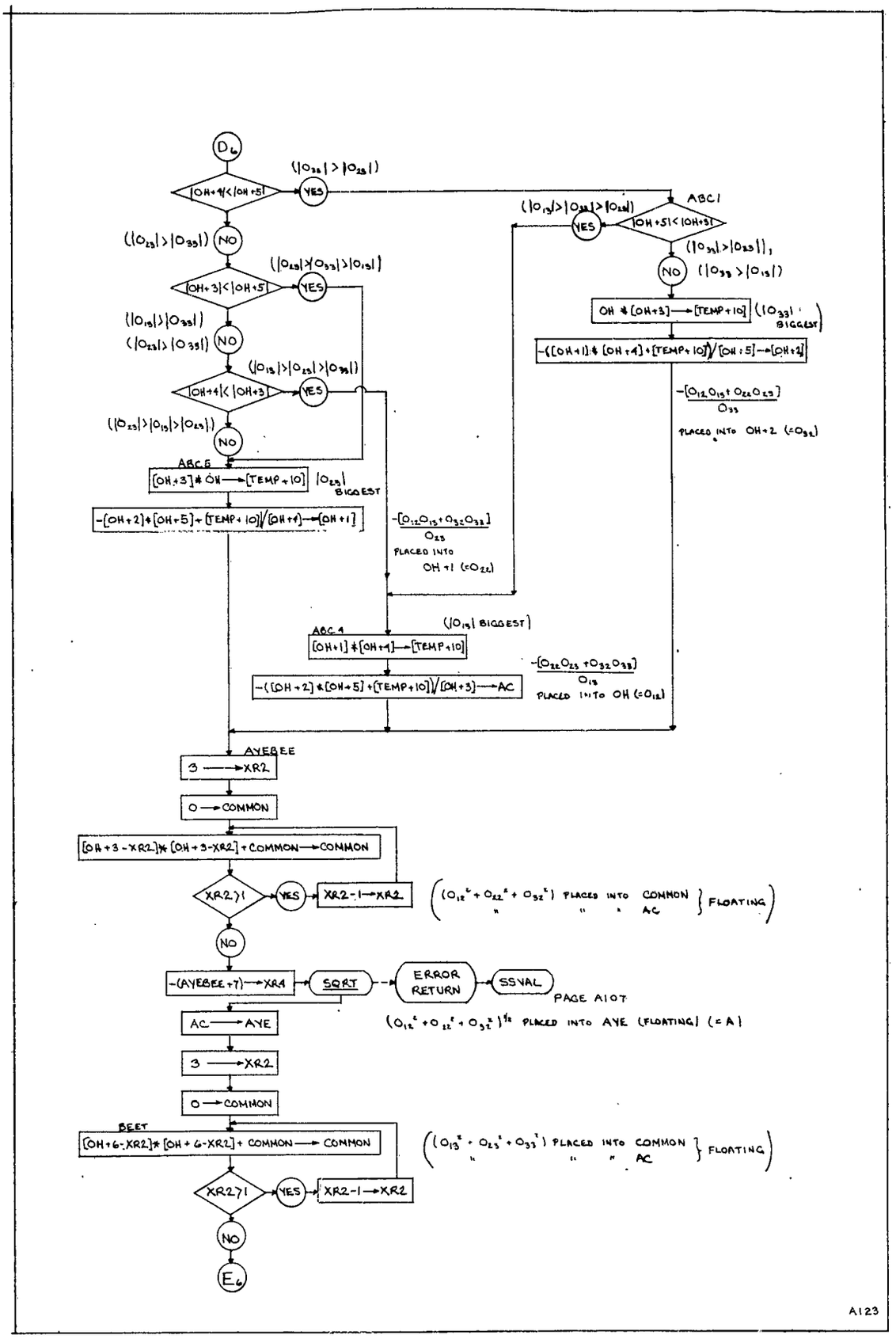

N5
O5
P5
Q5
R5
S5
T5
U5
V5
W5
YES
XR4-1→XR4
XR1-1→XR1
YES
XR1 > 1
NO
DPER1
HTR
* SEE BELOW
DPGAM
17→XR2
AC+[COMMON+17-XR2]→AC
XR2-1→XR2
YES
XR2 > 1
NO
AC + [COMMON+18] →AC
→MQ
[COMMON+19]b →XR2
AC→[RVECT - XR2]
MQ→[LRVEC - XR2]
XR2 > 1
NO
YES
XR2-1→XR2
XR4 > 1
NO
YES
XR4-1→XR4
XR1 +5→XR1
DPDEL
YES
XR2 > *
NO
XR1-6→XR1
YES
XR1 > 6
NO
DPER2
HTR
* SEE ABOVE
(6×6)×(6×1) TO FORM A 6×1
IN DOUBLE PRECISION
STORED IN RVECT-(6N to 1) [MAJOR]
LRVEC-(6N to 1) [MINOR]
THIS STAGE OPERATES UPON THE
MAIN DIAGONAL BLOCKS
DFGAM
17→XR1
AC+[COMMON+17 - XR1]→AC
XR1-1→XR1
YES
XR1 > 1
NO
(6×6)(6×1) = (6×1)
DOUBLE PRECISION
FOR ODB TO RIGHT
OF MAIN
DIAGONAL
AC+[LRVEC-XR1]→AC
AC+[COMMON+18]→AC
→MQ→[COMMON+17]
AC+[RVECT-XR1]→AC→[RVECT-XR1]
→MQ→[COMMON+22]
[COMMON+22]+[COMMON+17]→[LRVEC-XR1]
XR1-1→XR1
XR2+5→XR2
DFDEL
YES
XR1 > *
NO
XR1+6→XR1
XR4+1→XR4
XR2→ACb
ACb-6→DTDEL **
AC
YES
NO
DTALP
XR2→[COMMON+21]
0→[COMMON+18]
6→XR2
DTBET
XR4 > 6
NO
YES
XR4-6→XR4
X5
Y5
Z5
A6
B6

A119

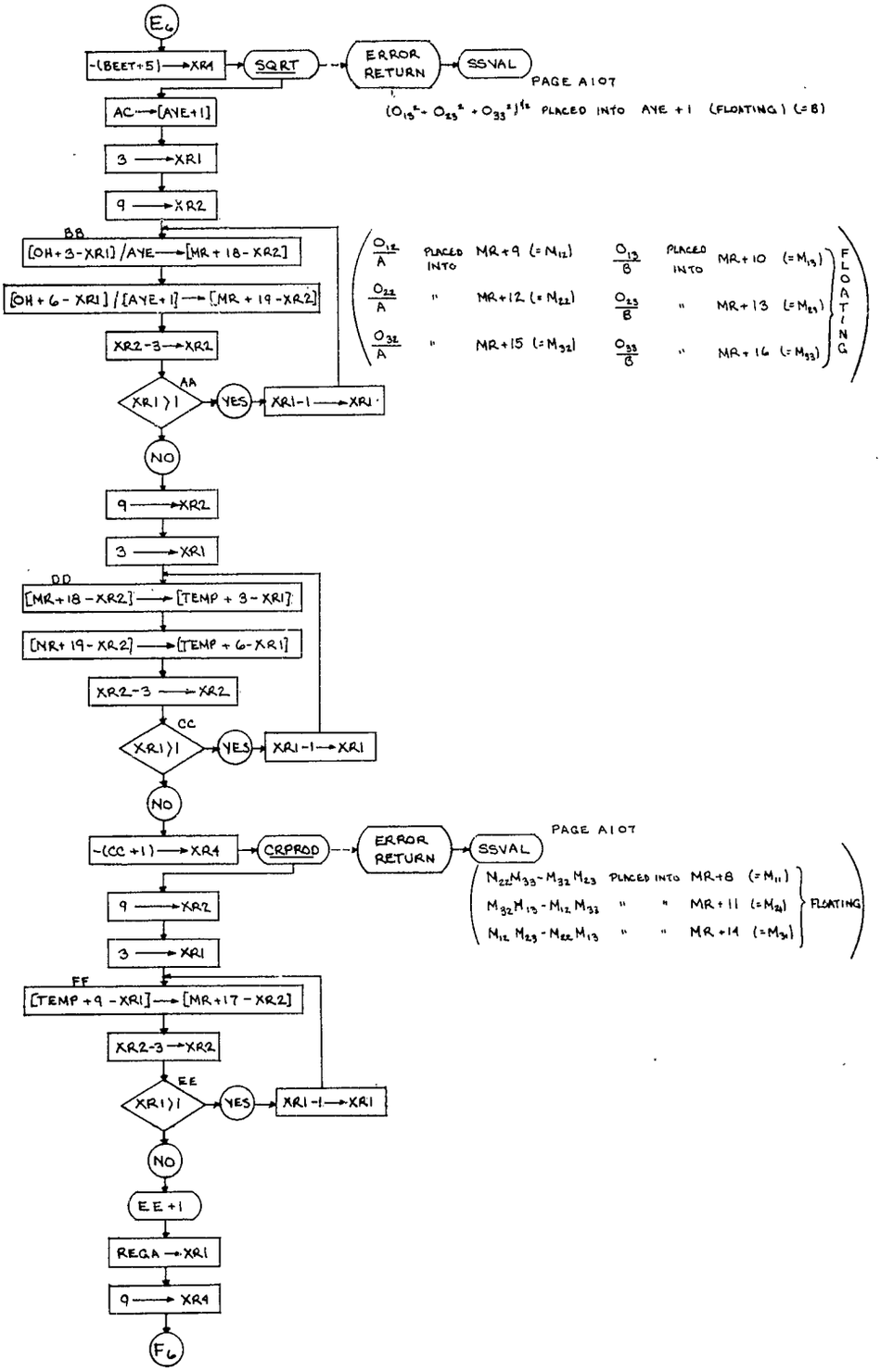

X_5
Y_5
Z_5
A_6
B_6
[XVECT-XR1] * [MATRX-XR1] → AC
→ MQ → [COMMON + 6 - XR2]
AC + [COMMON + 18] → AC → [COMMON + 18]
→ MQ → [COMMON + 12 - XR2]
[LXVEC-XR1] * [MATRX-XR1] → AC
XR2 > 1
NO
YES
XR2-1 → XR2
AC → [COMMON + 17 - XR2]
XR1-1 → XR1
YES
XR1 > 1
NO
DPER4
HTR
DTGAM
17 → XR2
AC + [COMMON + 17 - XR2] → AC
XR2-1 → XR2
YES
XR2 > 1
(6x6)(6x1) = (6x1)
DOUBLE PRECISION
FOR ODB TO LEFT
OF MAIN DIAGONAL
NO
[COMMON + 21]$_D$ → XR2
AC + [LRVEC-XR2] → AC
AC + [COMMON + 18] → AC
→ MQ → [COMMON + 17]
AC + [RVECT-XR2] → [RVECT-XR2]
→ MQ → [COMMON + 22]
[COMMON + 17] + [COMMON + 22] → [LRVEC-XR2]
XR2-1 → XR2
XR1+5 → XR1
XR2 ≤ 4*
YES
NO
XR4 + 35 → XR4
YES
XR4 & 1
NO
[COMMON + 19]$_D$ → XR1
XR1+1 → XR1
DPMEX
DEXC → XR4
DEXB → XR2
DEXA → XR1
AC OVER
YES
1-XR4
NO
2-XR4
FINAL PRODUCT IS A
(6N x 1) VECTOR
STORED IN RVECT-(6N x 1) [MAJOR]
LRVEC-(6N x 1) [MINOR]
A120


SEQ3B
TURN LTS. 4 & 1 ON
EXSTD → CHRTL₀ (= 20N) (*)
AC₀ - LD20 → [CHRTL+1]₀ → PRESL₀ (*) (LD20 = 20₀) (20N - 20 →)
VEDEX₀ → XR2 (= GN)
20 → XR1
CMRBE
SLT 1.
OFF
ON
TURN OFF
DREPS → MQ (DREPS = 10.E)
|[SVECT+3-XR2]| → MQ
MQ<AC
YES
NO
|[SVECT+1-XR2]| → AC
MQ<AC
YES
NO
|[SVECT+5-XR2]| → AC
MQ<AC
YES
NO
TURN LT. 1 OFF
dRx
dRy
dRz
IF ALL THREE LESS THAN 10. TURN LT. 1 OFF
CMTSX
XR1 → REGA
XR2 → REGB
-(CMTSX+2) → XR1
CORMR
CORMR
XR1 → REGC
[SVECT+3-XR2] → AC
AC (FIXED) → AC
ERROR RETURN
SSVAL
C6

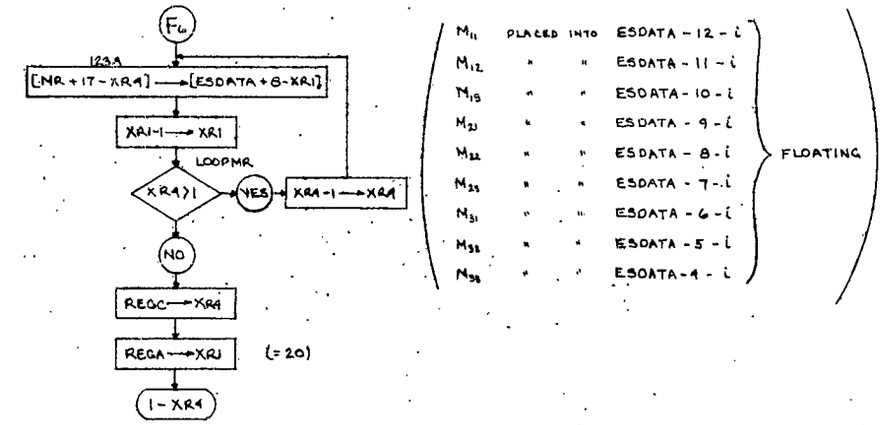

C6
AC+[ESDATA+17-XR1]→[ESDATA+17-XR1]
[RNX + dRNX] PLACED INTO ESDATA-3-i (FIXED) (= RNX [NEW])
[SVECT+4-XR2]→AC
AC (FIXED)→AC
ERROR RETURN
SSVAL
PAGE A107
AC+[ESDATA+18-XR1]→[ESDATA+18-XR1]
(RNY + dRNY) PLACED INTO ESDATA-2-i (FIXED) (= RNY [NEW])
[SVECT+5-XR2]→AC
AC (FIXED)→AC
ERROR RETURN
SSVAL
PAGE A107
AC+[ESDATA+19-XR1]→[ESDATA+19-XR1]
(RNZ + dRNZ) PLACED INTO ESDATA-1-i (FIXED) (= RNZ [NEW])
[SVECT-XR2]→TEMP
[SVECT+1-XR2]→[TEMP+1]
[SVECT+2-XR2]→[TEMP+2]
[ESDATA+9-XR1]→[TEMP+3]
[ESDATA+12-XR1]→[TEMP+4]
[ESDATA+15-XR1]→[TEMP+5]
dTNX TRANSFERED INTO TEMP
dTNY " " TEMP+1
dTNZ " " TEMP+2
M12 " " TEMP+3
M22 " " TEMP+4
M23 " " TEMP+5
FLOATING
-(CORREC-3)→XR4
CRPROD
ERROR RETURN
SSVAL
PAGE A107
3→XR4
CORREC.
[TEMP+6-XR4]+[TEMP+9-XR4]→[OH+3-XR4]
(M32 dTNY - M22 dTNZ) PLACED INTO TEMP+6
(M12 dTNZ - M32 dTNX) " " TEMP+7
(M22 dTNX - M12 dTNY) " " TEMP+8
FLOATING
XR4>1
YES
XR4-1→XR4
NO
[(M12+(M32 dTNY - M22 dTNZ)] PLACED INTO OH (FLOATING) (=O12)
[M22+(M12 dTNZ - M32 dTNX)] " " OH+1 (FLOATING) (=O22)
[M32+(M22 dTNX - M12 dTNY)] " " OH+2 (FLOATING) (=O32)
[ESDATA+10-XR1]→[TEMP+3]
[ESDATA+13-XR1]→[TEMP+4]
[ESDATA+16-XR1]→[TEMP+5]
-(CMPUTE-3)→XR4
CRPROD
ERROR RETURN
SSVAL
PAGE A107
M13 TRANSFERED INTO TEMP+3
M23 " " TEMP+4
M33 " " TEMP+5
FLOATING
3→XR4
CMPUTE
[TEMP+6-XR4]+[TEMP+9-XR4]→[OH+6-XR4]
[M13+(M33 dTNY - M23 dTNZ)] PLACED INTO OH+3 (=O13)
[M23+(M13 dTNZ - M33 dTNX)] " " OH+4 (=O23)
[M33+(M23 dTNX - M13 dTNY)] " " OH+5 (=O33)
FLOATING
XR4>1
YES
XR4-1→XR4
YES
CMPUTE+4
D6

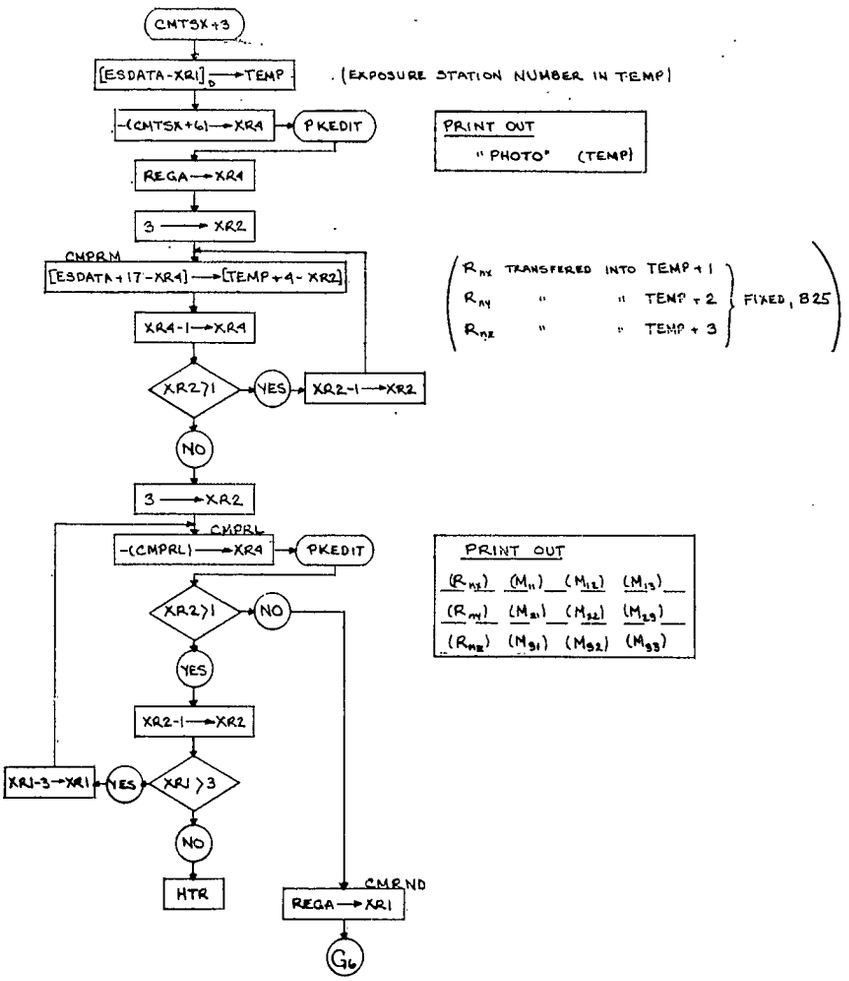

D6
|OH+4|<|OH+5|
YES
(|O32| > |O23|)
NO
(|O23| > |O33|)
|OH+3|<|OH+5|
YES
(|O23|>|O33|>|O13|)
NO
(|O13|>|O33|)
(|O23|>|O33|)
|OH+4|<|OH+3|
YES
(|O13|>|O23|>|O33|)
NO
(|O23|>|O13|>|O23|)
ABC5
[OH+3]*OH→[TEMP+10]
|O23| BIGGEST
-[OH+2]+[OH+5]+[TEMP+10]/[OH+4]→[OH+1]
-(O12O13+O32O33)/O23
PLACED INTO OH+1 (=O22)
ABC1
|OH+5|<|OH+3|
YES
(|O13|>|O33|>|O23|)
NO
(|O33|>|O23|),
(|O33>|O13|)
OH*[OH+3]→[TEMP+10]
(|O33| BIGGEST)
-([OH+1]*[OH+4]+[TEMP+10])/[OH+5]→[OH+2]
-(O12O13+O22O23)/O33
PLACED INTO OH+2 (=O32)
ABC4
(|O12| BIGGEST)
[OH+1]*[OH+4]→[TEMP+10]
-([OH+2]*[OH+5]+[TEMP+10])/[OH+3]→AC
-(O22O23+O32O33)/O12
PLACED INTO OH (=O12)
AYEBEE
3→XR2
0→COMMON
[OH+3-XR2]*[OH+3-XR2]+COMMON→COMMON
XR2>1
YES
XR2-1→XR2
(O12²+O22²+O32²) PLACED INTO COMMON
" " " AC
FLOATING
NO
-(AYEBEE+7)→XR4
SQRT
ERROR RETURN
SSVAL
PAGE A10T
AC→AYE
(O12²+O22²+O32²)^1/2 PLACED INTO AYE (FLOATING) (=A)
3→XR2
0→COMMON
BEET
[OH+6-XR2]*[OH+6-XR2]+COMMON→COMMON
(O13²+O23²+O33²) PLACED INTO COMMON
" " " AC
FLOATING
XR2>1
YES
XR2-1→XR2
NO
E6

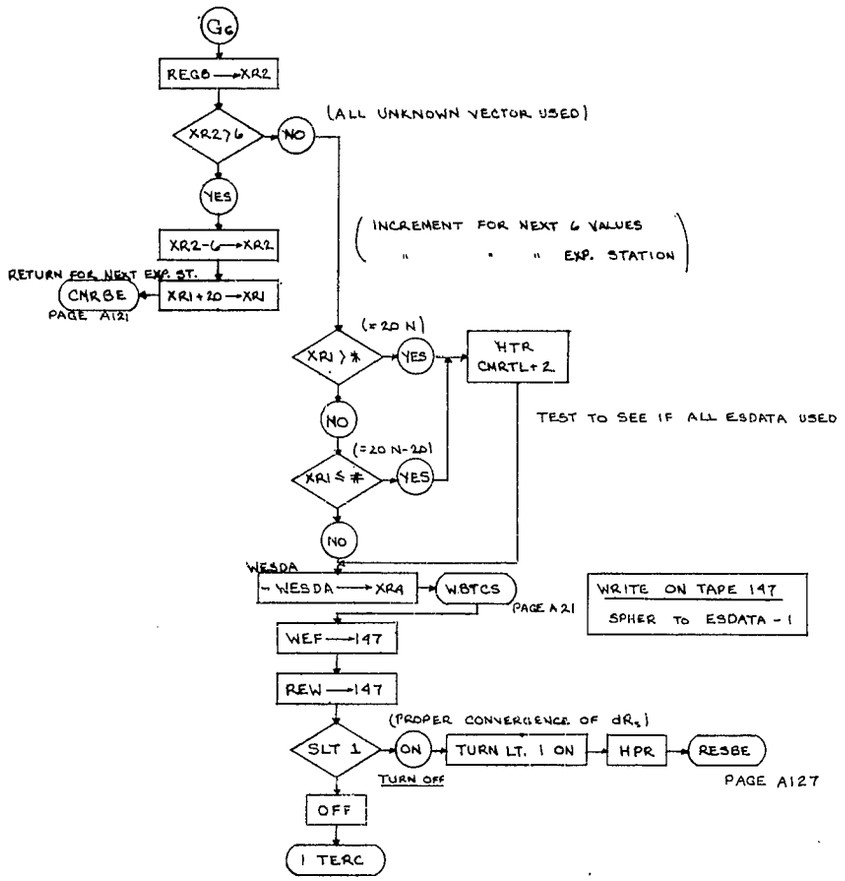
A123

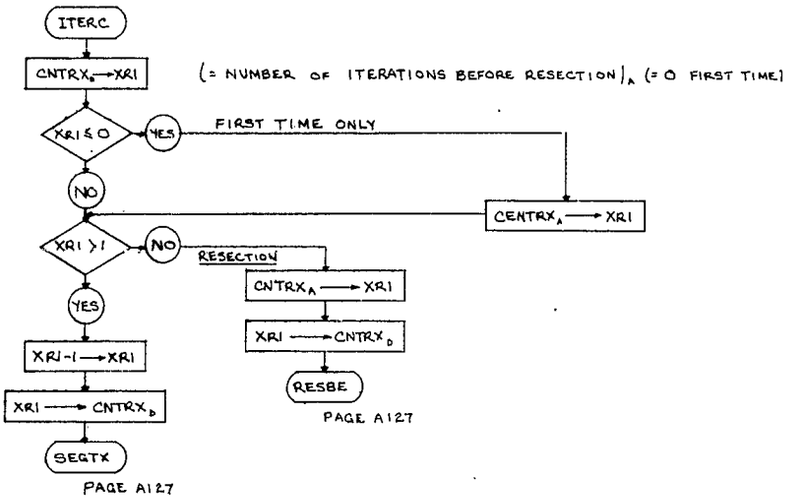

E6
-(BEET+5) → XR1
SQRT
ERROR RETURN
SSVAL
PAGE A107
AC → [AYE+1]
(O13² + O23² + O33²)^1/2 PLACED INTO AYE + 1 (FLOATING) (=B)
3 → XR1
9 → XR2
BB
[OH+3-XR1] / AYE → [MR + 18 - XR2]
[OH + 6 - XR1] / [AYE+1] → [MR + 19 - XR2]
XR2-3 → XR2
AA
XR1 > 1
YES
XR1-1 → XR1
NO
O12/A PLACED INTO MR+9 (=M12)
O13/B PLACED INTO MR+10 (=M13)
O22/A " MR+12 (=M22)
O23/B " MR+13 (=M23)
O32/A " MR+15 (=M32)
O33/B " MR+16 (=M33)
FLOATING
9 → XR2
3 → XR1
DD
[MR+18 - XR2] → [TEMP + 3 - XR1]
[MR+19 - XR2] → [TEMP + 6 - XR1]
XR2-3 → XR2
CC
XR1 > 1
YES
XR1-1 → XR1
NO
-(CC+1) → XR4
CRPROD
ERROR RETURN
SSVAL
PAGE A107
M22M33 - M32M23 PLACED INTO MR+8 (=M11)
M32M13 - M12M33 " " MR+11 (=M21)
M12M23 - M22M13 " " MR+14 (=M31)
FLOATING
9 → XR2
3 → XR1
FF
[TEMP+9 - XR1] → [MR+17 - XR2]
XR2-3 → XR2
EE
XR1 > 1
YES
XR1-1 → XR1
NO
EE+1
REGA → XR1
9 → XR4
F6

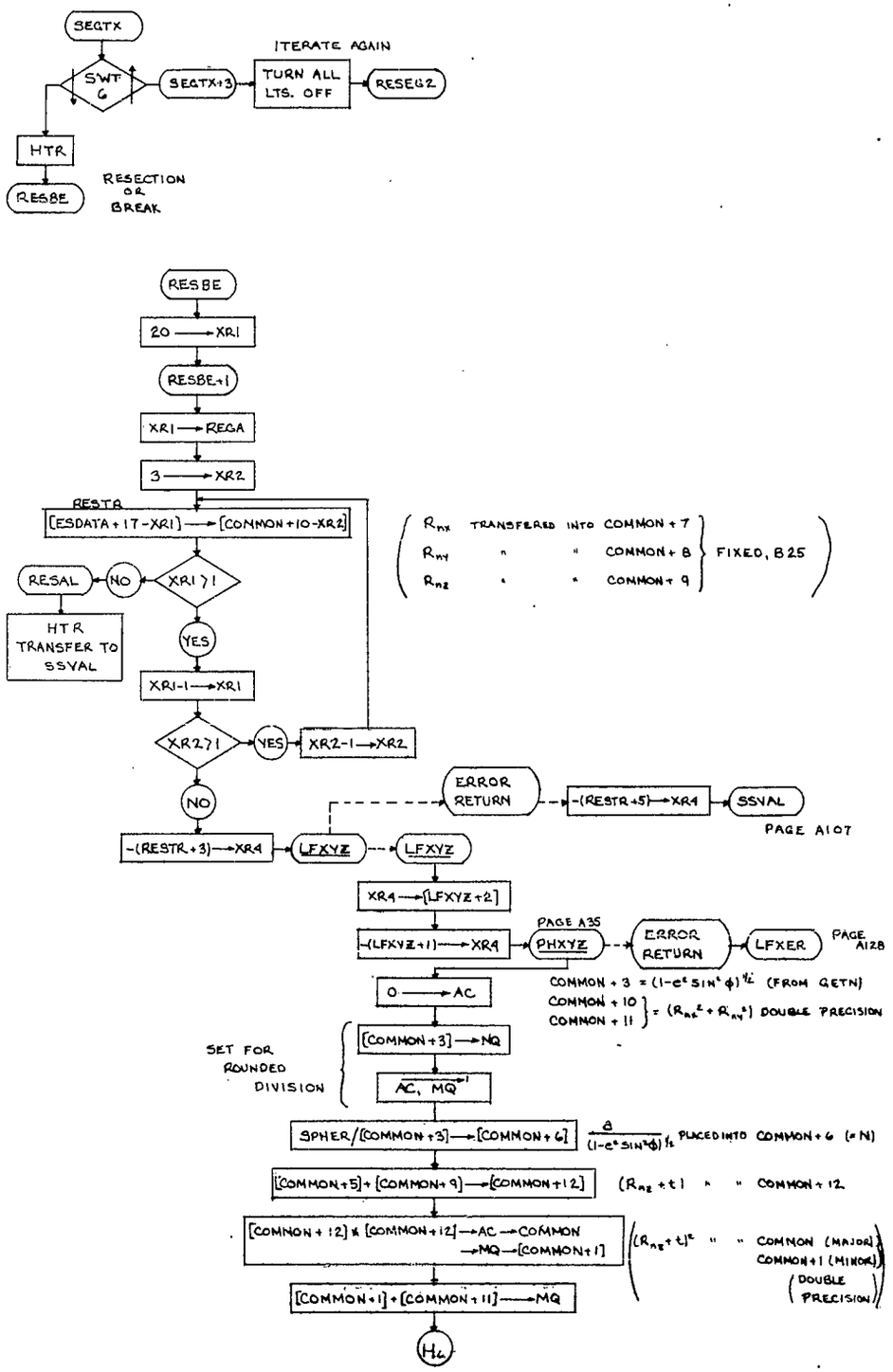
A129


F6
123.9
[NR + 17 - XR4] → [ESDATA + 6 - XR1]
XR1-1 → XR1
LOOPMR
XR4>1
YES
XR4-1 → XR4
NO
REGC → XR4
REGA → XR1
(= 20)
1 - XR4
M11 PLACED INTO ESDATA - 12 - i
M12 " " ESDATA - 11 - i
M13 " " ESDATA - 10 - i
M21 " " ESDATA - 9 - i
M22 " " ESDATA - 8 - i
M23 " " ESDATA - 7 - i
M31 " " ESDATA - 6 - i
M32 " " ESDATA - 5 - i
M33 " " ESDATA - 4 - i
FLOATING

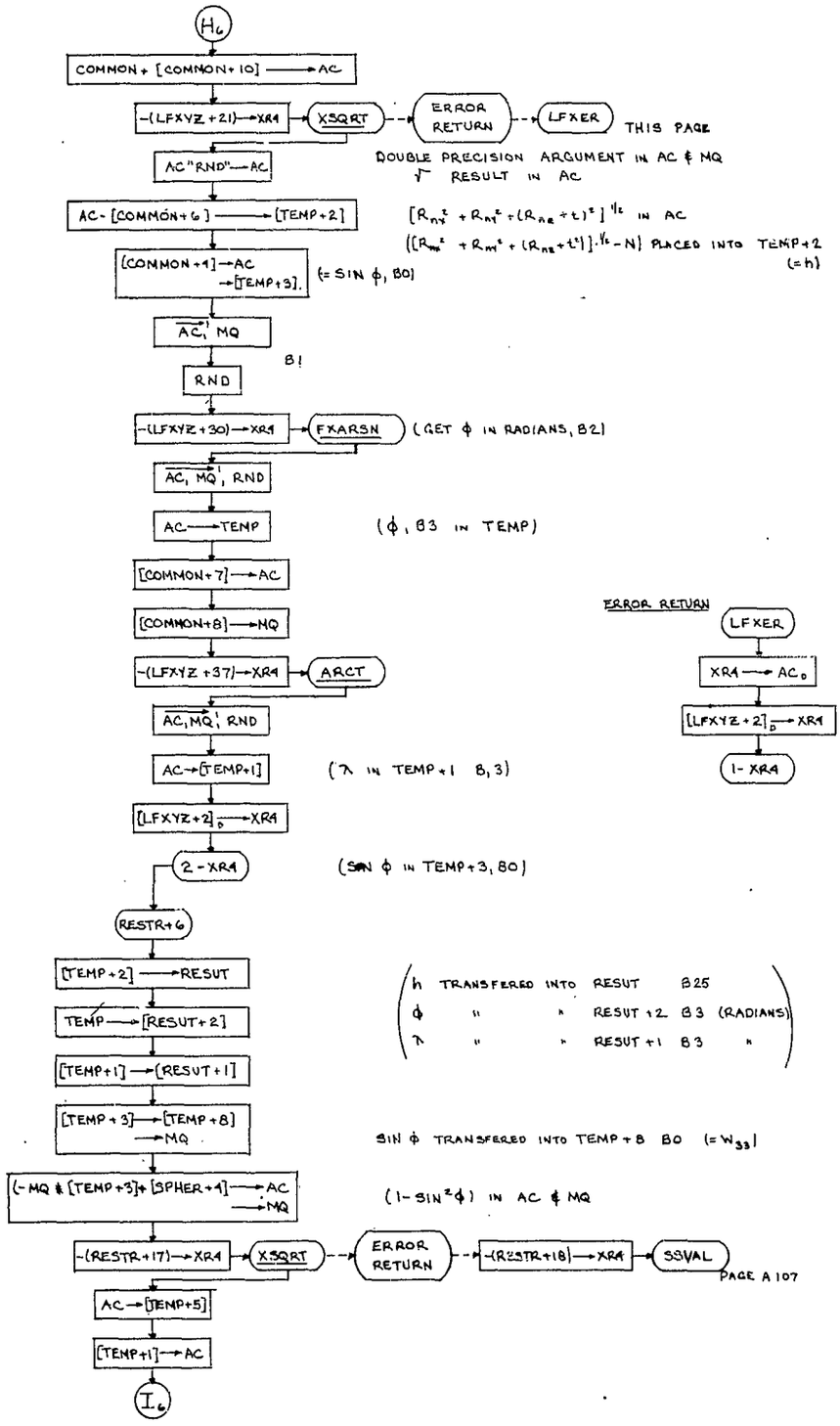

CMTSX+3
[ESDATA-XR1]D → TEMP
(EXPOSURE STATION NUMBER IN TEMP)
-(CMTSX+6) → XR4
PKEDIT
PRINT OUT
" PHOTO" (TEMP)
REGA → XR4
3 → XR2
CMPRM
[ESDATA+17-XR4] → [TEMP+4-XR2]
XR4-1 → XR4
XR2>1
YES
XR2-1 → XR2
NO
3 → XR2
CMPRL
-(CMPRL) → XR4
PKEDIT
PRINT OUT
(RNX) (M11) (M12) (M13)
(RNY) (M21) (M22) (M23)
(RNZ) (M31) (M32) (M33)
XR2>1
NO
YES
XR2-1 → XR2
XR1-3 → XR1
YES
XR1>3
NO
HTR
CMPND
REGA → XR1
G6
RNX TRANSFERED INTO TEMP+1
RNY " " TEMP+2
RNZ " " TEMP+3
FIXED, B25

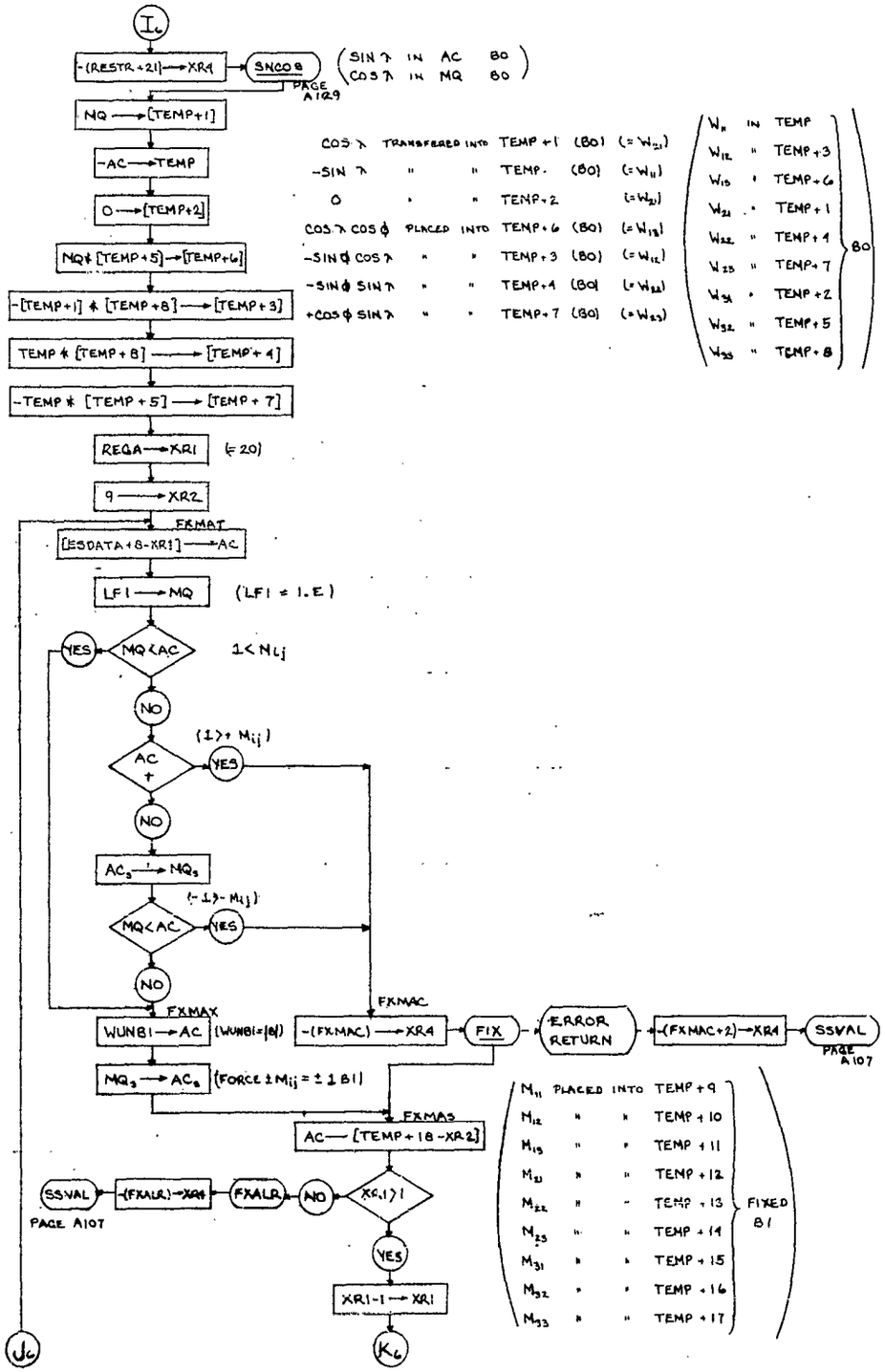

G6
REG8 → XR2
XR2 > 6
NO
(ALL UNKNOWN VECTOR USED)
YES
XR2-6 → XR2
(INCREMENT FOR NEXT 6 VALUES
" " " EXP. STATION)
RETURN FOR NEXT EXP. ST.
CNRGE
PAGE A121
XR1+20 → XR1
(=20 N)
XR1 > *
YES
HTR
CNRTL+2
NO
TEST TO SEE IF ALL ESDATA USED
(=20 N-20)
XR1 ≤ #
YES
NO
WESDA
WESDA → XR4
WBTCS
PAGE A21
WRITE ON TAPE 147
SPHER TO ESDATA - 1
WEF → 147
REW → 147
(PROPER CONVERGENCE OF dR_s)
SLT 1
ON
TURN LT. 1 ON
HPR
RESBE
PAGE A127
TURN OFF
OFF
I TERC


ITERC
CNTRX_D → XR1
(= NUMBER OF ITERATIONS BEFORE RESECTION)_A (= 0 FIRST TIME)
XR1 ≤ 0
YES
FIRST TIME ONLY
NO
CENTRX_A → XR1
XR1 > 1
NO
RESECTION
CNTRX_A → XR1
YES
XR1 → CNTRX_D
XR1-1 → XR1
RESBE
XR1 → CNTRX_D
PAGE A127
SEGTX
PAGE A127


SEGTX
SWT 6
SEGTX+3
ITERATE AGAIN
TURN ALL LTS. OFF
RESEG2
HTR
RESBE
RESECTION OR BREAK
RESBE
20 → XR1
RESBE+1
XR1 → REGA
3 → XR2
RESTR
[ESDATA+17-XR1] → [COMMON+10-XR2]
XR1 > 1
NO
RESAL
HTR TRANSFER TO SSVAL
YES
XR1-1 → XR1
XR2 > 1
YES
XR2-1 → XR2
NO
-(RESTR+3) → XR4
LFXYZ
LFXYZ
ERROR RETURN
-(RESTR+5) → XR4
SSVAL
PAGE A107
XR4 → [LFXYZ+2]
-(LFXYZ+1) → XR4
PAGE A35
PHXYZ
ERROR RETURN
LFXER
PAGE A128
0 → AC
SET FOR ROUNDED DIVISION
[COMMON+3] → NQ
AC, MQ
SPHER/[COMMON+3] → [COMMON+6]
PLACED INTO COMMON+6 (= N)
[COMMON+5]+[COMMON+9] → [COMMON+12]
COMMON+12
[COMMON+12] × [COMMON+12] → AC → COMMON → MQ → [COMMON+1]
COMMON (MAJOR)
COMMON+1 (MINOR)
(DOUBLE PRECISION)
[COMMON+1]+[COMMON+11] → MQ
Hc

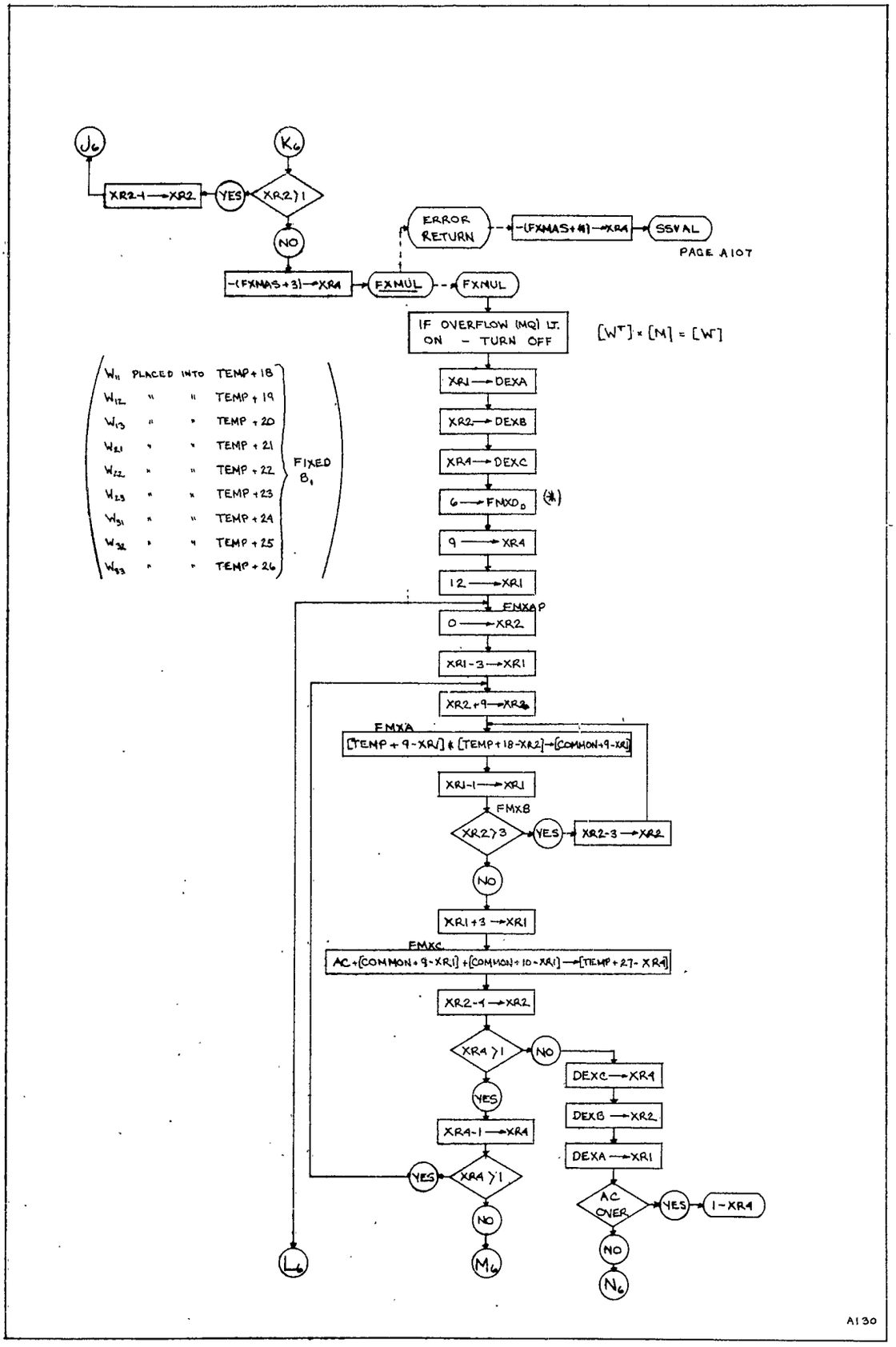
A127

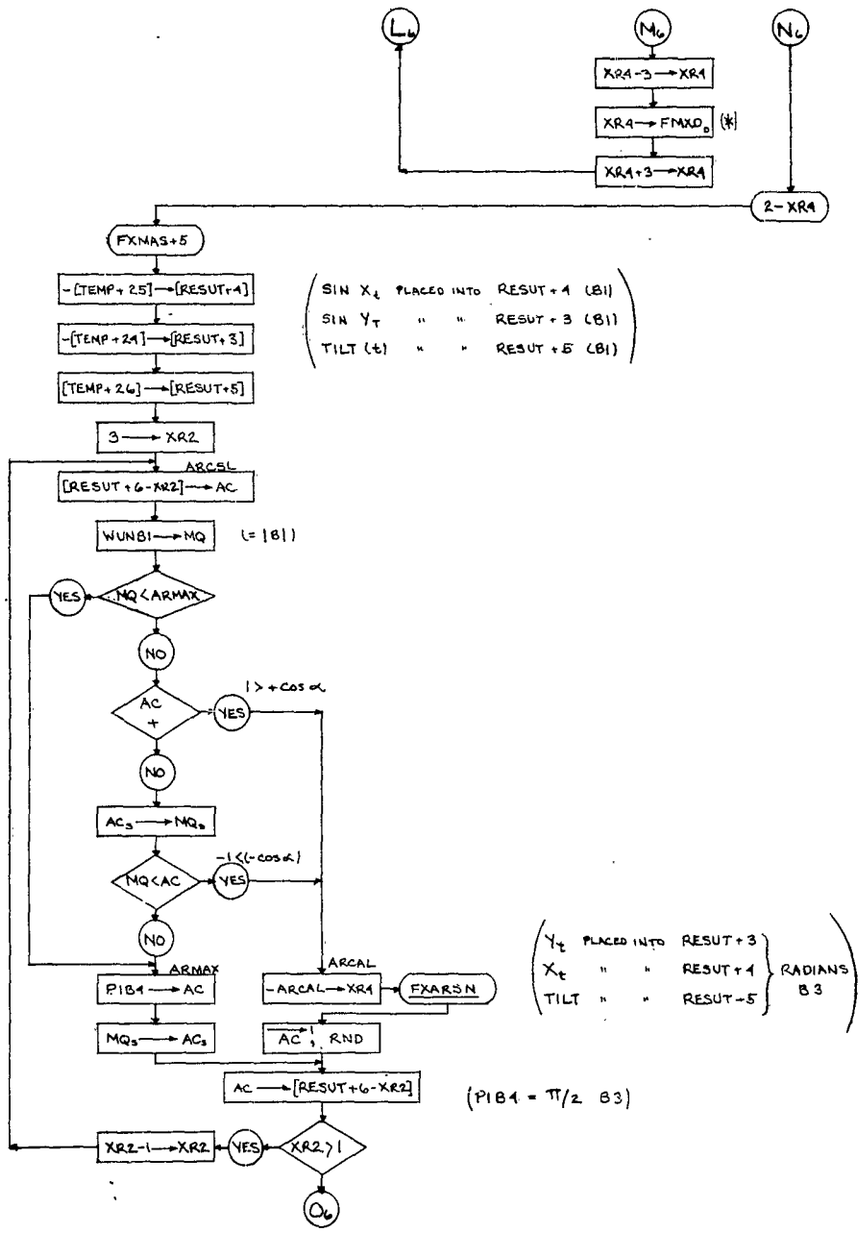

H6
COMMON + [COMMON+10] → AC
-(LFXYZ+21) → XR4
XSQRT
ERROR RETURN
LFXER
THIS PAGE
DOUBLE PRECISION ARGUMENT IN AC & MQ
√ RESULT IN AC
AC "RND" → AC
AC - [COMMON+6] → [TEMP+2]
[R_nx² + R_ny² + (R_nz + t)²]^1/2 IN AC
({[R_nx² + R_ny² + (R_nz + t)²]^1/2 - N} PLACED INTO TEMP+2 (= h)
[COMMON+1] → AC → [TEMP+3]. (= SIN φ, B0)
AC, MQ
B!
RND
-(LFXYZ+30) → XR4
FXARSN
(GET φ IN RADIANS, B2)
AC, MQ, RND
AC → TEMP
(φ, B3 IN TEMP)
[COMMON+7] → AC
[COMMON+8] → MQ
-(LFXYZ+37) → XR4
ARCT
AC, MQ, RND
AC → [TEMP+1]
(λ IN TEMP+1 B,3)
[LFXYZ+2]_D → XR4
2 - XR4
(SIN φ IN TEMP+3, B0)
RESTR+6
[TEMP+2] → RESUT
TEMP → [RESUT+2]
[TEMP+1] → [RESUT+1]
[TEMP+3] → [TEMP+8] → MQ
(h TRANSFERED INTO RESUT B25
φ " " RESUT+2 B3 (RADIANS)
λ " " RESUT+1 B3 "
SIN φ TRANSFERED INTO TEMP+8 B0 (= W33)
(- MQ & [TEMP+3] + [SPHER+4] → AC → MQ
(1 - SIN²φ) IN AC & MQ
-(RESTR+17) → XR4
XSQRT
ERROR RETURN
-(RESTR+18) → XR4
SSVAL
PAGE A 107
AC → [TEMP+5]
[TEMP+1] → AC
I6
ERROR RETURN
LFXER
XR4 → AC0
[LFXYZ+2]_D → XR4
1 - XR4



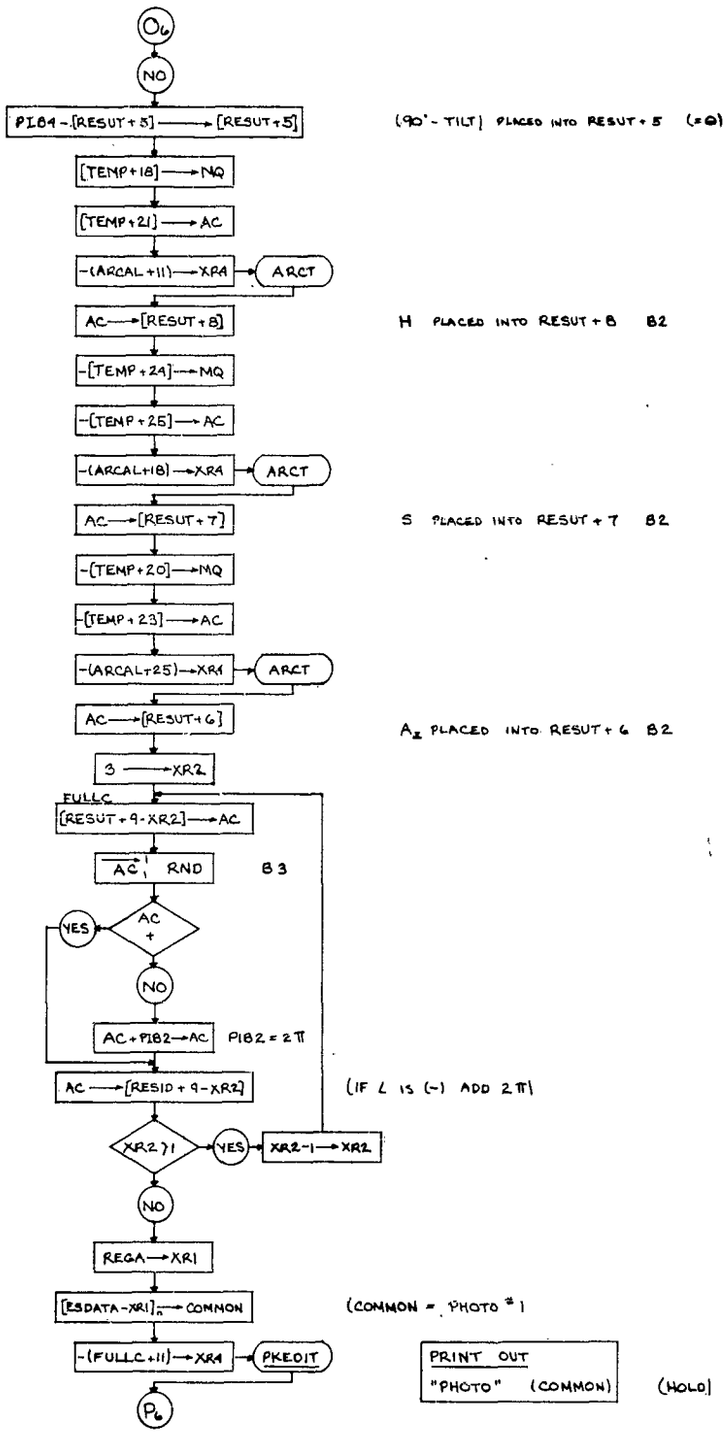
I6
-(RESTR+21)→XR4
SNCOS
PAGE A129
SIN λ IN AC BO
COS λ IN MQ BO
MQ→[TEMP+1]
-AC→TEMP
0→[TEMP+2]
MQ*[TEMP+5]→[TEMP+6]
-[TEMP+1]*[TEMP+8]→[TEMP+3]
TEMP*[TEMP+8]→[TEMP+4]
-TEMP*[TEMP+5]→[TEMP+7]
REGA→XR1
(=20)
9→XR2
FXMAT
[ESDATA+8-XR1]→AC
LF1→MQ
(LF1 = 1.E)
MQ<AC
1<Mij
YES
NO
AC +
(1>+Mij)
AC3→MQ3
(-1>-Mij)
FXMAX
WUNB1→AC
(WUNB1=|B|)
FXMAC
-(FXMAC)→XR4
FIX
ERROR RETURN
-(FXMAC+2)→XR4
SSVAL
PAGE A107
MQ3→AC3
(FORCE ±Mij = ±1 B1)
FXMAS
AC—[TEMP+18-XR2]
XR1>1
FXALR
-(FXALR)→XR4
SSVAL
PAGE A107
XR1-1→XR1
K6
J6
COS λ TRANSFERED INTO TEMP+1 (BO) (=W21)
-SIN λ " " TEMP (BO) (=W11)
0 " " TEMP+2 (=W21)
COS λ COS φ PLACED INTO TEMP+6 (BO) (=W13)
-SIN φ COS λ " " TEMP+3 (BO) (=W12)
-SIN φ SIN λ " " TEMP+4 (BO) (=W22)
+COS φ SIN λ " " TEMP+7 (BO) (=W23)
W11 IN TEMP
W12 " TEMP+3
W13 " TEMP+6
W21 " TEMP+1
W22 " TEMP+4
W23 " TEMP+7
W31 " TEMP+2
W32 " TEMP+5
W33 " TEMP+8
BO
M11 PLACED INTO TEMP+9
M12 " " TEMP+10
M13 " " TEMP+11
M21 " " TEMP+12
M22 " " TEMP+13
M23 " " TEMP+14
M31 " " TEMP+15
M32 " " TEMP+16
M33 " " TEMP+17
FIXED B1

A129

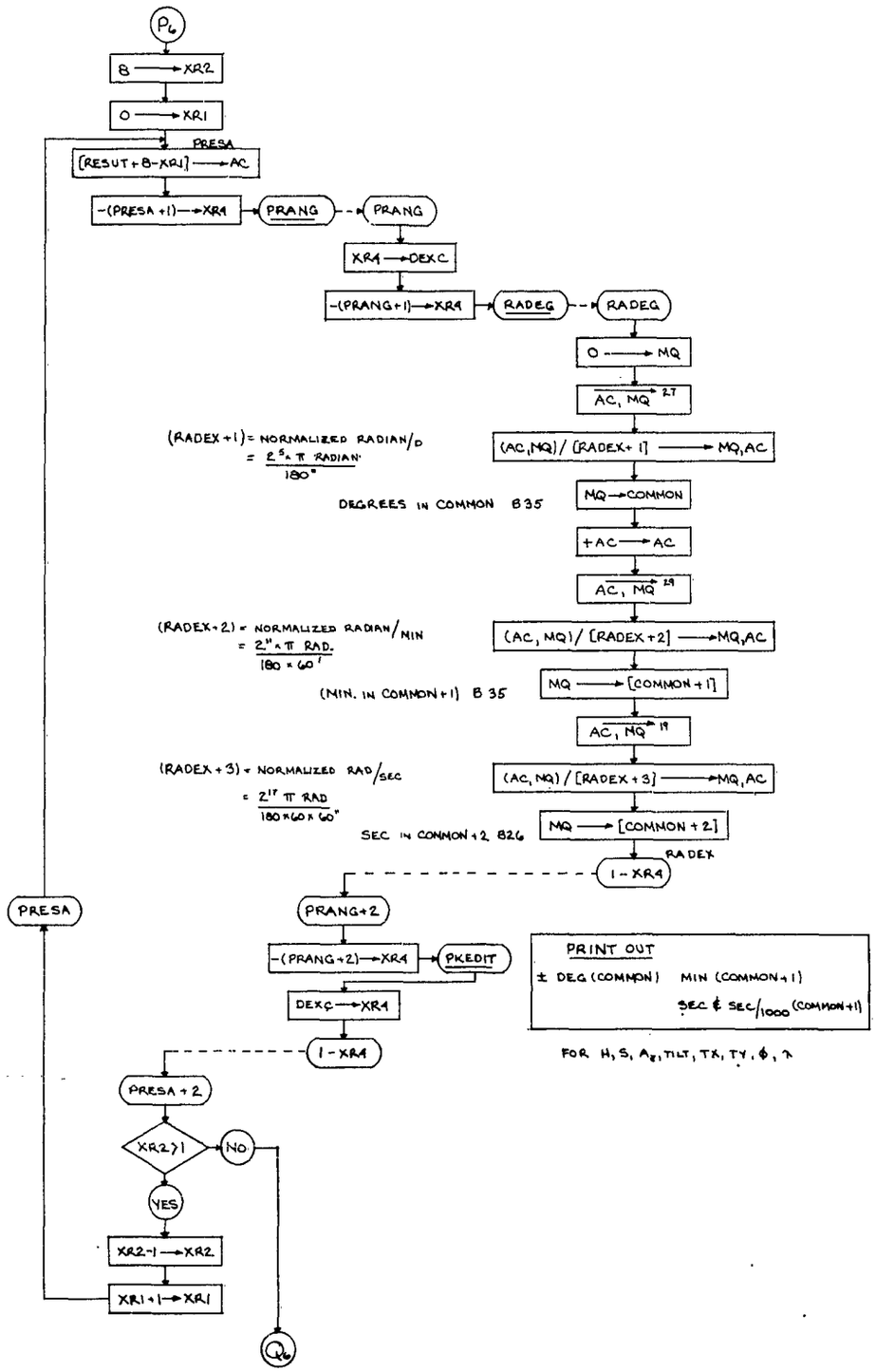

J6
K6
XR2-1 → XR2
YES
XR2 > 1
NO
ERROR RETURN
-(FXMAS+41) → XR4
SSVAL
PAGE A107
-(FXMAS+3) → XR4
FXMUL
FXMUL
IF OVERFLOW (MQ) LT. ON - TURN OFF
[W^T] × [M] = [W]
W11 PLACED INTO TEMP+18
W12 " " TEMP+19
W13 " " TEMP+20
W21 " " TEMP+21
W22 " " TEMP+22
W23 " " TEMP+23
W31 " " TEMP+24
W32 " " TEMP+25
W33 " " TEMP+26
FIXED B1
XR1 → DEXA
XR2 → DEXB
XR4 → DEXC
6 → FMXD0
(*)
9 → XR4
12 → XR1
FMXAP
0 → XR2
XR1-3 → XR1
XR2+9 → XR2
FMXA
[TEMP+9-XR1] & [TEMP+18-XR2] → [COMMON+9-XR1]
XR1-1 → XR1
FMXB
XR2 > 3
YES
XR2-3 → XR2
NO
XR1+3 → XR1
FMXC
AC+[COMMON+9-XR1]+[COMMON+10-XR1] → [TEMP+27-XR4]
XR2-1 → XR2
XR4 > 1
NO
YES
XR4-1 → XR4
XR4 > 1
YES
NO
L6
M6
DEXC → XR4
DEXB → XR2
DEXA → XR1
AC OVER
YES
1-XR4
NO
N6
A130


L6
M6
N6
XR4-3 → XR4
XR4 → FMXD0 (*)
XR4+3 → XR4
2-XR4
FXMAS+5
-[TEMP+25] → [RESUT+4]
-[TEMP+24] → [RESUT+3]
[TEMP+26] → [RESUT+5]
SIN Xt PLACED INTO RESUT+4 (B1)
SIN YT " " RESUT+3 (B1)
TILT (t) " " RESUT+5 (B1)
3 → XR2
ARCSL
[RESUT+6-XR2] → AC
WUNB1 → MQ
(= |B1|)
NQ<ARMAX
YES
NO
AC +
1 > +cos α
YES
NO
AC3 → MQ3
NQ<AC
-1 < (-cos α)
YES
NO
ARMAX
PIB4 → AC
MQ3 → AC3
ARCAL
-ARCAL → XR4
FXARSN
AC, RND
Yt PLACED INTO RESUT+3
Xt " " RESUT+4
TILT " " RESUT-5
RADIANS B3
AC → [RESUT+6-XR2]
(PIB4 = π/2 B3)
XR2-1 → XR2
YES
XR2>1
O6

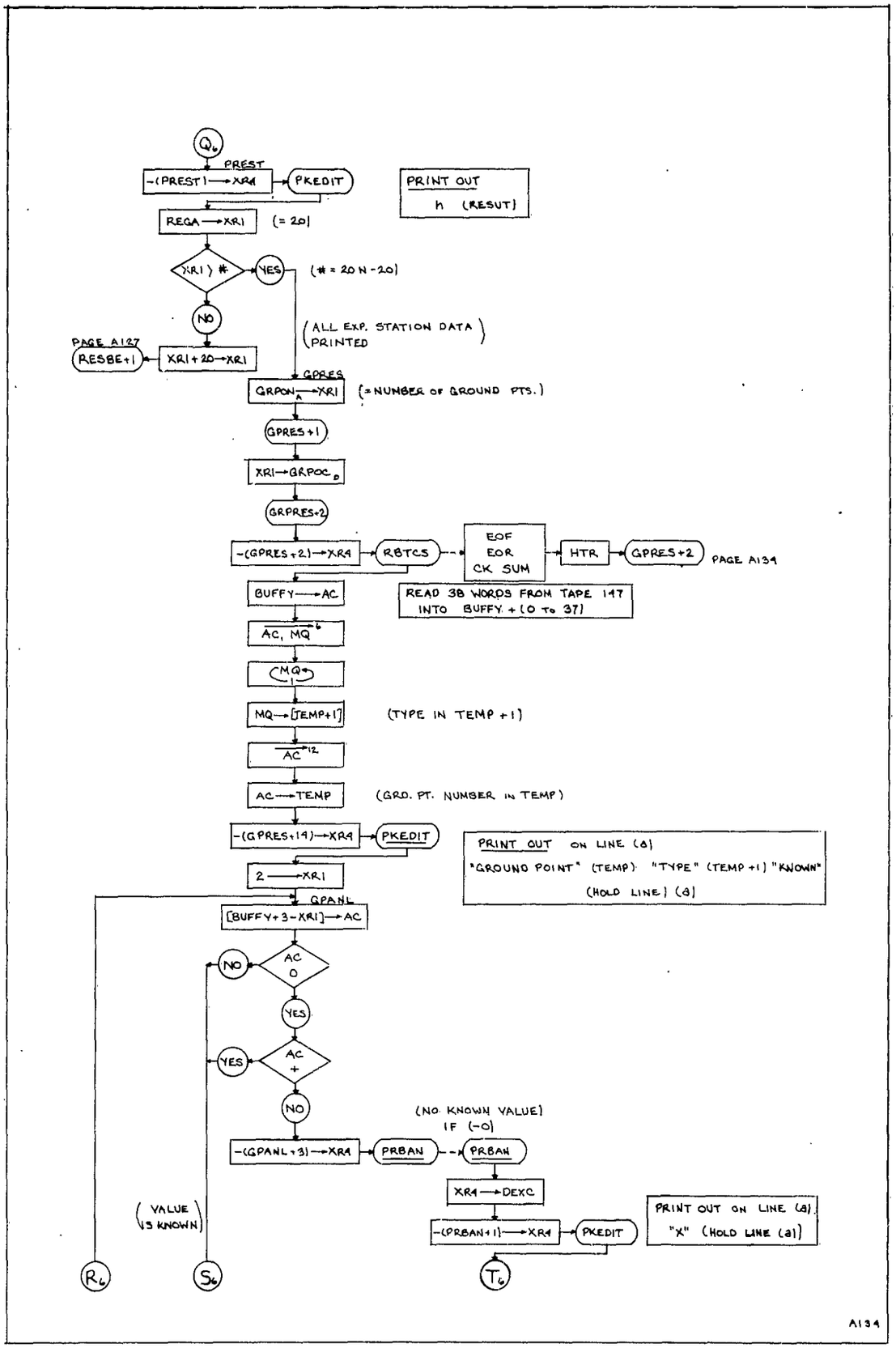
A131

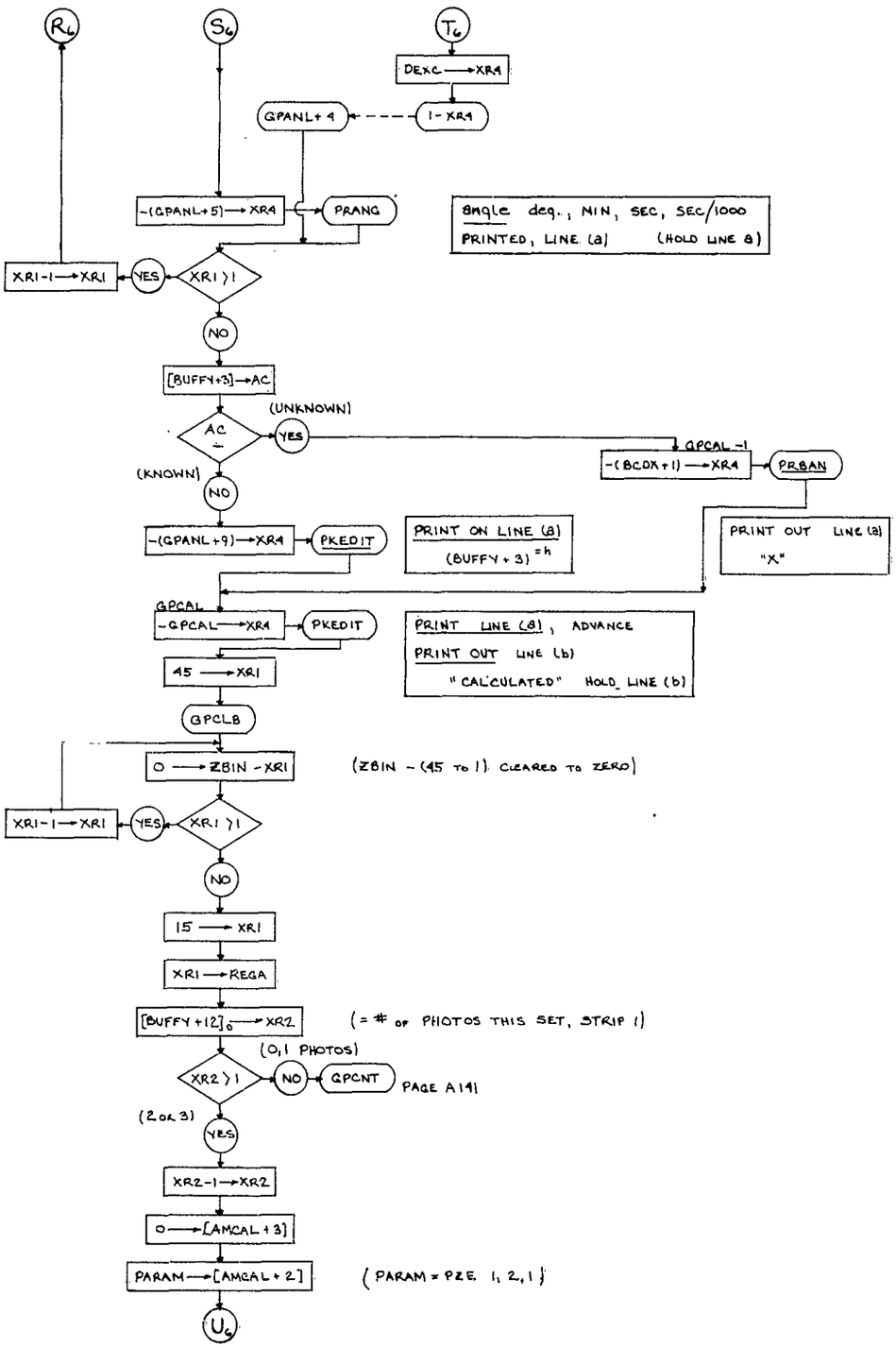

O6
NO
PI84 - [RESUT + 5] → [RESUT + 5]
(90° - TILT) PLACED INTO RESUT + 5 (= Θ)
[TEMP + 18] → MQ
[TEMP + 21] → AC
-(ARCAL + 11) → XR4
ARCT
AC → [RESUT + 8]
H PLACED INTO RESUT + 8 B2
-[TEMP + 24] → MQ
-[TEMP + 25] → AC
-(ARCAL + 18) → XR4
ARCT
AC → [RESUT + 7]
S PLACED INTO RESUT + 7 B2
-[TEMP + 20] → MQ
-[TEMP + 23] → AC
-(ARCAL + 25) → XR4
ARCT
AC → [RESUT + 6]
A_I PLACED INTO RESUT + 6 B2
3 → XR2
FULLC
[RESUT + 9 - XR2] → AC
AC RND
B3
AC +
YES
NO
AC + PI82 → AC
PI82 = 2π
AC → [RESID + 9 - XR2]
(IF L IS (-) ADD 2π)
XR2 > 1
YES
XR2 - 1 → XR2
NO
REGA → XR1
[ESDATA - XR1]n → COMMON
(COMMON = PHOTO # 1)
-(FULLC + 11) → XR4
PKEDIT
PRINT OUT
"PHOTO" (COMMON)
(HOLD)
P6

A132

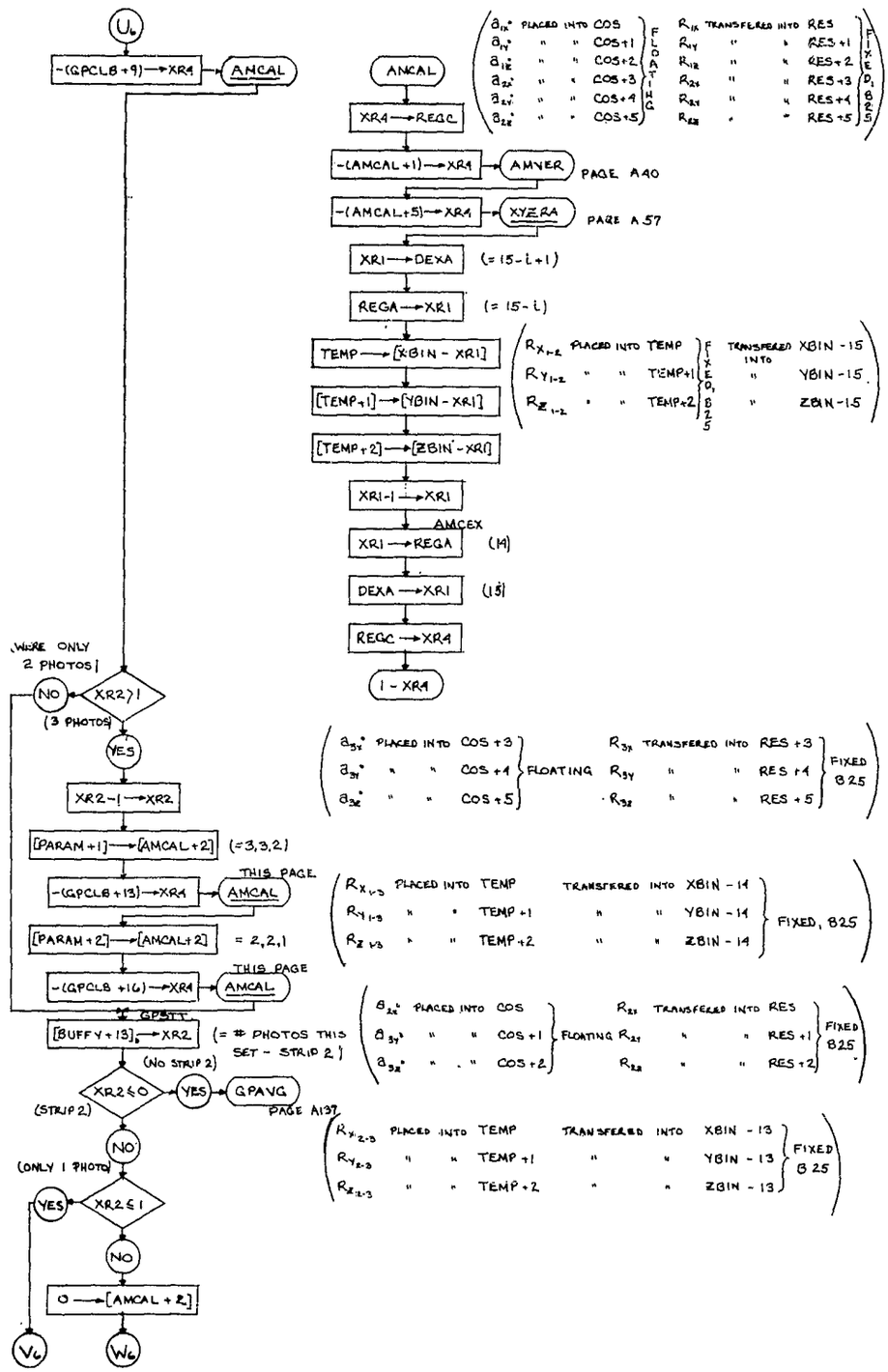

P6
B → XR2
0 → XR1
PRESA
[RESUT + B - XR1] → AC
-(PRESA + 1) → XR4
PRANG
PRANG
XR4 → DEXC
-(PRANG + 1) → XR4
RADEG
RADEG
0 → MQ
AC, MQ → 27
(RADEX + 1) = NORMALIZED RADIAN/D
= 2^5 × π RADIAN / 180°
(AC, MQ) / [RADEX + 1] → MQ, AC
DEGREES IN COMMON B35
MQ → COMMON
+AC → AC
AC, MQ → 29
(RADEX + 2) = NORMALIZED RADIAN/MIN
= 2^11 × π RAD. / 180 × 60'
(AC, MQ) / [RADEX + 2] → MQ, AC
MQ → [COMMON + 1]
(MIN. IN COMMON + 1) B 35
AC, MQ → 19
(RADEX + 3) = NORMALIZED RAD/SEC
= 2^17 π RAD / 180 × 60 × 60"
(AC, MQ) / [RADEX + 3] → MQ, AC
MQ → [COMMON + 2]
SEC IN COMMON + 2 B26
RADEX
1 - XR4
PRESA
PRANG + 2
-(PRANG + 2) → XR4
PKEDIT
DEXC → XR4
1 - XR4
PRINT OUT
± DEG (COMMON) MIN (COMMON + 1)
SEC & SEC/1000 (COMMON + 1)
FOR H, S, A_z, TILT, TX, TY, φ, λ
PRESA + 2
XR2 > 1
NO
YES
XR2 - 1 → XR2
XR1 + 1 → XR1
Q6

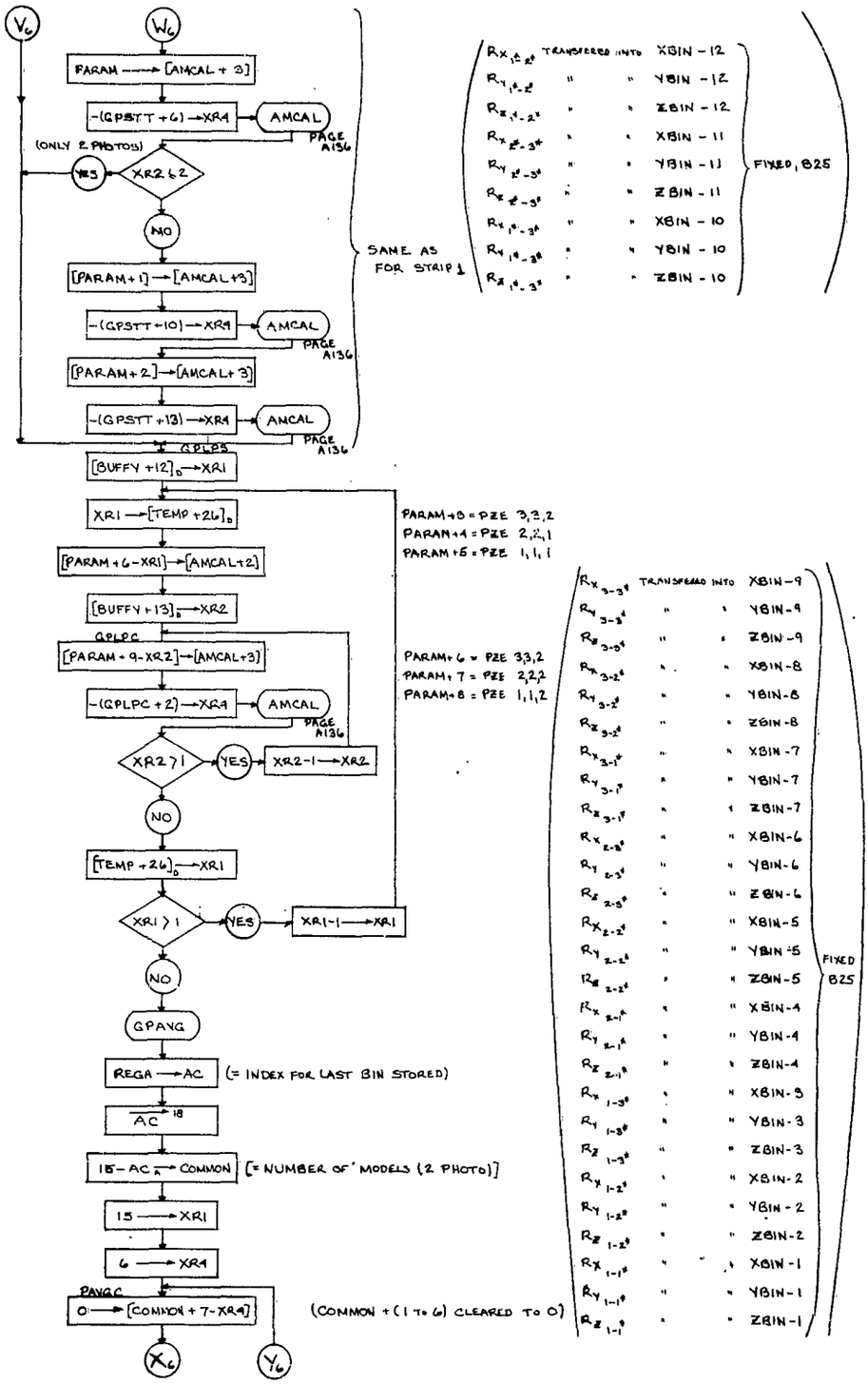
A133

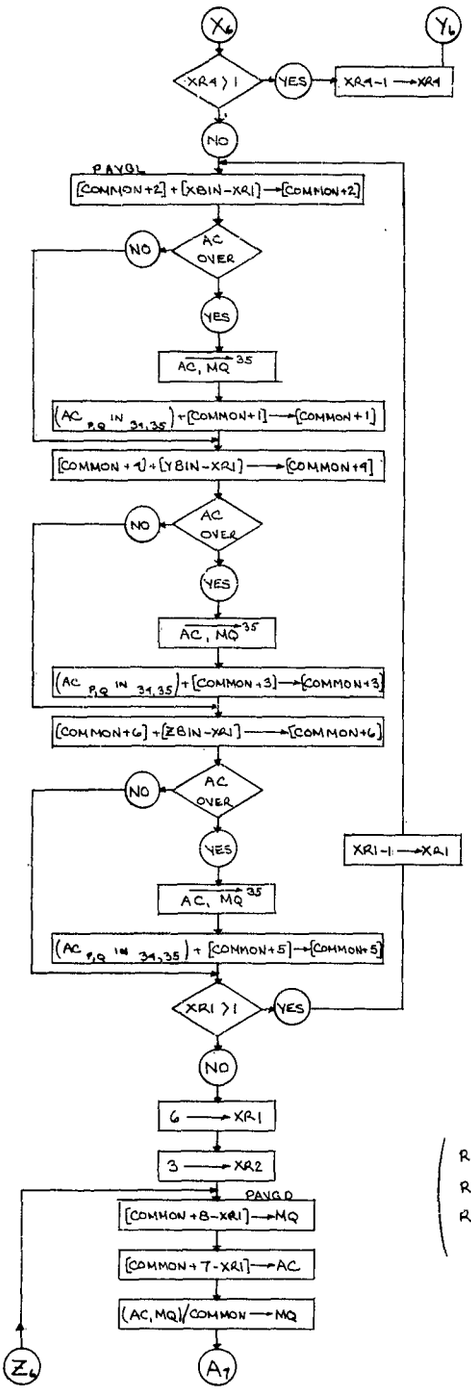

Q6
PREST
-(PREST) → XR4
PKEDIT
PRINT OUT
h (RESUT)
REGA → XR1
(= 20)
XR1) #
YES
(# = 20 N - 20)
NO
(ALL EXP. STATION DATA PRINTED)
PAGE A127
RESBE+1
XR1 + 20 → XR1
GPRES
GRPON → XR1
(= NUMBER OF GROUND PTS.)
GPRES+1
XR1 → GRPOC
GRPRES+2
-(GPRES+2) → XR4
RBTCS
EOF
EOR
CK SUM
HTR
GPRES+2
PAGE A134
BUFFY → AC
READ 38 WORDS FROM TAPE 147 INTO BUFFY + (0 TO 37)
AC, MQ
MQ
MQ → [TEMP+1]
(TYPE IN TEMP +1)
AC
AC → TEMP
(GRD. PT. NUMBER IN TEMP)
-(GPRES+19) → XR4
PKEDIT
PRINT OUT ON LINE (8)
"GROUND POINT" (TEMP) "TYPE" (TEMP +1) "KNOWN"
(HOLD LINE) (8)
2 → XR1
GPANL
[BUFFY+3-XR1] → AC
AC 0
NO
YES
AC +
YES
NO
(NO KNOWN VALUE)
IF (-0)
-(GPANL+3) → XR4
PRBAN
PRBAH
XR4 → DEXC
-(PRBAN+1) → XR4
PKEDIT
PRINT OUT ON LINE (8)
"X" (HOLD LINE (8))
(VALUE IS KNOWN)
R6
S6
T6
A134


R6
S6
T6
DEXC → XR4
1 - XR4
GPANL+4
-(GPANL+5) → XR4
PRANG
angle deg., MIN, SEC, SEC/1000
PRINTED, LINE (a) (HOLD LINE a)
XR1-1 → XR1
YES
XR1 > 1
NO
[BUFFY+3] → AC
(UNKNOWN)
AC
YES
GPCAL -1
-(BCDX+1) → XR4
PRBAN
(KNOWN)
NO
-(GPANL+9) → XR4
PKEDIT
PRINT ON LINE (a)
(BUFFY + 3) = h
PRINT OUT LINE (a)
"X"
GPCAL
-GPCAL → XR4
PKEDIT
PRINT LINE (a), ADVANCE
PRINT OUT LINE (b)
"CALCULATED" HOLD LINE (b)
45 → XR1
GPCLB
0 → ZBIN - XR1
(ZBIN - (45 TO 1) CLEARED TO ZERO)
XR1-1 → XR1
YES
XR1 > 1
NO
15 → XR1
XR1 → REGA
[BUFFY+12]0 → XR2
(= # OF PHOTOS THIS SET, STRIP 1)
(0,1 PHOTOS)
XR2 > 1
NO
GPCNT
PAGE A141
(2 OR 3)
YES
XR2-1 → XR2
0 → [AMCAL+3]
PARAM → [AMCAL+2]
(PARAM = PZE 1, 2, 1)
U6

A135


U6
-(GPCLB+9)→XR4
AMCAL
AMCAL
XR4→REGC
-(AMCAL+1)→XR4
AMVER
PAGE A40
-(AMCAL+5)→XR4
XYZRA
PAGE A57
XR1→DEXA
(= 15-i+1)
REGA→XR1
(= 15-i)
TEMP→[XBIN-XR1]
[TEMP+1]→[YBIN-XR1]
[TEMP+2]→[ZBIN-XR1]
XR1-1→XR1
AMCEX
XR1→REGA
(14)
DEXA→XR1
(15)
REGC→XR4
1-XR4
a1x* PLACED INTO COS
a1y* " " COS+1
a1z* " " COS+2
a2x* " " COS+3
a2y* " " COS+4
a2z* " " COS+5
FLOATING
R1x TRANSFERED INTO RES
R1y " " RES+1
R1z " " RES+2
R2x " " RES+3
R2y " " RES+4
R2z " " RES+5
FIXED, B25
RX1-2 PLACED INTO TEMP
RY1-2 " " TEMP+1
RZ1-2 " " TEMP+2
FIXED, B25
TRANSFERED INTO XBIN-15
" YBIN-15
" ZBIN-15
WERE ONLY 2 PHOTOS
NO
XR2>1
(3 PHOTOS)
YES
XR2-1→XR2
[PARAM+1]→[AMCAL+2]
(=3,3,2)
-(GPCLB+13)→XR4
THIS PAGE
AMCAL
[PARAM+2]→[AMCAL+2]
= 2,2,1
-(GPCLB+16)→XR4
THIS PAGE
AMCAL
GPSTT
[BUFFY+13]0→XR2
(= # PHOTOS THIS SET - STRIP 2)
(NO STRIP 2)
XR2≤0
YES
GPAVG
PAGE A137
(STRIP 2)
NO
(ONLY 1 PHOTO)
YES
XR2≤1
NO
0→[AMCAL+2]
V6
W6
a3x* PLACED INTO COS+3
a3y* " " COS+4
a3z* " " COS+5
FLOATING
R3x TRANSFERED INTO RES+3
R3y " " RES+4
R3z " " RES+5
FIXED B25
RX1-3 PLACED INTO TEMP
RY1-3 " " TEMP+1
RZ1-3 " " TEMP+2
TRANSFERED INTO XBIN-14
" YBIN-14
" ZBIN-14
FIXED, B25
a2x* PLACED INTO COS
a3y* " " COS+1
a3z* " " COS+2
FLOATING
R2x TRANSFERED INTO RES
R2y " " RES+1
R2z " " RES+2
FIXED B25
RX2-3 PLACED INTO TEMP
RY2-3 " " TEMP+1
RZ2-3 " " TEMP+2
TRANSFERED INTO XBIN-13
" YBIN-13
" ZBIN-13
FIXED B25

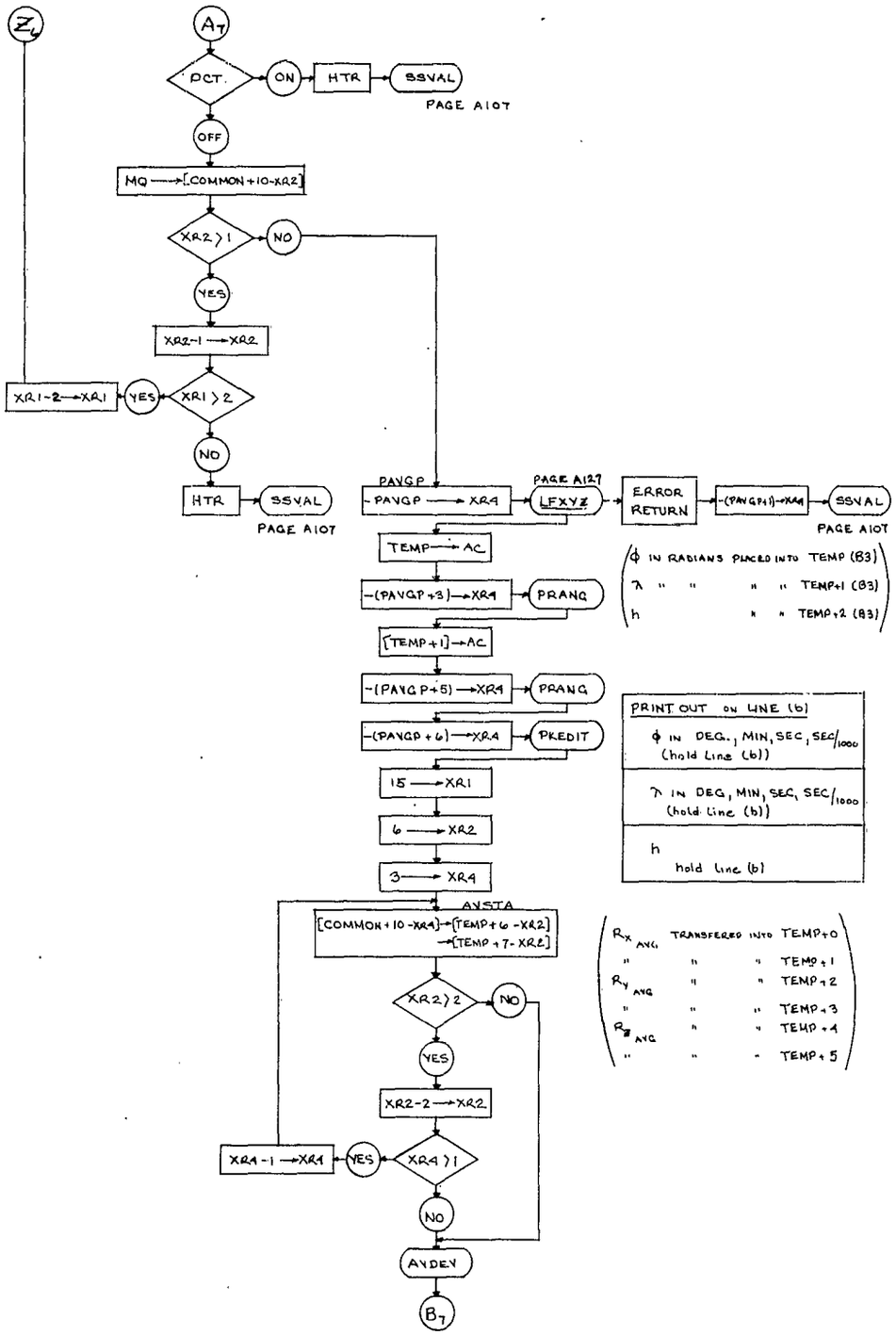

V6
W6
PARAM → [AMCAL + 3]
-(GPSTT + 6) → XR4
AMCAL
PAGE A136
(ONLY 2 PHOTOS)
XR2 ≥ 2
YES
NO
[PARAM + 1] → [AMCAL + 3]
-(GPSTT + 10) → XR4
AMCAL
PAGE A136
[PARAM + 2] → [AMCAL + 3]
-(GPSTT + 13) → XR4
AMCAL
PAGE A136
SAME AS FOR STRIP 1
GPLPS
[BUFFY + 12]D → XR1
XR1 → [TEMP + 26]D
PARAM + 3 = PZE 3,3,2
PARAM + 4 = PZE 2,2,1
PARAM + 5 = PZE 1,1,1
[PARAM + 6 - XR1] → [AMCAL + 2]
[BUFFY + 13]D → XR2
GPLPC
[PARAM + 9 - XR2] → [AMCAL + 3]
PARAM + 6 = PZE 3,3,2
PARAM + 7 = PZE 2,2,2
PARAM + 8 = PZE 1,1,2
-(GPLPC + 2) → XR4
AMCAL
PAGE A136
XR2 > 1
YES
XR2 - 1 → XR2
NO
[TEMP + 26]D → XR1
XR1 > 1
YES
XR1 - 1 → XR1
NO
GPAVG
REGA → AC
(= INDEX FOR LAST BIN STORED)
AC + 18
15 - AC → COMMON
[= NUMBER OF MODELS (2 PHOTO)]
15 → XR1
6 → XR4
PAVGC
0 → [COMMON + 7 - XR4]
(COMMON + (1 TO 6) CLEARED TO 0)
X6
Y6
RX 1-2 TRANSFERED INTO XBIN - 12
RY 1-2 " " YBIN - 12
RZ 1-2 " " ZBIN - 12
RX 2-3 " " XBIN - 11
RY 2-3 " " YBIN - 11
RZ 2-3 " " ZBIN - 11
RX 1-3 " " XBIN - 10
RY 1-3 " " YBIN - 10
RZ 1-3 " " ZBIN - 10
FIXED, 825
RX 3-3 TRANSFERED INTO XBIN - 9
RY 3-3 " " YBIN - 9
RZ 3-3 " " ZBIN - 9
RX 3-2 " " XBIN - 8
RY 3-2 " " YBIN - 8
RZ 3-2 " " ZBIN - 8
RX 3-1 " " XBIN - 7
RY 3-1 " " YBIN - 7
RZ 3-1 " " ZBIN - 7
RX 2-3 " " XBIN - 6
RY 2-3 " " YBIN - 6
RZ 2-3 " " ZBIN - 6
RX 2-2 " " XBIN - 5
RY 2-2 " " YBIN - 5
RZ 2-2 " " ZBIN - 5
RX 2-1 " " XBIN - 4
RY 2-1 " " YBIN - 4
RZ 2-1 " " ZBIN - 4
RX 1-3 " " XBIN - 3
RY 1-3 " " YBIN - 3
RZ 1-3 " " ZBIN - 3
RX 1-2 " " XBIN - 2
RY 1-2 " " YBIN - 2
RZ 1-2 " " ZBIN - 2
RX 1-1 " " XBIN - 1
RY 1-1 " " YBIN - 1
RZ 1-1 " " ZBIN - 1
FIXED 825



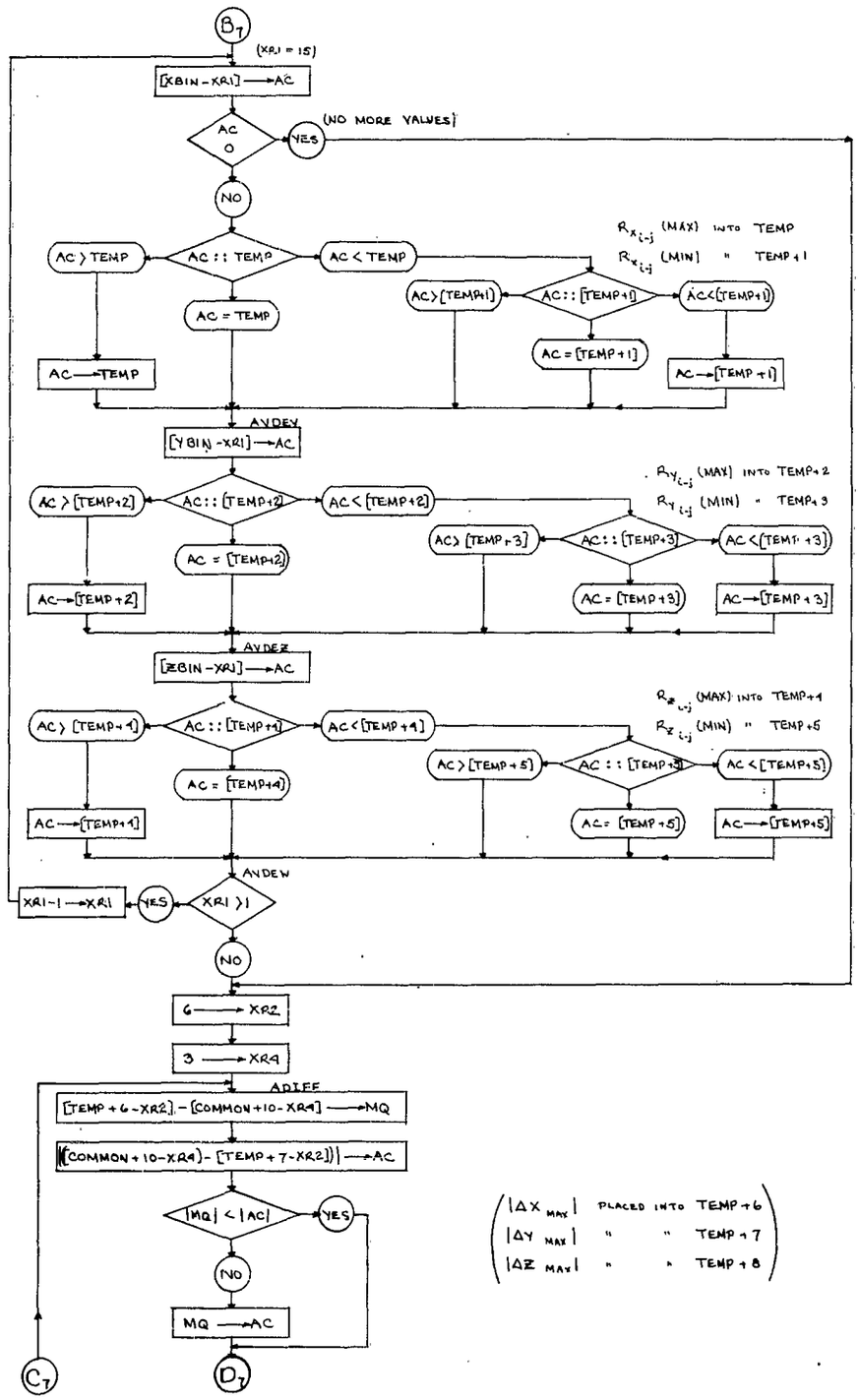
$\Sigma R_{x\,i-j}$ IN {COMMON + 2 (MAJOR), COMMON + 1 (OVER)}
$\Sigma R_{y\,i-j}$ " {COMMON + 4 (MAJOR), COMMON + 3 (OVER)}
$\Sigma R_{z\,i-j}$ " {COMMON + 6 (MAJOR), COMMON + 5 (OVER)}

$R_{x\,AVG}$ PLACED INTO COMMON + 7
$R_{y\,AVG}$ " " COMMON + 8
$R_{z\,AVG}$ " " COMMON + 9
} FIXED B25

A138


Z6
A7
PCT.
ON
HTR
SSVAL
PAGE A10T
OFF
MQ → [COMMON + 10 - XR2]
XR2 > 1
NO
YES
XR2 - 1 → XR2
XR1 - 2 → XR1
YES
XR1 > 2
NO
HTR
SSVAL
PAGE A10T
PAVGP
- PAVGP → XR4
PAGE A127
LFXYZ
ERROR RETURN
- (PAVGP + 1) → XR4
SSVAL
PAGE A10T
TEMP → AC
- (PAVGP + 3) → XR4
PRANG
(φ IN RADIANS PLACED INTO TEMP (B3)
λ " " " " TEMP + 1 (B3)
h " " TEMP + 2 (B3))
[TEMP + 1] → AC
- (PAVGP + 5) → XR4
PRANG
- (PAVGP + 6) → XR4
PKEDIT
PRINT OUT ON LINE (b)
φ IN DEG., MIN, SEC, SEC/1000 (hold Line (b))
λ IN DEG, MIN, SEC, SEC/1000 (hold Line (b))
h hold Line (b)
15 → XR1
6 → XR2
3 → XR4
AVSTA
[COMMON + 10 - XR4] → [TEMP + 6 - XR2]
→ [TEMP + 7 - XR2]
XR2 > 2
NO
YES
XR2 - 2 → XR2
XR4 - 1 → XR4
YES
XR4 > 1
NO
AVDEV
B7
($R_{X_{AVG}}$ TRANSFERED INTO TEMP + 0
" " " TEMP + 1
$R_{Y_{AVG}}$ " " TEMP + 2
" " " TEMP + 3
$R_{Z_{AVG}}$ " " TEMP + 4
" " " TEMP + 5)

A139

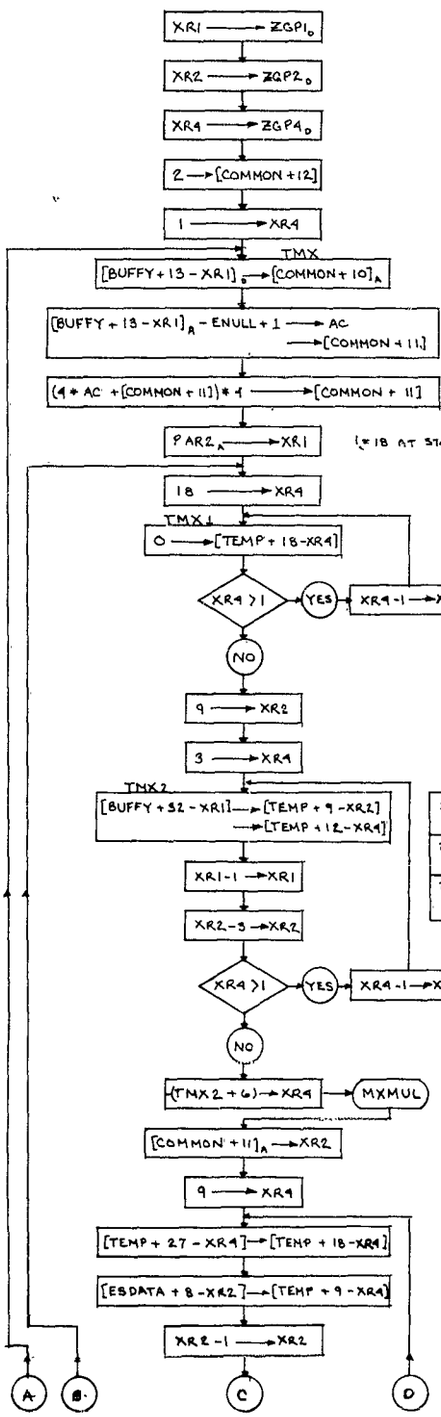

B7
(XR1 = 15)
[XBIN - XR1] → AC
AC 0
YES
(NO MORE VALUES)
NO
AC > TEMP
AC :: TEMP
AC < TEMP
AC = TEMP
AC → TEMP
Rx i-j (MAX) INTO TEMP
Rx i-j (MIN) " TEMP + 1
AC > [TEMP+1]
AC :: [TEMP+1]
AC < [TEMP+1]
AC = [TEMP+1]
AC → [TEMP + 1]
AVDEY
[YBIN - XR1] → AC
Ry i-j (MAX) INTO TEMP+2
Ry i-j (MIN) " TEMP+3
AC > [TEMP+2]
AC :: [TEMP+2]
AC < [TEMP+2]
AC = [TEMP+2]
AC → [TEMP + 2]
AC > [TEMP+3]
AC :: [TEMP+3]
AC < [TEMP+3]
AC = [TEMP+3]
AC → [TEMP + 3]
AVDEZ
[ZBIN - XR1] → AC
Rz i-j (MAX) INTO TEMP+4
Rz i-j (MIN) " TEMP+5
AC > [TEMP+4]
AC :: [TEMP+4]
AC < [TEMP+4]
AC = [TEMP+4]
AC → [TEMP+4]
AC > [TEMP+5]
AC :: [TEMP+5]
AC < [TEMP+5]
AC = [TEMP+5]
AC → [TEMP+5]
ANDEW
XR1 > 1
YES
XR1 - 1 → XR1
NO
6 → XR2
3 → XR4
ADIFF
[TEMP + 6 - XR2] - [COMMON + 10 - XR4] → MQ
|[COMMON + 10 - XR4] - [TEMP + 7 - XR2]| → AC
|MQ| < |AC|
YES
NO
MQ → AC
C7
D7
|ΔX MAX| PLACED INTO TEMP + 6
|ΔY MAX| " " TEMP + 7
|ΔZ MAX| " " TEMP + 8

A140

APPENDIX B

ADDITIONS AND MODIFICATIONS TO ORIGINAL PROGRAM - FLOW CHART

FORMATION OF T MATRIX



BUFFY + 12_A = # OF 1ST PHOTO THIS SET – STRIP 1
BUFFY + 12_B = # OF IMAGES THIS SET – STRIP 1
BUFFY + 13_A = # OF 1ST PHOTO THIS SET – STRIP 2
BUFFY + 13_B = # OF IMAGES THIS SET – STRIP 2

COMMON + 10_A = # OF PHOTOS (OR IMAGES)

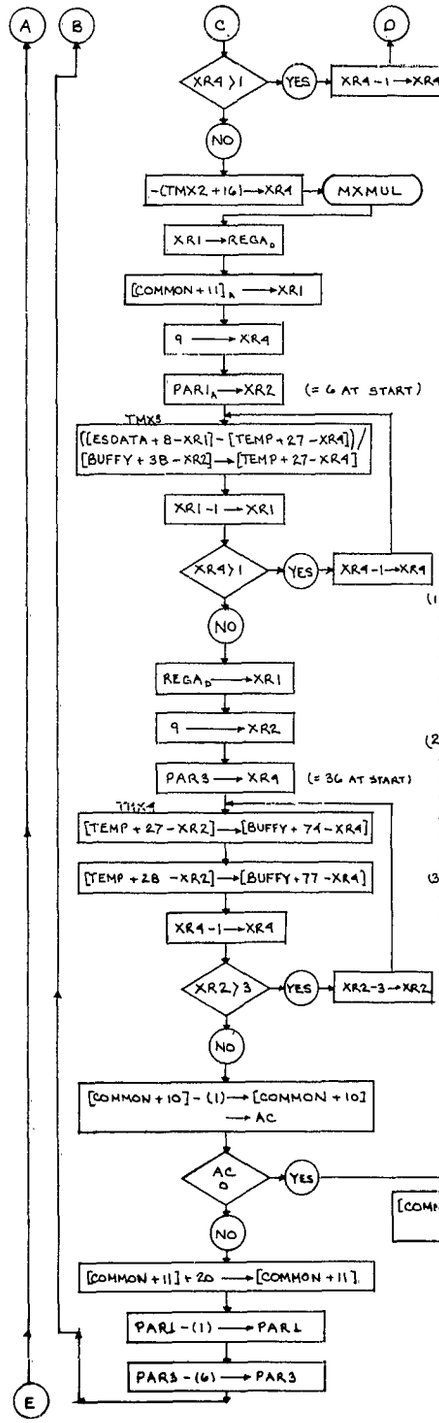
COMMON + 11_A = 20 (# 1ST PHOTO – # ORIGIN PHOTO + 1)

0 STORED IN TEMP + (0 TO 17)

(1)	(2)	(3)	(4)	(5)	(6)		
a'_{1X} "	a_{2X} "	a_{3X} "	a_{1X}^{*} "	a_{2X}^{*} "	a_{3X}^{*} "	TRANSFERED INTO "	TEMP + 0 TEMP + 9
a_{1Y} "	a_{2Y} "	a_{3Y} "	a_{1Y}^{*} "	a_{2Y}^{*} "	a_{3Y}^{*} "	" "	TEMP + 3 TEMP + 10
a_{1Z} "	a_{2Z} "	a_{3Z} "	a_{1Z}^{*} "	a_{2Z}^{*} "	a_{3Z}^{*} "	" "	TEMP + 6 TEMP + 11

$(a_{1X}^{*})^T$ STORED IN TEMP + 18 TRANSFERED INTO TEMP + 9
$(a_{1Z}^{*})(a_{1Y}^{*})$ " " TEMP + 19 " " TEMP + 10
$(a_{1X}^{*})(a_{1Z}^{*})$ " " TEMP + 20 " " TEMP + 11
$(a_{1Y}^{*})(a_{1Y}^{*})$ " " TEMP + 21 " " TEMP + 12
$(a_{1Y}^{*})(a_{1Y}^{*})$ " " TEMP + 22 " " TEMP + 13 $= [a^{*}][a^{*}]^T$
$(a_{1Z}^{*})(a_{1Z}^{*})$ " " TEMP + 23 " " TEMP + 14
$(a_{1X}^{*})(a_{1X}^{*})$ " " TEMP + 24 " " TEMP + 15
$(a_{1Z}^{*})(a_{1Y}^{*})$ " " TEMP + 25 " " TEMP + 16
$(a_{1X}^{*})(a_{1Z}^{*})$ " " TEMP + 26 " " TEMP + 17

M_{11} STORED IN TEMP + 0
M_{12} " " TEMP + 1
M_{13} " " TEMP + 2
M_{21} " " TEMP + 3
M_{22} " " TEMP + 4
M_{23} " " TEMP + 5
M_{31} " " TEMP + 6
M_{32} " " TEMP + 7
M_{33} " " TEMP + 8
$= [M]$

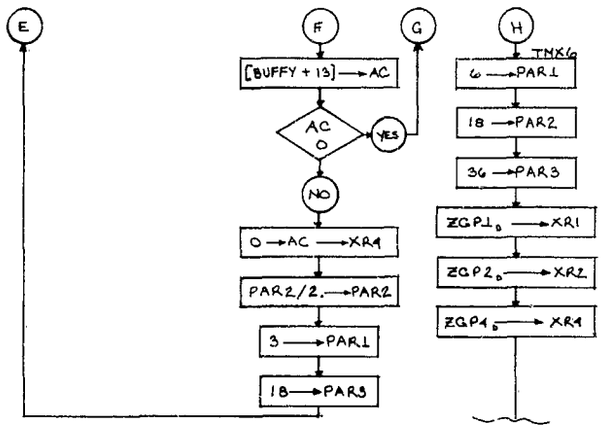


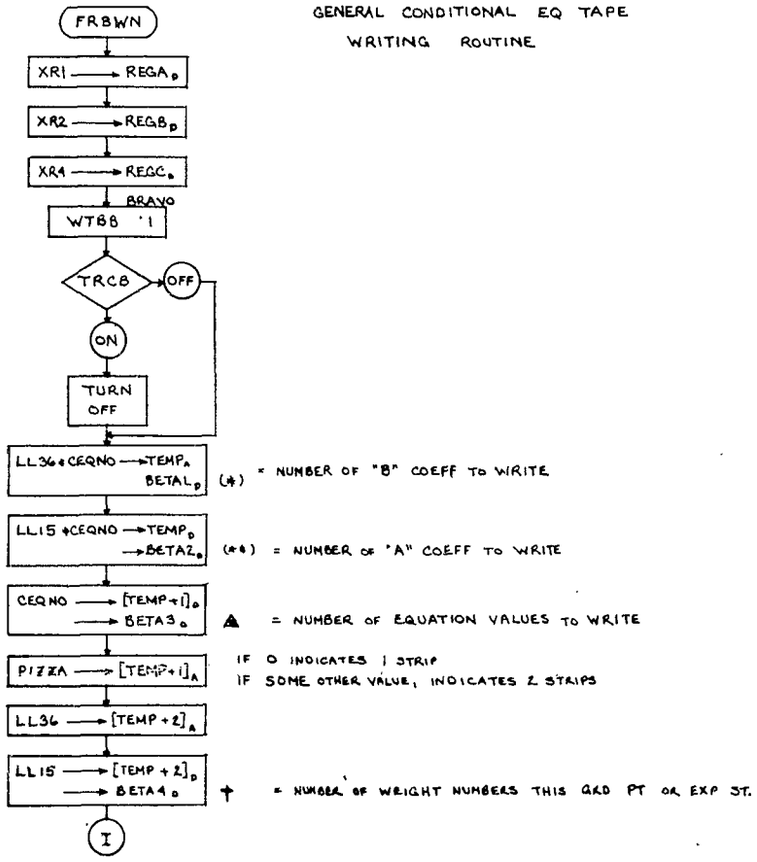
$[M]\,[a^*]\,[a^*]^T$ STORED IN TEMP + 18 TO TEMP + 26

BUFFY + 32 = I_1
BUFFY + 33 = I_2
BUFFY + 34 = I_3
BUFFY + 35 = I_1^*
BUFFY + 36 = I_2^*
BUFFY + 37 = I_3^*

$[M]\,I\,\left[[1] - [a^*]\,[a^*]^T\right]$ STORED IN TEMP + 18 TO TEMP + 26

(1)								
t_{11}	STORED	IN	BUFFY + 38	t_{11}	STORED	IN	BUFFY + 56	FLOATING
t_{21}	"	"	BUFFY + 39	t_{21}	"	"	BUFFY + 57	
t_{31}	"	"	BUFFY + 40	t_{31}	"	"	BUFFY + 58	
t_{12}	"	"	BUFFY + 41	t_{12}	"	"	BUFFY + 59	
t_{22}	"	"	BUFFY + 42	t_{22}	"	"	BUFFY + 60	
t_{32}	"	"	BUFFY + 43	t_{32}	"	"	BUFFY + 61	
(2)								
t_{11}	"	"	BUFFY + 44	t_{11}	"	"	BUFFY + 62	
t_{21}	"	"	BUFFY + 45	t_{21}	"	"	BUFFY + 63	
t_{31}	"	"	BUFFY + 46	t_{31}	"	"	BUFFY + 64	
t_{12}	"	"	BUFFY + 47	t_{12}	"	"	BUFFY + 65	
t_{22}	"	"	BUFFY + 48	t_{22}	"	"	BUFFY + 66	
t_{32}	"	"	BUFFY + 49	t_{32}	"	"	BUFFY + 67	
(3)								
t_{11}	"	"	BUFFY + 50	t_{11}	"	"	BUFFY + 68	
t_{21}	"	"	BUFFY + 51	t_{21}	"	"	BUFFY + 69	
t_{31}	"	"	BUFFY + 52	t_{31}	"	"	BUFFY + 70	
t_{12}	"	"	BUFFY + 53	t_{12}	"	"	BUFFY + 71	
t_{22}	"	"	BUFFY + 54	t_{22}	"	"	BUFFY + 72	
t_{32}	"	"	BUFFY + 55	t_{32}	"	"	BUFFY + 73	





GENERAL CONDITIONAL EQ TAPE WRITING ROUTINE

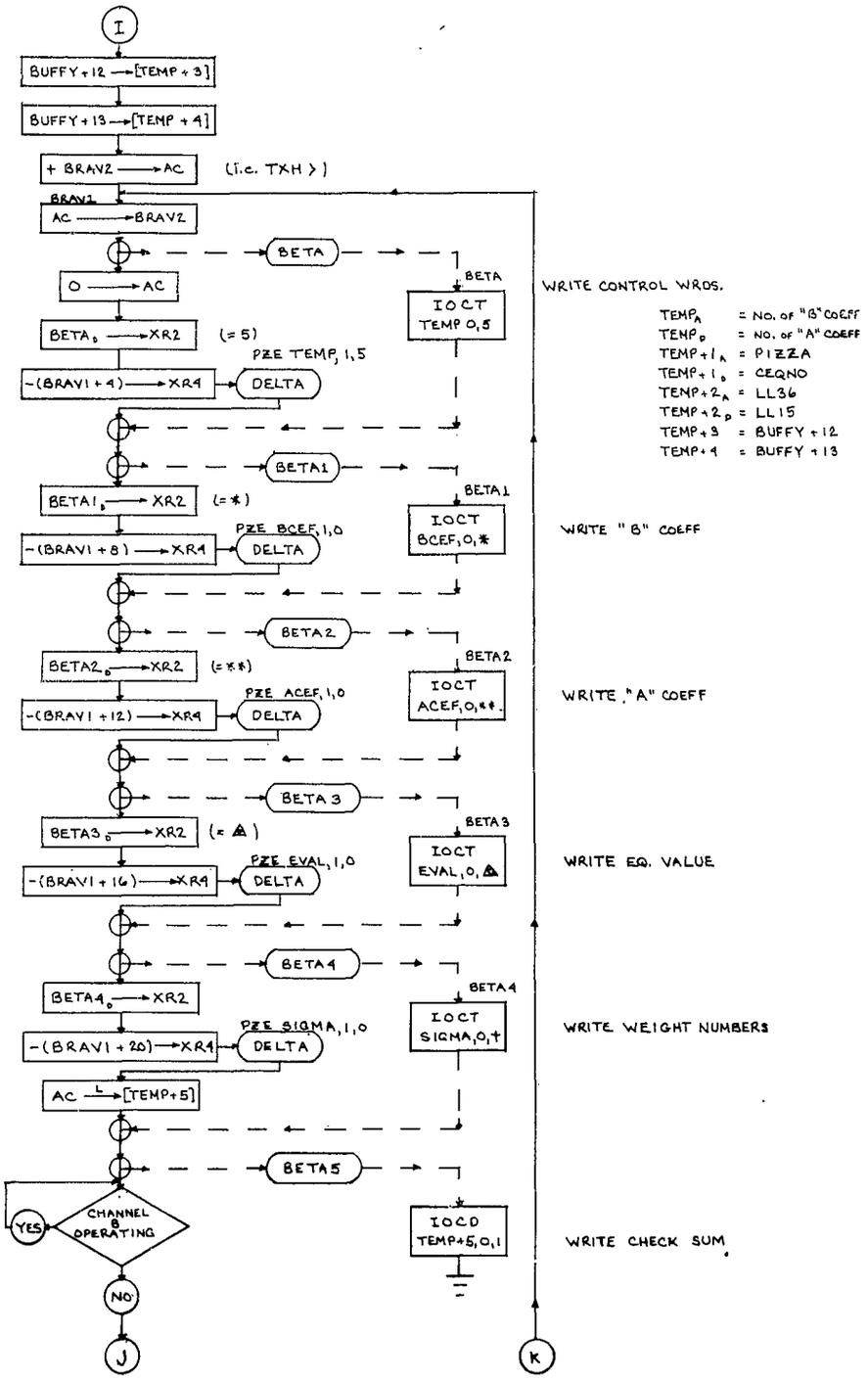
* NUMBER OF "B" COEFF TO WRITE

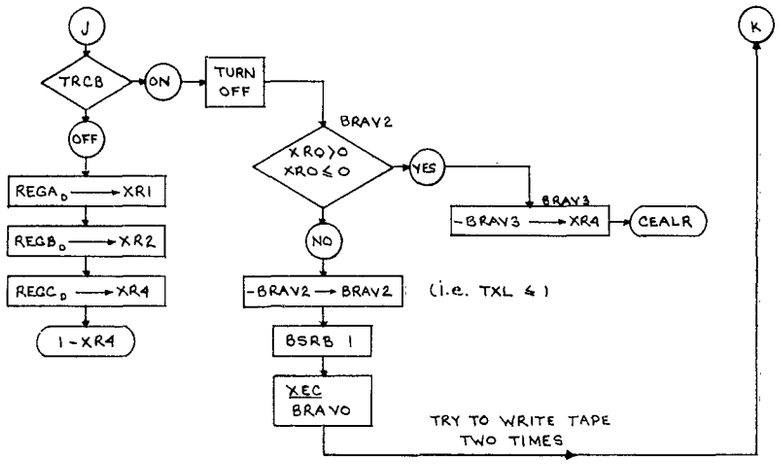
(**) = NUMBER OF "A" COEFF TO WRITE

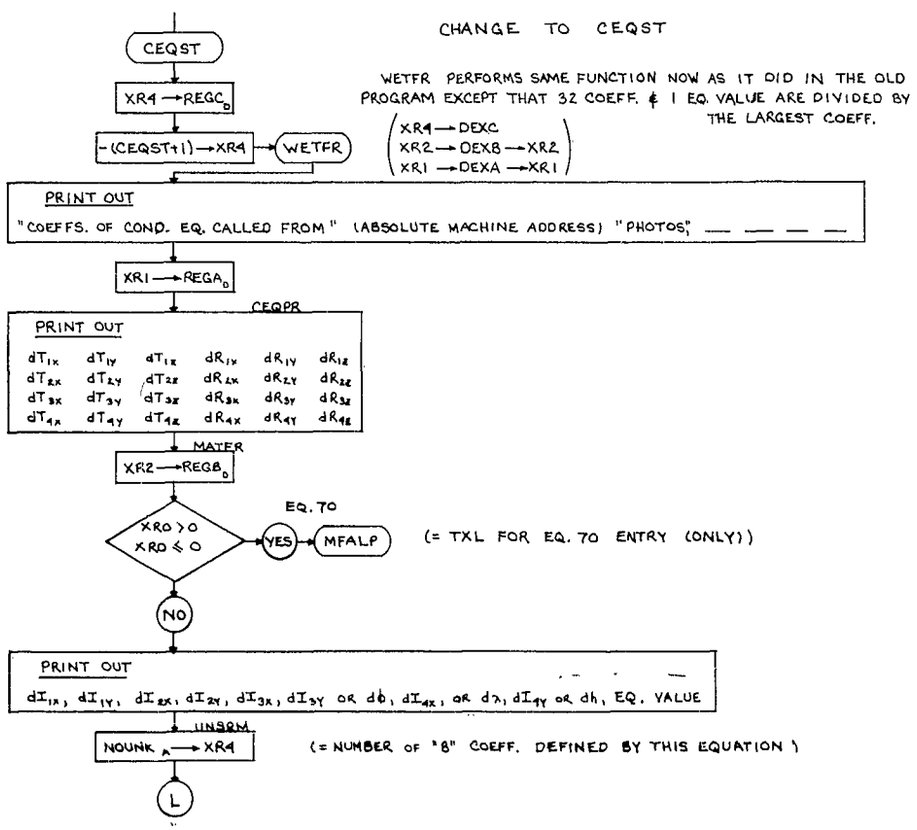
▲ = NUMBER OF EQUATION VALUES TO WRITE

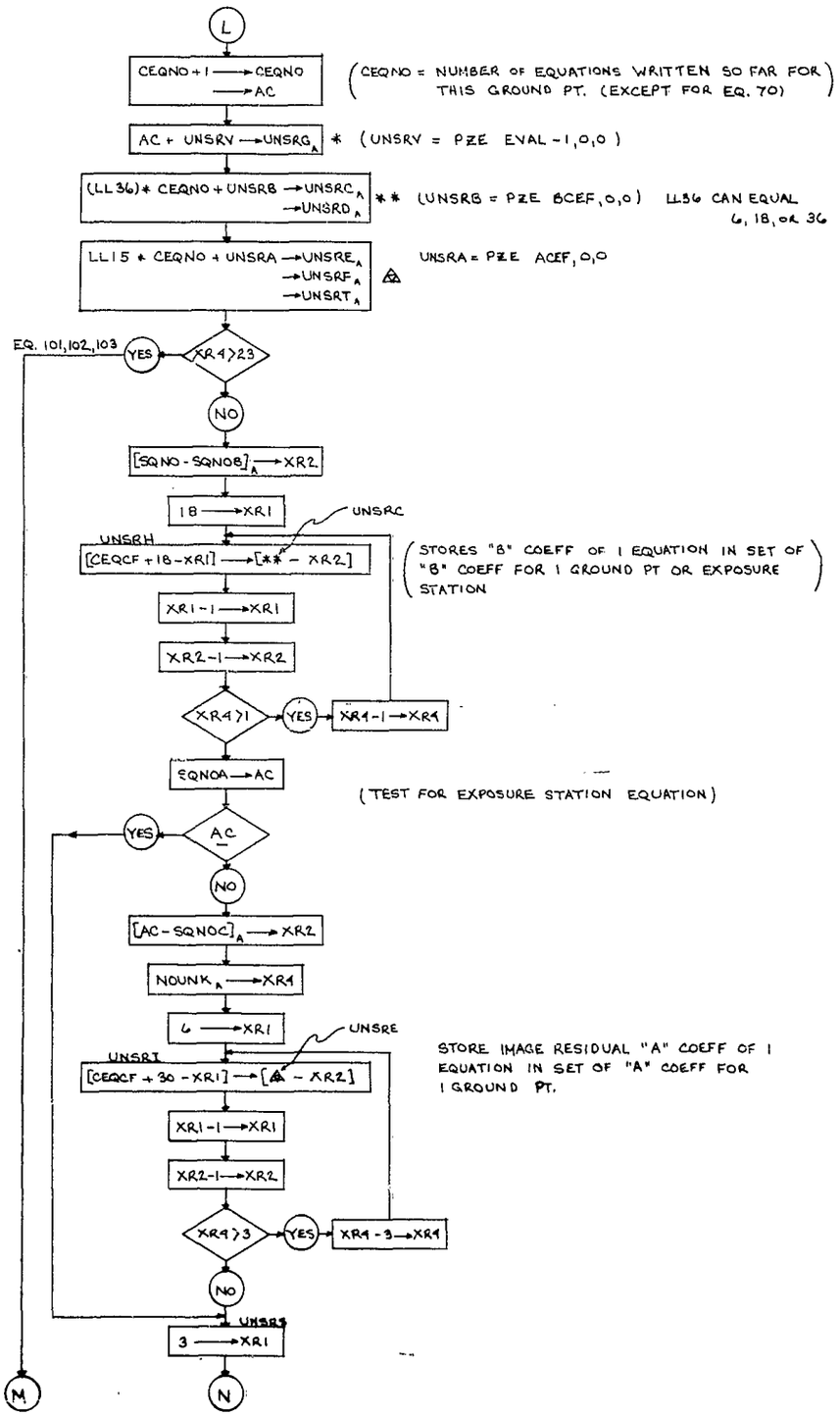
IF 0 INDICATES 1 STRIP
IF SOME OTHER VALUE, INDICATES 2 STRIPS

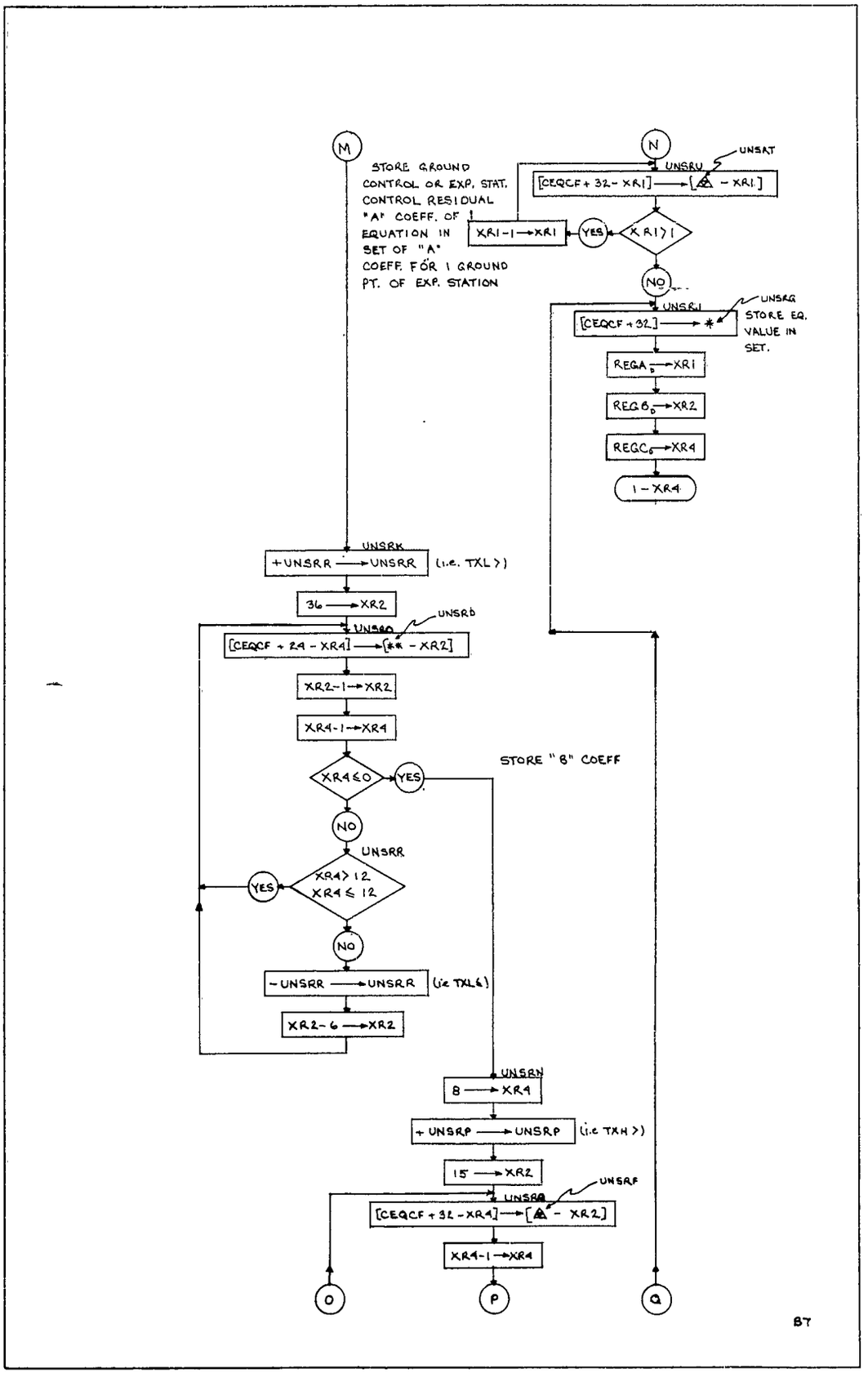
† = NUMBER OF WEIGHT NUMBERS THIS GRD PT OR EXP ST.

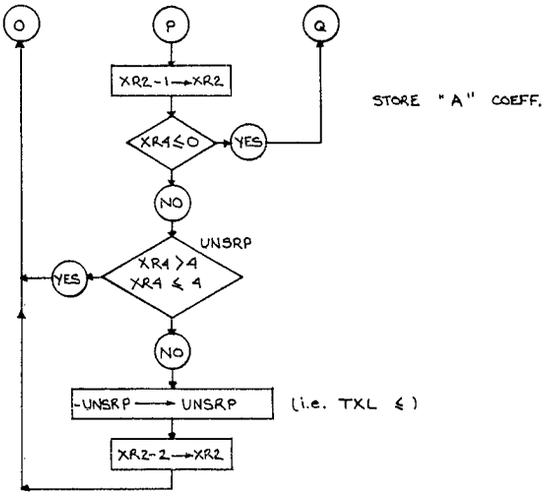

I
BUFFY+12 → [TEMP+3]
BUFFY+13 → [TEMP+4]
+ BRAV2 → AC
(i.e. TXH >)
BRAV2
AC → BRAV2
BETA
BETA
IOCT TEMP 0,5
WRITE CONTROL WRDS.
TEMP$_A$ = No. of "B" COEFF
TEMP$_D$ = No. of "A" COEFF
TEMP+1$_A$ = PIZZA
TEMP+1$_D$ = CEQNO
TEMP+2$_A$ = LL36
TEMP+2$_D$ = LL15
TEMP+3 = BUFFY+12
TEMP+4 = BUFFY+13
0 → AC
BETA$_D$ → XR2
(= 5)
PZE TEMP, 1,5
-(BRAV1+4) → XR4
DELTA
BETA1
BETA1
BETA1$_D$ → XR2
(= *)
PZE BCEF, 1,0
-(BRAV1+8) → XR4
DELTA
IOCT BCEF,0,*
WRITE "B" COEFF
BETA2
BETA2
BETA2$_D$ → XR2
(= **)
PZE ACEF, 1,0
-(BRAV1+12) → XR4
DELTA
IOCT ACEF,0,**
WRITE "A" COEFF
BETA3
BETA3
BETA3$_D$ → XR2
(= ▲)
PZE EVAL, 1,0
-(BRAV1+16) → XR4
DELTA
IOCT EVAL,0,▲
WRITE EQ. VALUE
BETA4
BETA4
BETA4$_D$ → XR2
PZE SIGMA, 1,0
-(BRAV1+20) → XR4
DELTA
IOCT SIGMA,0,+
WRITE WEIGHT NUMBERS
AC → [TEMP+5]
BETA5
CHANNEL B OPERATING
YES
NO
IOCD TEMP+5,0,1
WRITE CHECK SUM
J
K


J
TRCB
ON
OFF
TURN OFF
BRAV2
XRO>0
XRO≤0
YES
NO
BRAV3
-BRAV3 → XR4
CEALR
K
REGA_D → XR1
REGB_D → XR2
REGC_D → XR4
1-XR4
-BRAV2 → BRAV2
(i.e. TXL ≤ 1)
BSRB 1
XEC BRAVO
TRY TO WRITE TAPE TWO TIMES

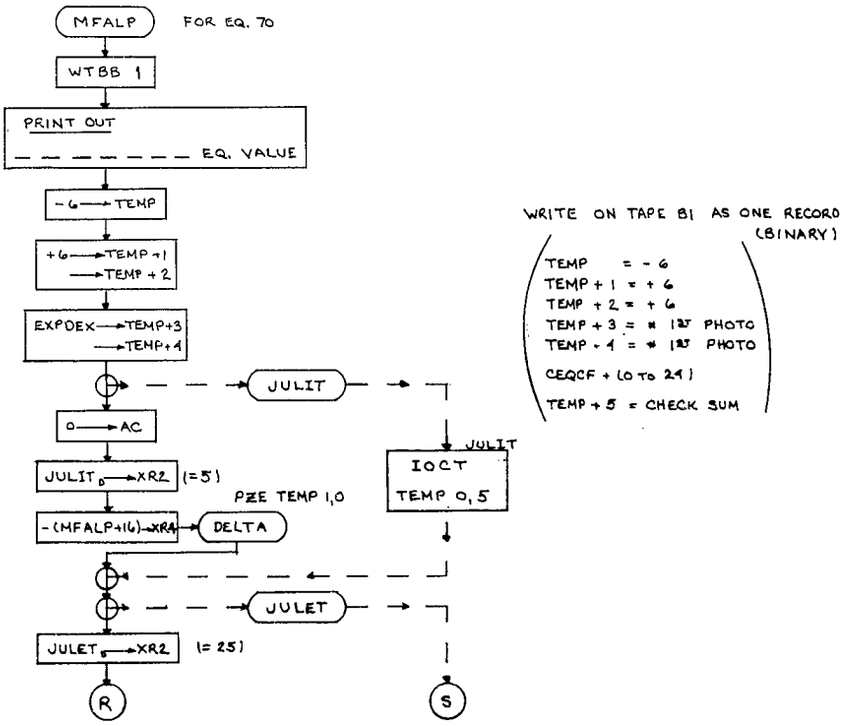

CHANGE TO CEQST
CEQST
XR4 → REGC_D
-(CEQST+1) → XR4
WETFR
WETFR PERFORMS SAME FUNCTION NOW AS IT DID IN THE OLD PROGRAM EXCEPT THAT 32 COEFF. & 1 EQ. VALUE ARE DIVIDED BY THE LARGEST COEFF.
XR4 → DEXC
XR2 → DEXB → XR2
XR1 → DEXA → XR1
PRINT OUT
"COEFFS. OF COND. EQ. CALLED FROM" (ABSOLUTE MACHINE ADDRESS) "PHOTOS" ___ ___ ___ ___
XR1 → REGA_D
CEQPR
PRINT OUT
dT1x dT1y dT1z dR1x dR1y dR1z
dT2x dT2y dT2z dR2x dR2y dR2z
dT3x dT3y dT3z dR3x dR3y dR3z
dT4x dT4y dT4z dR4x dR4y dR4z
MATER
XR2 → REGB_D
EQ. 70
XRO>0
XRO≤0
YES
MFALP
(= TXL FOR EQ. 70 ENTRY (ONLY))
NO
PRINT OUT
dI1x, dI1y, dI2x, dI2y, dI3x, dI3y OR db, dI4x, OR dλ, dI4y OR dh, EQ. VALUE
UNSRM
NOUNK_A → XR4
(= NUMBER OF "8" COEFF. DEFINED BY THIS EQUATION)
L

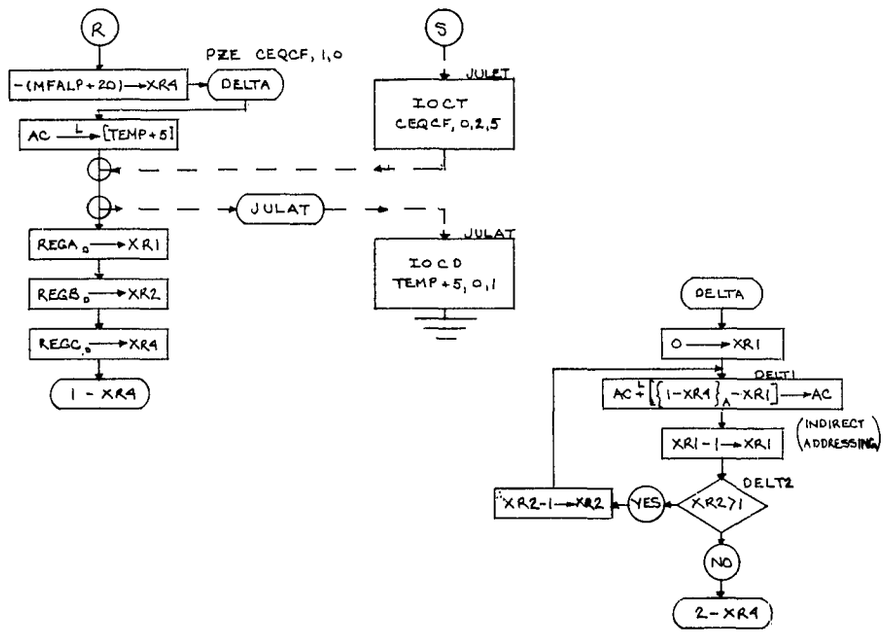

L
CEQNO + 1 → CEQNO
→ AC
(CEQNO = NUMBER OF EQUATIONS WRITTEN SO FAR FOR THIS GROUND PT. (EXCEPT FOR EQ. 70))
AC + UNSRV → UNSRG_A *
(UNSRV = PZE EVAL -1,0,0)
(LL36) * CEQNO + UNSRB → UNSRC_A
→ UNSRD_A **
(UNSRB = PZE BCEF,0,0)
LL36 CAN EQUAL 6, 18, OR 36
LL15 * CEQNO + UNSRA → UNSRE_A
→ UNSRF_A
→ UNSRT_A
UNSRA = PZE ACEF,0,0
EQ. 101,102,103
YES
XR4 > 23
NO
[SQNO - SQNOB]_A → XR2
18 → XR1
UNSRC
UNSRH
[CEQCF + 18 - XR1] → [** - XR2]
(STORES "B" COEFF OF 1 EQUATION IN SET OF "B" COEFF FOR 1 GROUND PT OR EXPOSURE STATION)
XR1 - 1 → XR1
XR2 - 1 → XR2
XR4 > 1
YES
XR4 - 1 → XR4
SQNOA → AC
(TEST FOR EXPOSURE STATION EQUATION)
YES
AC
NO
[AC - SQNOC]_A → XR2
NOUNK_A → XR4
6 → XR1
UNSRE
UNSRI
[CEQCF + 30 - XR1] → [A - XR2]
STORE IMAGE RESIDUAL "A" COEFF OF 1 EQUATION IN SET OF "A" COEFF FOR 1 GROUND PT.
XR1 - 1 → XR1
XR2 - 1 → XR2
XR4 > 3
YES
XR4 - 3 → XR4
NO
UNSRS
3 → XR1
M
N


M
STORE GROUND CONTROL OR EXP. STAT. CONTROL RESIDUAL "A" COEFF. OF EQUATION IN SET OF "A" COEFF. FOR 1 GROUND PT. OF EXP. STATION
N
UNSAT
UNSRU
[CEQCF + 32 - XR1] → [Δ - XR1]
XR1 > 1
YES
XR1 - 1 → XR1
NO
UNSRU
UNSRQ
[CEQCF + 32] → *
STORE EQ. VALUE IN SET.
REGA$_5$ → XR1
REGB$_5$ → XR2
REGC$_5$ → XR4
1 - XR4
UNSRK
+ UNSRR → UNSRR (i.e. TXL >)
36 → XR2
UNSRO
UNSRD
[CEQCF + 24 - XR4] → [** - XR2]
XR2 - 1 → XR2
XR4 - 1 → XR4
XR4 ≤ 0
YES
STORE "B" COEFF
NO
UNSRR
XR4 > 12
XR4 ≤ 12
YES
NO
- UNSRR → UNSRR (i.e TXL &)
XR2 - 6 → XR2
UNSRN
8 → XR4
+ UNSRP → UNSRP (i.e TXH >)
15 → XR2
UNSRF
UNSRQ
[CEQCF + 32 - XR4] → [Δ - XR2]
XR4 - 1 → XR4
O
P
Q
B7

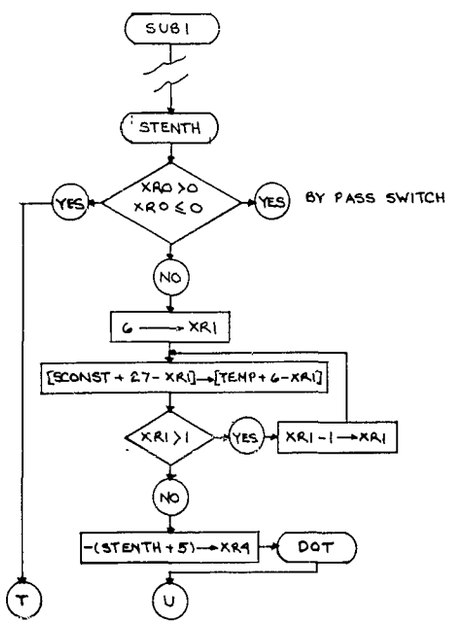


EQ. 70 TAPE WRITING ROUTINE



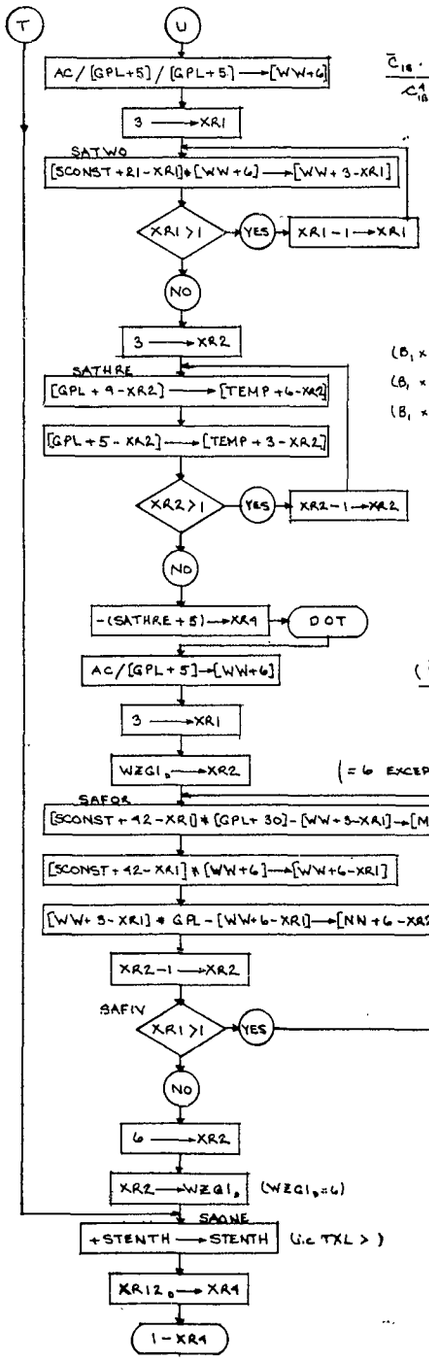


ADDITIONS TO SUB 1



C_{18X} TRANSFERED TO TEMP+0
C_{18Y} " " TEMP+1
C_{18Z} " " TEMP+2
B_{1X} " " TEMP+3
B_{1Y} " " TEMP+4
B_{1Z} " " TEMP+5
(FLT)

$\bar{C}_{18} \cdot \bar{B}_1$ IN AC



$$\frac{\bar{C}_{16} \cdot \bar{B}_1}{\mathcal{C}_{16}^{1}} \quad \text{PLACED IN} \quad WW+6$$

$$\frac{\bar{C}_{16} \cdot \bar{B}_1}{\mathcal{C}_{16}^{1}} \cdot C_{16X} \quad \text{PLACED IN} \quad WW+0 \quad \left(= \frac{q\, C_{16X}^{\circ}}{\mathcal{C}_{16}^{2}}\right)$$

$$\frac{\bar{C}_{16} \cdot \bar{B}_1}{\mathcal{C}_{16}^{1}} \cdot C_{16Y} \quad \text{" "} \quad WW+1 \quad \left(= \frac{q\, C_{16Y}^{\circ}}{\mathcal{C}_{16}^{2}}\right)$$

$$\frac{\bar{C}_{16} \cdot \bar{B}_1}{\mathcal{C}_{16}^{1}} \cdot C_{16Z} \quad \text{" "} \quad WW+2 \quad \left(= \frac{q\, C_{16Z}^{\circ}}{\mathcal{C}_{16}^{2}}\right)$$

$(B_1 \times A_1^{\circ})_X$	TRANSFERED TO	TEMP + 3	C_{16X}	TRANSFERED TO	TEMP + 0
$(B_1 \times A_1^{\circ})_Y$	"	TEMP + 4	C_{16Y}	"	TEMP + 1
$(B_1 \times A_1^{\circ})_Z$	"	TEMP + 5	C_{16Z}	"	TEMP + 2

$$\frac{(\bar{B}_1 \times \bar{A}_1^{\circ}) \cdot \bar{C}_{16}^{\circ}}{\mathcal{C}_{16}} \quad \text{PLACED IN} \quad WW+6 \quad (= a_2)$$

(= 6 EXCEPT FOR EQ 101, 102, 103 SECOND ENTRY TO SUB1 WHERE $WZG1_0 = 3$)

$$\left[\frac{a_1 (A_2^{\circ} \times C_{16})_X}{\mathcal{C}_{16}^{2}} - \frac{q\, C_{16X}^{\circ}}{\mathcal{C}_{16}^{2}}\right] \quad \text{PLACED IN} \quad MM+0 \quad (= M_{1X})$$

$$\left[\frac{a_1 (A_2^{\circ} \times C_{16})_Y}{\mathcal{C}_{16}^{2}} - \frac{q\, C_{16Y}^{\circ}}{\mathcal{C}_{16}^{2}}\right] \quad \text{" "} \quad MM+1 \quad (= M_{1Y})$$

$$\left[\frac{a_1 (A_2^{\circ} \times C_{16})_Z}{\mathcal{C}_{16}^{2}} - \frac{q\, C_{16Z}^{\circ}}{\mathcal{C}_{16}^{2}}\right] \quad \text{" "} \quad MM+2 \quad (= M_{1Z})$$

$$\left[\frac{q\, C_{16X}^{\circ}}{\mathcal{C}_{16}^{2}} (\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) - \frac{a_2 (A_2^{\circ} \times C_{16})_X}{\mathcal{C}_{16}^{2}}\right] \quad \text{" "} \quad NN+0 \quad (= N_{1X})$$

$$\left[\frac{q\, C_{16Y}^{\circ}}{\mathcal{C}_{16}^{2}} (\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ}) - \frac{a_2 (A_2^{\circ} \times C_{16})_Y}{\mathcal{C}_{16}^{2}}\right] \quad \text{" "} \quad NN+1 \quad (= N_{1Y})$$

$$\left[\frac{q\, C_{16Z}^{\circ}}{\mathcal{C}_{16}^{2}} (\bar{A}_1^{\circ} \cdot \bar{A}_2^{\circ} - \frac{a_2 (A_2^{\circ} \times C_{16})_Z}{\mathcal{C}_{16}^{2}}\right] \quad \text{" "} \quad NN+2 \quad (= N_{1Z})$$

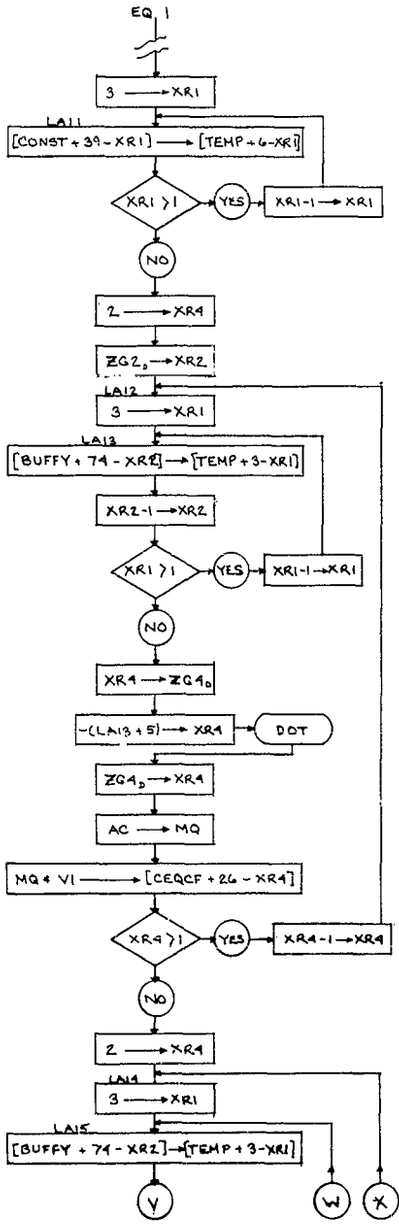
AFTER SECOND ENTRY FOR EQ 101, 102, 103

M_{3X}	PLACED	IN	MM + 3
M_{3Y}	"	"	MM + 4
M_{3Z}	"	"	MM + 5
N_{3X}	"	"	NN + 3
N_{3Y}	"	"	NN + 4
N_{3Z}	"	"	NN + 5

ADDITIONS TO EQ 1

IN CALLING SEQUENCE

PHOTOS		1,2	2,3	1*, 2*	2*, 3*
$SQNO_A$	=	36	30	18	12
$ZG2_D$	=	36	30	18	12
$SQNOA_A$	=	15	13	9	7



1ST LOOP.

C_{10X}^{*} TRANSFERED TO TEMP + 3
C_{10Y}^{*} " " TEMP + 4
C_{10Z}^{*} " " TEMP + 5

$t_{11}^{(1)}$ TRANSFERED TO TEMP
$t_{21}^{(1)}$ " " TEMP + 1
$t_{31}^{(1)}$ " " TEMP + 2

$AC = C_{10X}^{*} t_{11}^{(1)} + C_{10Y}^{*} t_{21}^{(1)} + C_{10Z}^{*} t_{31}^{(1)}$

dI_H STORED IN CEQCF + 24

2ND LOOP

$t_{12}^{(1)}$ TRANSFERED TO TEMP
$t_{22}^{(1)}$ " " TEMP + 1
$t_{32}^{(1)}$ " " TEMP + 2

$AC = C_{10X}^{*} t_{12}^{(1)} + C_{10Y}^{*} t_{22}^{(1)} + C_{10Z}^{*} t_{32}^{(1)}$

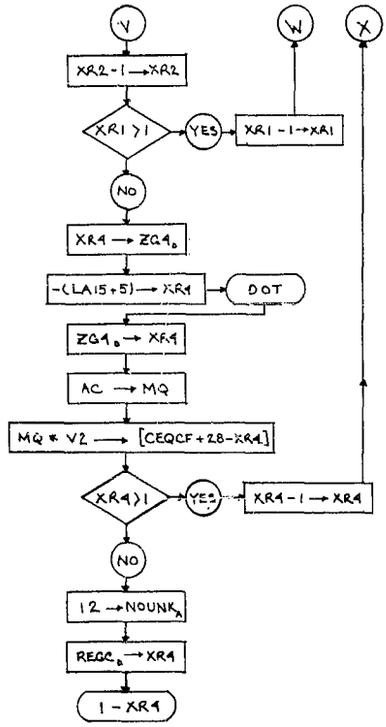
dI_H STORED IN CEQCF + 25

1ST LOOP

$t_{11}^{(2)}$ TRANSFERED TO TEMP
$t_{21}^{(2)}$ " " TEMP + 1
$t_{31}^{(2)}$ " " TEMP + 2

2ND LOOP

$t_{12}^{(2)}$ TRANSFERED TO TEMP
$t_{22}^{(2)}$ " " TEMP + 1
$t_{32}^{(2)}$ " " TEMP + 2

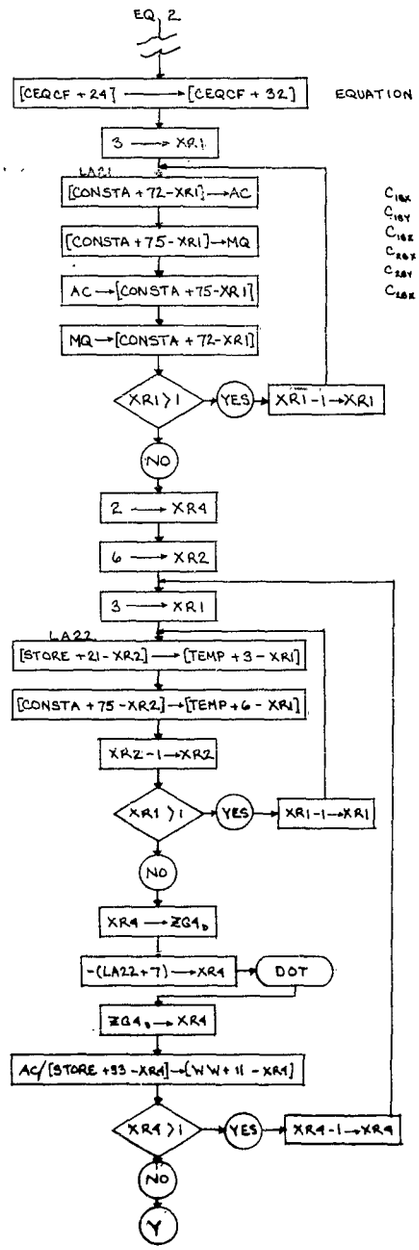


1ST LOOP	2ND LOOP
$AC = C_{10X}^{*} t_{X}^{(1)} + C_{10Y}^{*} t_{Z1}^{(1)} + C_{10Z}^{*} t_{S1}^{(1)}$	$AC = C_{10X}^{*} t_{12}^{(1)} + C_{10Y}^{*} t_{S2}^{(1)} + C_{10Z}^{*} t_{S2}^{(1)}$
dI_{RX} STORED IN CEQCF+26	dI_{RY} STORED IN CEQCF+27
$NOUNK_A = 12$	

ADDITIONS TO EQ 2

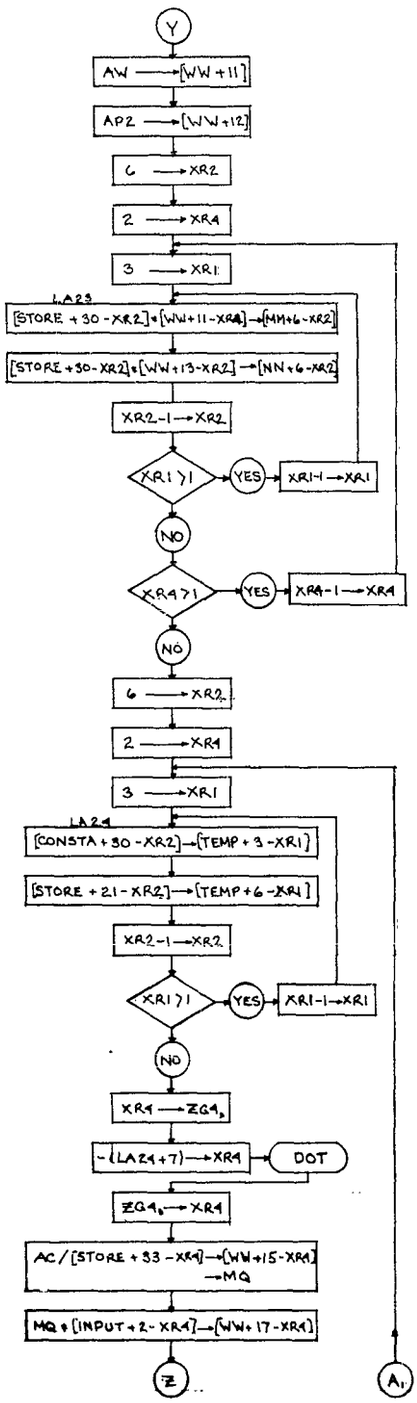
	1,2,3	1st 2nd 3rd
SQNO	36	18
ZQ2$_D$	36	18
SQNOA	15	9

} FROM CALLING SEQUENCE FOR EQ 1 (1ST PAIRS)



C_{18X}	TRANSFERED	TO	CONSTA + 69
C_{18Y}	"	"	CONSTA + 70
C_{18Z}	"	"	CONSTA + 71
C_{20X}	"	"	CONSTA + 72
C_{20Y}	"	"	CONSTA + 73
C_{20Z}	"	"	CONSTA + 74

1ST LOOP			2ND LOOP		
$(B_1 \times A_2^*)_X$	TRANSFERED TO	TEMP	$(B_2 \times A_2^*)_X$	TRANSFERED TO	TEMP
$(B_1 \times A_2^*)_Y$	"	TEMP + 1	$(B_2 \times A_2^*)_Y$	"	TEMP + 1
$(B_1 \times A_2^*)_Z$	"	TEMP + 2	$(B_2 \times A_2^*)_Z$	"	TEMP + 2
C_{18X}	"	TEMP + 3	C_{20X}	"	TEMP + 3
C_{18Y}	"	TEMP + 4	C_{20Y}	"	TEMP + 4
C_{18Z}	"	TEMP + 5	C_{20Z}	"	TEMP + 5
$(\bar{B}_1 \times \bar{A}_2^*) \cdot \bar{C}_{18}$ PLACED IN AC			$(\bar{B}_2 \times \bar{A}_2^*) \cdot \bar{C}_{20}$ PLACED IN AC		
$\dfrac{(\bar{B}_1 \times \bar{A}_2^*) \cdot \bar{C}_{18}}{\mathcal{L}_{18}^2}$ STORED IN WW + 9 $(= \theta_1 = V_1)$			$\dfrac{(\bar{B}_2 \times \bar{A}_2^*) \cdot \bar{C}_{20}}{\mathcal{L}_{20}^2}$ STORED IN WW + 10 $(= \theta_3)$		



a_L TRANSFERED TO WW + 11

a_L' " " WW + 12

1ST LOOP		2ND LOOP	
$a_1(A_1^* \times C_{18})_x$	STORED IN MM+0	$a_3(A_3^* \times C_{28})_x$	STORED IN MM+3
$a_1(A_1^* \times C_{18})_y$	" " MM+1	$a_3(A_3^* \times C_{28})_y$	" " MM+4
$a_1(A_1^* \times C_{18})_z$	" " MM+2	$a_3(A_3^* \times C_{28})_z$	" " MM+5
$a_2(A_1^* \times C_{18})_x$	" " NN+0	$a_2'(A_3^* \times C_{28})_x$	" " NN+3
$a_2(A_1^* \times C_{18})_y$	" " NN+1	$a_2'(A_3^* \times C_{28})_y$	" " NN+4
$a_2(A_1^* \times C_{18})_z$	" " NN+2	$a_2'(A_3^* \times C_{28})_z$	" " NN+5

1ST LOOP		2ND LOOP	
a_{1x}^*	TRANSFERED TO TEMP+0	a_{3x}^*	TRANSFERED TO TEMP+0
a_{1y}^*	" " TEMP+1	a_{3y}^*	" " TEMP+1
a_{1z}^*	" " TEMP+2	a_{3z}^*	" " TEMP+2
$(B_1 \times A_2^*)_x$	" " TEMP+3	$(B_2 \times A_2^*)_x$	" " TEMP+3
$(B_1 \times A_2^*)_y$	" " TEMP+4	$(B_2 \times A_2^*)_y$	" " TEMP+4
$(B_1 \times A_2^*)_z$	" " TEMP+5	$(B_2 \times A_2^*)_z$	" " TEMP+5

$\bar{A}_1^* \cdot (\bar{B}_1 \times \bar{A}_2^*)$ PLACED IN AC

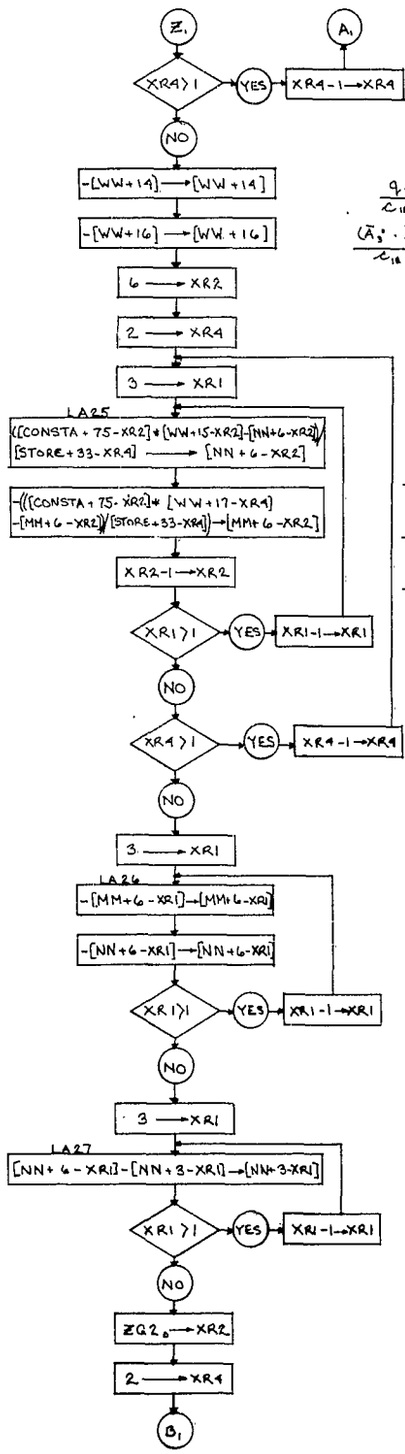
$\bar{A}_2^* \cdot (\bar{B}_2 \times \bar{A}_2^*)$ PLACED IN AC

$\dfrac{\bar{A}_1^* \cdot (\bar{B}_1 \times \bar{A}_2^*)}{c_{18}^*}$ PLACED IN WW+13 $\left(\dfrac{= q_1}{c_{18}}\right)$

$\dfrac{\bar{A}_2^* \cdot (\bar{B}_2 \times \bar{A}_2^*)}{c_{28}^*}$ PLACED IN WW+14 $\left(\dfrac{= q_2}{c_{28}}\right)$

$(\bar{A}_1^* \cdot \bar{A}_2^*)\left[\dfrac{\bar{A}_1^* \cdot (\bar{B}_1 \times \bar{A}_2^*)}{c_{18}^*}\right]$ PLACED IN WW+15 $= \dfrac{(\bar{A}_2^* \cdot \bar{A}_1^*) q_1}{c_{18}}$

$(\bar{A}_2^* \cdot \bar{A}_2^*)\left[\dfrac{\bar{A}_2^* \cdot (\bar{B}_2 \times \bar{A}_2^*)}{c_{28}^*}\right]$ PLACED IN WW+16 $= -\dfrac{(\bar{A}_2^* \cdot \bar{A}_2^*) q_2}{c_{18}}$



$\frac{q_z}{c_{18}}$ PLACED IN WW + 14

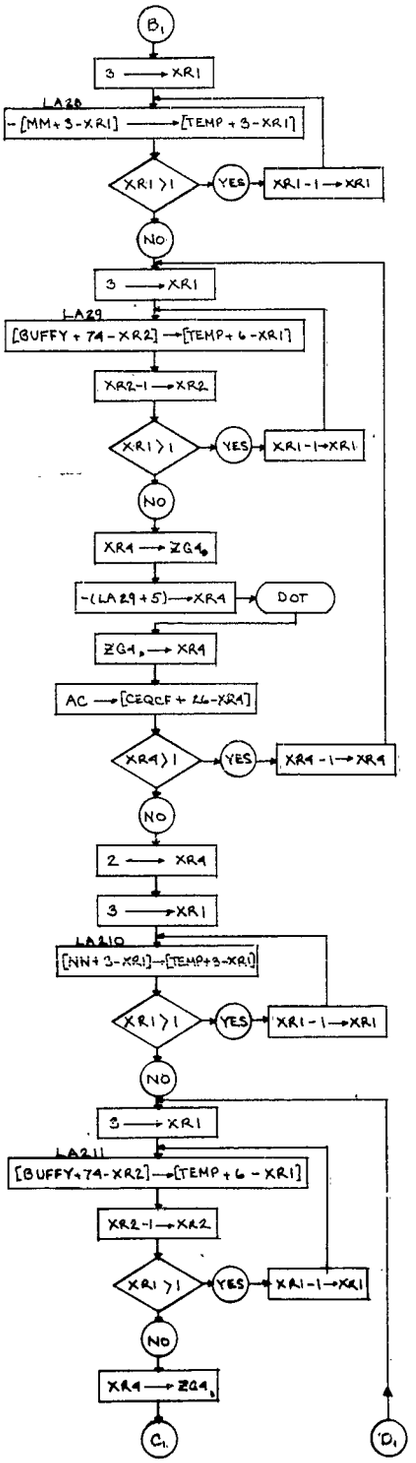
$\frac{(\bar{A}_3^* \cdot \bar{A}_z^*) q_z}{c_{18}}$ " " WW + 16

1ST LOOP		2ND LOOP	
$\frac{C_{18x}^* q - \partial_z (A_1^* \times C_{18})_x}{c_{18}^*}$	PLACED IN NN + 0 (= N_{zx})	$\frac{C_{28x}^* q_z - \partial_z' (A_3^* \times C_{28})_x}{c_{28}^*}$	PLACED IN NN + 3 (= N_{zx}')
$\frac{C_{18y}^* q - \partial_z (A_1^* \times C_{18})_y}{c_{18}^*}$	" NN + 1 (= N_{zy})	$\frac{C_{28y}^* q_z - \partial_z' (A_3^* \times C_{28})_y}{c_{28}^*}$	" NN + 4 (= N_{zy}')
$\frac{C_{18z}^* q - \partial_z (A_1^* \times C_{18})_z}{c_{18}^*}$	" NN + 2 (= N_{zz})	$\frac{C_{28z}^* q_z - \partial_z' (A_3^* \times C_{28})_z}{c_{28}^*}$	" NN + 5 (= N_{zz}')
$-\left[\frac{C_{18x}^* q (\bar{A}_z^* \cdot \bar{A}_1^*) - \partial_1 (A_1^* \times C_{18})_x}{c_{18}^*}\right]$	PLACED IN MM+0 (= M_{zx})	$-\left[\frac{C_{28x}^* (\bar{A}_3^* \cdot \bar{A}_z^*) q_z - \partial_3 (A_3^* \times C_{28})_x}{c_{28}^*}\right]$	PLACED IN MM+3 (= $-M_{zx}'$)
$-\left[\frac{C_{18y}^* q (\bar{A}_z^* \cdot \bar{A}_1^*) - \partial_1 (A_1^* \times C_{18})_y}{c_{18}^*}\right]$	PLACED IN MM+1 (= M_{zy})	$-\left[\frac{C_{28y}^* (\bar{A}_3^* \cdot \bar{A}_z^*) q_z - \partial_3 (A_3^* \times C_{28})_y}{c_{28}^*}\right]$	PLACED IN MM+4 (= $-M_{zy}'$)
$-\left[\frac{C_{18z}^* q (\bar{A}_z^* \cdot \bar{A}_1^*) - \partial_1 (A_1^* \times C_{18})_z}{c_{18}^*}\right]$	PLACED IN MM+2 (= M_{zz})	$-\left[\frac{C_{28z}^* (\bar{A}_3^* \cdot \bar{A}_z^*) q_z - \partial_3 (A_3^* \times C_{28})_z}{c_{28}^*}\right]$	PLACED IN MM+5 (= $-M_{zz}'$)

M_{zx}'	PLACED IN	MM + 3
M_{zy}'	" "	MM + 4
M_{zz}'	" "	MM + 5
N_{zx}'	" "	NN + 3
N_{zy}'	" "	NN + 4
N_{zz}'	" "	NN + 5

$(N_{zx}' - N_{zx})$	PLACED IN	NN + 0
$(N_{zy}' - N_{zy})$	" "	NN + 1
$(N_{zz}' - N_{zz})$	" "	NN + 2

$-M_{zx}$	TRANSFERED TO	TEMP + 0
$-M_{zy}$	" "	TEMP + 1
$-M_{zz}$	" "	TEMP + 2



1ST LOOP	2ND LOOP
$t_{11}^{(1)}$ TRANSFERED TO TEMP+3	$t_{12}^{(1)}$ TRANSFERED TO TEMP+3
$t_{21}^{(1)}$ " " TEMP+4	$t_{22}^{(1)}$ " " TEMP+4
$t_{31}^{(1)}$ " " TEMP+5	$t_{32}^{(1)}$ " " TEMP+5

$AC = -M_{2X}t_{11}^{(1)} - M_{2Y}t_{21}^{(1)} - M_{2Z}t_{31}^{(1)}$ $(=dI_{1X})$

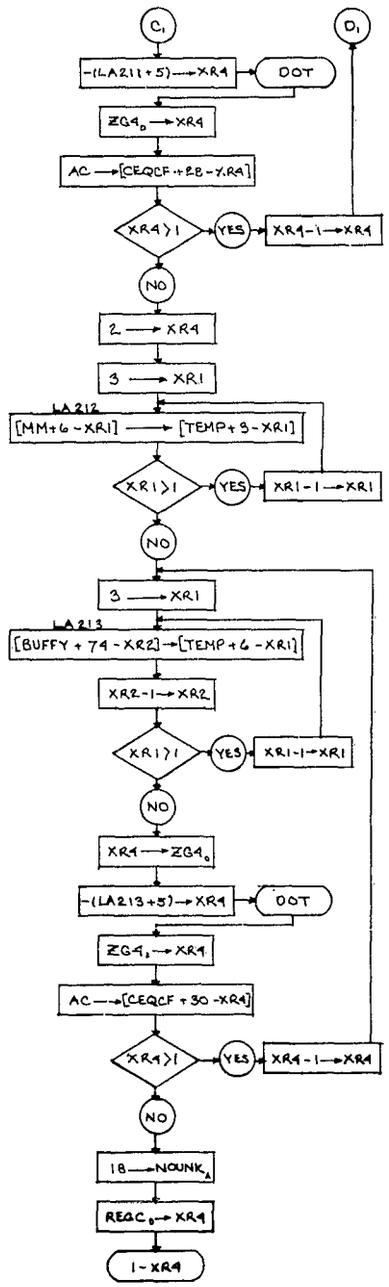
$AC = -M_{2X}^{(1)}t_{12} - M_{2Y}t_{22}^{(1)} - M_{2Z}t_{32}^{(1)}$ $(=dI_{1Y})$

dI_{1X} STORED IN CEQCF+24

dI_{1Y} STORED IN CEQCF+25

$(N_{2X}' - N_{2X})$ TRANSFERED TO TEMP+0
$(N_{2Y}' - N_{2Y})$ " TEMP+1
$(N_{2Z}' - N_{2Z})$ " TEMP+2

1ST LOOP	2ND LOOP
$t_{11}^{(1)}$ TRANSFERED TO TEMP+3	$t_{12}^{(1)}$ TRANSFERED TO TEMP+3
$t_{21}^{(1)}$ " " TEMP+4	$t_{22}^{(1)}$ " " TEMP+4
$t_{31}^{(1)}$ " " TEMP+5	$t_{32}^{(1)}$ " " TEMP+5



$AC = (N_{2X}' - N_{2X})t_{11}^{(1)} + (N_{2Y}' - N_{2Y})t_{21}^{(1)} + (N_{2Z}' - N_{2Z})t_{31}^{(1)}$ $(= dI_{2X})$

$AC = (N_{2X}' - N_{2X})t_{12}^{(1)} + (N_{2Y}' - N_{2Y})t_{22}^{(1)} + (N_{2Z}' - N_{2Z})t_{32}^{(1)}$ $(= dI_{2Y})$

dI_{2X} STORED IN CEQCF+26

dI_{2Y} STORED IN CEQCF+27

M_{2X}' TRANSFERED TO TEMP+0

M_{2Y}' " " TEMP+1

M_{2Z}' " " TEMP+2

1ST LOOP	2ND LOOP
$t_{11}^{(3)}$ TRANSFERED TO TEMP+3	$t_{12}^{(3)}$ TRANSFERED TO TEMP+3
$t_{21}^{(3)}$ " " TEMP+4	$t_{22}^{(3)}$ " " TEMP+4
$t_{31}^{(3)}$ " " TEMP+5	$t_{32}^{(3)}$ " " TEMP+5

$AC = M_{2X}'t_{11}^{(3)} + M_{2Y}'t_{21}^{(3)} + M_{2Z}'t_{31}^{(3)}$ $(= dI_{3X})$

$AC = M_{2X}'t_{12}^{(3)} + M_{2Y}'t_{22}^{(3)} + M_{2Z}'t_{32}^{(3)}$ $(= dI_{3Y})$

dI_{3X} STORED IN CEQCF+28

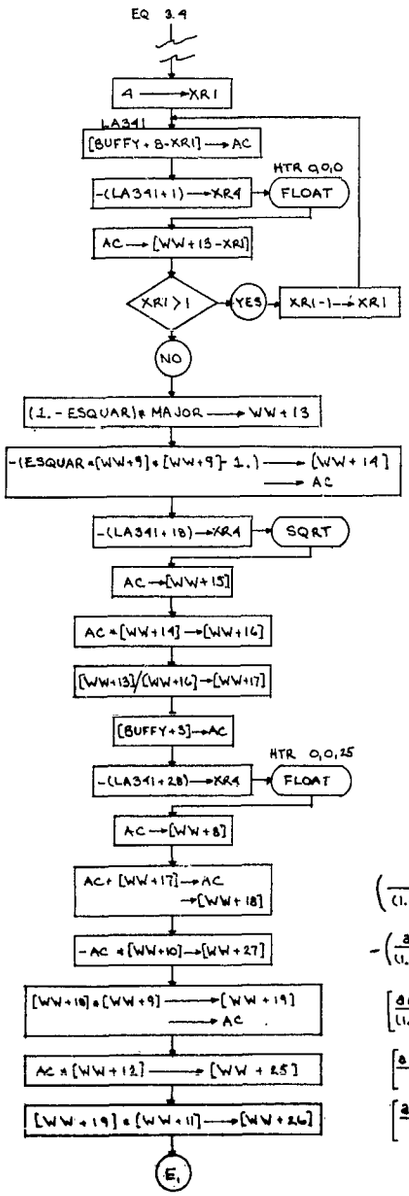
dI_{3Y} STORED IN CEQCF+29

$NOUNK_A = 18$

ADDITIONS TO EQ3 & EQ 4

IN CALLING SEQUENCE

	PHOTO 1	2	3	1*	2*	3*
SQNO	36	30	24	18	12	6
EQ2	36	30	24	18	12	6
SQNOA	15	13	11	9	7	5
NOUNK	6	6	6	6	6	6



SIN ϕ FLOATED AND STORED IN WW + 9
COS ϕ " " " " WW + 10
SIN λ " " " " WW + 11
COS λ " " " " WW + 12
(FLT)

ESQUAR = e^2
MAJOR = a
(FLT)

$a(1-e^2)$ PLACED IN WW + 13 (FLT)

$(1.-e^2\sin^2\phi)$ PLACED IN WW + 14 (FLT)

$(1.-e^2\sin^2\phi)^{1/2}$ PLACED IN WW + 15 (FLT)

$(1.-e^2\sin^2\phi)^{3/2}$ " " WW+16 (FLT)

$\dfrac{a(1.-e^2)}{(1.-e^2\sin^2\phi)^{3/2}}$ " " WW+17 (FLT)

h PLACED IN WW + 8 (FLT)

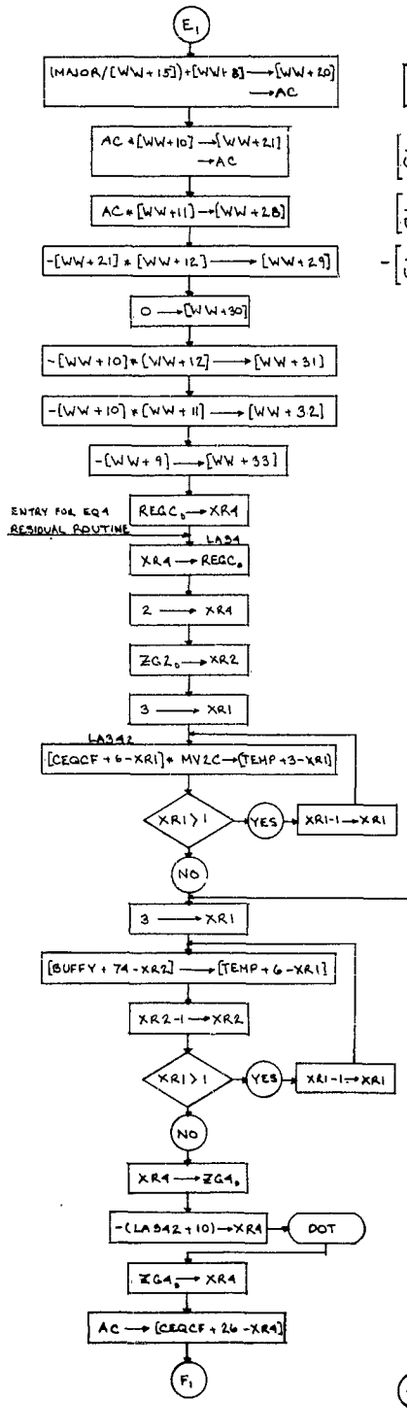
$\left(\dfrac{a(1.-e^2)}{(1.-e^2\sin^2\phi)^{3/2}}+h\right)$ PLACED IN WW + 18 (FLT)

$-\left(\dfrac{a(1.-e^2)\cos\phi}{(1.-e^2\sin^2\phi)^{3/2}}+h\cos\phi\right)$ " " WW + 27 (FLT)

$\left[\dfrac{a(1.-e^2)\sin\phi}{(1.-e^2\sin^2\phi)^{3/2}}+h\sin\phi\right]$ " " WW + 19 (FLT)

$\left[\dfrac{a(1.-e^2)\sin\phi\cos\lambda}{(1.-e^2\sin^2\phi)^{3/2}}+h\sin\phi\cos\lambda\right]$ " " WW + 25 (FLT)

$\left[\dfrac{a(1.-e^2)\sin\phi\sin\lambda}{(1.-e^2\sin^2\phi)^{3/2}}+h\sin\phi\sin\lambda\right]$ " " WW + 26 (FLT)



$\left[\frac{a}{(1.-e^2\sin^2\phi)^{1/2}} + h\right]$ PLACED IN WW + 20 (FLT)

$\left[\frac{a\cos\phi}{(1.-e^2\sin^2\phi)^{1/2}} + h\cos\phi\right]$ " " WW + 21 (FLT)

$\left[\frac{a\cos\phi\sin\lambda}{(1.-e^2\sin^2\phi)^{1/2}} + h\cos\phi\sin\lambda\right]$ " " WW + 28 (FLT)

$-\left[\frac{a\cos\phi\sin\lambda}{(1.-e^2\sin^2\phi)^{1/2}} + h\cos\phi\sin\lambda\right]$ " " WW + 29 (FLT)

0 " " WW + 30

$-\cos\phi\cos\lambda$ " " WW + 31 (FLT)

$-\cos\phi\sin\lambda$ " " WW + 32 (FLT)

$-\sin\phi$ " " WW + 33 (FLT)

EQ 3

$a_{02x}\cdot V_{2c}$ PLACED IN TEMP + 0
$a_{02y}\cdot V_{2c}$ " TEMP + 1
$a_{02z}\cdot V_{2c}$ " TEMP + 2

1ST LOOP

$t_{11}^{(1)}$ TRANSFERED TO TEMP + 3
$t_{21}^{(1)}$ " " TEMP + 4
$t_{31}^{(1)}$ " " TEMP + 5

$AC = A_{02x}\cdot V_{2c}t_{11} + A_{02y}\cdot V_{2c}t_{21} + A_{02z}\cdot V_{2c}t_{31}$ $(=dI_{nx})$

dI_{nx} PLACED IN CEQCF + 24

2ND LOOP

$t_{12}^{(1)}$ TRANSFERED TO TEMP + 3
$t_{22}^{(1)}$ " " TEMP + 4
$t_{32}^{(1)}$ " " TEMP + 5

$AC = A_{02x}\cdot V_{2c}t_{12} + A_{02y}\cdot V_{2c}t_{22} + A_{02z}\cdot V_{2c}t_{32}$ $(=dI_{ny})$

dI_{ny} PLACED IN CEQCF + 25

EQ 4

$-a_{01x}\cdot V_{2c}$ PLACED IN TEMP + 0
$-a_{01y}\cdot V_{2c}$ " " TEMP + 1
$-a_{01z}\cdot V_{2c}$ " " TEMP + 2

1ST LOOP

SAME AS FOR EQ3

$AC = -V_{2c}(a_{01x}\cdot t_{11} + A_{01y}\cdot t_{21} + A_{01z}\cdot t_{31})$ $(=dI_{nx})$

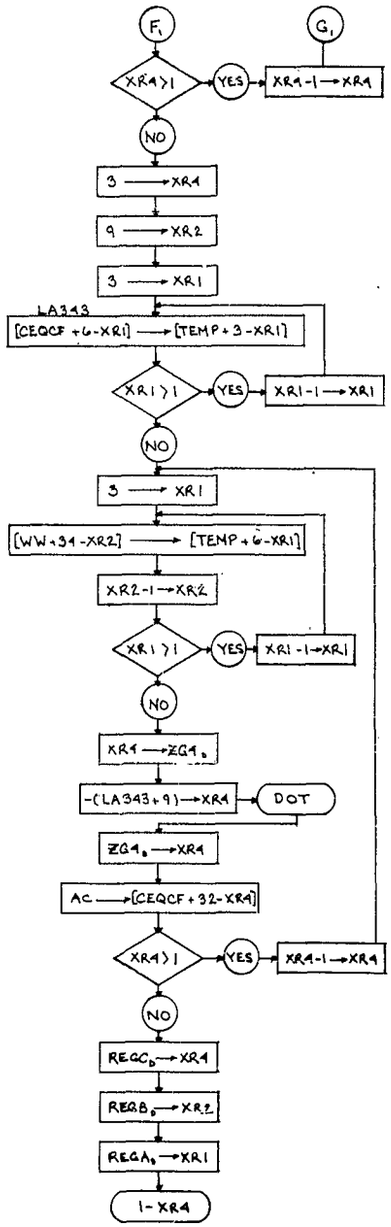
dI_{nx} PLACED IN CEQCF + 24

2ND LOOP

SAME AS FOR EQ 3

$AC = -V_{2c}(a_{01x}\cdot t_{12} + A_{01y}\cdot t_{22} + A_{01z}\cdot t_{32})$ $(=dI_{ny})$

dI_{ny} PLACED IN CEQCF + 25



EQ 3

$-a_{02X}^{*}$ TRANSFERED TO TEMP + 0

$-a_{02Y}^{*}$ " " TEMP + 1

$-a_{02Z}^{*}$ " " TEMP + 2

1st LOOP

$$AC = (-a_{02X}^{*})\left[\frac{a(1-e^2)\sin\phi\cos\lambda}{(1-e^2\sin^2\phi)^{3/2}} + h\sin\phi\cos\lambda\right]$$

$$+(-a_{02Y}^{*})\left[\frac{a(1-e^2)\sin\phi\sin\lambda}{(1-e^2\sin^2\phi)^{3/2}} + h\sin\phi\sin\lambda\right]$$

$$+(-a_{02Z}^{*})\left[-\frac{a(1-e^2)\cos\phi}{(1-e^2\sin^2\phi)^{3/2}} + h\cos\phi\right]$$

$$= d\phi$$

$d\phi$ STORED IN CEQCF + 29

2nd LOOP

$$AC = (-a_{02X}^{*})\left[\frac{a\cos\phi\sin\lambda}{(1-e^2\sin^2\phi)^{1/2}} + h\cos\phi\sin\lambda\right]$$

$$+(-a_{02Y}^{*})(+)\left[\frac{a\cos\phi\cos\lambda}{(1-e^2\sin^2\phi)^{1/2}} + h\cos\phi\cos\lambda\right]$$

$$+ 0$$

$$= d\lambda$$

$d\lambda$ STORED IN CEQCF + 30

3rd LOOP

$$AC = (-a_{02X}^{*})\,[-\cos\phi\cos\lambda]$$
$$+ (a_{02Y}^{*})\,[-\cos\phi\sin\lambda]$$
$$+ (a_{02Z}^{*})\,[-\sin\phi]$$
$$= dh$$

dh STORED IN CEQCF + 31

EQ 4

a_{01X}^{*} TRANSFERED TO TEMP + 1

a_{01Y}^{*} " " TEMP + 2

a_{01Z}^{*} " " TEMP + 3

1st LOOP

$$AC = d\phi$$

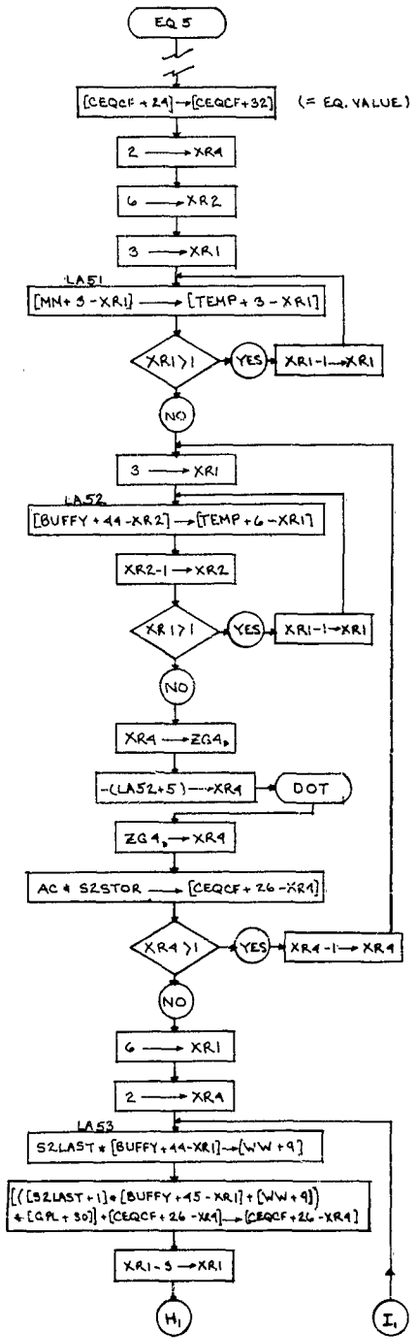
$d\phi$ STORED IN CEQCF + 29

2nd LOOP

$$AC = d\lambda$$

$d\lambda$ STORED IN CEQCF + 30

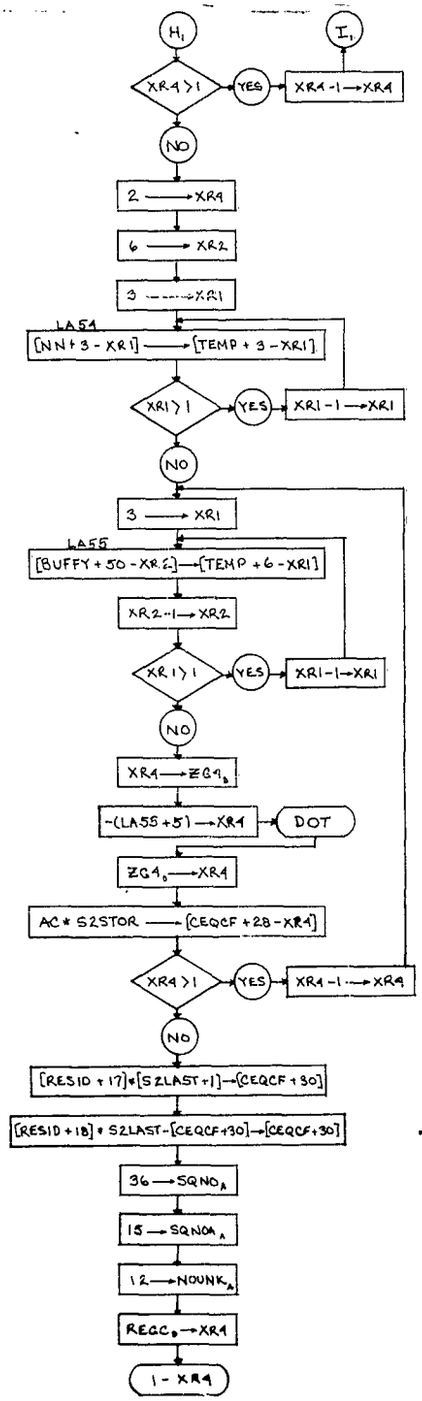
ADDITIONS TO EQ 5



M_{1X} TRANSFERED TO TEMP + 0
M_{1Y} " " TEMP + 1
M_{1R} " " TEMP + 2

1ST LOOP	2ND LOOP
t_{11}^{W} TRANSFERED TO TEMP + 3	t_{12}^{W} TRANSFERED TO TEMP + 3
t_{21}^{W} " " TEMP + 4	t_{22}^{W} TEMP + 4
t_{31}^{W} " " TEMP + 5	t_{32}^{W} TEMP + 5

$AC = M_{1X}t_{11} + M_{1Y}t_{21} + M_{1R}t_{31}$	$AC = M_{1X}t_{12} + M_{1Y}t_{22} + M_{1R}t_{32}$
$[\alpha a_{1X}^{+} - \beta a_{1Y}^{+}][M_{1X}t_{11} + M_{1Y}t_{21} + M_{1R}t_{31}]$ STORED IN CEQCF + 29	$[\alpha a_{1X}^{+} - \beta a_{1Y}^{+}][M_{1X}t_{12} + M_{1Y}t_{22} + M_{1R}t_{32}]$ STORED IN CEQCF + 25
αt_{11} STORED IN WW + 9	αt_{12} STORED IN WW + 9
$a_1(\alpha t_{11} - \beta t_{21}) + [\alpha a_{1X}^{+} - \beta a_{1Y}^{+}]$	$a_1(\alpha t_{12} - \beta t_{22}) + [\alpha a_{1X}^{+} - \beta a_{1Y}^{+}]$
$[M_{1X}t_{11} + M_{1Y}t_{21} + M_{1R}t_{31}]$	$[M_{1X}t_{12} + M_{1Y}t_{22} + M_{1R}t_{32}]$
$= dI_{1X}$ PLACED IN CEQCF + 29	$= dI_{1Y}$ PLACED IN CEQCF + 25



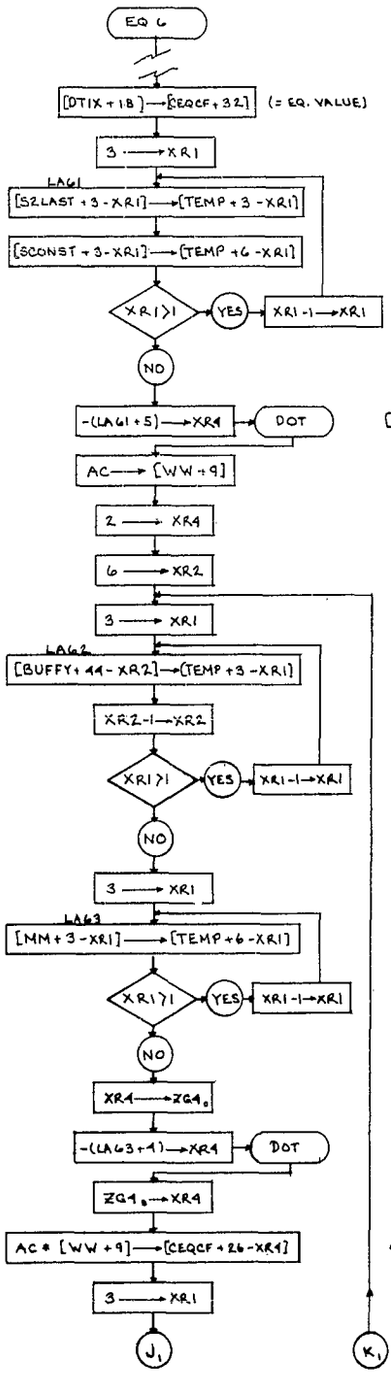
N_{1K} TRANSFERED TO TEMP + 0

N_{1Y} " " TEMP + 1

N_{1B} " " TEMP + 2

1ST LOOP	2ND LOOP
$t_{11}^{(4)}$ TRANSFERED TO TEMP + 3	$t_{1L}^{(4)}$ TRANSFERED TO TEMP + 3
$t_{21}^{(4)}$ " " TEMP + 4	$t_{2L}^{(4)}$ " " TEMP + 4
$t_{31}^{(4)}$ " " TEMP + 5	$t_{3L}^{(4)}$ " " TEMP + 5
$AC = [N_{1K} t_{11}^{(4)} + N_{1Y} t_{21}^{(4)} + N_{1B} t_{31}^{(4)}]$	$AC = [N_{1K} t_{1L}^{(4)} + N_{1Y} t_{2L}^{(4)} + N_{1B} t_{3L}^{(4)}]$
$[\alpha \theta_{1Z}^{*} - \beta \theta_{1Y}^{*}][N_{1K} t_{11}^{(4)} + N_{1Y} t_{21}^{(4)} + N_{1B} t_{31}^{(4)}]$ $= dI_{2X}$ PLACED IN CEQCF + 26	$[\alpha \theta_{1Z}^{*} - \beta \theta_{1Y}^{*}][N_{1K} t_{1L}^{(4)} + N_{1Y} t_{2L}^{(4)} + N_{1B} t_{3L}^{(4)}]$ $= dI_{2Y}$ PLACED IN CEQCF + 27
$-\beta[R_{1X} + \theta_1 \theta_{1X}^{*}]$ PLACED IN CEQCF + 30	
$\alpha[R_{1Y} + \theta_1 \theta_{1Y}^{*}] + \beta[R_{1Y} + \theta_1 \theta_{1Z}^{*}]$ $= d\lambda$ PLACED IN CEQCF + 30	

ADDITIONS TO EQ 6



δ TRANSFERED TO TEMP + 0 (= K)

δ " " TEMP + 1 (= μ)

ϵ " " TEMP + 2 (= ν)

a_{1x}^* " " TEMP + 3

a_{1y}^* " " TEMP + 4

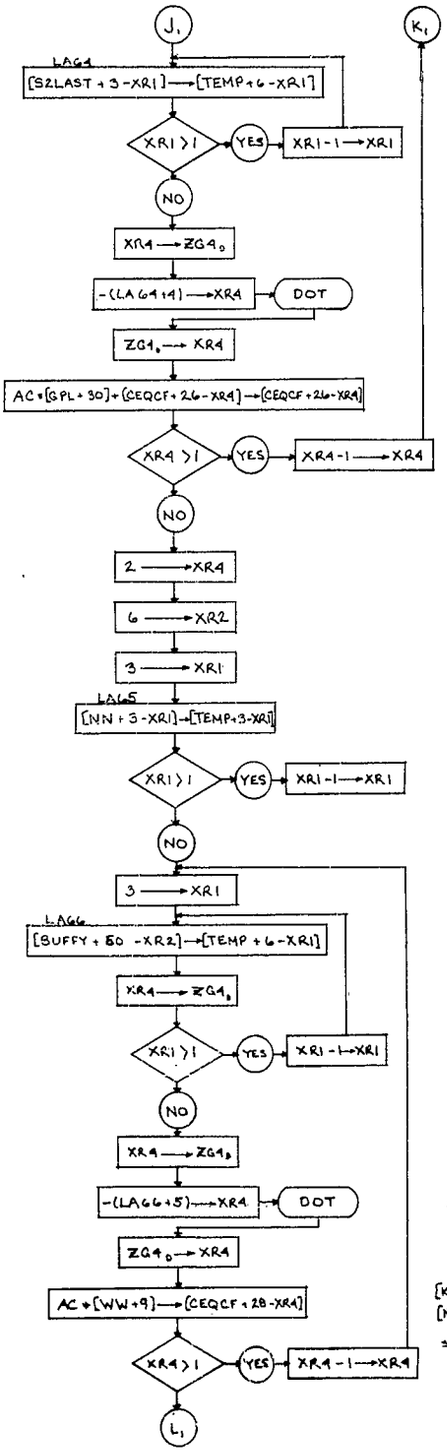
a_{1z}^* " " TEMP + 5

$[K a_{1x}^* + \mu a_{1y}^* + \nu a_{1z}^*]$ PLACED IN AC, STORED IN WW + 9

1ST LOOP	2ND LOOP
$t_{1x}^{(1)}$ TRANSFERED TO TEMP + 0	$t_{1x}^{(1)}$ TRANSFERED TO TEMP + 0
$t_{2y}^{(1)}$ " " TEMP + 1	$t_{2x}^{(1)}$ TEMP + 1
$t_{3z}^{(1)}$ " " TEMP + 2	$t_{3z}^{(1)}$ TEMP + 2
M_{1x} TRANSFERED TO TEMP + 3	SAME
M_{1y} " " TEMP + 4	
M_{1z} " " TEMP + 5	

$\therefore AC = M_{1x} t_{1x}^{(1)} + M_{1y} t_{2y}^{(1)} + M_{1z} t_{3z}^{(1)}$

$$CEQCF + 24 = \left([K a_{1x}^* + \mu a_{1y}^* + \nu a_{1z}^*] * [M_{1x} t_{1x}^{(1)} + M_{1y} t_{2y}^{(1)} + M_{1z} t_{3z}^{(1)}] \right)$$



K TRANSFERED TO TEMP + 3

μ " " TEMP + 4

ν " " TEMP + 5

$AC = K t_{11}^{(1)} + \mu t_{21}^{(1)} + \nu t_{31}^{(1)}$

$$\left(\begin{array}{l} a_1[K t_{11}^{(1)} + \mu t_{21}^{N} + \nu t_{31}^{(1)}] \\ + [K a_{1x}^{*} + \mu a_{1y}^{*} + \nu a_{1z}^{*}] \\ [M_{1x} t_{11}^{(1)} + M_{1y} t_{21}^{(1)} + M_{1z} t_{31}^{(1)}] \end{array}\right)$$

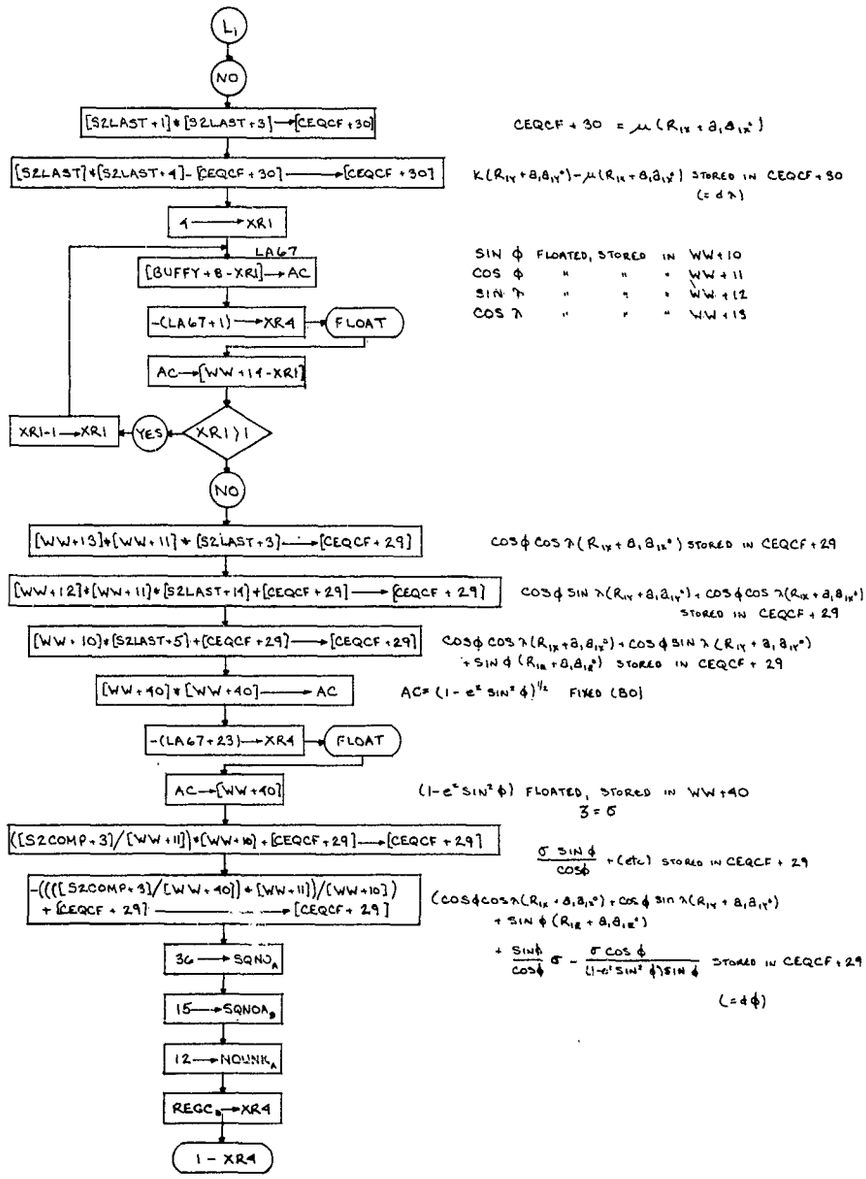
$= dI_{1x}$ STORED IN CEQCF + 24 $= dI_{1y}$ STORED IN CEQCF + 25

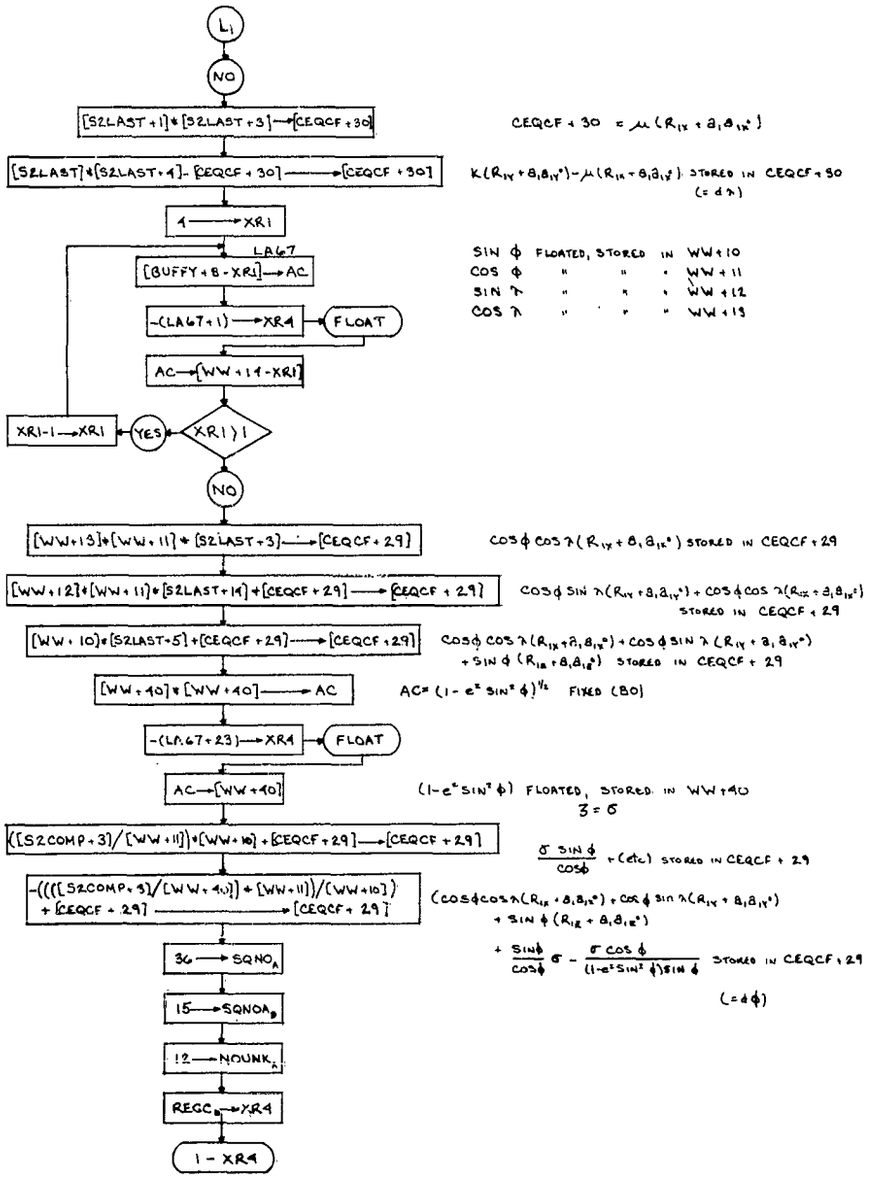
N_{1x} TRANSFERED TO TEMP + 0

N_{1y} " " TEMP + 1

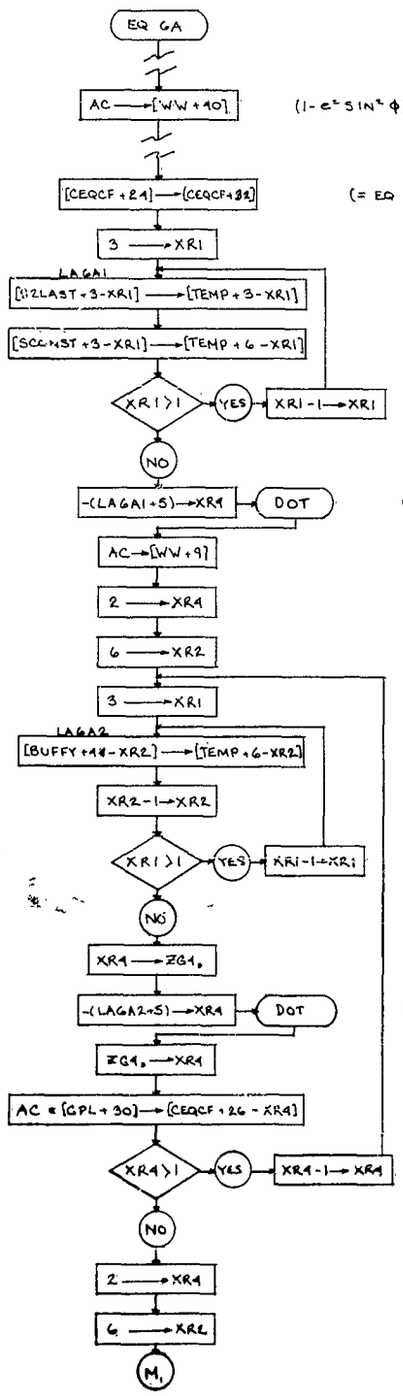
N_{1z} " " TEMP + 2

1ST LOOP	2ND LOOP
$t_{11}^{(1)}$ TRANSFERED TO TEMP + 3	t_{1z}^{N} TRANSFERED TO TEMP + 3
$t_{21}^{(1)}$ " " TEMP + 4	t_{2z}^{N} " " TEMP + 4
$t_{31}^{(1)}$ " " TEMP + 5	$t_{3z}^{(1)}$ " " TEMP + 5
$AC = N_1 \cdot t_{11}^{(1)}$	$AC = N_1 \cdot t_{1z}^{N}$
$[K a_{1x}^{*} + \mu a_{1y}^{*} + \nu a_{1z}^{*}]$ $[N_{1x} t_{11}^{(1)} + N_{1y} t_{21}^{N} + N_{1z} t_{31}^{N}]$ STORED IN CEQCF + 26 $(= dI_{2x})$	$[K a_{1x}^{*} + \mu a_{1y}^{*} - \nu a_{1z}^{*}][N_{1x} t_{1z}^{N}$ $N_{1y} t_{2z}^{N} + N_{1z} t_{3z}^{(1)}]$ STORED IN CEQCF + 27 $(= dI_{2y})$


L1
NO
[S2LAST+1]*[S2LAST+3]→[CEQCF+30]
CEQCF + 30 = μ(R1X + a1a1X²)
[S2LAST]*[S2LAST+4]-[CEQCF+30]→[CEQCF+30]
K(R1Y + a1a1Y²) - μ(R1X + a1a1X²) STORED IN CEQCF+30 (= dλ)
1→XR1
LA67
[BUFFY+8-XR1]→AC
SIN φ FLOATED, STORED IN WW+10
COS φ " " " WW+11
SIN λ " " " WW+12
COS λ " " " WW+13
-(LA67+1)→XR4
FLOAT
AC→[WW+14-XR1]
XR1-1→XR1
YES
XR1 > 1
NO
[WW+13]*[WW+11]*[S2LAST+3]→[CEQCF+29]
COS φ COS λ(R1X + a1a1X²) STORED IN CEQCF+29
[WW+12]*[WW+11]*[S2LAST+14]+[CEQCF+29]→[CEQCF+29]
COS φ SIN λ(R1Y + a1a1Y²) + COS φ COS λ(R1X + a1a1X²) STORED IN CEQCF+29
[WW+10]*[S2LAST+5]+[CEQCF+29]→[CEQCF+29]
COS φ COS λ(R1X + a1a1X²) + COS φ SIN λ(R1Y + a1a1Y²) + SIN φ (R1Z + a1a1Z²) STORED IN CEQCF+29
[WW+40]*[WW+40]→AC
AC = (1 - e² SIN² φ)^1/2 FIXED (B0)
-(LA67+23)→XR4
FLOAT
AC→[WW+40]
(1 - e² SIN² φ) FLOATED, STORED IN WW+40
3 = σ
([S2COMP+3]/[WW+11])*[WW+10]+[CEQCF+29]→[CEQCF+29]
σ SIN φ / COS φ + (etc) STORED IN CEQCF+29
-(((([S2COMP+3]/[WW+40])+[WW+11])/[WW+10]) + [CEQCF+29])→[CEQCF+29]
(COS φ COS λ(R1X + a1a1X²) + COS φ SIN λ(R1Y + a1a1Y²) + SIN φ (R1Z + a1a1Z²)) + SIN φ / COS φ σ - σ COS φ / ((1-e² SIN² φ)^3/2 SIN φ) STORED IN CEQCF+29 (= dφ)
36→SQNOA
15→SQNOB
12→NOUNKA
REGCB→XR4
1 - XR4


L1
NO
[S2LAST+1]*[S2LAST+3]→[CEQCF+30]
CEQCF + 30 = μ(R1X + B1B1X*)
[S2LAST]*[S2LAST+4]-[CEQCF+30]→[CEQCF+30]
K(R1Y + B1B1Y*) - μ(R1X + B1B1X*) STORED IN CEQCF+30 (= dλ)
1→XR1
LA67
[BUFFY+8-XR1]→AC
SIN φ FLOATED, STORED IN WW+10
COS φ " " " WW+11
SIN λ " " " WW+12
COS λ " " " WW+13
-(LA67+1)→XR4
FLOAT
AC→[WW+14-XR1]
XR1-1→XR1
YES
XR1 > 1
NO
[WW+13]*[WW+11]*[S2LAST+3]→[CEQCF+29]
cos φ cos λ(R1Y + B1B1Y*) STORED IN CEQCF+29
[WW+12]*[WW+11]*[S2LAST+14]+[CEQCF+29]→[CEQCF+29]
cos φ sin λ(R1Y + B1B1Y*) + cos φ cos λ(R1X + B1B1X*) STORED IN CEQCF+29
[WW+10]*[S2LAST+5]+[CEQCF+29]→[CEQCF+29]
cos φ cos λ(R1X + B1B1X*) + cos φ sin λ(R1Y + B1B1Y*) + sin φ (R1Z + B1B1Z*) STORED IN CEQCF+29
[WW+40]*[WW+40]→AC
AC = (1 - e² sin² φ)^1/2 FIXED (B0)
-(LA67+23)→XR4
FLOAT
AC→[WW+40]
(1 - e² sin² φ) FLOATED, STORED IN WW+40
3 = σ
([S2COMP+3]/[WW+11])*[WW+10]+[CEQCF+29]→[CEQCF+29]
σ sin φ / cos φ + (etc) STORED IN CEQCF+29
-((([S2COMP+3]/[WW+40])*[WW+11])/[WW+10]) + [CEQCF+29] → [CEQCF+29]
(cos φ cos λ(R1X + B1B1X*) + cos φ sin λ(R1Y + B1B1Y*) + sin φ (R1Z + B1B1Z*)
+ sin φ / cos φ σ - σ cos φ / ((1 - e² sin² φ) sin φ) STORED IN CEQCF+29
(= dφ)
36→SQNOA
15→SQNOB
12→NOUNKA
REGCB→XR4
1 - XR4

ADDITIONS TO EQ 6A



$(1 - e^2 \sin^2 \phi)^{1/2}$ FIXED, (80) STORED IN WW + 40

(= EQ VALUE)

ψ TRANSFERED TO TEMP + 0
δ " " TEMP + 1
ω " " TEMP + 2
a_{1x}^* " " TEMP + 3
a_{1y}^* " " TEMP + 4
a_{1z}^* " " TEMP + 5

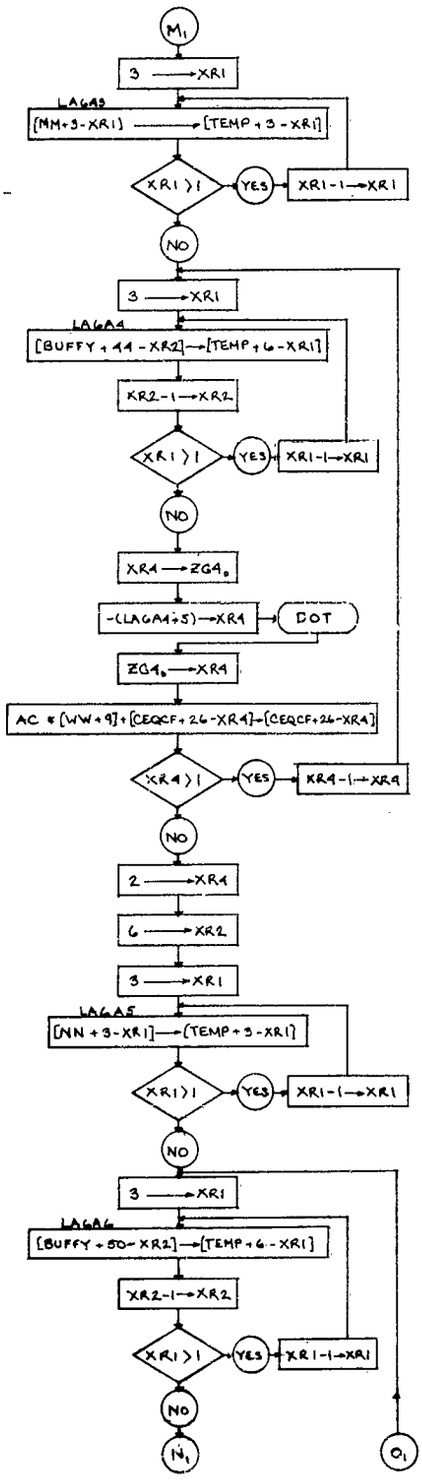
$\psi a_{1x}^* + \delta a_{1y}^* + \omega a_{1z}^* = (\psi' + \delta' + \omega')$

STORED IN WW + 9

1ST LOOP		2ND LOOP	
$t_{11}^{(j)}$ TRANSFERED TO	TEMP + 3	$t_{12}^{(j)}$ TRANSFERED TO	TEMP + 3
$t_{21}^{(j)}$ " "	TEMP + 4	$t_{22}^{(j)}$ " "	TEMP + 4
$t_{31}^{(j)}$ " "	TEMP + 5	$t_{32}^{(j)}$ " "	TEMP + 5

$a_1(\psi t_{11}^{(j)} + \delta t_{21}^{(j)} + \omega t_{31}^{(j)})$ STORED IN CEQCF + 24

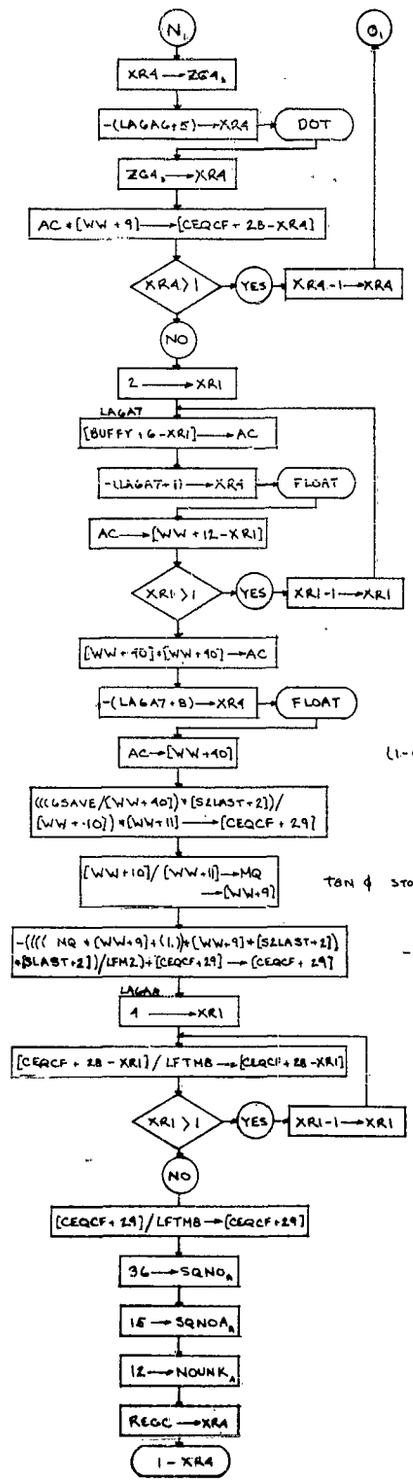
$a_1(\psi t_{12}^{(j)} + \delta t_{22}^{(j)} + \omega t_{32}^{(j)})$ STORED IN CEQCF + 25



M_{1X} TRANSFERRED TO TEMP+0
M_{1Y} TEMP+1
M_{1Z} TEMP+2

1ST LOOP	2ND LOOP
$t_{1X}^{(1)}$ TRANSFERRED TO TEMP+3	
$t_{2X}^{(1)}$ " " TEMP+4	$t_{1Z}^{(1)}$
$t_{3X}^{(1)}$ " " TEMP+5	
$AC = M_1 \cdot t_{1X}^{(1)}$	$AC = \bar{M}_1 \cdot t_{1Z}^{(1)}$
$(\psi' + \delta' + \omega')(M_{1X}t_{1X}^{(1)} + M_{1Y}t_{2X}^{(1)} + M_{1Z}t_{3X}^{(1)}) + \Omega_1(\psi t_{1X}^{(1)} + \delta t_{2X}^{(1)} + \omega t_{3X}^{(1)})$	$(\psi' + \delta' + \omega')(M_{1X}t_{1Z}^{(1)} + M_{1Y}t_{2Z}^{(1)} + M_{1Z}t_{3Z}^{(1)}) + \Omega_1(\psi t_{1Z}^{(1)} + \delta t_{2Z}^{(1)} + \omega t_{3Z}^{(1)})$
$= dI_{1X}$ STORED IN CEQCF+24	$= dI_{1Y}$ STORED IN CEQCF+25

1ST LOOP	2ND LOOP
N_{1X} TRANSFERRED TO TEMP+0	
N_{1Y} " " TEMP+1	
N_{1Z} " " TEMP+2	
$t_{1X}^{(1)}$ TRANSFERRED TO TEMP+0	$t_{1Z}^{(1)}$ TRANSFERRED TO TEMP+0
$t_{2X}^{(1)}$ " " TEMP+1	$t_{2Z}^{(1)}$ " " TEMP+1
$t_{3X}^{(1)}$ " " TEMP+2	$t_{3Z}^{(1)}$ " " TEMP+2



$AC = \bar{N}_1 \cdot t_{i1}^{(3)}$ $\qquad$ $AC = N_1 \cdot t_{i2}^{(3)}$

$(\psi' + \delta' + \omega')[N_{1x} t_{11}^{(3)} + N_{1y} t_{21}^{(3)} + N_{1z} t_{31}^{(3)}]$ $\qquad$ $(\psi' + \delta' + \omega')[N_{1x} t_{12}^{(3)} + N_{1y} t_{22}^{(3)} + N_{1z} t_{32}^{(3)}]$

$= dI_{2x}$ STORED IN CEQCF + 26 $\qquad$ $= dI_{2y}$ STORED IN CEQCF + 27

SIN ϕ FLOATED, STORED IN WW + 10
COS ϕ " " " WW + 11

$(1 - e^2 \sin^2 \phi)$, FLOATED, STORED IN WW + 40

$\dfrac{a e^2 \cos \phi \, \omega}{(1 - e^2 \sin^2 \phi)^{3/2}}$ STORED IN CEQCF + 29

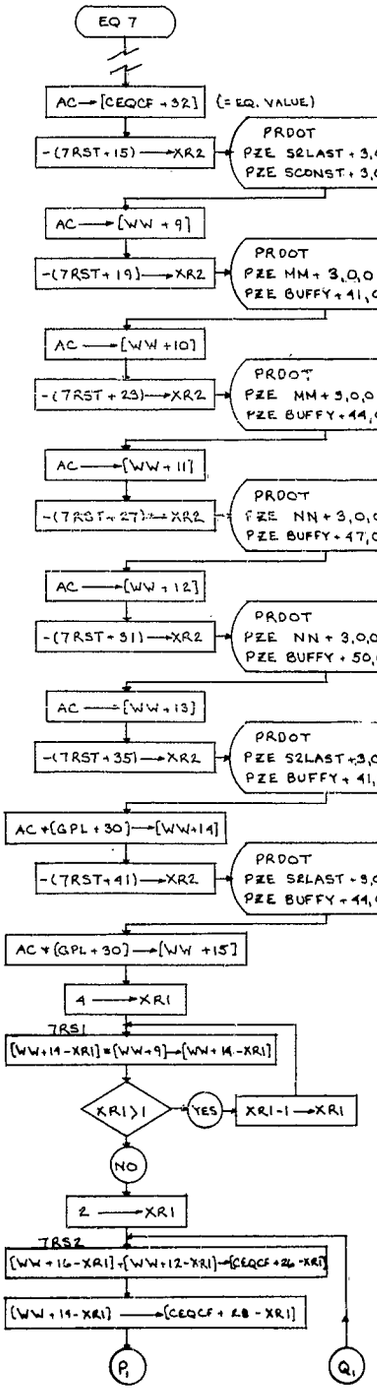
TAN ϕ STORED IN WW + 9

$- \tan \dfrac{(1 + \tan^2 \phi)\, \omega^2}{-2} + \dfrac{a e^2 \cos \phi \, \omega}{(1 - e^2 \sin^2 \phi)^{3/2}}$ $\quad (= d\phi)$

dI_{1x} DIVIDED BY 10^8 STORED IN CEQCF + 24
dI_{1y} " " " " CEQCF + 25
dI_{2x} " " " " CEQCF + 26
dI_{2y} " " " " CEQCF + 27

$d\phi$ DIVIDED BY 10^8 STORED IN CEQCF + 29

ADDITIONS TO EQ 7



$[\eta a_{1x}^{*} + \theta a_{1y}^{*} + \zeta a_{1z}^{*}]$ STORED IN WW + 9

$[M_{1x} t_{11}^{(1)} + M_{1y} t_{21}^{(1)} + M_{1z} t_{31}^{(1)}]$ STORED IN WW + 10

$[M_{1x} t_{12}^{(1)} + M_{1y} t_{22}^{(1)} + M_{1z} t_{32}^{(1)}]$ STORED IN WW + 11

$[N_{1x} t_{11}^{(1)} + N_{1y} t_{21}^{(1)} + N_{1z} t_{31}^{(1)}]$ STORED IN WW + 12

$[N_{1x} t_{12}^{(1)} + N_{1y} t_{22}^{(1)} + N_{1z} t_{32}^{(1)}]$ STORED IN WW + 13

$a_1 [\eta t_{11}^{(1)} + \theta t_{21}^{(1)} + \zeta t_{31}^{(1)}]$ STORED IN WW + 14

$a_1 [\eta t_{12}^{(1)} + \theta t_{22}^{(1)} + \zeta t_{32}^{(1)}]$ STORED IN WW + 15

$[\eta a_{1x}^{*} + \theta a_{1y}^{*} + \zeta a_{1z}^{*}] [M_{1x} t_{11}^{(1)} + M_{1y} t_{21}^{(1)} + M_{1z} t_{31}^{(1)}]$ STORED IN WW + 10

$[\eta a_{1x}^{*} + \theta a_{1y}^{*} + \zeta a_{1z}^{*}] [M_{1x} t_{12}^{(1)} + M_{1y} t_{22}^{(1)} + M_{1z} t_{32}^{(1)}]$ " " WW + 11

$[\eta a_{1x}^{*} + \theta a_{1y}^{*} + \zeta a_{1z}^{*}] [N_{1x} t_{11}^{(1)} + N_{1y} t_{21}^{(1)} + N_{1z} t_{31}^{(1)}]$ " " WW + 12

TRANSFERRED TO CEQCF + 26 $(= dI_{2x})$

$[\eta a_{1x}^{*} + \theta a_{1y}^{*} + \zeta a_{1z}^{*}] [N_{1x} t_{12}^{(1)} + N_{1y} t_{22}^{(1)} + N_{1z} t_{32}^{(1)}]$ STORED IN WW + 13

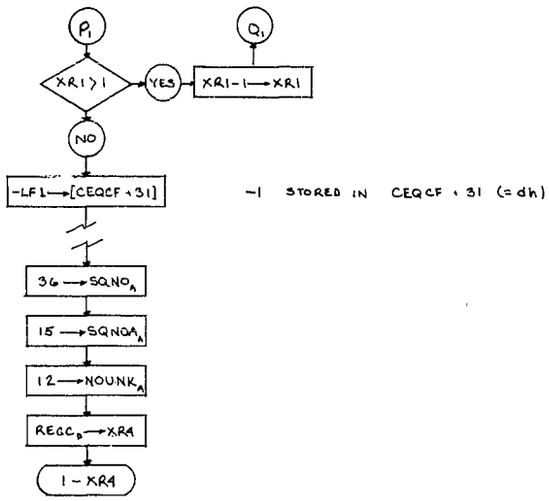
TRANSFERRED TO CEQCF + 27 $(= dI_{2y})$

$a_1 [\eta t_{11}^{(1)} + \theta t_{21}^{(1)} + \zeta t_{31}^{(1)}] - [\eta a_{1x}^{*} + \theta a_{1y}^{*} + \zeta a_{1z}^{*}] [M_{1x} t_{11}^{(1)} + M_{1y} t_{21}^{(1)} + M_{1z} t_{31}^{(1)}]$

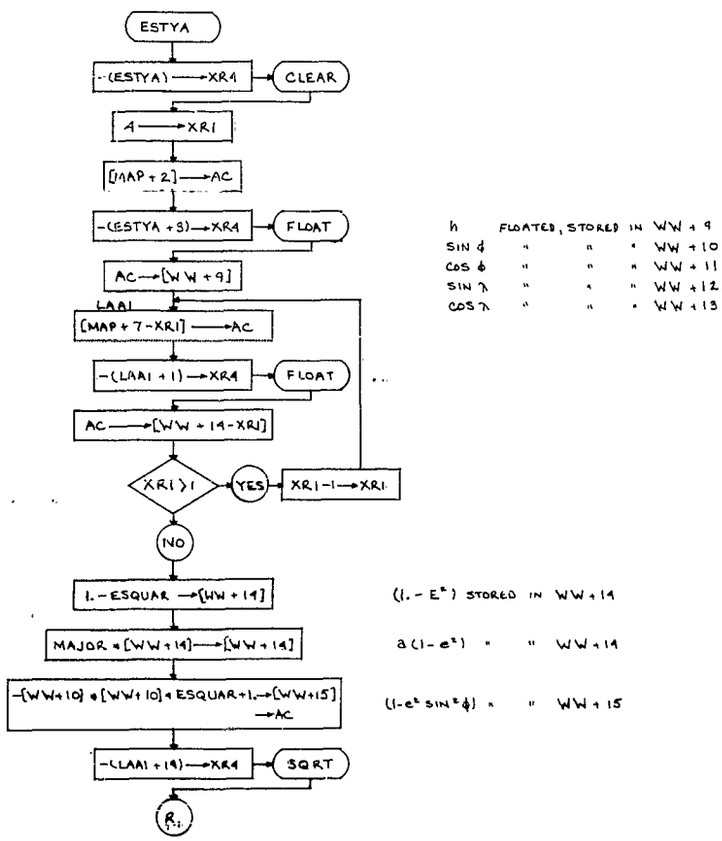
STORED IN CEQCF + 24 $(= dI_{1x})$

$a_1 [\eta t_{12}^{(1)} + \theta t_{22}^{(1)} + \zeta t_{32}^{(1)}] + [\eta a_{1x}^{*} + \theta a_{1y}^{*} + \zeta a_{1z}^{*}] [M_{1x} t_{12}^{(1)} + M_{1y} t_{22}^{(1)} + M_{1z} t_{32}^{(1)}]$

STORED IN CEQCF + 25 $(= dI_{1y})$



EQ 8, 9, 10

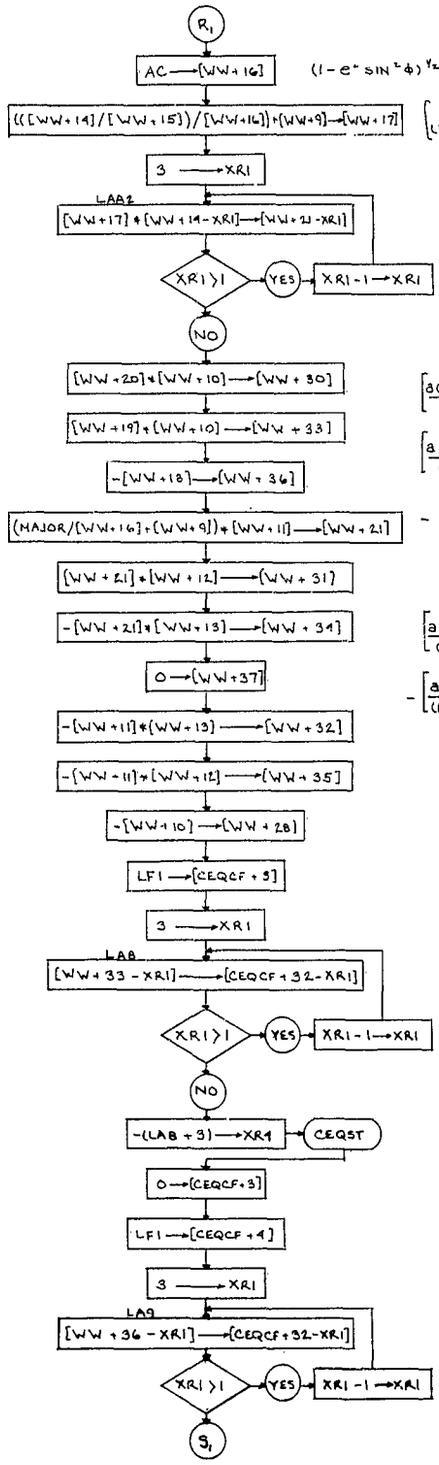


h	FLOATED,	STORED	IN	WW + 9
SIN ϕ	"	"	"	WW + 10
COS ϕ	"	"	"	WW + 11
SIN λ	"	"	"	WW + 12
COS λ	"	"	"	WW + 13

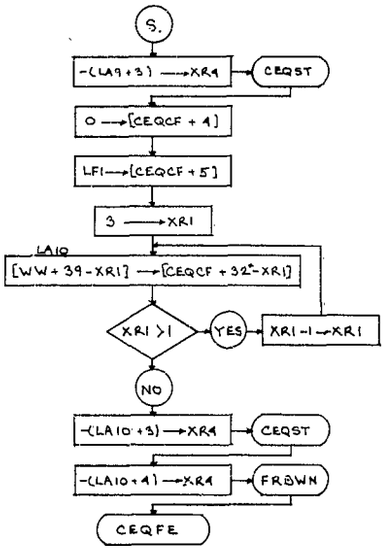
$(1. - E^2)$ STORED IN WW + 14

$a(1 - e^2)$ " " WW + 14

$(1 - e^2 \sin^2 \phi)$ " " WW + 15



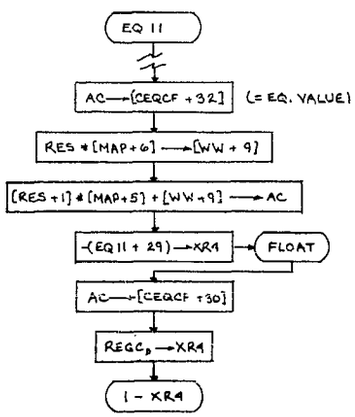
$(1-e^2 \sin^2\phi)^{1/2}$	STORED IN	WW + 16
$\left[\frac{a(1-e^2)}{(1-e^2\sin^2\phi)^{3/2}} + h\right]$	STORED IN	WW + 17
$\left[\frac{a(1-e^2)\cos\phi}{(1-e^2\sin^2\phi)^{3/2}} + \cos h\right]$	STORED IN	WW + 18
$\left[\frac{a(1-e^2)\sin\lambda}{(1-e^2\sin^2\phi)^{3/2}} + \sin\lambda h\right]$	" "	WW + 19
$\left[\frac{a(1-e^2)\cos\lambda}{(1-e^2\sin^2\phi)^{3/2}} + \cos\lambda h\right]$	" "	WW + 20
$\left[\frac{a(1-e^2)\sin\phi\cos\lambda}{(1-e^2\sin^2\phi)^{3/2}} + \sin\phi\cos\lambda h\right]$	" "	WW + 30
$\left[\frac{a(1-e^2)\sin\phi\sin\lambda}{(1-e^2\sin^2\phi)^{3/2}} + \sin\phi\sin\lambda h\right]$	" "	WW + 33
$-\left[\frac{a(1-e^2)\cos\phi}{(1-e^2\sin^2\phi)^{3/2}} + \cos\phi h\right]$	" "	WW + 36
$\left[\frac{a\cos\phi}{(1-e^2\sin^2\phi)^{3/2}} + \cos\phi h\right]$	" "	WW + 21
$\left[\frac{a\cos\phi\sin\lambda}{(1-e^2\sin^2\phi)^{3/2}} + \cos\phi\sin\lambda h\right]$	" "	WW + 31
$-\left[\frac{a\cos\phi\cos\lambda}{(1-e^2\sin^2\phi)^{3/2}} + \cos\phi\sin\lambda h\right]$	" "	WW + 34
0	" "	WW + 37
$-\cos\phi\cos\lambda$	" "	WW + 32
$-\cos\phi\sin\lambda$	" "	WW + 35
$-\sin\phi$	" "	WW + 38
1.	" "	CEQCF + 3 ($=dR_{IV}$)
$d\phi$	" "	CEQCF + 29
$d\lambda$	" "	CEQCF + 30
dh	" "	CEQCF + 31
		EQ 8
1.	" "	CEQCF + 4 ($=dR_{IV}$)
$d\phi$	" "	CEQCF + 29.
$d\lambda$	" "	CEQCF + 30
dh	" "	CEQCF + 31
		EQ 9



1.	STORED IN	CEQCF + 5 ($= dR_{IX}$)
$d\phi$		CEQCF + 29
$d\lambda$ (=0)		CEQCF + 30
dh		CEQCF + 31

EQ 10

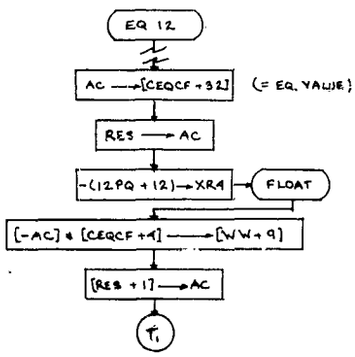
ADDITIONS TO EQ 11



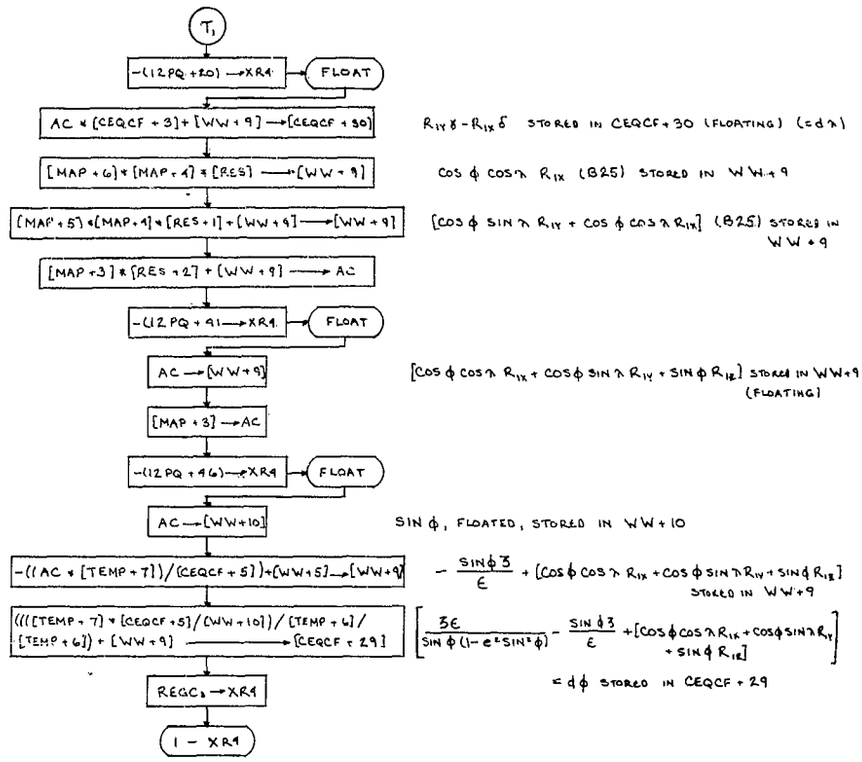
$R_{IX} \cos\lambda$ (825) STORED IN WW + 9

$[R_{IX} \cos\lambda + R_{IY} \sin\lambda]$ FLOATED, STORED IN CEQCF + 30 ($= d\lambda$)

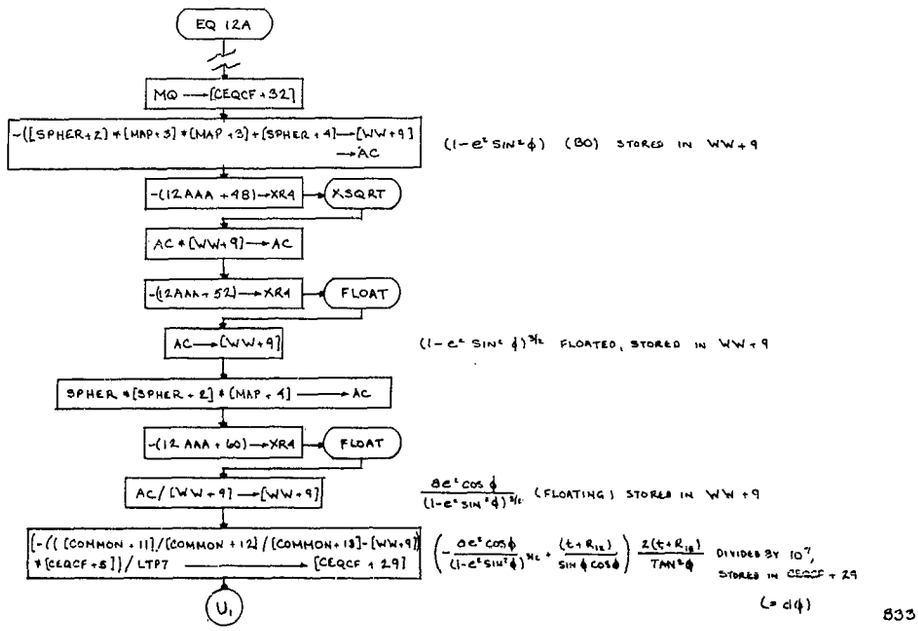
ADDITIONS TO EQ 12

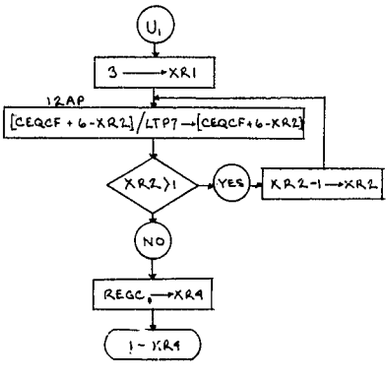


$-R_{IX}\,\delta$ FLOATED, STORED IN WW + 9



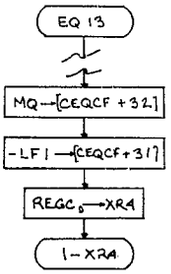
ADDITIONS TO EQ 12A





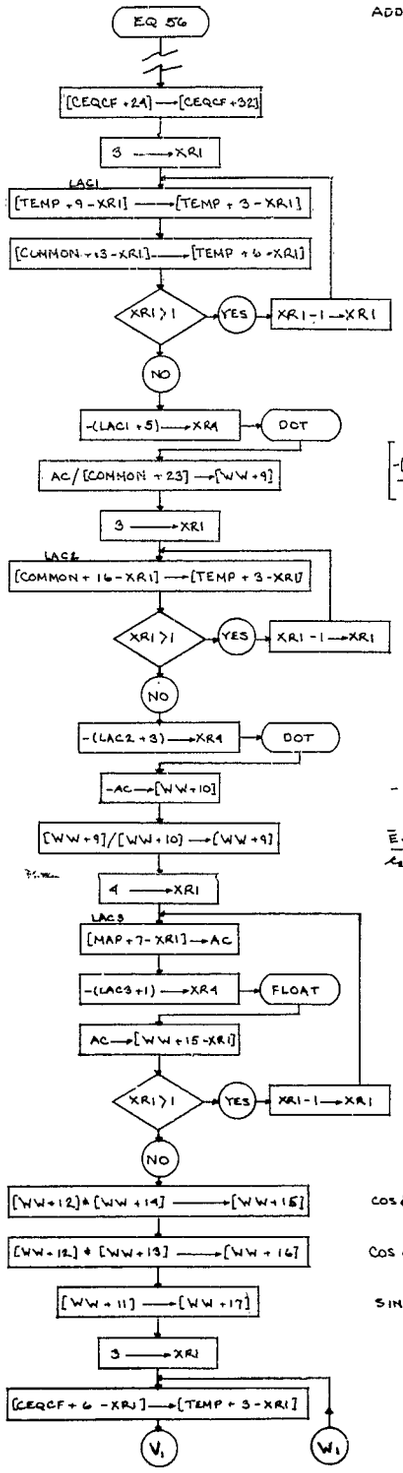
dR_{1X} DIVIDED BY 10^7, STORED IN CEQCF + 3
dR_{1Y} " " " " " CEQCF + 4
dR_{1Z} " " " " " CEQCF + 5

ADDITIONS TO EQ 13



-1 STORED IN CEQCF + 31 (= dh)

ADDITIONS TO EQ 56



$(A_i^\circ \times C_E^\circ)_X$ TRANSFERED TO TEMP + 0
$(A_i^\circ \times C_E^\circ)_Y$ " " TEMP + 1
$(A_i^\circ \times C_E^\circ)_Z$ " " TEMP + 2
E_X " " TEMP + 3
E_Y " " TEMP + 4
E_Z " " TEMP + 5

$$\left[\frac{-[E_X(A_i^\circ \times C_E^\circ)_X + E_Y(A_i^\circ \times C_E^\circ)_Y + E_Z(A_i^\circ \times C_E^\circ)_Z]}{\mathcal{L}_E}\right]$$ STORED IN WW + 9 $(= -V_1)$

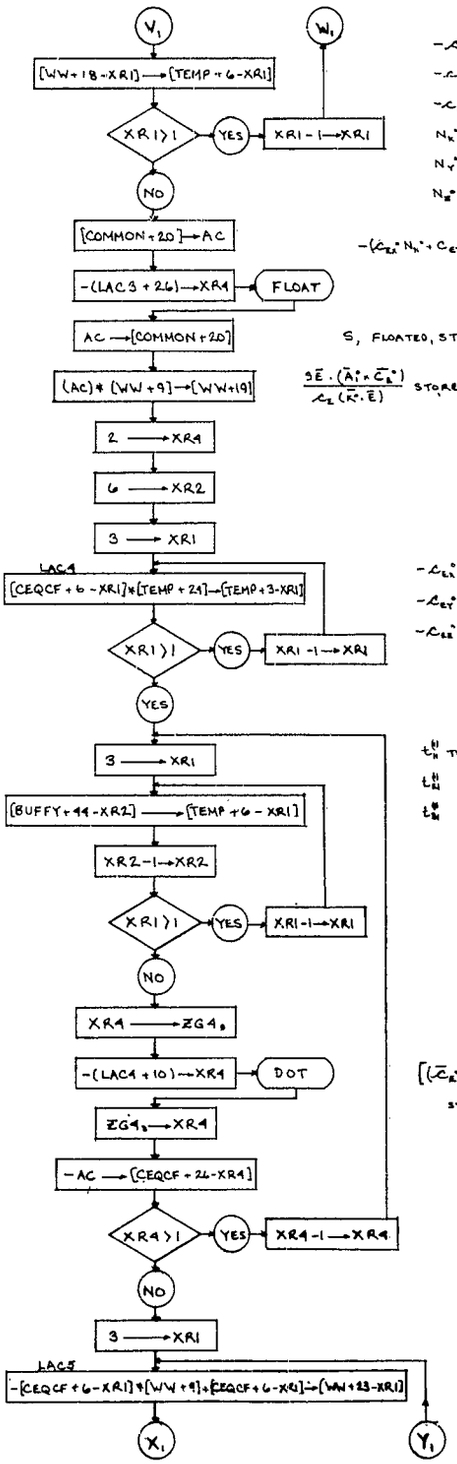
K_X° TRANSFERED TO TEMP + 0
K_Y° TEMP + 1
K_Z° TEMP + 2

$-[K_X^\circ E_X + K_Y^\circ E_Y + K_Z^\circ E_Z]$ STORED IN WW + 10 $(= -K)$

$$\frac{\bar{E}\cdot(\bar{A}_i^\circ \times C_E^\circ)}{\mathcal{L}_E(\bar{K}^\circ \cdot \bar{E})}$$ STORED IN WW + 9 $\left(= \frac{V_1}{K}\right)$

SIN ϕ FLOATED AND STORED IN WW + 11
COS ϕ " " " " WW + 12
SIN λ " " " " WW + 13
COS λ " " " " WW + 14

COS ϕ COS λ STORED IN WW + 15 (N_X°)
COS ϕ SIN λ " " WW + 16 (N_Y°)
SIN ϕ " " WW + 17 (N_Z°)



$-\mathcal{C}_{EX}^{*}$ TRANSFERED TO TEMP

$-\mathcal{C}_{EY}^{*}$ " " TEMP + 1

$-\mathcal{C}_{EZ}^{*}$ " " TEMP + 2

N_X^{*} " " TEMP + 3

N_Y^{*} " " TEMP + 4

N_Z^{*} " " TEMP + 5

$-(\mathcal{C}_{EX}^{*} N_X^{*} + \mathcal{C}_{EY}^{*} N_Y^{*} + \mathcal{C}_{EZ}^{*} N_Z^{*}) \quad \dfrac{\bar{E}\cdot(\bar{A}_1^{*} \times \bar{C}_E^{*})}{\mathcal{C}_E(\bar{K}^{*}\cdot\bar{E})}$ STORED IN WW + 18 $\left(= \dfrac{-V_1}{K}(\bar{C}_E^{*}\cdot\bar{N})\right)$

S, FLOATED, STORED IN COMMON + 20

$\dfrac{S\bar{E}\cdot(\bar{A}_1^{*} \times \bar{C}_E^{*})}{\mathcal{C}_E(\bar{K}^{*}\cdot\bar{E})}$ STORED IN WW + 19 $\left(= \dfrac{SV_1}{K}\right)\left(= -(\bar{E}\cdot\bar{N})\dfrac{V_1}{K}\right)$

$-\mathcal{C}_{EX}^{*} V_{EN}$ STORED IN TEMP

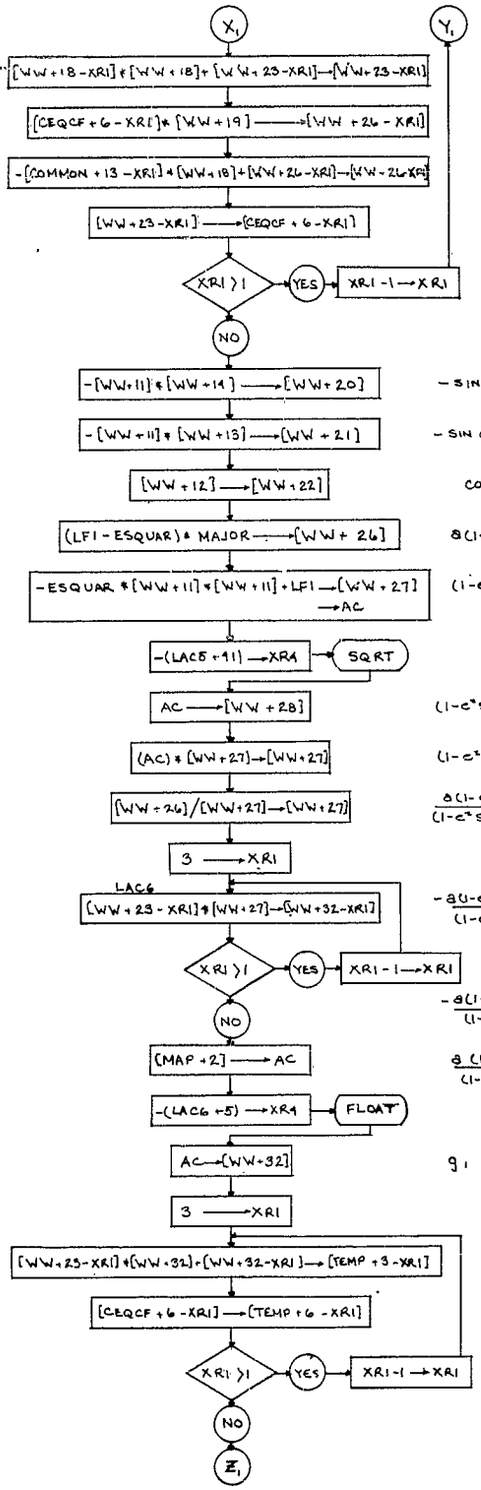
$-\mathcal{C}_{EY}^{*} V_{EN}$ " " TEMP + 1

$-\mathcal{C}_{EZ}^{*} V_{EN}$ " " TEMP + 2

1ST LOOP		2ND LOOP	
t_{1N}^{N} TRANSFERED TO	TEMP + 3	t_{1X}^{N} TRANSFERED TO	TEMP + 3
t_{2N}^{N} " "	TEMP + 4	t_{2X}^{N}	TEMP + 4
t_{3N}^{N} " "	TEMP + 5	t_{3X}^{N}	TEMP + 5

$\left[(\bar{\mathcal{C}}_E^{*} V_{EN})\cdot t_{1I}^{N}\right] (= dI_N)$ STORED IN CEQCF + 24

$\left[(\bar{\mathcal{C}}_E^{*} V_{EN})\cdot t_{1X}^{N}\right] (= dI_X)$ STORED IN CEQCF + 25



W_x FORMED AND STORED IN WW+20 TRANSFERRED TO CEQCF+3 (=dR_x)

W_y " " " " WW+21 " CEQCF+4 (=dR_y)

W_z " " " " WW+22 " CEQCF+5 (=dR_z)

W_x' " " " " WW+23

W_y' " " " " WW+24

W_z' " WW+25

$-\sin\phi\cos\lambda$ STORED IN WW+20 ($=\alpha'$)

$-\sin\phi\sin\lambda$ " " WW+21 ($=\gamma'$)

$\cos\phi$ " " WW+22 ($=\epsilon'$)

$a(1-e^2)$ " " WW+26

$(1-e^2\sin^2\phi)$ " " WW+27

$(1-e^2\sin^2\phi)^{1/2}$ STORED IN WW+28

$(1-e^2\sin^2\phi)^{3/2}$ " " WW+27

$\frac{a(1-e^2)}{(1-e^2\sin^2\phi)^{3/2}}$ " " WW+27

$-\frac{a(1-e^2)\sin\phi\cos\lambda}{(1-e^2\sin^2\phi)^{3/2}}$ " " WW+29

$-\frac{a(1-e^2)\sin\phi\sin\lambda}{(1-e^2\sin^2\phi)^{3/2}}$ " " WW+30

$\frac{a(1-e^2)\cos\phi}{(1-e^2\sin^2\phi)^{3/2}}$ " " WW+31

g_1 FLOATED, STORED IN WW+32

α STORED IN TEMP

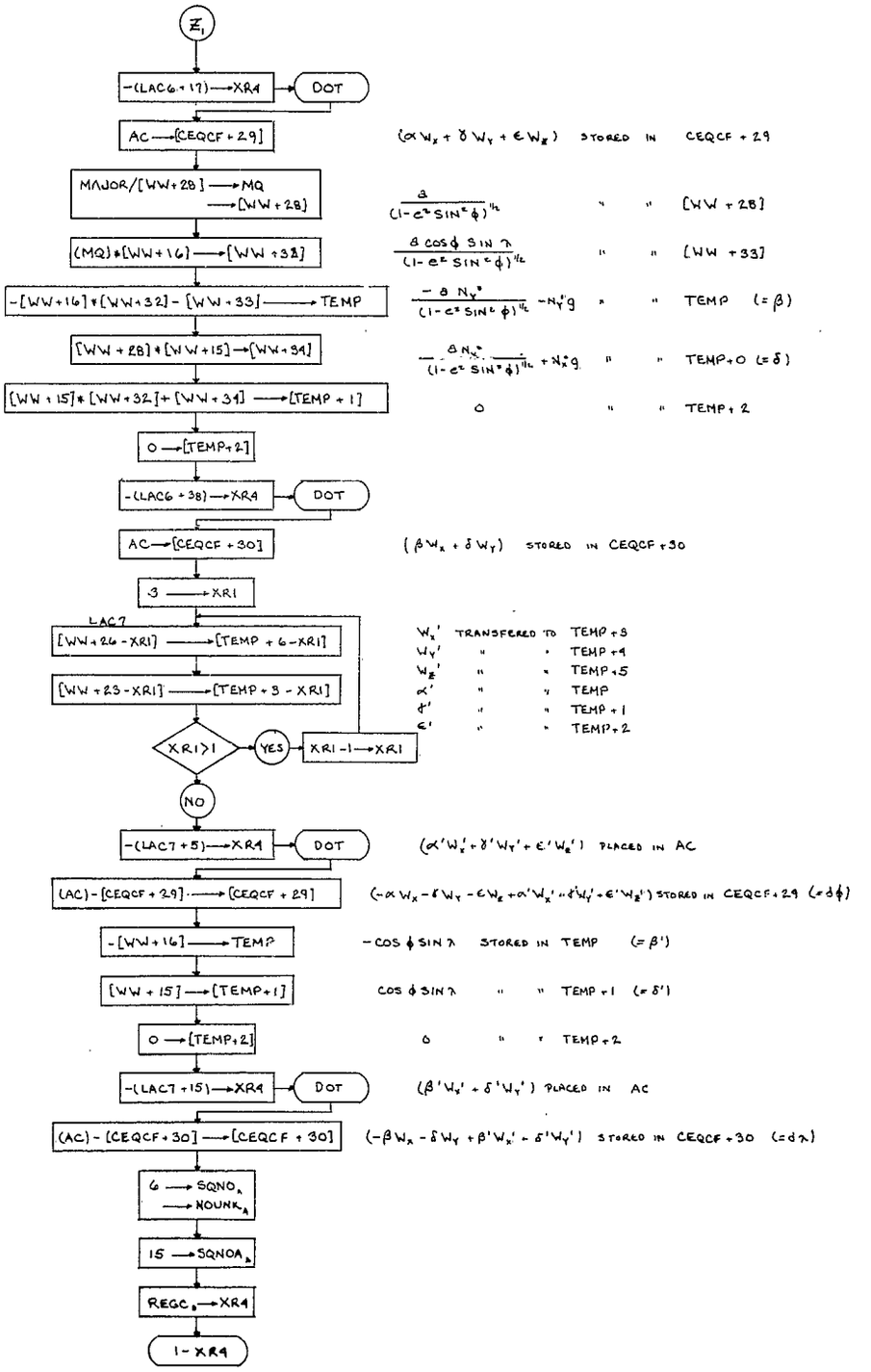
γ " " TEMP+1

ϵ " " TEMP+2

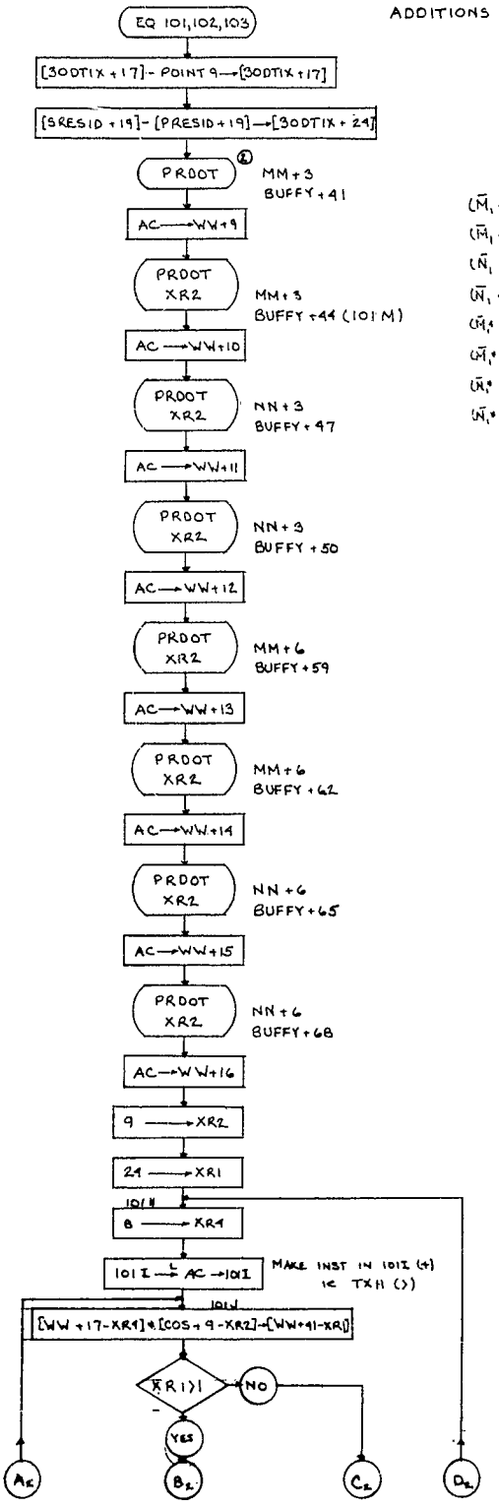
W_x " " TEMP+3

W_y " " TEMP+4

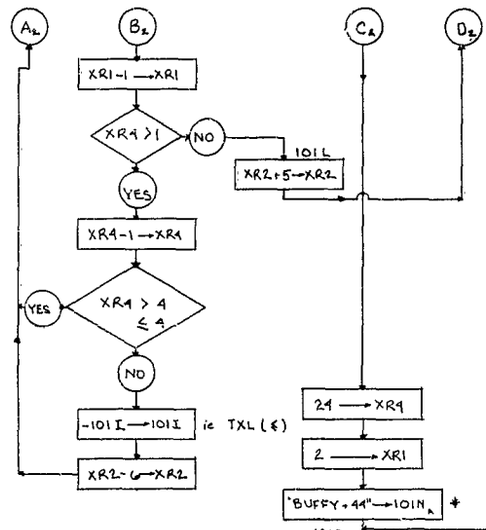
W_z " " TEMP+5


Z1
-(LAC6+17)→XR4
DOT
AC→[CEQCF+29]
(αWx + γWY + εWz) STORED IN CEQCF+29
MAJOR/[WW+28]→MQ
→[WW+28]
a / (1-e² SIN² φ)^1/2 " " [WW+28]
(MQ)*[WW+16]→[WW+32]
a cos φ SIN λ / (1-e² SIN² φ)^1/2 " " [WW+33]
-[WW+16]*[WW+32]-[WW+33]→TEMP
-a Nx° / (1-e² SIN² φ)^1/2 - Ny°g " " TEMP (=β)
[WW+28]*[WW+15]→[WW+34]
-a Nx° / (1-e² SIN² φ)^1/2 + Nz°g " " TEMP+0 (=δ)
[WW+15]*[WW+32]+[WW+34]→[TEMP+1]
0 " " TEMP+2
0→[TEMP+2]
-(LAC6+38)→XR4
DOT
AC→[CEQCF+30]
(βWx + δWY) STORED IN CEQCF+30
3→XR1
LAC7
[WW+26-XR1]→[TEMP+6-XR1]
[WW+23-XR1]→[TEMP+3-XR1]
Wx' TRANSFERED TO TEMP+3
WY' " " TEMP+4
Wz' " " TEMP+5
α' " " TEMP
γ' " " TEMP+1
ε' " " TEMP+2
XR1>1
YES
XR1-1→XR1
NO
-(LAC7+5)→XR4
DOT
(α'Wx' + γ'WY' + ε'Wz') PLACED IN AC
(AC)-[CEQCF+29]→[CEQCF+29]
(-αWx - δWY - εWz + α'Wx' + γ'WY' + ε'Wz') STORED IN CEQCF+29 (=dφ)
-[WW+16]→TEMP
-COS φ SIN λ STORED IN TEMP (=β')
[WW+15]→[TEMP+1]
COS φ SIN λ " " TEMP+1 (=δ')
0→[TEMP+2]
0 " " TEMP+2
-(LAC7+15)→XR4
DOT
(β'Wx' + δ'WY') PLACED IN AC
(AC)-[CEQCF+30]→[CEQCF+30]
(-βWx - δWY + β'Wx' + δ'WY') STORED IN CEQCF+30 (=dλ)
6→SQNOA
→NOUNKA
15→SQNOA
REGCA→XR4
1-XR4

ADDITIONS TO EQ 101, 102, 103



$(\bar{M}_1 \cdot \bar{E}_{L_1})$	STORED	IN	WW+9
$(\bar{M}_1 \cdot \bar{E}_{L_2})$	"	"	WW+10
$(\bar{N}_1 \cdot \bar{E}_{L_1}')$	"	"	WW+11
$(\bar{N}_1 \cdot \bar{E}_{L_2}')$	"	"	WW+12
$(\bar{M}_1^* \cdot \bar{E}_{L_1}^*)$	"	"	WW+13
$(\bar{M}_1^* \cdot \bar{E}_{L_2}^*)$	"	"	WW+14
$(\bar{N}_1^* \cdot \bar{E}_{L_1}'^*)$	"	"	WW+15
$(\bar{N}_1^* \cdot \bar{E}_{L_2}'^*)$	"	"	WW+16



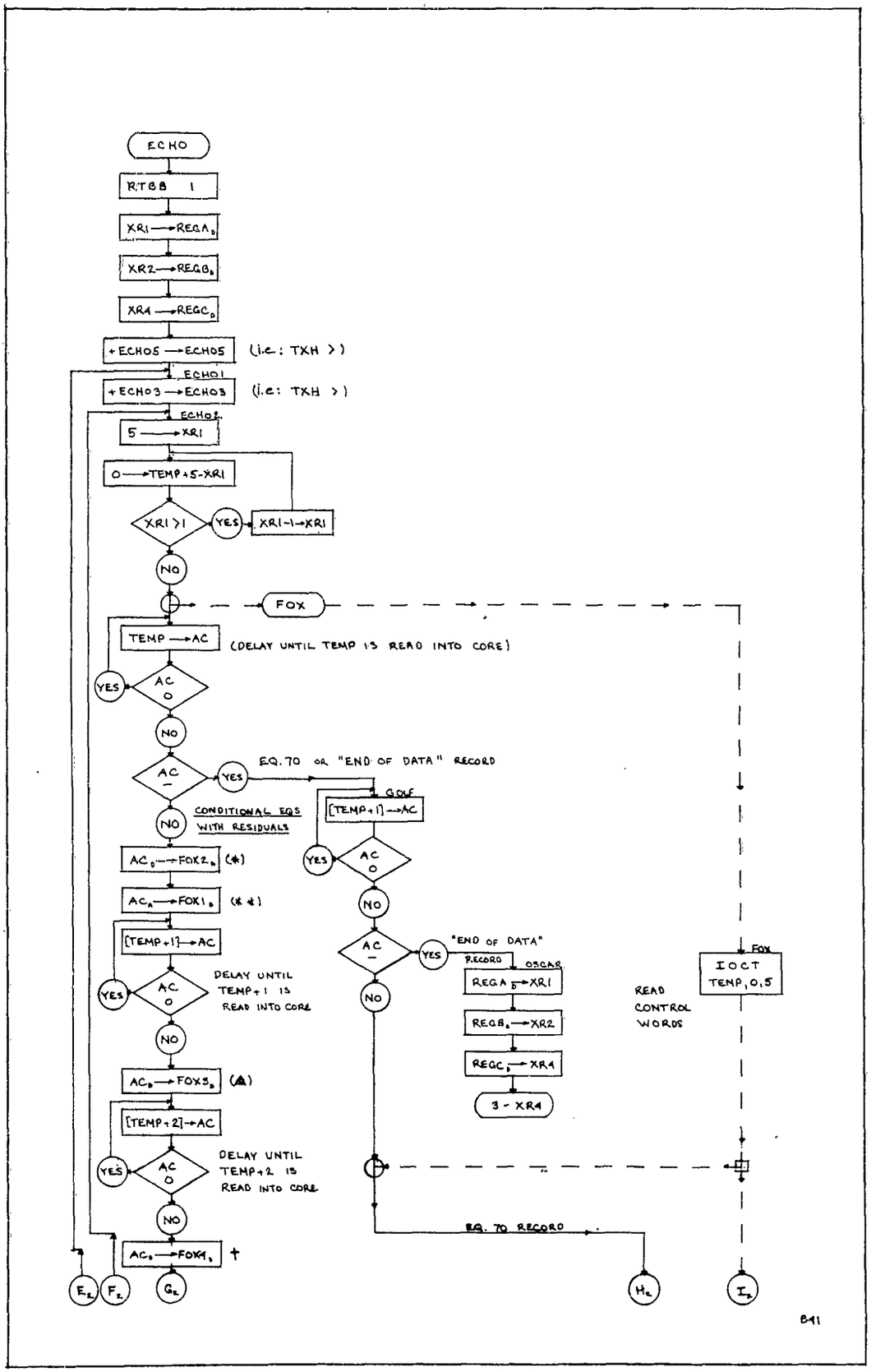
$A_{1X}^{*}(\bar{M}_1 \cdot \bar{t}_{L1})$ STORED IN WW + 17
$A_{1Y}^{*}(\bar{M}_1 \cdot \bar{t}_{L2})$ " " WW + 18
$A_{1Y}^{*}(\bar{N}_1 \cdot \bar{t}_{L1}')$ " " WW + 19 $(= dI_{2X} - 101)$
$A_{1X}^{*}(\bar{N}_1 \cdot \bar{t}_{L2}')$ " " WW + 20 $(= dI_{2Y} - 101)$
$A_{1X}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L1}^{*})$ " " WW + 21
$A_{1Y}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L2}^{*})$ " " WW + 22
$A_{1X}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L1}'^{*})$ " " WW + 23 $(= -dI_{2X}^{*} - 101)$
$A_{1X}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L2}'^{*})$ " " WW + 24 $(= -dI_{2Y}^{*} - 101)$
$A_{1Y}^{*}(\bar{M}_1 \cdot \bar{t}_{L1})$ " " WW + 25
$A_{1Y}^{*}(\bar{M}_1 \cdot \bar{t}_{L2})$ " " WW + 26
$A_{1Y}^{*}(\bar{N}_1 \cdot \bar{t}_{L1}')$ " " WW + 27 $(= dI_{2X} - 102)$
$A_{1Y}^{*}(\bar{N}_1 \cdot \bar{t}_{L2}')$ " " WW + 28 $(= dI_{2Y} - 102)$
$A_{1Y}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L1}^{*})$ " " WW + 29
$A_{1Y}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L2}^{*})$ " " WW + 30
$A_{1Y}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L1}'^{*})$ " " WW + 31 $(= -dI_{2X}^{*} - 102)$
$A_{1Y}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L2}'^{*})$ " " WW + 32 $(= -dI_{2Y}^{*} - 102)$
$A_{1Z}^{*}(\bar{M}_1 \cdot \bar{t}_{L1})$ " " WW + 33
$A_{1Z}^{*}(\bar{M}_1 \cdot \bar{t}_{L2})$ " " WW + 34
$A_{1Z}^{*}(\bar{N}_1 \cdot \bar{t}_{L1}')$ " " WW + 35 $(= dI_{2X} - 103)$
$A_{1Z}^{*}(\bar{N}_1 \cdot \bar{t}_{L2}')$ " " WW + 36 $(= dI_{2Y} - 103)$
$A_{1Z}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L1}^{*})$ " " WW + 37
$A_{1Z}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L2}^{*})$ " " WW + 38
$A_{1Z}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L1}'^{*})$ " " WW + 39 $(= -dI_{2Y} - 103)$
$A_{1Z}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L2}'^{*})$ " " WW + 40 $(= -dI_{2Y}\ 103)$

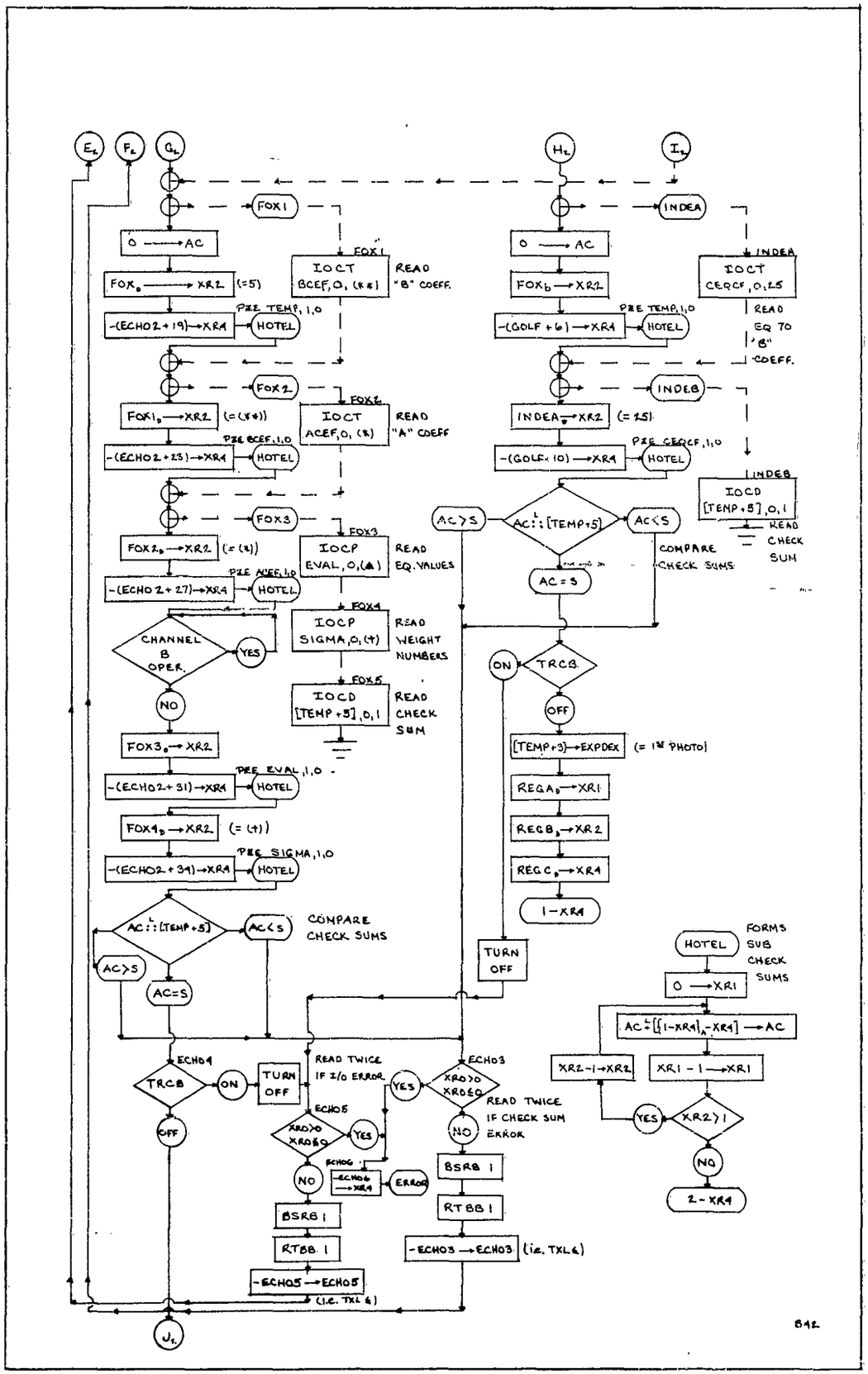
$\partial_1 t_{1X} + A_{1X}^{*}(\bar{M}_1 \cdot \bar{t}_{L1})$ STORED IN WW + 17 $(= dI_{1X} - 101)$
$\partial_1 t_{2X} + A_{1Y}^{*}(\bar{M}_1 \cdot \bar{t}_{L1})$ " " WW + 25 $(= dI_{1X} - 102)$
$\partial_1 t_{3X} + A_{1Z}^{*}(\bar{M}_1 \cdot \bar{t}_{L1})$ " " WW + 33 $(= dI_{1X} - 103)$
$\partial_1 t_{1Y} + A_{1X}^{*}(\bar{N}_1 \cdot \bar{t}_{L2})$ " " WW + 18 $(= dI_{1Y} - 101)$
$\partial_1 t_{2Y} + A_{1Y}^{*}(\bar{N}_1 \cdot \bar{t}_{L2})$ " " WW + 26 $(= dI_{1Y} - 102)$
$\partial_1 t_{3Y} + A_{1Z}^{*}(\bar{N}_1 \cdot \bar{t}_{L2})$ " " WW + 34 $(= dI_{1Y} - 103)$
$\partial_1^{*} t_{1X}^{*} + A_{1X}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L1}^{*})$ " " WW + 21 $(= -dI_{1X}^{*} - 101)$
$\partial_1^{*} t_{2X}^{*} + A_{1Y}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L1}^{*})$ " " WW + 29 $(= -dI_{1X}^{*} - 102)$
$\partial_1^{*} t_{3X}^{*} + A_{1Z}^{*}(\bar{M}_1^{*} \cdot \bar{t}_{L1}^{*})$ " " WW + 37 $(= -dI_{1X}^{*} - 103)$
$\partial_1^{*} t_{1Y}^{*} + A_{1X}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L2}^{*})$ " " WW + 22 $(= -dI_{1Y}^{*} - 101)$
$\partial_1^{*} t_{2Y}^{*} + A_{1Y}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L2}^{*})$ " " WW + 30 $(= -dI_{1Y}^{*} - 102)$
$\partial_1^{*} t_{3Y}^{*} + A_{1Z}^{*}(\bar{N}_1^{*} \cdot \bar{t}_{L2}^{*})$ " " WW + 38 $(= -dI_{1Y}^{*} - 103)$

SUMMARY

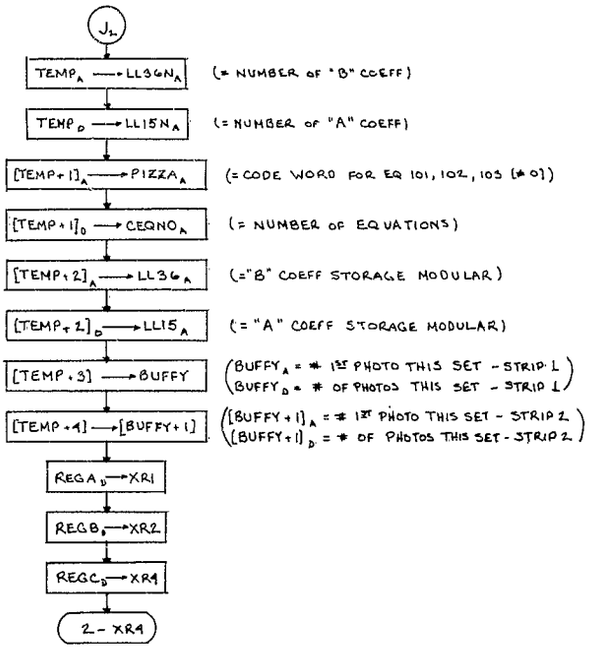
101	"A" COEFF IN CEQCF + 21	TO	CEQCF + 31			
102	" " "	WW + 25	"	WW + 32		
103	" " "	WW + 33	"	WW + 40		

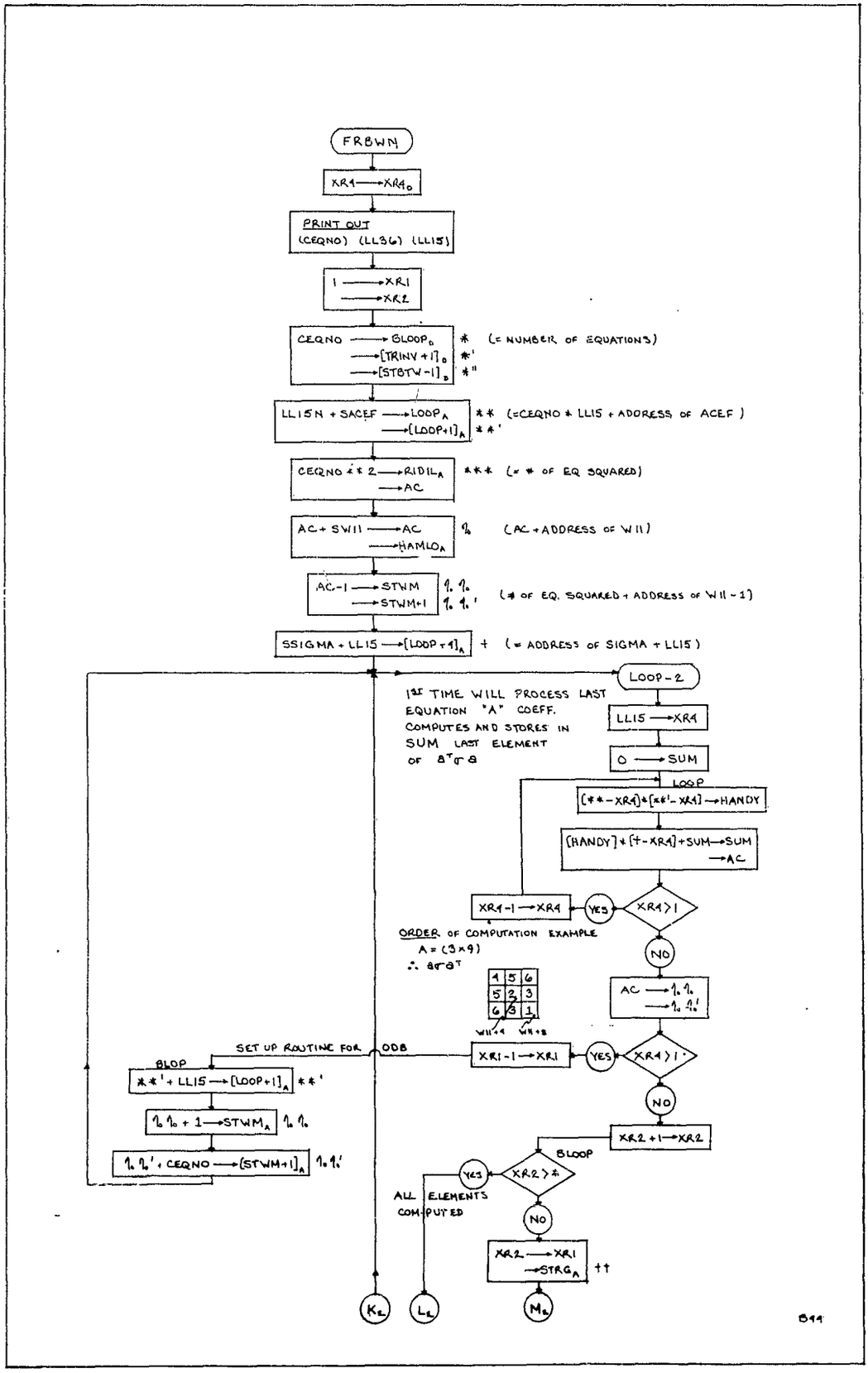
840

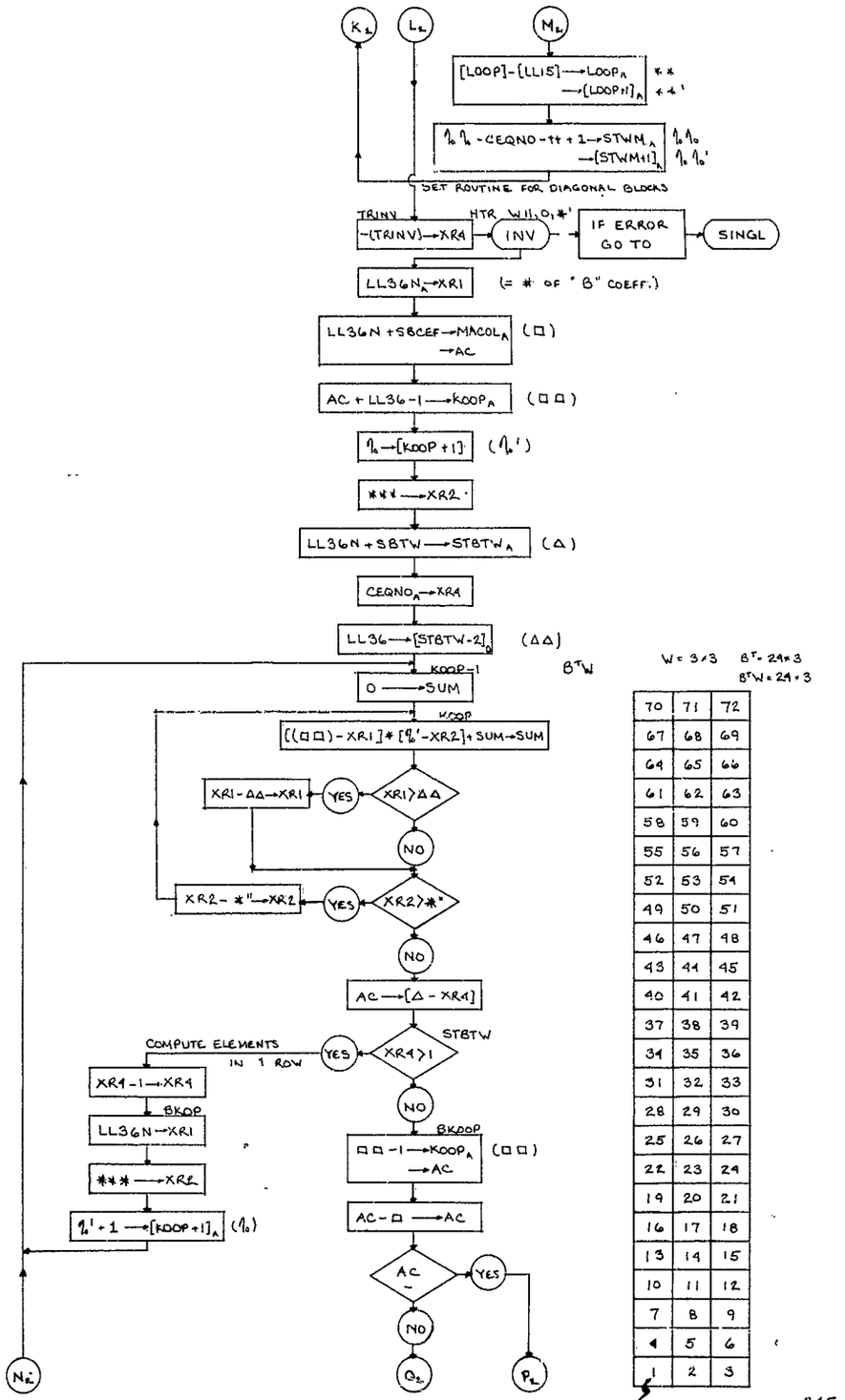

ECHO
RTBB 1
XR1 → REGA
XR2 → REGB
XR4 → REGC
+ECHO5 → ECHO5
(i.e.: TXH >)
ECHO1
+ECHO3 → ECHO3
(i.e.: TXH >)
ECHO2
5 → XR1
0 → TEMP+5-XR1
XR1 > 1
YES
XR1-1 → XR1
NO
FOX
TEMP → AC
(DELAY UNTIL TEMP IS READ INTO CORE)
AC 0
YES
NO
AC −
YES
EQ. 70 OR "END OF DATA" RECORD
GOLF
[TEMP+1] → AC
CONDITIONAL EQS WITH RESIDUALS
NO
AC 0
YES
NO
AC_B → FOX2_B (*)
AC_A → FOX1_B (**)
[TEMP+1] → AC
AC −
YES
"END OF DATA"
RECORD
OSCAR
REGA_B → XR1
REGB → XR2
REGC → XR4
3 - XR4
FOX
IOCT TEMP,0,5
READ CONTROL WORDS
AC 0
YES
DELAY UNTIL TEMP+1 IS READ INTO CORE
NO
NO
AC_B → FOX3_B (▲)
[TEMP+2] → AC
AC 0
YES
DELAY UNTIL TEMP+2 IS READ INTO CORE
NO
AC_B → FOX4_B †
EQ. 70 RECORD
E
F
G
H
I
B41

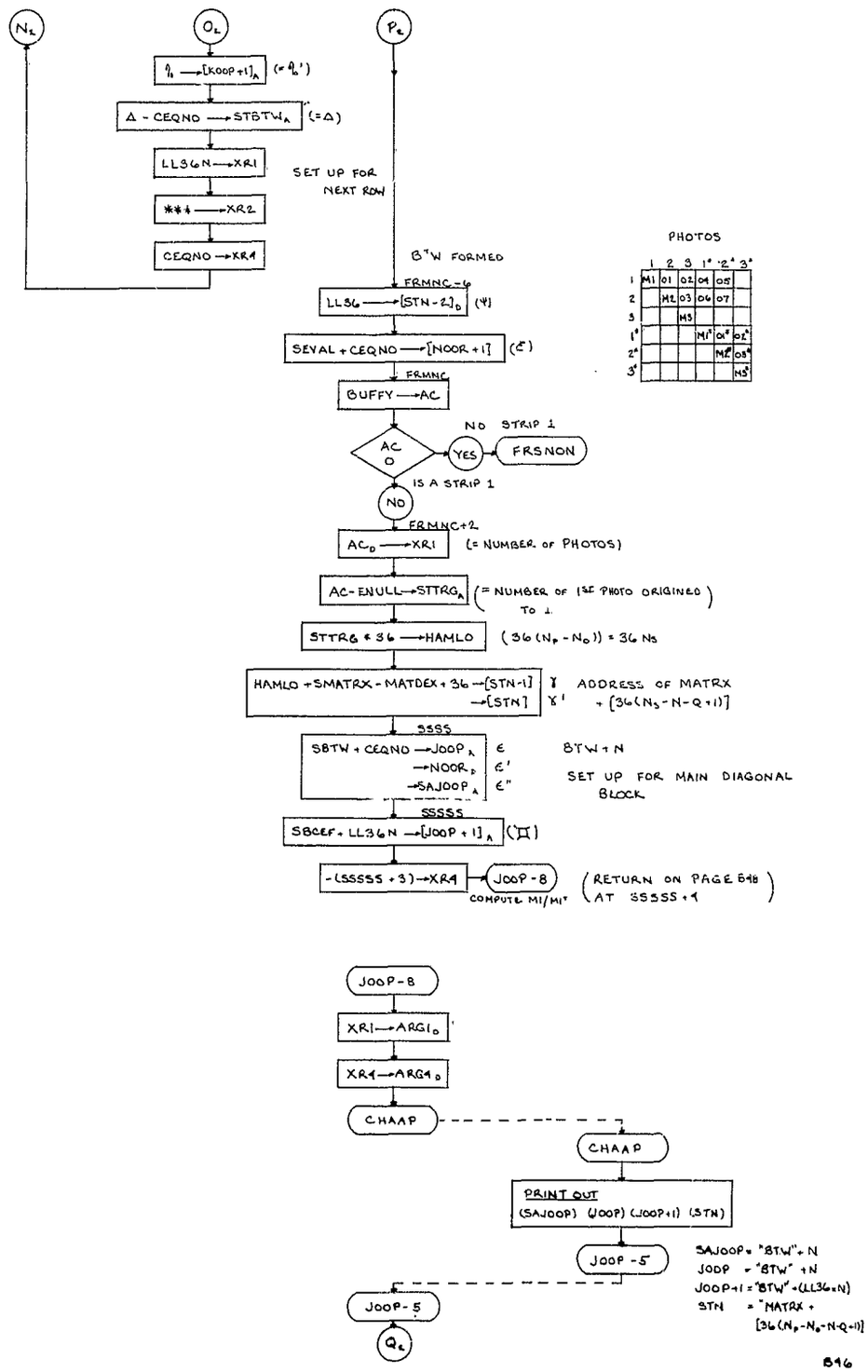


E2
F2
G2
H2
I2
FOX1
0 → AC
FOX0 → XR2 (=5)
-(ECHO2+19) → XR4
PZE TEMP,1,0
HOTEL
FOX1
IOCT BCEF,0,(**)
READ "B" COEFF.
FOX2
FOX1D → XR2 (=(**))
-(ECHO2+23) → XR4
PZE BCEF,1,0
HOTEL
FOX2
IOCT ACEF,0,(*)
READ "A" COEFF
FOX3
FOX2D → XR2 (=(*))
-(ECHO2+27) → XR4
PZE ACEF,1,0
HOTEL
FOX3
IOCP EVAL,0,(▲)
READ EQ. VALUES
FOX4
IOCP SIGMA,0,(+)
READ WEIGHT NUMBERS
FOX5
IOCD [TEMP+5],0,1
READ CHECK SUM
CHANNEL B OPER.
YES
NO
FOX3D → XR2
-(ECHO2+31) → XR4
PZE EVAL,1,0
HOTEL
FOX4D → XR2 (=(+))
-(ECHO2+34) → XR4
PZE SIGMA,1,0
HOTEL
AC :: [TEMP+5]
AC<S
COMPARE CHECK SUMS
AC>S
AC=S
ECHO4
TRCB
ON
OFF
TURN OFF
READ TWICE IF I/O ERROR
ECHO5
XRO>0 XRO≤0
YES
NO
ECHO6
-ECHO6 → XR4
ERROR
BSRB 1
RTBB 1
-ECHO5 → ECHO5
(i.e. TXL ≤)
ECHO3
XRO>0 XRO≤0
YES
NO
READ TWICE IF CHECK SUM ERROR
BSRB 1
RTBB 1
-ECHO3 → ECHO3 (i.e. TXL ≤)
J2
INDEA
0 → AC
FOXb → XR2
-(GOLF+6) → XR4
PZE TEMP,1,0
HOTEL
INDEA
IOCT CEQCF,0,25
READ EQ TO "B" COEFF.
INDEB
INDEA → XR2 (=25)
-(GOLF+10) → XR4
PZE CEQCF,1,0
HOTEL
INDEB
IOCD [TEMP+5],0,1
READ CHECK SUM
AC>S
AC :: [TEMP+5]
AC<S
COMPARE CHECK SUMS
AC=S
TRCB
ON
OFF
[TEMP+3] → EXPDEX (= 1st PHOTO)
REGAD → XR1
REGBD → XR2
REGCD → XR4
1 - XR4
TURN OFF
HOTEL
FORMS SUB CHECK SUMS
0 → XR1
AC + [{1-XR4}A - XR4] → AC
XR2-1 → XR2
XR1 - 1 → XR1
XR2>1
YES
NO
2 - XR4
842

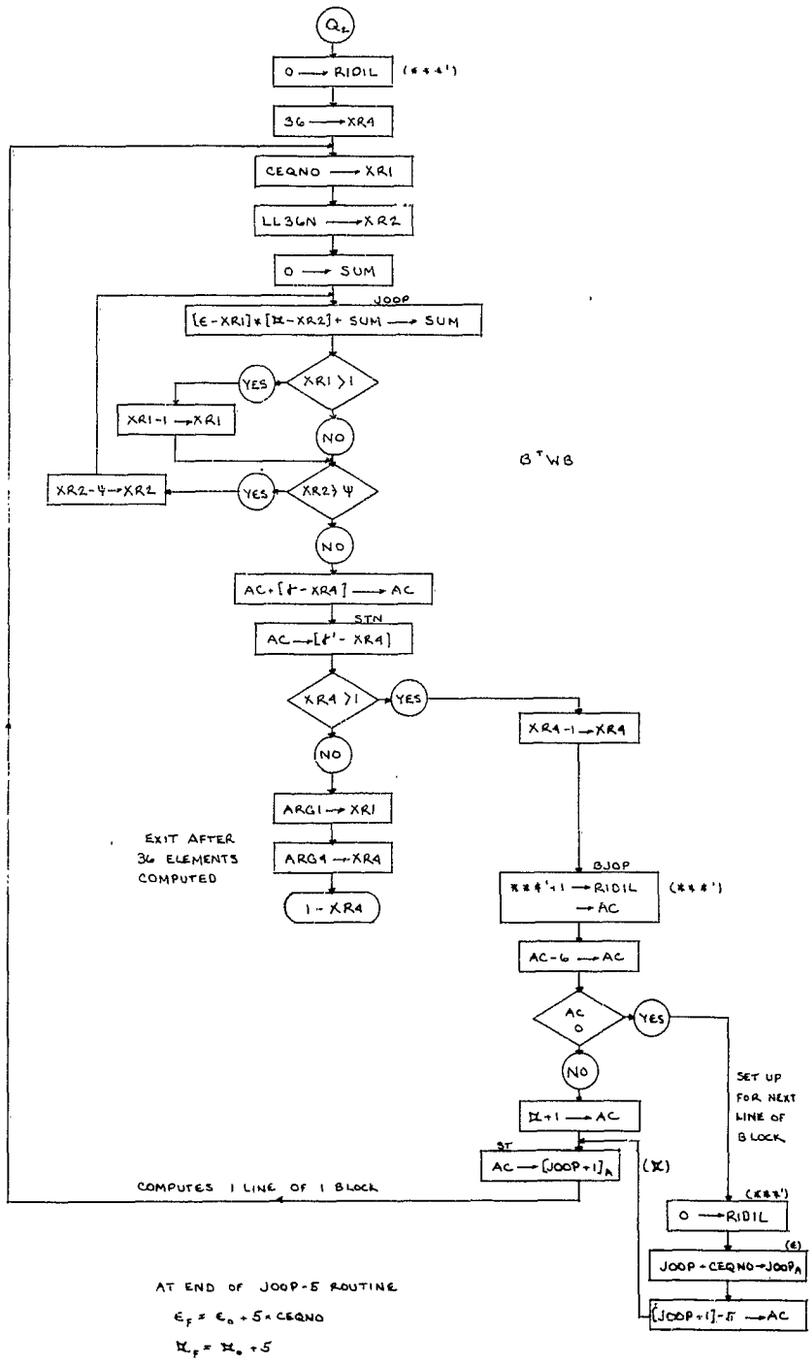

J1
TEMP_A → LL36N_A
(= NUMBER OF "B" COEFF)
TEMP_D → LL15N_A
(= NUMBER OF "A" COEFF)
[TEMP+1]_A → PIZZA_A
(= CODE WORD FOR EQ 101, 102, 105 [≠ 0])
[TEMP+1]_D → CEQNO_A
(= NUMBER OF EQUATIONS)
[TEMP+2]_A → LL36_A
(="B" COEFF STORAGE MODULAR)
[TEMP+2]_D → LL15_A
(= "A" COEFF STORAGE MODULAR)
[TEMP+3] → BUFFY
(BUFFY_A = # 1ST PHOTO THIS SET - STRIP 1
BUFFY_D = # OF PHOTOS THIS SET - STRIP 1)
[TEMP+4] → [BUFFY+1]
([BUFFY+1]_A = # 1ST PHOTO THIS SET - STRIP 2
[BUFFY+1]_D = # OF PHOTOS THIS SET - STRIP 2)
REGA_D → XR1
REGB_D → XR2
REGC_D → XR4
2 - XR4

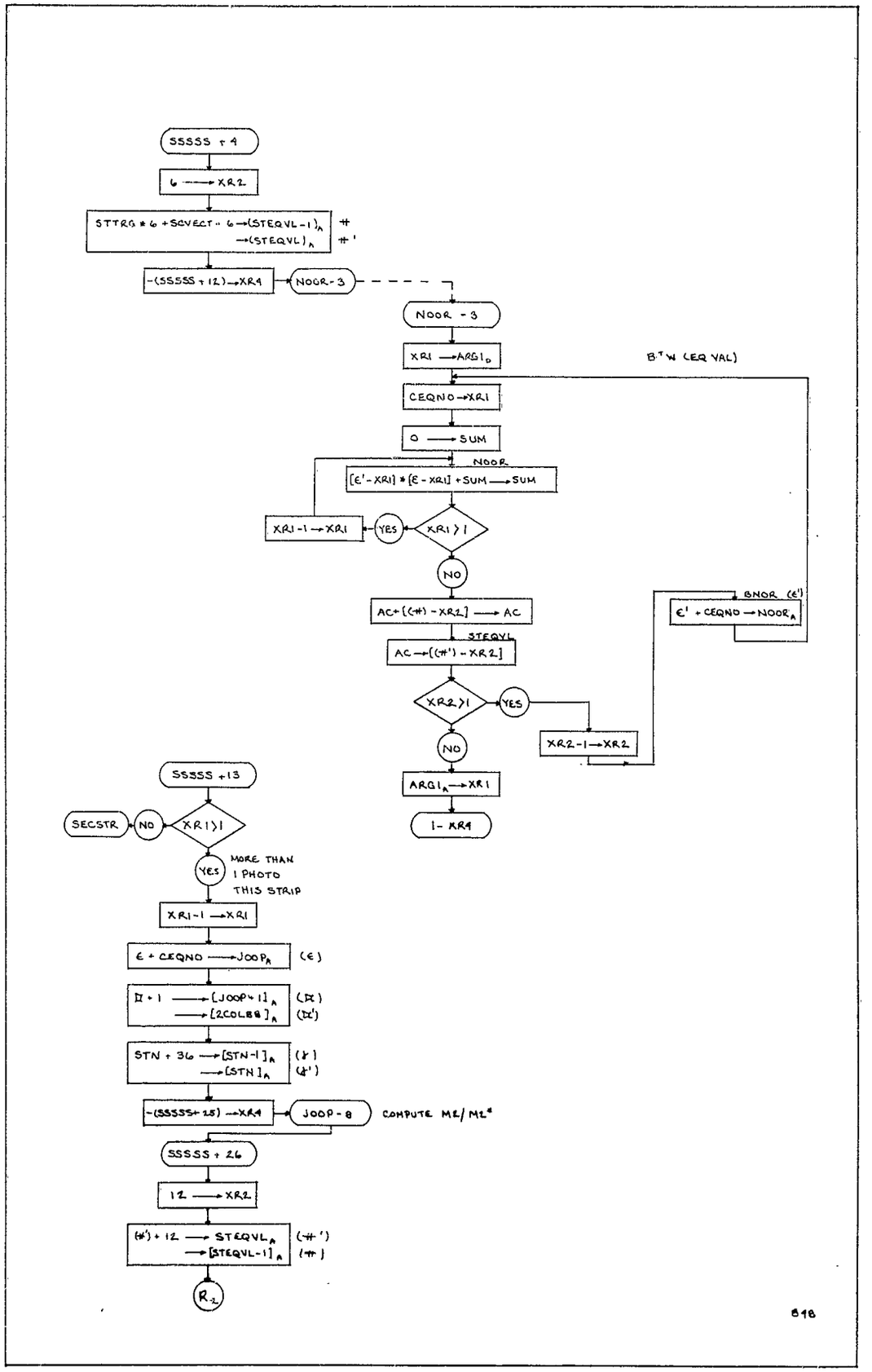

FRBWN
XR4 → XR4₀
PRINT OUT
(CEQNO) (LL36) (LL15)
1 → XR1
→ XR2
CEQNO → BLOOP₀ * (= NUMBER OF EQUATIONS)
→ [TRINV+1]₀ *'
→ [STBTW-1]₀ *''
LL15N + SACEF → LOOP_A ** (=CEQNO * LL15 + ADDRESS OF ACEF)
→ [LOOP+1]_A **'
CEQNO ** 2 → RIDIL_A *** (= # OF EQ SQUARED)
→ AC
AC + SW11 → AC % (AC + ADDRESS OF W11)
→ HAMLO_A
AC-1 → STWM %% (# OF EQ. SQUARED + ADDRESS OF W11 - 1)
→ STWM+1 %%'
SSIGMA + LL15 → [LOOP+4]_A + (= ADDRESS OF SIGMA + LL15)
LOOP-2
1ST TIME WILL PROCESS LAST EQUATION "A" COEFF. COMPUTES AND STORES IN SUM LAST ELEMENT OF aᵀσa
LL15 → XR4
0 → SUM
LOOP
[**-XR4]*[**'-XR4] → HANDY
[HANDY]*[+-XR4]+SUM → SUM
→ AC
XR4-1 → XR4
YES
XR4>1
ORDER OF COMPUTATION EXAMPLE
A = (3×9)
∴ aσaᵀ
NO
AC → %%
→ %%'
4 5 6
5 2 3
6 3 1
W11+4 W11+8
SET UP ROUTINE FOR ODB
XR1-1 → XR1
YES
XR4>1
BLOP
**' + LL15 → [LOOP+1]_A **'
%% + 1 → STWM_A %%
%%' + CEQNO → [STWM+1]_A %%'
NO
XR2+1 → XR2
BLOOP
YES
XR2>*
ALL ELEMENTS COMPUTED
NO
XR2 → XR1
→ STRG_A ††
K₂
L₂
M₂
B44

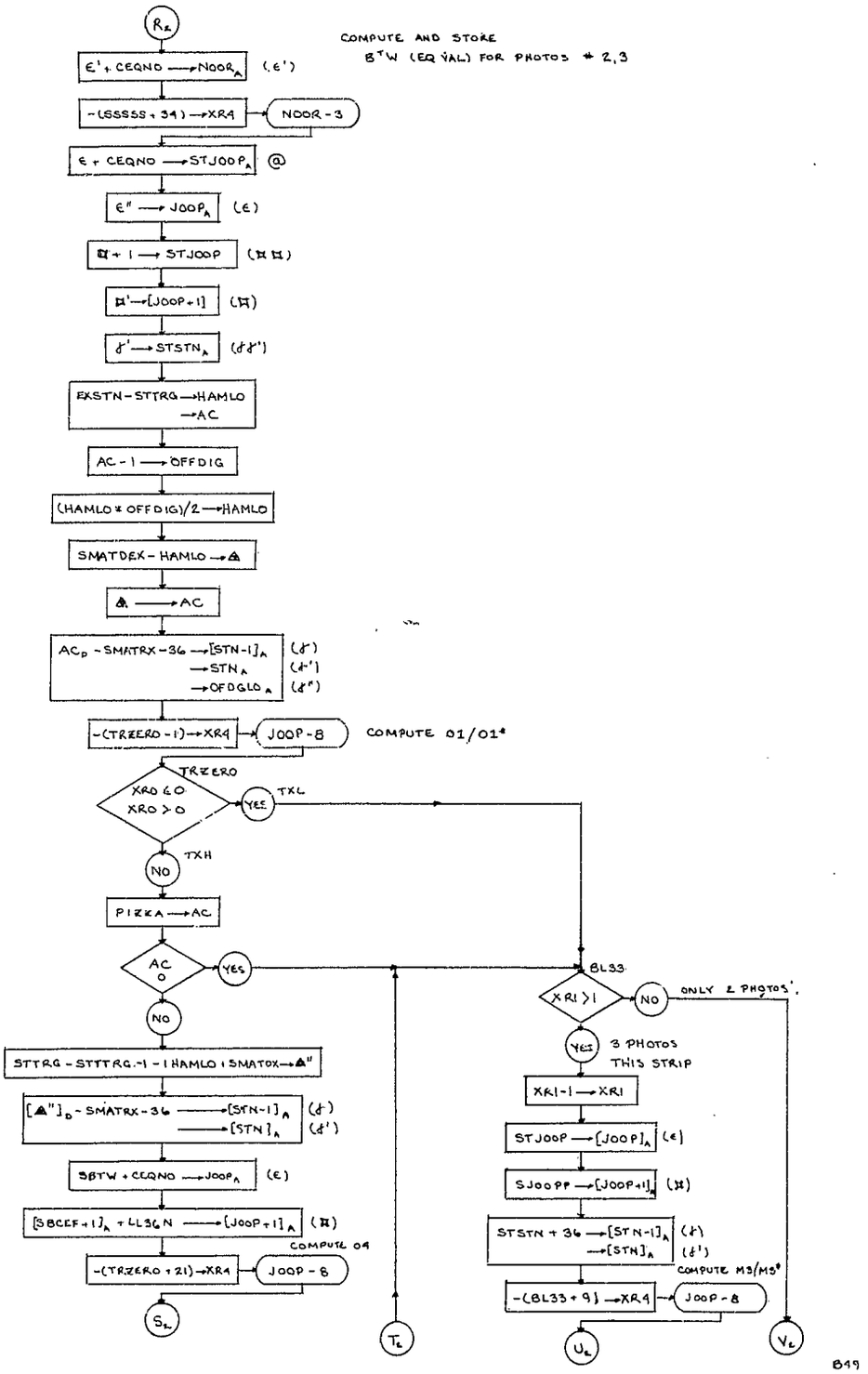

K2
L2
M2
[LOOP]-[LL15]→LOOP_A
→[LOOP+1]_A
CEQNO-++1→STWM_A
→[STWM+1]_A
SET ROUTINE FOR DIAGONAL BLOCKS
TRINV
-(TRINV)→XR4
HTR W11,0,*'
INV
IF ERROR GO TO
SINGL
LL36N_A→XR1
(= # OF "B" COEFF.)
LL36N+SBCEF→MACOL_A
→AC
AC+LL36-1→KOOP_A
[KOOP+1]
***→XR2
LL36N+SBTW→STBTW_A
CEQNO_A→XR4
LL36→[STBTW-2]_0
KOOP=1
0→SUM
KOOP
[(□□)-XR1]*[%'-XR2]+SUM→SUM
XR1-ΔΔ→XR1
YES
XR1>ΔΔ
NO
XR2-*"→XR2
YES
XR2>*"
NO
AC→[Δ-XR4]
STBTW
COMPUTE ELEMENTS IN 1 ROW
YES
XR4>1
NO
XR4-1→XR4
BKOP
LL36N→XR1
***→XR2
%'+1→[KOOP+1]_A
BKOOP
□□-1→KOOP_A
→AC
AC-□→AC
AC
YES
NO
N2
Q2
P2
B^TW
W=3×3
B^T=24×3
B^TW=24×3
70 71 72
67 68 69
64 65 66
61 62 63
58 59 60
55 56 57
52 53 54
49 50 51
46 47 48
43 44 45
40 41 42
37 38 39
34 35 36
31 32 33
28 29 30
25 26 27
22 23 24
19 20 21
16 17 18
13 14 15
10 11 12
7 8 9
4 5 6
1 2 3
BTW + 69
B45

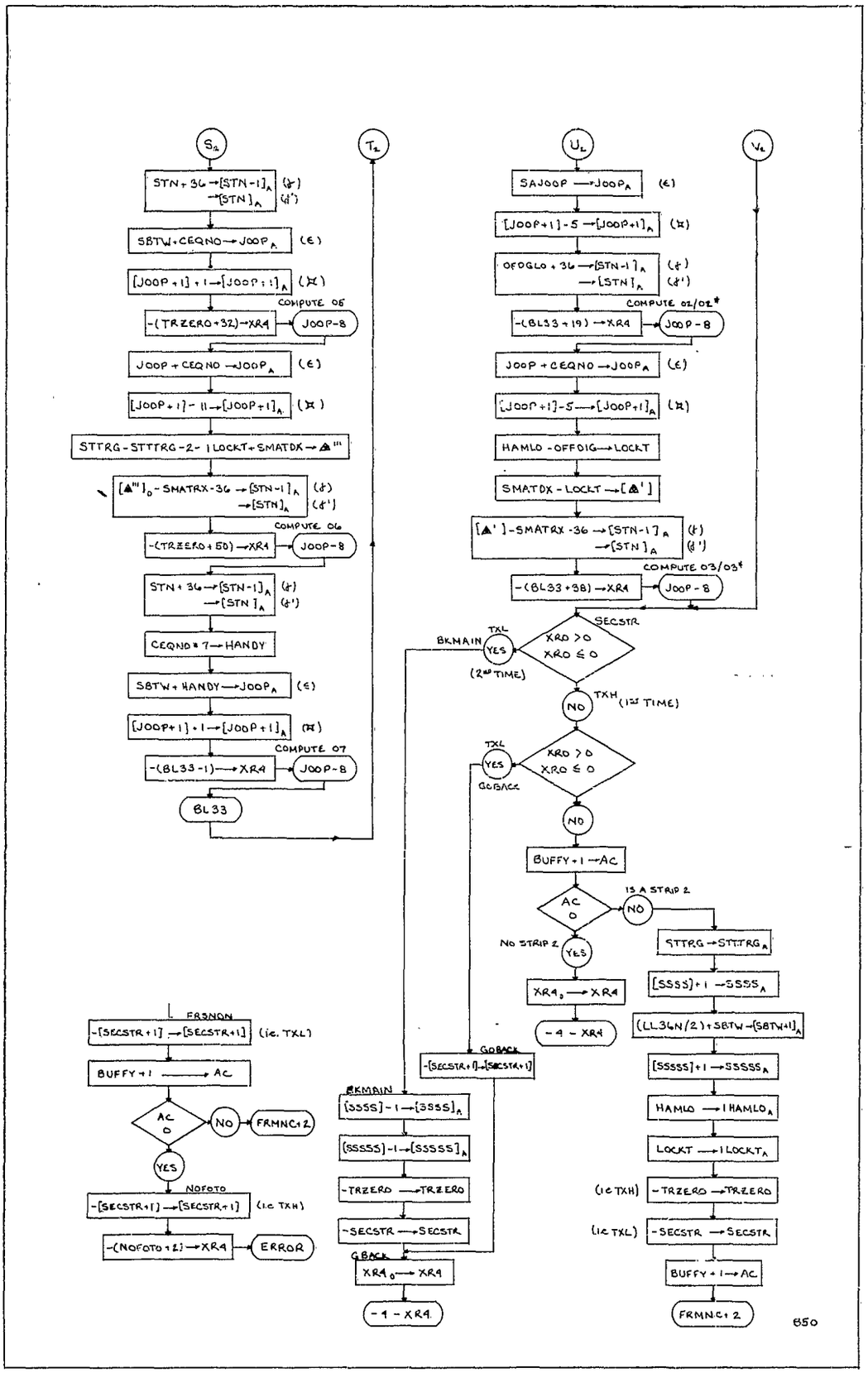


N2
O2
P2
[KOOP+1]A (= ⌀0')
Δ - CEQNO → STBTWA (=Δ)
LL36N → XR1
SET UP FOR NEXT ROW
*** → XR2
CEQNO → XR4
BTW FORMED
FRMNC-6
LL36 → [STN-2]D (Ψ)
SEVAL + CEQNO → [NOOR+1] (ε')
FRMNC
BUFFY → AC
AC 0
YES
NO STRIP 1
FRSNON
IS A STRIP 1
NO
FRMNC+2
ACD → XR1 (= NUMBER OF PHOTOS)
AC-ENULL → STTRGA (= NUMBER OF 1ST PHOTO ORIGINED TO 1.)
STTRG * 36 → HAMLO (36 (NP - NO)) = 36 NS
HAMLO + SMATRX - MATDEX + 36 → [STN-1] γ
→ [STN] γ'
ADDRESS OF MATRX + [36(NS - N - Q + 1)]
SSSS
SBTW + CEQNO → JOOPA ε
→ NOORD ε'
→ SAJOOPA ε"
BTW + N
SET UP FOR MAIN DIAGONAL BLOCK
SSSSS
SBCEF + LL36N → [JOOP + 1]A (Ⅱ)
-(SSSSS + 3) → XR4
JOOP - 8
COMPUTE M1/M1'
(RETURN ON PAGE 848 AT SSSSS + 4)
JOOP-8
XR1 → ARG1D
XR4 → ARG4D
CHAAP
CHAAP
PRINT OUT
(SAJOOP) (JOOP) (JOOP+1) (STN)
JOOP - 5
JOOP-5
Q2
SAJOOP = "BTW" + N
JOOP = "BTW" + N
JOOP+1 = "BTW" + (LL36 * N)
STN = "MATRX + [36(NP - NO - N - Q + 1)]
PHOTOS
1 2 3 1* 2* 3*
1 M1 01 02 04 05
2 M2 03 06 07
3 M3
1* M1* 01* 02*
2* M2* 03*
3* M3*


Q2
0 → RIDIL
(***')
36 → XR4
CEQNO → XR1
LL36N → XR2
0 → SUM
JOOP
[ε - XR1] * [ϰ - XR2] + SUM → SUM
XR1 > 1
YES
XR1 - 1 → XR1
NO
XR2 - 4 → XR2
YES
XR2 ≥ 4
NO
AC + [t - XR4] → AC
STN
AC → [t' - XR4]
XR4 > 1
YES
NO
XR4 - 1 → XR4
ARG1 → XR1
ARG4 → XR4
1 - XR4
EXIT AFTER 36 ELEMENTS COMPUTED
BJOP
***'+1 → RIDIL → AC
(***')
AC - 6 → AC
AC 0
YES
NO
SET UP FOR NEXT LINE OF BLOCK
ϰ + 1 → AC
ST
AC → [JOOP + 1]A
(ϰ)
COMPUTES 1 LINE OF 1 BLOCK
(***')
0 → RIDIL
(ε)
JOOP + CEQNO → JOOPA
[JOOP + 1] - 5 → AC
AT END OF JOOP - 5 ROUTINE
εF = εo + 5 × CEQNO
ϰF = ϰo + 5
B^T WB


SSSSS + 4
6 → XR2
STTRG * 6 + SCVECT + 6 → (STEQVL - 1)A #
→ (STEQVL)A #'
-(SSSSS + 12) → XR4
NOOR - 3
NOOR - 3
XR1 → ARG1D
B.T.W (EQ VAL)
CEQNO → XR1
0 → SUM
NOOR
[ε' - XR1] * [ε - XR1] + SUM → SUM
XR1 > 1
YES
XR1 - 1 → XR1
NO
AC + [(#) - XR2] → AC
STEQVL
AC → [(#') - XR2]
XR2 > 1
YES
XR2 - 1 → XR2
NO
ARG1A → XR1
1 - XR4
BNOR (ε')
ε' + CEQNO → NOORA
SSSSS + 13
XR1 > 1
NO
SECSTR
YES
MORE THAN
1 PHOTO
THIS STRIP
XR1 - 1 → XR1
ε + CEQNO → JOOPA (ε)
Π + 1 → [JOOP + 1]A (Π)
→ [2COLBB]A (Π')
STN + 36 → [STN - 1]A (γ)
→ [STN]A (γ')
-(SSSSS + 25) → XR4
JOOP - 8
COMPUTE ML/ML*
SSSSS + 26
12 → XR2
(#') + 12 → STEQVLA (#')
→ [STEQVL - 1]A (#)
R2


R2
COMPUTE AND STORE
BTW (EQ VAL) FOR PHOTOS # 2,3
E' + CEQNO → NOOR_A (ε')
-(SSSSS + 34) → XR4
NOOR - 3
E + CEQNO → STJOOP_A @
E'' → JOOP_A (ε)
¤ + 1 → STJOOP (¤¤)
¤' → [JOOP + 1] (¤)
δ' → STSTN_A (δδ')
EXSTN - STTRG → HAMLO
→ AC
AC - 1 → OFFDIG
(HAMLO * OFFDIG)/2 → HAMLO
SMATDEX - HAMLO → ▲
▲ → AC
AC_D - SMATRX - 36 → [STN-1]_A (δ)
→ STN_A (δ')
→ OFDGLO_A (δ'')
-(TRZERO - 1) → XR4
JOOP - 8
COMPUTE 01/01*
TRZERO
XR0 < 0
XR0 > 0
YES
TXL
NO
TXH
PIZKA → AC
AC 0
YES
NO
BL33
XR1 > 1
NO
ONLY 2 PHOTOS'.
YES
3 PHOTOS
THIS STRIP
XR1 - 1 → XR1
STJOOP → [JOOP]_A (ε)
SJOOPP → [JOOP+1]_A (¤)
STSTN + 36 → [STN-1]_A (δ)
→ [STN]_A (δ')
COMPUTE M3/M3*
-(BL33 + 9) → XR4
JOOP - 8
STTRG - STTTRG - 1 - 1 HAMLO 1 SMATOX → ▲''
[▲'']_D - SMATRX - 36 → [STN-1]_A (δ)
→ [STN]_A (δ')
SBTW + CEQNO → JOOP_A (ε)
[SBCEF + 1]_A + LL36N → [JOOP + 1]_A (¤)
COMPUTE 04
-(TRZERO + 21) → XR4
JOOP - 8
S2
T2
U2
V2
B49



S2
T2
STN + 36 → [STN-1]A (γ)
→ [STN]A (γ')
SBTW + CEQNO → JOOPA (ε)
[JOOP+1] + 1 → [JOOP+1]A (¤)
COMPUTE 05
-(TRZERO+32) → XR4
JOOP-8
JOOP + CEQNO → JOOPA (ε)
[JOOP+1] - 11 → [JOOP+1]A (¤)
STTRG - STTTRG - 2 - 1 LOCKT + SMATDX → ▲'''
[▲''']0 - SMATRX - 36 → [STN-1]A (γ)
→ [STN]A (γ')
COMPUTE 06
-(TRZERO+50) → XR4
JOOP-8
STN + 36 → [STN-1]A (γ)
→ [STN]A (γ')
CEQNO * 7 → HANDY
SBTW + HANDY → JOOPA (ε)
[JOOP+1] + 1 → [JOOP+1]A (¤)
COMPUTE 07
-(BL33-1) → XR4
JOOP-8
BL33
U2
V2
SAJOOP → JOOPA (ε)
[JOOP+1] - 5 → [JOOP+1]A (¤)
OFDGLO + 36 → [STN-1]A (γ)
→ [STN]A (γ')
COMPUTE 02/02*
-(BL33+19) → XR4
JOOP-8
JOOP + CEQNO → JOOPA (ε)
[JOOP+1] - 5 → [JOOP+1]A (¤)
HAMLO - OFFDIG → LOCKT
SMATDX - LOCKT → [▲']
[▲'] - SMATRX - 36 → [STN-1]A (γ)
→ [STN]A (γ')
COMPUTE 03/03*
-(BL33+38) → XR4
JOOP-8
SECSTR
XRO > 0
XRO ≤ 0
TXL
YES
BKMAIN
(2ND TIME)
NO
TXH (1ST TIME)
XRO > 0
XRO ≤ 0
TXL
YES
GOBACK
NO
BUFFY + 1 → AC
AC 0
IS A STRIP 2
NO
NO STRIP 2
YES
XR4₀ → XR4
-4 - XR4
STTRG → STTTRGA
[SSSS] + 1 → SSSSA
(LL36N/2) + SBTW → [SBTW+1]A
[SSSSS] + 1 → SSSSSA
HAMLO → 1 HAMLOA
LOCKT → 1 LOCKTA
(IC TXH) -TRZERO → TRZERO
(IC TXL) -SECSTR → SECSTR
BUFFY + 1 → AC
FRMNC+2
FRSNON
-[SECSTR+1] → [SECSTR+1] (IC. TXL)
BUFFY + 1 → AC
AC 0
NO
FRMNC+2
YES
NOFOTO
-[SECSTR+1] → [SECSTR+1] (IC TXH)
-(NOFOTO+2) → XR4
ERROR
GOBACK
-[SECSTR+1] → [SECSTR+1]
BKMAIN
[SSSS] - 1 → [SSSS]A
[SSSSS] - 1 → [SSSSS]A
-TRZERO → TRZERO
-SECSTR → SECSTR
GBACK
XR4₀ → XR4
-4 - XR4

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ANALYTICAL AERIAL TRIANGULATION ERROR ANALYSIS AND
APPLICATION OF COMPENSATING EQUATIONS TO
THE GENERAL BLOCK TRIANGULATION AND ADJUSTMENT PROGRAM

FINAL TECHNICAL REPORT
VOLUME 2

Civil Engineering Systems Laboratory
Department of Civil Engineering
Massachusetts Institute of Technology
Cambridge, Massachusetts

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Further information concerning this project may be obtained from Mr. R. D. Esten, Chief, Photogrammetry Division, U. S. Army Engineer Geodesy, Intelligence and Mapping Research and Development Agency, Fort Belvoir, Virginia, telephone EDgewater 9-5500, ext. 62140.

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The objective of the activities reported is to effect improved accuracy in the supplied General Block Triangulation digital computer program through incorporation in the program means of error adjustment and compensation. The first volume of the report presents:

1. the nature of random and systematic errors and the basic techniques for treating their effects as applicable to the analytical photogrammetric problem;
2. the basic least squares method and its incorporation in the computer program;
3. complete mathematical description of the program;
4. studies of the nature and effects of the important error sources: lens and camera errors, atmospheric refraction, film distortion;
5. the study of various techniques for the solution of simultaneous equations;
6. operating instructions;
7. the results, conclusions, and resulting recommendations of test runs of the final computer program.

The second volume contains the appendices which consist of the complete flow charts representing the original and final programs.

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