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AD 913127

Project Report

PA-229-11
(RSP)

Data Reduction Program Documentation ALERT

(Effective: April 1971)

C. R. Berndtson
R. H. French
D. E. Nessman

11 June 1971 19659

Prepared for the Advanced Research Projects Agency,
the Department of the Army, and the Department of the Air Force
under Electronic Systems Division Contract F19628-70-C-0230 by

Lincoln Laboratory

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Lexington, Massachusetts



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MASSACHUSETTS INSTITUTE OF TECHNOLOGY
LINCOLN LABORATORY

DATA REDUCTION PROGRAM DOCUMENTATION
ALERT 7

(EFFECTIVE: APRIL 1971)

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Group 92

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Philco-Ford Corporation
Editors

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FOREWORD

This is the eleventh report in the Data Reduction Program Documentation series. It is dated according to the date of completion of the documentation. No implication is made that this program will not subsequently be modified, amended, or superseded; on the contrary, the history of radar data processing is one of continuous evolution of techniques, and it is unrealistic to assume that steady-state has been reached.

The preparation of reports in this series is under the Editorship of Charles R. Berndtson of Lincoln, and of D. Nessman and R. French of Philco-Ford Corporation. Inquiries, suggestions, corrections, criticisms, and requests for additional copies should be directed to C. R. Berndtson.

The principal contributor to this report was G. L. Shapiro (Philco-Ford). Due to the intricate, evolutionary manner in which the programs came into being, the editors regret that it is in general impossible to give due credit to all -- mathematicians or radar analysts or programmers -- who contributed to the definition and writing of the programs.


Alan A. Grometstein

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COMMON SYMBOLS AND ABBREVIATIONS

(The units given for certain quantities are the units commonly used for those quantities, unless otherwise noted.)

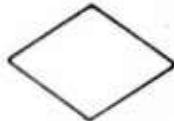
ADT	ALCOR Data Tape
ALCOR	ARPA-Lincoln C-band Observables Radar
ALTAIR	ARPA Long-Range Tracking and Instrumentation Radar
Alt	Altitude (km)
APS	Average Pulse Shape
ARS	ALTAIR Recording System
Avg	Average, Averaging
Az	Azimuth (deg)
c	Speed of Light
CADJ	Adjusted Calibration Constant (db)
C-band	ALCOR frequency, 5664 MHz (NB) and 5667 MHz (WB)
DBLT	Wide Band Pulse Doublet
DCO	Designations and Communications Operator
EI	Elevation (deg)
EOF	End of File
GMT	Greenwich Mean Time
h	Hours
Hz	Hertz
IF	Intermediate Frequency
in	Inches
IRV	Inter-Range Vector
LC	Left Circular Polarization
lsb	Least Significant Bit
min	Minutes
NB	Narrow Band
NRTPOD	Non-real Time Precision Orbit Determination Program
POD	Project PRESS Operation and Data Summary Report
Phase	Presented in deg
PRF	Pulse Repetition Frequency (pps)
PRI	Pulse Repetition Interval (s)
pps	Pulses per second
pts	Points

R	Range (km)
$\dot{R}$	Range Rate (km/s)
rad	Radians
RC	Right Circular Polarization
RCS	Radar Cross Section (dbsm)
RF	Radio Frequency
s	Seconds
SD_w	Standard Deviation of Wake Velocity
SDBLT	Wide Band Slaved Pulse Doublet
S/N	Signal-to-noise Ratio
T	Time
TAL	Time After Launch (s)
Tr	Traverse Angle (deg)
UHF	ALTAIR Frequency; 415 MHz
V	Velocity
V_d	Doppler Velocity
V_w	Mean Wake Velocity
VHF	ALTAIR Frequency; 155.5 MHz
WB	Wide Band
WBS	Wide Band Slaved
WTR	Western Test Range
θ	Total Off-axis Angle (deg)
λ	Wavelength
*	Denotes Multiplication

FLOW DIAGRAM SYMBOLS



PROCESS, ANNOTATION



DECISION



TERMINATOR



SUBROUTINE: where NAME is the entry
call into the subroutine



CONNECTOR: where P specifies a page in the
flow diagram, and L designates
a statement number in the program
listing or a reference point in the
flow diagram



CONNECTOR: where X implies a continuation
of the diagram to the next page



INPUT/OUTPUT OPERATION



MAGNETIC TAPE



PUNCHED CARD



DISK

ALERT

I. PURPOSE AND UTILIZATION

A. Source of Data

ALCOR¹

B. Data Input

ALCOR Data Tape (ADT)

C. Description

ALCOR data tape
ALERT is designed to obtain a summary of the data available on an ADT tape. Output is normally requested every 10th pulse. When ~~WBS~~, ~~DBLT~~, or ~~SDBLT~~ waveforms are operative, ALERT should be requested every pulse. The data presented in an ALERT listing are essential to run other ALCOR programs.

D. Output

A listing of metric and radar status data.

*continue
on page 2*

Wide band slaved

wide band pulse doublet

Wide band slaved pulse doublet

from page 1

II. DESCRIPTION

ALERT gives a listing of metric and radar status information correlated with pulse ^{numbers}nos. which are necessary to run other ALCOR programs. The program should be run every pulse when WBS, DBLT, or SDBLT waveforms are in use.

The items listed by ALERT are determined as follows:

R, Az, and El are corrected:

$$R = \text{IRANGE} + \text{TRBIAS} + \text{TTCOR} + \text{RRCOR} - \text{RCORF}$$

$$\text{Az} = \text{IAZ} + \text{AZBIAS}$$

$$\text{El} = \text{IEL} + \text{ELBIAS} - \text{ECORF}$$

where

IRANGE is uncorrected R

TRBIAS is range bias

TTCOR (transit time correction) = $\dot{R}R/c$

RRCOR is range doppler coupling correction

RCORF is tropospheric refraction correction

IAZ is Az encoder angle

AZBIAS is Az bias (Calibration Record Word 602)

IEL is El encoder angle

ELBIAS is El bias (Calibration Record Word 603)

ECORF is tropospheric refraction correction

Alt is computed as follows:

$$\text{Alt} = (R^2 + R_e^2 + 2 R R_e \sin \text{El})^{\frac{1}{2}} - R_e$$

where R_e = radius of earth (6378.145 km)

RCS is always the NB real time RCS whether the ADT is NB or WB. It is obtained:

$$\begin{aligned} \text{LC RCS} &= (\text{IPPRCS}) (80/255) - 40 \\ \text{RC RCS}^{\#} &= (\text{IOPRCS}) (80/255) - 40 \end{aligned}$$

where

IPPRCS is Data Record Byte 802

IOPRCS is Data Record Byte 803

A/D count is given for Gate 52 unless IW117 = 1 is input. In the latter case, IMOV^{##} is given.

The angle offsets (ΔTr and ΔEl) are determined:

$$\Delta\text{Tr} = \text{AZGRAD} (2 \pi) (10^{P_a/20}) (\cos Z1)$$

$$\Delta\text{El} = \text{ELGRAD} (2 \pi) (10^{P_e/20}) (\cos Z2)$$

where

AZGRAD is the traverse scaling factor (revolutions/unit error),
Calibration Record Word 612

ELGRAD is the elevation scaling factor (revolutions/unit error),
Calibration Record Word 613

$10^{P/20}$ is the normalized error voltage

$$P_a \text{ (db)} = \Delta\text{Tr (db)} - \text{REF (db)}$$

$$P_e \text{ (db)} = \Delta\text{El (db)} - \text{REF (db)}$$

[#] Not an output at present.

^{##} IMOV^{##} indicates whether primary and offset range gates are being moved manually; 62 to 66 counts: not moved; < 62 or > 66 counts: are moved; the separation between the primary and offset gates remains constant.²

ΔTr (db), ΔEl (db), and REF (db) are found by indexing the amplitude reference table (Calibration Record Words 256-383) with the log detector counts obtained in the ADT data record for the ΔTr , ΔEl , and reference channels.

$$Z1 = \Delta Tr \text{ phase} - REF \text{ phase} + AGAMA$$

$$Z2 = \Delta El \text{ phase} - REF \text{ phase} + EGAMA$$

ΔTr phase, ΔEl phase, and REF phase are found by indexing the phase reference table (Calibration Record Words 1-255) with the phase detector counts obtained in the data record.

AGAMA is a phase offset between the reference channel and the ΔTr channel, found in Calibration Record Word 596

EGAMA is a phase offset between the reference channel and the ΔEl channel, found in Calibration Record Word 597

Peak transmit power is determined:

$$NB \text{ POWER} = PWRCN + PWRSN \log XPKPWR$$

$$WB \text{ POWER} = PWRSN + PWRSW \log XPKPWR$$

where

PWRCN is Calibration Record Word 620

PWRSN is Calibration Record Word 621

PWRCW is Calibration Record Word 622

PWRSW is Calibration Record Word 623

XPKPWR is Data Record Byte 344

The type of returned pulse is obtained from Data Record Byte 817, Bits 1-4,

where:

<u>Code</u>	<u>Pulse Return</u>
0	NB
1	WB
2	Phantom (not expected on ADT)
3	WBS

<u>Code</u>	<u>Pulse Return</u>
4	not used
5	DBLT
6	not used
7	SDBLT

Range offset is obtained from Data Record Bytes 832, 833, and 834.

DBLT waveform status information includes:

	<u>Calibration Record Word No.</u>
Alt at which DBLT is initiated	643
Alt at which DBLT is terminated	644

The following offset range scan status information is listed:

<u>Exo-atmospheric</u>	<u>Calibration Record Word No.</u>
Alt at which slaved mode is initiated	631
Alt at which slaved mode is terminated	632
No. of dwells/scan	633
Initial range offset (m)	634
Range offset increment (m)	635
Total no. of pulses/dwell	636

<u>Endo-atmospheric</u>	<u>Calibration Record Word No.</u>
Alt at which slaved mode is initiated	637
Alt at which slaved mode is terminated	638
No. of dwells/scan	639
Initial range offset (m)	640
Range offset increment (m)	641
Total no. of pulses/dwell	642

PRF is IPRF, determined from the transmitted PRF for the particular waveform on the ADT.[#]

[#] See Ref. 2, Appendix F.

Radar status is obtained:

<u>Type of Information</u>	<u>Column Heading</u>	<u>Code</u>	<u>Status</u>	<u>Source</u>
Range	R	D	Designated mode	Data Record Byte 816, Bits 6-8
		T	Track mode	
		A	Automatic acquisition mode	
		C	Coast mode	
Angle	A	O	NB R not slaved to WB R	Data Record Byte 814, Bit 3
		S	NB R slaved to WB R	
	N	N	NB R into target tracker	Data Record Byte 814, Bit 6
		W	WB R into target tracker	
	G	O	Initially set to O	Data Record Byte 814, Bit 7
		T	Alternates with every track transfer	
	E	C	Tracking target centroid	Data Record Byte 818, Bit 8
		E	Tracking leading edge of target	
	A	D	Designated mode	Data Record Byte 819, Bits 6-8
		T	Track mode	
		W	Wait mode	
		C	Coast mode	
Miscellaneous	N	2	Angle servo type 2	Data Record Byte 818, Bit 5
		I	Angle servo type 1	
	G	H	Maximum angle servo bandwidth	Data Record Byte 818, Bit 6
		L	Minimum angle servo bandwidth	
	M	*	Not used	Data Record Byte 814, Bit 1
	I	O	Skin track mode	
		B	Beacon track mode	

<u>Type of Information</u>	<u>Column Heading</u>	<u>Code</u>	<u>Status</u>	<u>Source</u>
RD Designation Source	S	N	Detection normal	Data Record Byte 819, Bit 1
		O	Detection override	
	C	O	NB transmission only	Data Record Byte 818, Bit 4
		W	NB/WB transmission	
	R	D	Designation source selected by DCO	Data Record Byte 815, Bits 7 and 8
		P	Current track file	
		C	Manual	
		*	Not used	
	D	T (1-4)	Track files (1-4)	Data Record Byte 815, Bits 1-4
		N (1-4)	Nominal track files (1-4)	
		I (1-4)	Inflight (IRV) messages	
		F (1-3)	Fixed point	
		B*	Boresight tower	
		P*	PRESS track file	
Waveform	W	O	No WBS or SDBLT	Data Record Byte 817, Bit 5
		S	WBS or SDBLT	
	B	O	Not used	Data Record Byte 817, Bit 6
		N	Endo offset range scan	
		X	Exo offset range scan	
		O	Not used	
	S	M	Manual offset range scan	Data Record Byte 817, Bit 7
		A	Automatic offset range scan	
	D	O	No DBLT or SDBLT	Data Record Byte 817, Bit 8
		D	DBLT or SDBLT	

III. OPERATION

A. Input

Title

Launch Time (GMT total ms)

A/D option

First and last pulse nos. of processing intervals

Skip interval (pulses)

No. of processing intervals

A sample input is shown in Appendix A.

CARD 1 (I10, 3I5, 1X, A4)

(Col.)

1-10	ILNCH	Launch time in GMT total ms
11-15	NVALS	No. of processing intervals
16-20	IW117	A/D option: 0 = Gate 52; 1 = IMOV
21-25	IAUTO [#]	0: NSKIP = 0 during WBS, DBLT, and SDBLT operation 1: NSKIP used as input
27-30	TITL	Title for listing

CARD 2 (6I10)

1-10	NSTART(1)	First pulse no. of initial processing interval
11-20	NSTOP(1)	Last pulse no. of initial processing interval
21-30	NSKIP(1)	No. of pulses between each line output
31-40	NSTART(2)	First pulse no. of second processing interval
41-50	NSTOP(2)	Last pulse no. of second processing interval
51-60	NSKIP(2)	No. of pulses between each line output

Repeat Card 2 as necessary.

[#] Applies only to WB ADT's.

B. Output

All input parameters are summarized at the beginning of the listing. This is followed by a summary of the offset range scan parameters in effect for the mission, and a summary of the meaning of all mnemonics that can appear in an ALERT listing.

The ALERT listing includes the following: time (TAL and GMT h, min, s, and ms), Alt, R, $\dot{R}$,[#] Az, El, NB LC RCS, A/D count (Gate 52 or IMOV), Tr error,^{##} El error, LC attenuation,[†] peak power, range offset, pulse no. and type, and status information. Status information is listed only when a change occurs.

A sample listing is presented in Appendix B.

[#]This $\dot{R}$ is computed by the Real Time Program, and only approximates the true $\dot{R}$. The best estimate of $\dot{R}$ should be computed by differentiating R, which is accurate.

^{##}Called Az error in listing.

[†]Called AGC in listing.

IV. PROGRAM LIMITATIONS

NVALS ≤ 50 processing intervals

V. PROGRAMMING

A. ALERT (see Appendices C and D.)

ALERT is the control section of ALERT. It reads the input cards, calls the subroutines, and lists the desired data.

B. HEDADT (see Appendix E.)

Subroutine HEDADT unpacks the ADT header record which contains bandwidth, reel no., WTR no., data of mission, and mission designator. The call statement is HEDADT [ISIG, [#] INBUF(1), IEQM(1)]

INPUT

INBUF(1) First word in the ADT header record^{##}

OUTPUT

IEQM(1)	IZBAND	(bandwidth: 1 = WB, 0 = NB)
IEQM(2)	ITREEL	(reel no.)
IEQM(3)	ITWTR	(WTR no.)
IEQM(4)	IMTH	
IEQM(5)	IDAY	(Date of test)
IEQM(6)	IYR	
IEQM(7-9)	ITDESG	(mission designator)

C. UNPACK (see Appendix F.)²

Subroutine UNPACK unpacks the raw data from the ADT, and translates it into a format usable by the IBM 360/67 computer.

[#]Not used.

^{##}INBUF(2) to INBUF (1803) contain the remaining words in the record.

D. READJS²

The first call to subroutine READJS opens the file and reads the ADT header record. The second call to READJS reads the ADT calibration record and stores the values in a buffer area. ALERT extracts the individual calibration values it requires. Each subsequent call to READJS reads an ADT data record consisting of eight ALCOR pulses.

E. REFC (see Appendix G.)

The tropospheric refraction correction subroutine, REFC, is based on tropospheric refraction tables in PPP-36.³ A modified version of this subroutine is now in use.

The call statement is REFC (E, R, DEE, DRR).

E = Uncorrected El (must be between 0° and 90°)

R = Uncorrected R

DEE = El tropospheric correction

DRR = R tropospheric correction

The corrected values to be computed after exiting from the REFC subroutine are:

El = E-DEE

R = R-DRR

F. STATUS (see Appendix H.)

Subroutine STATUS examines the designated status words, checks for changes, and returns to control section for output. The call statement is STATUS.

STORED IN COMMON

ISTAT Array of status mnemonics

IALSW Not used

ISTSW Change of status indicator: 0 = no change; 1 = change

REFERENCES

1. "ALCOR Data Users Manual", LM-86, Lincoln Laboratory, M.I.T. (17 June 1970), UNCLASSIFIED.
2. "Data Reduction Program Documentation, ALCOR Tape Read Package, (Effective: April 1971)", PA-229-7, Lincoln Laboratory, M.I.T. (26 April 1971), UNCLASSIFIED.
3. J. P. Penhune, "Refraction Corrections for the TRADEX Radar", PPP-36 Lincoln Laboratory, M.I.T. (21 April 1965), UNCLASSIFIED.

APPENDIX A
ALERT INPUT

18900972 1 0 0 1J05

[illegible]

22401 24001 9

[illegible]

APPENDIX B ALERT OUTPUT

ALERT-ALCDR BAND = NB REEL NO. = TITLE = JJ05 DATE = 3/ 3/71
 START STOP SKIP START STOP SKIP START STOP SKIP
 22401 24001 9
 LAUNCH TIME (TOTAL SECS) = 18900.972 1W117 = 0

EXO-ATMOSPHERIC

UPPER WBS SCAN ALTITUDE (KM) = -0.0 UPPER WBS SCAN ALTITUDE (KM) = -0.0
 LOWER WBS SCAN ALTITUDE (KM) = -0.0 LOWER WBS SCAN ALTITUDE (KM) = -0.0
 NUMBER OF DWELLS PER SCAN = 10. NUMBER OF DWELLS PER SCAN = 78.
 INITIAL RANGE OFFSET (M) = 23.98 INITIAL RANGE OFFSET (M) = 29.98
 RANGE OFFSET INCREMENT (M) = 0.0 RANGE OFFSET INCREMENT (M) = 0.0
 NO. OF SLAVED PRIS PER DWELL = 40. NO. OF SLAVED PRIS PER DWELL = 16.
 UPPER DOUBLET MODE ALTITUDE (KM) = -0.0 LOWER DOUBLET MODE ALTITUDE (KM) = -0.0

ENDO-ATMOSPHERIC SCAN

THE CODE (C) LISTED IN THE OUTPUT HEADING DEFINES THE
 CURRENT PULSE AS HAVING THE FOLLOWING WAVEFORM :

CODE	PULSE RETURN
0	NB RETURN
1	WB RETURN
2	PHANTOM INDT TO BE USED)
3	WB SLAVED WINDOW RETURN
4	INDT USED)
5	WB PULSE DOUBLET RETURN
6	(INDT USED)
7	WB PULSE DOUBLET SLAVED WINDOW RETURN

THE CODE (RANGE) LISTED IN THE STATUS OUTPUT DEFINES THE FOLLOWING :

R	= 0 DESIGNATION
	= T TRACK
	= A AUTO-ACQUISITION
	= C COAST
A	= D NB RANGE INPUT ESTIMATOR NOT SLAVED TO WB
	= S NB IS SLAVED TO WB
N	= N NB RANGE INTD TARGET TRACKER
	= W WB RANGE INTD TARGET TRACKER
G	= 0 D ANDT WILL ALTERNATE WITH EVERY TRACK
	= T TRANSFER (FIRST SET = 0)
E	= C CENTER OR CENTROID TRACK
	= E EDGE TRACK

THE CODE (ANG) LISTED IN THE STATUS OUTPUT DEFINES THE FOLLOWING:

A = D DESIGNATE
 = T TRACK
 = W WAIT
 = C COAST

 N = 2 ANGLE TYPE 2 SERVO
 = 1 ANGLE TYPE 1 SERVO

 G = H MAXIMUM SERVO BANDWIDTH
 = L MINIMUM ANGLE SERVO BANDWIDTH

THE CODE (MISC) LISTED IN THE STATUS OUTPUT DEFINES THE FOLLOWING :

M = * (NOT USED)

 I = 0 BEACON TRACKER OFF
 = 8 BEACON TRACKER ACTIVE

 S = N DETECTION NORMAL
 = 0 DETECTION OVERRIDE

 C = 0 N8 TRANSMISSION ONLY
 = 4 N8/W8 TRANSMISSION

THE CODE (R D) LISTED IN THE STATUS OUTPUT DEFINES THE FOLLOWING :

R = D DCO-DESIGNATION SOURCE SELECTED BY DCO
 = P PRIME TF (CURRENTLY TRACKFILE)
 = C CONSOLE (JOYSTICK,BUTTONS,ETC.)
 = * (NOT USED)

 DCO SELECTED DESIGNATION SOURCE
 = T(1-4) TRACKFILE
 = N(1-4) NOMINAL
 = I(1-3) INFLIGHT MESSAGES
 = F(1-3) FIXED POINT
 = B* BORESIGHT TOWER
 = P* PRESS

THE CODE (W8SD) LISTED IN THE STATUS OUTPUT DEFINES THE FOLLOWING :

W = 0 WIDE BAND SLAVED MODE NOT IN EFFECT
 = S IN EFFECT

 B = 0 18IT NOT BEING USED YET)
 = N ENDO SCAN IN PROGRESS
 = X EXD SCAN IN PROGRESS

 S = 0 18IT NOT BEING USED YET)
 = M MANUAL W8S SCAN
 = A AUTOMATIC W8S SCAN

 O = 0 DOUBLET MODE OFF
 = 3 DOUBLET MODE ON

BAND = NH

TIME (SECS)	HEIGHT (KMH)	RANGE (KMH)	ROOT (M/SEC)	AZIM DEG	ELEV DEG	LC A/D DBM CNT	AZERR JCS	ELERR JCS	AGC PWP C DB DBM	HR	GMT M SECS	R.OFFST (M)	RANGE *****	ANG *****	MISC *****	P* *****	PRI	
1608.186	383.3	1075.1	-6441.2	59.91	16.36	-2	59	0.005	0.015	0.0 62 0	5 42 49.158	0.0	TUNIC	T4M	*0NM	>0 P	0000	22401
1608.386	382.8	1076.8	-6441.9	59.91	16.37	0	61	0.015	0.024	0.0 62 0	5 42 49.358	0.0						22411
1608.586	382.4	1075.5	-6442.5	59.92	16.39	-8	43	0.012	0.041	0.0 62 0	5 42 49.558	0.0						22421
1608.786	382.1	1074.2	-6443.1	59.92	16.39	-2	29	0.019	0.065	0.0 62 0	5 42 49.758	0.0						22431
1608.986	381.7	1072.9	-6443.7	59.93	16.40	-2	57	0.015	0.010	0.0 62 0	5 42 49.958	0.0						22441
1609.186	381.3	1071.6	-6444.4	59.93	16.40	-6	45	0.038	0.035	0.0 62 0	5 42 50.158	0.0						22451
1609.386	380.8	1070.3	-6445.0	59.93	16.41	-4	53	0.007	0.039	0.0 62 0	5 42 50.358	0.0						22461
1609.586	380.4	1069.1	-6445.5	59.93	16.42	-4	43	0.004	0.066	0.0 62 0	5 42 50.558	0.0						22471
1609.786	380.0	1067.8	-6446.1	59.93	16.43	-5	40	0.033	0.008	0.0 62 0	5 42 50.758	0.0						22481
1609.986	379.7	1066.5	-6446.9	59.93	16.44	-7	59	0.011	0.007	0.0 62 0	5 42 50.958	0.0						22491
1610.186	379.3	1065.2	-6447.5	59.94	16.45	-3	54	0.017	0.013	0.0 62 0	5 42 51.158	0.0						22501
1610.386	378.9	1063.9	-6448.1	59.94	16.46	-6	70	0.015	0.029	0.0 62 0	5 42 51.358	0.0						22511
1610.586	378.4	1062.6	-6448.6	59.94	16.46	-6	62	0.002	0.006	0.0 62 0	5 42 51.558	0.0						22521
1610.786	378.0	1061.3	-6449.3	59.94	16.47	-4	53	0.033	0.001	0.0 62 0	5 42 51.758	0.0						22531
1610.986	377.7	1060.0	-6450.1	59.94	16.48	-7	44	0.011	0.042	0.0 62 0	5 42 51.958	0.0						22541
1611.186	377.2	1058.7	-6450.5	59.94	16.49	-5	39	0.069	0.042	0.0 62 0	5 42 52.158	0.0						22551
1611.386	376.8	1057.5	-6451.2	59.95	16.50	-2	62	0.006	0.004	0.0 62 0	5 42 52.358	0.0						22561
1611.586	376.4	1056.2	-6451.7	59.95	16.51	-13	39	0.030	0.040	0.0 62 0	5 42 52.558	0.0						22571
1611.786	376.0	1054.9	-6452.6	59.95	16.51	-2	59	0.024	0.001	0.0 62 0	5 42 52.758	0.0						22581
1611.986	375.5	1053.6	-6453.2	59.96	16.52	-1	77	0.000	0.001	0.0 62 0	5 42 52.958	0.0						22591
1612.186	375.2	1052.3	-6453.8	59.97	16.53	3	61	0.005	0.020	0.0 62 0	5 42 53.158	0.0						22601
1612.386	374.8	1051.0	-6454.8	59.97	16.54	0	57	0.035	0.002	0.0 62 0	5 42 53.358	0.0						22611
1612.586	374.3	1049.7	-6455.5	59.96	16.54	5	69	0.014	0.014	0.0 62 0	5 42 53.558	0.0						22621
1612.786	373.8	1048.4	-6456.1	59.96	16.55	-6	27	0.165	0.153	0.0 62 0	5 42 53.758	0.0						22631
1612.986	373.4	1047.1	-6456.6	59.97	16.56	-1	53	0.042	0.031	0.0 62 0	5 42 53.958	0.0						22641
1613.186	372.9	1045.8	-6457.1	59.97	16.57	-3	63	0.006	0.007	0.0 62 0	5 42 54.158	0.0						22651
1613.386	372.6	1044.5	-6457.6	59.97	16.57	-3	63	0.006	0.007	0.0 62 0	5 42 54.358	0.0						22661
1613.586	372.2	1043.3	-6458.2	59.97	16.58	-11	47	0.024	0.021	0.0 62 0	5 42 54.558	0.0						22671
1613.786	371.8	1042.0	-6458.8	59.97	16.59	-5	51	0.007	0.013	0.0 62 0	5 42 54.758	0.0						22681
1613.986	371.4	1040.7	-6459.4	59.98	16.60	-11	62	0.021	0.019	0.0 62 0	5 42 54.958	0.0						22691
1614.186	371.0	1039.4	-6459.9	59.98	16.61	-17	18	0.058	0.207	0.0 62 0	5 42 55.158	0.0						22701
1614.386	370.6	1038.1	-6460.5	59.99	16.62	-1	28	0.085	0.011	0.0 62 0	5 42 55.358	0.0						22711
1614.586	370.0	1036.8	-6461.1	59.99	16.62	-14	59	0.003	0.007	0.0 62 0	5 42 55.558	0.0						22721
1614.786	369.6	1035.5	-6461.7	59.99	16.63	-1	44	0.043	0.011	0.0 62 0	5 42 55.758	0.0						22731
1614.986	369.2	1034.2	-6462.3	59.99	16.64	0	56	0.008	0.047	0.0 62 0	5 42 55.958	0.0						22741
1615.186	368.8	1032.9	-6462.9	59.99	16.64	-5	33	0.013	0.285	0.0 62 0	5 42 56.158	0.0						22751
1615.386	368.4	1031.5	-6463.0	59.99	16.65	1	49	0.023	0.034	0.0 62 0	5 42 56.358	0.0						22761
1615.586	368.0	1030.3	-6463.7	60.00	16.65	0	50	0.004	0.001	0.0 62 0	5 42 56.558	0.0						22771
1615.786	367.9	1029.0	-6465.0	60.00	16.66	-2	49	0.017	0.016	0.0 62 0	5 42 56.758	0.0						22781
1615.986	367.5	1027.7	-6466.4	60.01	16.67	0	52	0.012	0.001	0.0 62 0	5 42 56.958	0.0						22791
1616.186	367.1	1026.4	-6467.1	60.01	16.67	-5	50	0.024	0.078	0.0 62 0	5 42 57.158	0.0						22801
1616.386	366.7	1025.2	-6467.8	60.01	16.69	-3	54	0.010	0.017	0.0 62 0	5 42 57.358	0.0						22811
1616.586	366.3	1023.9	-6468.5	60.01	16.70	-3	38	0.014	0.072	0.0 62 0	5 42 57.558	0.0						22821
1616.786	366.0	1023.9	-6468.5	60.01	16.71	-2	39	0.025	0.023	0.0 62 0	5 42 57.758	0.0						22831
1616.986	365.5	1022.6	-6469.3	60.01	16.72	1	53	0.005	0.030	0.0 62 0	5 42 57.958	0.0						22841
1617.186	365.1	1021.3	-6469.9	60.01	16.73	0	46	0.014	0.072	0.0 62 0	5 42 58.158	0.0						22851
1617.386	364.7	1020.0	-6470.3	60.01	16.73	0	46	0.014	0.072	0.0 62 0	5 42 58.358	0.0						22861
1617.586	364.3	1018.7	-6471.1	60.01	16.74	-6	55	0.032	0.009	0.0 62 0	5 42 58.558	0.0						22871
1617.786	363.9	1017.4	-6471.7	60.01	16.75	-6	63	0.015	0.025	0.0 62 0	5 42 58.758	0.0						22881
1617.986	363.5	1016.1	-6473.0	60.02	16.76	-3	47	0.012	0.009	0.0 62 0	5 42 58.958	0.0						22891
1618.186	363.1	1014.8	-6473.6	60.02	16.76	1	61	0.024	0.016	0.0 62 0	5 42 59.158	0.0						22901
1618.386	362.8	1013.5	-6474.2	60.02	16.78	0	61	0.005	0.003	0.0 62 0	5 42 59.358	0.0						22911
1618.586	362.4	1012.2	-6474.6	60.02	16.79	1	24	0.036	0.034	0.0 62 0	5 42 59.558	0.0						22921
1618.786	362.0	1010.9	-6475.1	60.02	16.80	1	67	0.007	0.013	0.0 62 0	5 42 59.758	0.0						22931

APPENDIX C ALERT PROGRAM LISTING

DOUBLE PRECISION TLNCH,D1000,TAL,TOTL

C COMMON/ICCM/INPUF(1803),IAZ,IEL,INDEX,IPPRCS,IORS,IRANGE,IPKPWR,IRSTA00010
IDOT,IALT,INDAZ,JNDZ,INDEL,IRB54,IRB85,ICPRCS,I240B1,I240B2,I240B3STA00020
1,I241B1,I241B2,I241B3,XPPAGC,IBETA,NEWA,IBAND,NSW,RBIAS(8),ISVPRI,
1IHRS,IMIN,ISEC,IMSEC,ISTAT(21),TRBIAS,ISTAT1,ISTAT2,ISTAT3,ISTAT4,STA00D40
1IALSW,ISTSW,NBWB,ISIGNO,I115B2,JCON,NBEG,NEND,ITST,NUMPRI,XOPAGC,
1ITBAND,ITAPNO,IPRF,IPOLAR,ISSERR,PIFA(16),OIFA(16),PFSA,OFSA,
1PSSA,OSSA,PSSL,OSSL,ICODE,I273B5,I273B6,I273B7,I273B8,IMOV,IMCVO,
1IOFFST

C DIMENSION XNBUF(1803), QBIAS(8),XKRC(5)
DIMENSION XATBL(128),XFZLN(255)
DIMENSION IEQM(9),ITDESG(3)
DIMENSION NSTART(50),NSTOP(50),NSKIP(50)
DIMENSION DW(14),IOLDS(18)

C EQUIVALENCE(XNPUF(1),INBUF(1))
EQUIVALENCE (IEQM(1),NWBAN),(IEQM(2),ITAPEN),(IEQM(3),ITWTR),
2(IEQM(4),IMTH),(IEQM(5),IDAY),(IEQM(6),IYR),
3(IEQM(7),ITDESG(1))

C 2008 FORMAT('D',10X,'THE CODE (C) LISTED IN THE OUTPUT HEADING DEFINE
IS THE'//15X,'CURRENT PULSE AS HAVING THE FOLLOWING WAVEFORM 0 '//
213X,'CODE PULSE RETURN'//13X,'----'//15X,'0 NB
3 RETURN'//15X,'1 WB RETURN'//15X,'2 PHANTOM (NOT TO BE USED)
4 '//15X,'3 WB SLAVED WINDOW RETURN'//15X,'4 (NCT USED)'
515X,'5 WB PULSE DOUBLET RETURN'//15X,'6 (NOT USED)'
6 WB PULSE DOUBLET SLAVED WINDOW RETURN'//15X,'7
2004 FORMAT('D',10X,'THE CODE (RANGE) LISTED IN THE STATUS OUTPUT DEFIN
IES THE FOLLOWING 0'//15X,'R = D DESIGNATION'//21X,'= T TR
2ACK'//21X,'= A AUTO-ACQUISITION'//21X,'= C COAST'//15X,'A
3= 0 NB RANGE INPUT ESTIMATOR NOT SLAVED TO WB'//21X,'= S NB I
4S SLAVED TO WB'//15X,'N = N NB RANGE INTO TARGET TRACKER'
521X,'= W WB RANGE INTO TARGET TRACKER'//15X,'G = 0 0 AND
6T WILL ALTERNATE WITH EVERY TRACK'//21X,'= T TRANSFER (FIRST SE
7T = 0)'//15X,'F = C CENTER OR CENTROID TRACK'//21X,'= E E
8DGE TRACK'//15X,'
2005 FORMAT('I',10X,'THE CODE (ANG) LISTED IN THE STATUS OUTPUT DEFINES
1 THE FOLLOWING 0'//15X,'A = D DESIGNATE'//21X,'= T TRACK'
2 21X,'= W WAIT'//21X,'= C COAST'//15X,'N = 2 ANGLE T
3TYPE 2 SERVO'//21X,'= 1 ANGLE TYPE 1 SERVO'//15X,'G = H M
4AXIMUM SERVO BANDWIDTH'//21X,'= L MINIMUM ANGLE SERVC BANDWIDTH'
5/)
2006 FORMAT('D',10X,'THE CODE (MISC) LISTED IN THE STATUS OUTPUT DEFINE
IS THE FOLLOWING 0'//15X,'H = * (NOT USED)'
21 = 0 BEACON TRACKER OFF'//21X,'= B BEACON TRACKER ACTIV
3E'//15X,'S = N DETECTION NORMAL'//21X,'= 0 DETECTION OVE
4RRIDE'//15X,'C = 0 NB TRANSMISSION ONLY'//21X,'= W NB/

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5WB TRANSMISSION'//)
2007 FORMAT('O',10X,'THE CODE (R D) LISTED IN THE STATUS OUTPUT DEFINES
1 THE FOLLOWING O'//15X,'R      = D   DCCS-DESIGNATION SOURCE SELEC
2TED BY DCO'//21X,'= P   PRIME TF (CURRENTLY TRACKFILE) '
3      /21X,'= C   CCNSOLE (JOYSTICK,BUTTONS,ETC.) '
4      /21X,'= *   (NOT USED)' //21X,'DCO SELECTED DESIGNATIO
5N SOURCE' /15X,'D      = T(1-4)   TRACKFILE '
6      /21X,'= N(1-4)   NOMINAL '
7      /21X,'= I(1-4)   INFLIGHT MESSAGES'
8      /21X,'= F(1-3)   FIXED POINT '
9      /21X,'= B*      BORESIGHT TOWER '
A      /21X,'= P*      PRESS ' //)
2009 FORMAT('O',10X,'THE CODE (WBSD) LISTED IN THE STATUS OUTPUT DEFINE
1S THE FOLLOWING O'//15X,'W      = C   WIDE BAND SLAVED MCDE NOT IN
2 EFFECT'//21X,'= S   IN EFFECT'//15X,'B      = C   (BIT NOT BEING
3USED YET)'//21X,'= N   ENDO SCAN IN PROGRESS'//21X,'= X   EXO SCAN
4 IN PROGRESS'//15X,'S      = O   (BIT NOT BEING USED YET)'//21X,'=
5 M   MANUAL WBS SCAN      '//21X,'= A   AUTOMATIC WBS
6SCAN      '//15X,'D      = O   DOUBLET MCDE OFF '//21X,
7'= D   DOUBLET MODE CN'//)
2017 FORMAT('O',10X,'LAUNCH TIME (TOTAL SECS) = ',F10.3,5X,'IW117 = ',
115//)
3100 FORMAT('1BAND = ',A2)
3200 FORMAT('O   TIME   HGHT  RANGE  RDOT    AZIM  ELEV  LC  A/D  AZER
1R  ELERR AGC PWP C    GMT      R.CFFST RANGE ANG MISC PRF R D  WB
2SD  PRI')
3300 FORMAT(' (SECS)  (KM)  (KM) (M/SEC)   DEG   DEG DBM CNT  DEG
1   DEG  DB DPW  HR  M  SECS  (M)  ',5A1,1X,3A1,1X,2A1,A2,1X,
2I3,1X,A1,1X,A2,1X,4A1,/)
3400 FORMAT(' ',F9.3,A1,F5.1,F7.1,F8.1,F7.2,F6.2,2I4,2F7.3,F5.1,I3,1X,I
11,3I3,'.',I3,1X,F7.1,1X,5A1,1X,3A1,1X,2A1,A2,1X,I3,1X,A1,1X,A2,1X,
24A1,1X,I5)
3600 FORMAT(' ',F9.3,A1,F5.1,F7.1,F8.1,F7.2,F6.2,2I4,2F7.3,F5.1,I3,1X,I
11,3I3,'.',I3,1X,F7.1,29X,1X,I5)
C
DATA ZLC/'LC  '//,ZRC/'RC  '//,ZWB/'WB  '//,ZNB/'NB  '//
DATA      IFRST3/C/,IFRST4/O/,INTAV/1/,IFRST2/O/,IFRST5/C/
DATA ER /6378.145/ ,IFRST1/O/,BLNKK/'  '// ,ZBUSE/'  '//
DATA IAST2/'*****',IAST/'*  '// ,IBLNK/'  '//
DATA D1000/1000. DO/
C
C      ITST = 1   ARE NOT WITHIN THE NSTART-NSTCP INTERVAL
C      ITST = 2   ARE WITHIN THE NSTART-NSTCP INTERVAL
C      ITST = 3   AT NSTOP OF THE NSTART-NSTCP INTERVAL
C      NEWA = 0   MISSION FLOWN BEFORE 15 CCT 70 (CLD ATTN.)
C      NEWA = 1   MISSION FLOWN AFTER 15 CCT 70 (NEW ATTN.)
C
READ(5,1) ILNCH,NVALS,IW117,IAUTO,TITL,(NSTART(I),NSTCP(I),NSKIP(I)
1,I=1,NVALS)
1 FORMAT(I10,3I5,1X,A4/(6I10))
C
IF(NVALS.LE.C)NVALS=1
C
IEOF=0
IERR=0
CALL READJS(INPUT,IEOF,IERR)
IF(IEOF.EQ.1)GO TO 680

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      ISIG=1
      CALL HEDACT (ISIG,INBUF(1),IEQM(1))
      NEWA=0
      IF(IYR.GT.70)GO TO 282
      IF(IYR.LT.70)GO TO 283
      IF(IMTH.GT.10)GO TO 282
      IF(IMTH.LT.10)GO TO 283
      IF(IDAY.LT.15)GO TO 283
282  NEWA=1
283  CONTINUE
      IF(NWBAN.EQ.C)TAUTO=1
      IERR=0
      CALL READJS(INBUF,IEQF,IERR)
      IF(IEQF.EQ.1)GO TO 680
C
C      STORE THE DESIRED CALIBRATION VALUES
C
      DO 21 K=1,255
21  XFZLN(K)=XNBUF(K)
C
      N=0
      DO 20 K=256,383
      N=N+1
20  XATBL(N)=XNBUF(K)
C
      N=0
      DO 22 K=512,527
      N=N+1
22  PTFA(N)=XNBUF(K)
      N=0
      DO 23 K=528,543
      N=N+1
23  OIFA(N)=XNBUF(K)
C
      PFSA=XNBUF(592)
      PSSA=XNBUF(593)
      OFSA=XNBUF(594)
      OSSA=XNBUF(595)
      AGAMA = XNBUF(596)
      EGAMA = XNBUF(597)
C
      ABIAS=XNBUF(602)
      EBIAS=XNBUF(603)
      DEGCON=(180.*.0479369)/3141.59
      AZBIAS=DEGCON*ABIAS
      ELBIAS=DEGCON*EBIAS
C
      DO 25 K=604,611
      N=N+1
      QB IAS(N)=XNBUF(K)
25  RBIAS(N)=QB IAS(N)
C
      AZGRAD = XNBUF(612)
      ELGRAD = XNBUF(613)
C
      PWRCN=XNBUF(620)

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PWRSN=XNBUF(621)
PWRCW=XNBUF(622)
PWRSW=XNBUF(623)

C
N=0
DO 27 K=624,628
N=N+1
27 XKRCS(N)=XNBUF(K)

C
PSSL=XNBUF(629)
OSSL=XNBUF(630)

C
N=0
DO 28 K=631,644
N=N+1
28 DW(N)=XNBUF(K)

C
CKCN=14.989625/2048.
XLX634=DW(4)*CKCN
XLX635=DW(5)*CKCN
XLX640=DW(10)*CKCN
XLX641=DW(11)*CKCN

C
ISTAT1=0
ISTAT2=0
LCNT=0
DO 280 J=1,21
ISTAT(J)=ISTAT2
280 CCNTINUE
JCON=-1
INDEX=0
ITST=1
ITDEC=1
IPOLAR=0
IFCNT=0
IPULS=0

C
DO 120 IJ=1,NVALS
NBEG=NSTART(IJ)

C
IF(INSTART(IJ).LE.0)INSTART(IJ)=1
IF(INSTOP(IJ).LE.0)INSTOP(IJ)=99999
NNSET=NSKIP(IJ)+1
NNSVE=NNSET

C
3 JCON=JCON+1
IF(JCON.EQ.9.0P.JCON.EQ.0)GO TO 97
INDEX=(JCON-1)*900
GO TO 99
97 JCON=1
INDEX=0
98 IEOF=0
IERR=0
IPAR=IBLNK
CALL READJS(INBUF,IEOF,IERR)
IF(IERR.EQ.1)IPAR=IAST
IF(IEOF.EQ.1)GO TO 680

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99 IALSW=0
C
  CALL UNPACK
  IF(IAUTO.EQ.1)GO TO 100
  NNSET=NNSVE
  IF(I27385.NE.0.OR.I27388.NE.0)NNSET=1
100 CONTINUE
C
  IF(IFRST2.EQ.1)GO TO 92
  PWRUS1=PWRCN
  IF(NWBAN.EQ.1)PWRUS1=PWRCW
  PWRUS2=PWRSN
  IF(NWBAN.EQ.1)PWRUS2=PWRSW
  ZBUSE=ZNB
  IF(NWBAN.EQ.1)ZBUSE=ZWB
  RRUSE=-.C0943
  IF(NWBAN.EQ.1)RRUSE=-.000115
C
  WRITE(6,200)ZBUSE,ITAPEN ,TITL,(IEQM(1),I=4,6)
200 FORMAT('1ALERT-ALCOR' ,4X,'BAND = ',A2,4X,'REEL NO. = '
1,I5,' TITLE = ',A4,' DATE = ',I2,'/',I2,'/',I2)
  WRITE(6,212)(NSTART(I),NSTOP(I),NSKIP(I),I=1,NVALS)
212 FORMAT('0 START STOP SKIP',12X,'START STOP SKIP',12X,'STAR
IT STOP SKIP',12X,'START STOP SKIP'/(4(2X,I5,2X,I5,2X,
2I5,10X)))
  TLNCH=DFLOAT(IINCH)/D1COC
  WRITE(6,2017)TLNCH,IW117
  WRITE(6,7431)DW(1),DW(7),DW(2),DW(8),DW(3),DW(9),
1XLX634,XLX640,XLX635,XLX641,DW(6),DW(12),DW(13),DW(14)
7431 FORMAT('0',10X,'EXO-ATMOSPHERIC',38X,'ENDO-ATMOSPHERIC SCAN'//
115X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,17X,'UPPER WBS SCAN AL
2TITUDE (KM) = ',F10.2/
315X,'LOWER WBS SCAN ALTITUDE (KM) = ',F10.2,17X,'LOWER WBS SCAN AL
4TITUDE (KM) = ',F10.2/
515X,'NUMBER OF DWELLS PER SCAN = ',F10.0,17X,'NUMBER OF DWELLS
6PER SCAN = ',F10.0/
715X,'INITIAL RANGE OFFSET (M) = ',F10.2,17X,'INITIAL RANGE OFF
8SET (M) = ',F10.2/
915X,'RANGE OFFSET INCREMENT (M) = ',F10.2,17X,'RANGE OFFSET INCR
AEMENT (M) = ',F10.2/
B15X,'NO. OF SLAVED PRIS PER DWELL = ',F10.0,17X,'NO. OF SLAVED PRIS
C PER DWELL = ',F10.0//
B11X,'UPPER DCUPLET MODE ALTITUDE (KM) = ',F10.2 ,
C13X,'LOWER DCUPLET MODE ALTITUDE (KM) = ',F10.2)
  WRITE(6,8149)
8149 FORMAT(///)
  WRITE(6,2008)
  WRITE(6,2004)
  WRITE(6,2005)
  WRITE(6,2006)
  WRITE(6,2007)
  WRITE(6,2009)
  WRITE(6,3100)ZBUSE
  WRITE(6,3200)
  WRITE(6,3300)(ISTAT(J),J=1,18)
C
  IFRST2=1

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92 CONTINUE
  IF (NUMPRI.LT.NSTART(IJ).OR.NUMPRI.GT.NSTOP(IJ))GO TO 3
C
  ITOT=(3600*IHRS+60*IMIN+ISEC)*1000+IMSEC
  ITAL=ITOT-ILNCH
  TAL=DFLOAT(ITAL)/D1000
  DO 710 K=1,18
710 IOIDS(K)=ISTAT(K)
  CALL STATUS
C
  IF(IFRST4.EQ.0)GO TO 10
  IPULS=IPULS+1
  IF(IPULS.GE.NNSET)GO TO 87
  IF(ISTSW.EQ.0)GO TO 118
  WRITE(6,90)TAL,IPAR,(ISTAT(I),I=1,18),NUMPRI
90 FORMAT(' ',F9.3,A1,87X,5A1,1X,3A1,1X,2A1,A2,1X,I3,1X,A1,1X,A2,1X,
14A1,1X,I5)
  LCNT=LCNT+1
  GO TO 118
C
87 IPULS=0
  GO TO 11
10 IFRST4=1
11 IADOUT=IRB54-1
  IF(IW117.EQ.1)IADOUT=IMOV
  IF(ICODE.EQ.5)XOPAGC=XPPAGC
  IF(ICODE.EQ.7)XOPAGC=XPPAGC
  RDOT=(IRDOT/(8192.0))*14.989625
  RANGE=(FLOAT(IPRANGE)/2048000.)*14.989625+TRBIAS*.14989625
  TTCOR= (RANGE/299776.)*(RDOT/1000.)
  RANGE=RANGE+TTCOR
  RRCOR=RRUSE*RDOT
  RANGE=RANGE+RRCOR/1000.
  APPOP=((IPPRCS/255.0)*80.0)-40.0
  IPPRCS=APPOP
  APPOP=((IOPRCS/255.0)*80.0)-40.0
  IOPRCS=APPOP
  AZ=(IAZ*2*3141.59265358)/(2.0**17)
  XAZ=AZ*.0572958
  XAZ=XAZ+AZBIAS
  EL=(IEL*2*3141.59265358)/(2.0**17)
  XEL=EL*.0572958
  XEL=XEL+ELBIAS
  CALL REFC(XEL,RANGE,ECORF,RCORF)
  RNGF=RANGE-RCORF
  ELVF=XEL-ECORF
  RADEL=ELVF*.017453
  CALT=SQRT(RNGF**2+ER*ER+2.*RNGF*ER*SIN(RADEL))-ER
  RANGE=RNGF
  EL=ELVF
  AZ=XAZ
  XPKPWR=IPKPWR
  IF(IPKPWR.LE.0)GO TO 39
  POWER=PWRUS1+PWRUS2*ALOG10(XPKPWR)
  IPKPWR=POWER
39 CONTINUE
  XOFFST=(FLOAT(IOFFST)/2048.)*14.989625

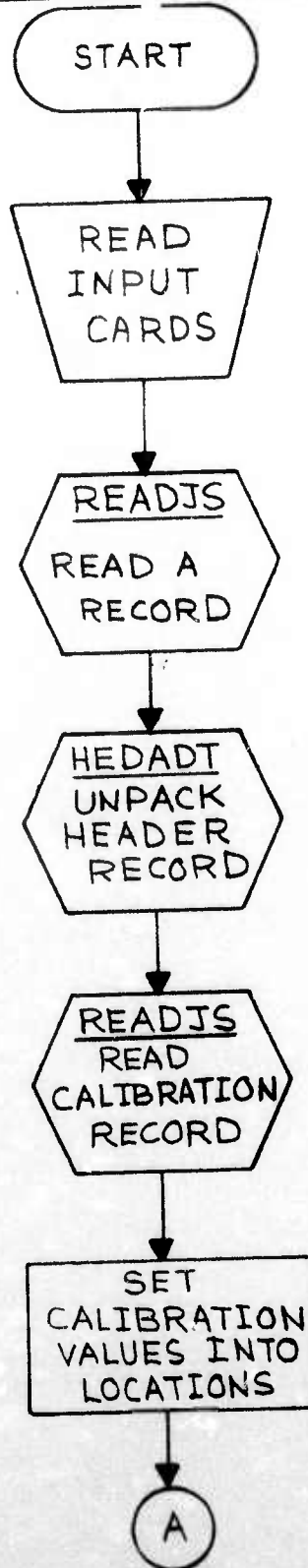
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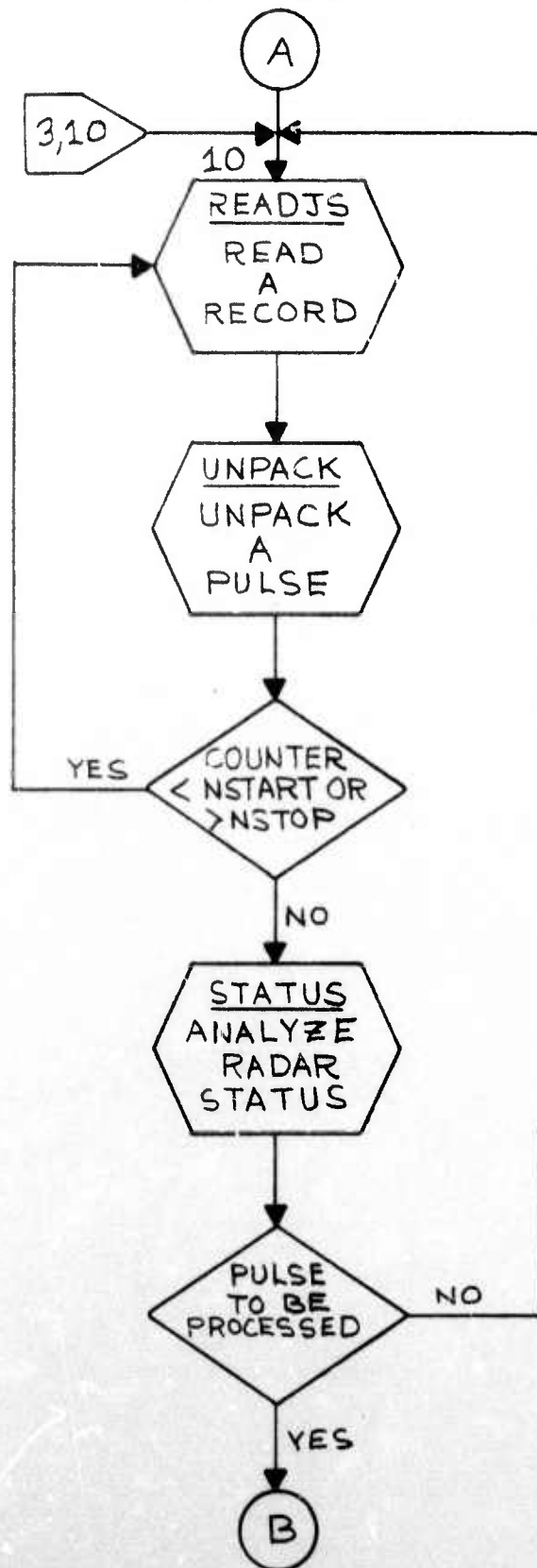
C      IF(I241B1.GT.127)GO TO 6310
        I241B1=I241B1+128
        GO TO 6311
6310  CCNTINUE
        IF(I241B1.LT.129)GO TO 6311
        I241B1=256-I241B1
6311  CCNTINUE
        IF(I241B2.GT.127)GO TO 6312
        I241B2=I241B2+128
        GO TO 6313
6312  CCNTINUE
        IF(I241B2.LT.129)GO TO 6313
        I241B2=256-I241B2
6313  CCNTINUE
        IF(I241B3.GT.127)GO TO 6314
        I241B3=I241B3+128
        GO TO 6315
6314  CCNTINUE
        IF(I241B3.LT.129)GO TO 6315
        I241B3=256-I241B3
6315  CCNTINUE
C
        Z1=XFZLN(I241B2)-XFZLN(I241B1)+AGAMA
        COSTA=COS(Z1)
        P=XATBL(I240B2)-XATBL(I240B1)
        AZERR=AZGRAC*2.*3.141593*(10.**(P/20.))*CCSTA
        AZERR=AZERR*57.2958
C
        Z2=XFZLN(I241B3)-XFZLN(I241B1)+EGAMA
        COSTE=COS(Z2)
        P=XATBL(I240B3)-XATBL(I240B1)
        ELERR=ELGRAC*2.*3.141593*(10.**(P/20.))*CCSTE
        ELERR=ELERR*57.2958
C
        LCNT=LCNT+1
        IF(LCNT.LT.54)GO TO 689
        WRITE(6,3100)ZPUSE
        WRITE(6,3200)
        WRITE(6,3300)      (IOLDS(J),J=1,18)
        LCNT=0
689  CCNTINUE
657  CCNTINUE
        IF(IISTSW.EQ.0)GO TO 645
        WRITE(6,3400)IAT,IPAR,CALT,RANGE,RDOT,AZ,EL,IPPRCS,IADCU,AZERR,
        IELERR,XPPAGC,IPKPWR,ICODE,IHRS,IMIN,ISEC,IMSEC,XOFFST,
        1(IISTAT(J),J=1,18),NUPRI
        GO TO 650
645  WRITE(6,3600)IAT,IPAR,CALT,RANGE,RDOT,AZ,EL,IPPRCS,IADCU,AZERR,
        IELERR,XPPAGC,IPKPWR,ICODE,IHRS,IMIN,ISEC,IMSEC,XOFFST,NUPRI
650  CCNTINUE
C
118  IF(NUPRI.LT.NSTOP(IJ))GO TO 3
        IFRST4=0
        IPULS=0
        IFRST1=0
119  IFRST3=0
C
120  CCNTINUE
C
        GO TO 125
680  WRITE(6,109)NUPRI
109  FORMAT(' END OF FILE REACHED LAST NUPRI VALUE = ',I10)
125  RETURN
        END

```

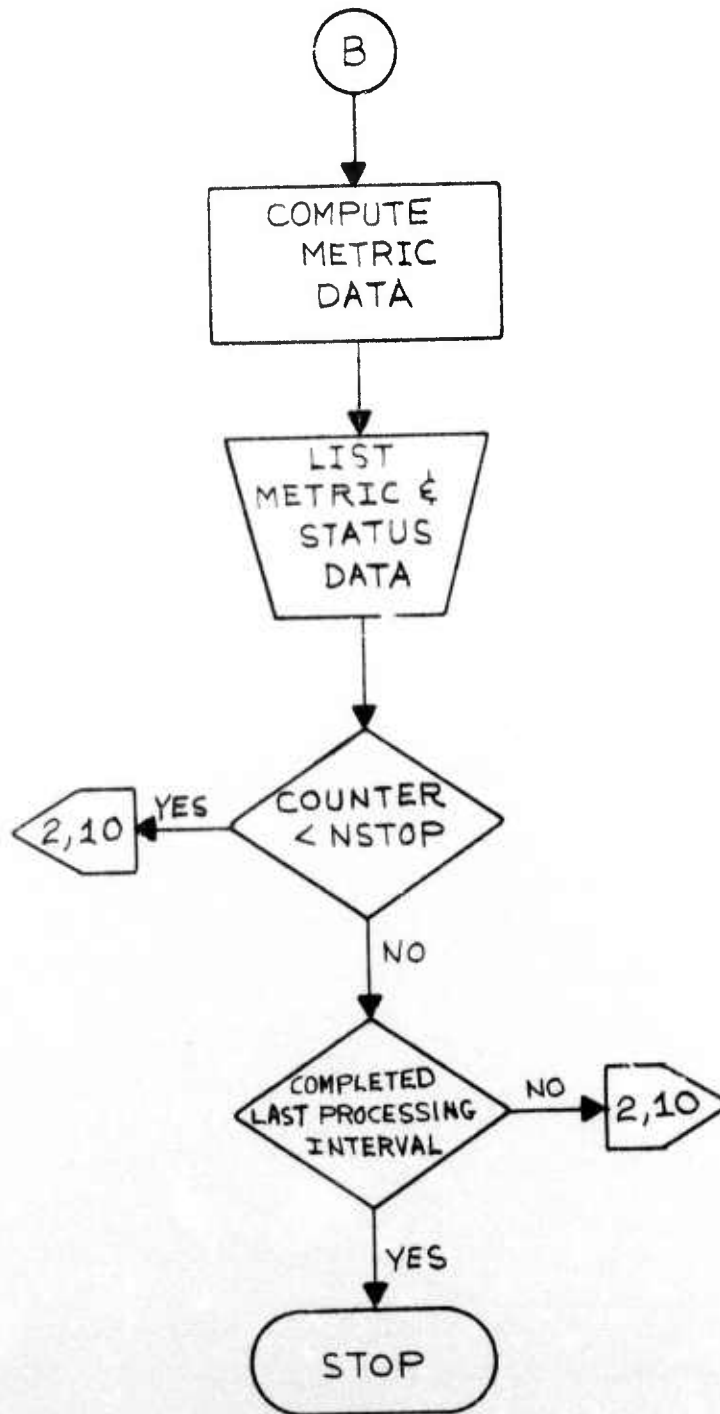
APPENDIX D
ALERT FLOW DIAGRAM



APPENDIX D-2



APPENDIX D-3



APPENDIX E SUBROUTINE HEDADT PROGRAM LISTING

```

*          CALL HEDADT (ISIG,INBUF,IEQU)
*          ISIG = 1      UNPACK THE 20 WORD ADT HEADER

START
ENTRY HEDADT
SPACE
XISIG     EQU    4
XICAL     EQU    5
XIEQU     EQU    6
BASE      EQU    12
SPACE
HEDADT    SAVE   (14,12),T,*
          BALR   12,C
          USING  *,BASE
          ST     13,SAVEA+4
          LA     7,SAVEA
          ST     7,8(0,13)
          LR     13,7
          SPACE
          LM     XISIG,XIEQU,0(1)
          SPACE
          L      8,0(XICAL)
          ST     8,TEMP1
          ST     8,TEMP2
          SRL    8,31
          ST     8,0(XIEQU)      MBAND
          L      8,TEMP1
          SLL    8,1
          SRL    8,25
          ST     8,4(XIEQU)      MREEL
          SPACE
          L      8,4(XICAL)
          ST     8,TEMP1
          ST     8,TEMP2
          SRL    8,16
          ST     8,8(XIEQU)      MWTR
          L      9,TEMP1
          SLL    8,16
          SRL    8,24
          ST     8,12(XIEQU)     MMNTH
          L      8,TEMP2
          SLL    8,24
          SRL    8,24
          ST     8,16(XIEQU)     MDAY
          SPACE
          SR     8,8
          IC     8,8(XICAL)
          ST     8,20(XIEQU)      MYEAR
          MVC    24(9,XIEQU),9(XICAL)  MISSION DES.
          SPACE
RETURN    L      13,SAVEA+4
          RETURN (14,12),T
          CNOP   0,4
TEMP1     DC     F'0'
TEMP2     DC     F'0'
SAVEA     DC     18A(*)
          END

```

APPENDIX F
SUBROUTINE UNPACK PROGRAM LISTING

	CSECT		
	ENTRY	UNPACK	
UNPACK	SAVEL		
	DROP	15	
	CNOP	0,4	
	BALR	2,0	
	USING	START,2,3	
START	L	3,BASA	
	L	4,DUBUF	
	L	5,DUBUF	
	L	6,DUBUF	
	A	5,=F'4096'	
	A	6,=F'8192'	
	USING	DUBUF,4,5,6	
	B	START1	
DUBUF	DC	V(ICOM)	
BASA	DC	A(START+4096)	
START1	L	8,=F'1'	
	ST	8,IALSW	
	LA	8,INBUF NUMPRI=8*(NPR-1)+JCUN	
	MVC	TEMP(1),0(8)	
	MVC	TEMP2(1),0(8)	
	L	9,TEMP	
	SLL	9,0	
	SRL	9,16	
	S	9,ONE	
	SR	8,8	
	M	8,EIGHT	
	A	9,JCON	
	ST	9,NUMPRI	
	L	9,NBEG	
	C	9,NUMPRI	
	BH	CDELTA	
	SPACE		
	LA	8,WC233 COMPUTE GMT	
	A	8,INDEX	
	MVC	TEMP(1),0(8)	
	L	9,TEMP	
	N	9,=X'1F000000'	
	SRL	9,24	
	ST	9,IHRS	STORE HRS
	L	9,TEMP	
	N	9,=X'003F0000'	
	SRA	9,16	
	ST	9,IMIN	STORE MINS
	L	9,TEMP	
	N	9,=X'00003F00'	
	SRA	9,8	
	ST	9,ISEC	STORE SECS
	LA	8,WC234	
	A	8,INDEX	
	MVC	TEMP(1),0(8)	
	L	9,TEMP	
	N	9,=X'7F000000'	
	SRL	9,21	
	ST	9,IMSEC	STORE MSEC
	SPACE		

GOODI	LA	8,WD237	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'7FFFC000'	
	SRL	9,14	
	ST	9,IAZ	STORE A2
	LA	8,WD236	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'7FFFC000'	
	SRL	9,14	
	ST	9,IEL	STORE ELEV
	LA	8,WD268	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'FFC00000'	
	SRL	9,24	
	ST	9,IPPRCS	STORE PP DBSM
GOODN	LA	8,WD265	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'FFFFE000'	
	SRL	9,13	
	ST	9,TEMP2	
	LA	8,WD267	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'FFFF0000'	
	SRL	9,16	
	A	9,TEMP2	
	SLL	9,11	
	ST	9,TEMP2	
	LA	8,WD266	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'FFE00000'	
	SRL	9,21	
	A	9,TEMP2	
	ST	9,IRANGE	STORE RANGE
	LA	8,WD115	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'0CF0000'	
	SRA	9,16	
	ST	9,IPKPWR	STORE PEAK PCWR
	LA	8,WD269	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	C	9,=F'0'	

	BNL	DCTG1	
	N	9,=X'7FFFFFF0'	
	SRA	9,8	
	LCR	9,9	
	B	DCTG2	
DCTG1	SRA	9,8	
DCTG2	ST	9,IRDOT	STORE R-DCT
	LA	8,WD1P	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'7FC00000'	
	SRL	9,24	
	LA	9,1(9)	
	ST	9,IR854	A/D COUNT-R8 52
	LA	8,WD268	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'00FFC000'	
	SRL	9,16	
	ST	9,ICPROS	STORE CP D8SM
	SPACE		
	LA	8,WD117	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'FFC00000'	
	SRL	9,24	
	ST	9,IMOVF	ARE PRIMARY AND OFFSET MOVING
	SPACE		
	L	9,TEMP	
	N	9,=X'00C0FF00'	
	SRL	9,8	
	ST	9,IMOVQ	IS OFFSET WINDOW MOVING
	SPACE		
	LA	8,WD273	
	A	8,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'F0000000'	
	SRL	9,28	
	ST	9,ICODE	COMPUTE THE CODE FOR PRI
	SPACE		
	L	9,TEMP	
	N	9,=X'08C00000'	
	SRL	9,27	
	ST	9,1273B5	WBS MCDE INDICATOR
	L	9,TEMP	
	N	9,=X'04C00000'	
	SRL	9,26	
	ST	9,1273B6	ENDO-EXO SCAN INDICATOR
	L	9,TEMP	
	N	9,=X'02C00000'	
	SRL	9,25	
	ST	9,1273B7	WBS SCAN MCDE INDICATOR
	L	9,TEMP	

	N	9,=X'01C00000'	
	SRL	9,24	
	ST	9,I27188	DCU8LET MODE INDICATOR
	SPACE		
	SR	9,9	
	ST	9,ICFFST	
	L	9,IC0DE	
	C	9,THRE	
	BE	OFFCOM	
	C	9,SEVEN	
	BE	OFFCOM	
	B	OFFSKP	
	SPACE		
CFFCOM	LA	8,WC278	
	A	8,INDEX	
	MVC	TEMP(1),0(8)	
	SR	9,9	
	L	9,TEM	
	C	9,ZERO	
	BNL	RPLUS	
	N	9,=X'7FFFFFF00'	
	SRA	9,8	
	LCR	9,9	
	B	RNEG	
RPLUS	SRA	9,8	
RNEG	ST	9,ICFFST	RANGE OFFSET FOR SLAVED WINDOW
	SPACE		
CFFSKP	LA	8,WC240	
	A	8,INDEX	
	MVC	TEMP(1),0(8)	
	L	9,TEMP	
	N	9,=X'7FC00000'	
	SRL	9,24	
	LA	9,1(9)	
	ST	9,I240B1	
	L	9,TEMP	
	N	9,=X'007F0000'	
	SRL	9,16	
	LA	9,1(9)	
	ST	9,I24082	
	L	9,TEMP	
	N	9,=X'00C07F00'	
	SRL	9,8	
	LA	9,1(9)	
	ST	9,I24083	
	LA	8,WC241	
	A	8,INDEX	
	MVC	TEMP(1),0(8)	
	L	9,TEMP	
	N	9,=X'FFC00000'	
	SRL	9,24	
	LA	9,1(9)	
	ST	9,I241B1	
	L	9,TEMP	
	N	9,=X'00FF0000'	
	SRL	9,16	
	LA	9,1(9)	

	ST	9, I241B2	
	L	9, TEMP	
	N	9, =X'0000FF00'	
	SRL	9, 8	
	LA	9, I(9)	
	ST	9, I241B3	
	LA	8, WD263	
	A	8, INOFX	
	MVC	TEMP(3), 0(8)	
	L	9, TEMP	
	N	9, =X'00000000'	
	SRL	9, 20	
	LA	11, PIFA	
	LE	0, 0(9, 11)	GET VALUE FROM PIFA TABLE
	STE	0, XPPAGC	
	L	9, TEMP	
	N	9, =X'00000000'	
	SRL	9, 22	
	LA	11, CIFA	
	LE	0, 0(9, 11)	GET VALUE FROM CIFA TABLE
	STE	0, XCPAGC	
	L	9, ZERC	
	ST	9, ISWSSP	
	ST	9, ISWSSC	
	ST	9, ISSFRR	
	LA	8, WD239	
	A	8, INOFX	
	MVC	TEMP(3), 0(8)	
	L	9, TEMP	
	N	9, =X'00000200'	CHECK BIT 23 (PFSA)
	C	9, ZERC	
	BE	CKFSOP	
	LE	0, PFSA	
	AF	0, XPPAGC	
	STE	0, XPPAGC	ADD IN PFSA VALUE
CKFSOP	L	9, TEMP	
	N	9, =X'00000100'	CHECK BIT 24 (CFSA)
	C	9, ZERC	
	BE	CKSSOP	
	LE	0, CFSA	
	AE	0, XCPAGC	
	STE	0, XCPAGC	ADD IN CFSA VALUE
CKSSOP	L	11, TEMP	
	N	11, =X'00802000'	
	C	11, =F'0'	
	BNE	CKSSOP	
INDET	L	8, ONE	INDETERMINATE SITUATION
	ST	8, ISSFRR	
	B	CDELTAR	
CKSSCP	L	11, TEMP	
	N	11, =X'00401000'	
	C	11, =F'0'	
	BE	INDET	
PPTST	LA	9, WD239	
	A	9, INOFX	
	MVC	TEMP(3), 0(9)	
	L	10, TEMP	AUX.MICR.WORD INTO REG.10
	LA	9, WD252	AUX.MICROWAVE WORD INTO REG.11

	A	9,INDEX	
	MVC	TEMP(3),0(9)	RANGE TR.WCRD INTO TEMP
	N	10,=X'0C8C2C00'	
	C	1C,=X'0C8C0000'	
	BNE	S74	BIT 9 = 0 (COND.A)
	LE	0,PSSL	ADD IN PSSL (COND.B)
	AE	0,XPPAGC	
	STE	0,XPPAGC	
	L	9,ONE	
	ST	9,ISWSSP	
S74	L	8,NEWA	OLD OR NEW ATTEN.
	C	8,ZERO	
	BE	CPTEST	
	L	9,TEMP	
	N	9,=X'00C8CC00'	
	C	9,=F'0'	
	BE	RDBKLC	ATTENLATCH REACBACK
	N	11,=X'080CC000'	S74 ARMED
	C	11,ZERO	STATUS READ BACK
	HNE	SLC	
NOATTLC	LE	0,PREVLC	
	STE	0,XPPAGC	
	MVC	JSWLC(4),ONE	
	MVC	ISSERR(4),CNE	
	B	CPTEST	
RDBKLC	N	11,=X'040CC0C0'	S74 NOT ARMED
	C	11,ZERO	STATUS REACBACK
	BE	NCATTLC	
	B	CPTEST	
SLC	LE	0,PSSA	
	AE	0,XPPAGC	ADD IN PSSA (COND.B)
STCRLC	STE	0,XPPAGC	
	MVC	ISWSSP(4),CNE	
CPTEST	LA	9,WD239	
	A	9,INDEX	
	MVC	TEMP(3),0(9)	AUX.MICR.WCRD INTO REG.10
	L	1C,TEMP	AUX.MICROWAVE WORD INTO REG.11
	LA	9,WD252	
	A	9,INDEX	
	MVC	TEMP(3),0(9)	
	L	11,TEMP	
	LA	9,WD272	
	A	9,INDEX	
	MVC	TEMP(3),0(9)	RANGE TR.WCRD INTO TEMP
	N	1C,=X'0C4C1000'	
	C	1C,=X'004C0C0C'	
	BNE	S75	BIT 1C = 0 (COND.A)
LE	LE	0,OSSL	ADD IN OSSL (COND.B)
	AE	0,XOPAGC	
	STE	0,XOPAGC	
	L	9,ONE	
	ST	9,ISWSSC	

S75	L	8,NEWA	OLD OR NEW ATTEN.
	C	8,ZERO	
	BE	CUT1	
	L	9,TEMP	
	N	9,=X'00040000'	
	C	9,=F'0'	
	BE	RDBKRC	ATTENLATOR READBACK
	N	11,=X'02000000'	S75 ARMED
	C	11,ZERO	STATUS READ BACK
	BNE	SRC	
NOATTTC	LE	0,PREVRC	
	STE	0,XCPAGC	
	MVC	JSWRC(4),ONE	
	MVC	ISSERR(4),CNE	
	B	OUT1	
RDBKRC	N	11,=X'0 00000'	S75 NOT ARMED
	C	11,ZERO	STATUS READBACK
	BE	NCATTTC	
	B	OUT1	
SRC	LE	0,OSSA	
	AE	0,XCPAGC	ADD IN OSSA (COND.8)
STORCC	STE	0,XCPAGC	
	MVC	ISWSSP(4),ONE	
CUT1	L	9,JSWLC	
	C	9,ZERO	
	BNE	OUT2	
	LE	0,XPPAGC	
	SE	0,=E'16'	
	STE	0,XPPAGC	
	STE	0,PREVLC	
CUT2	L	9,JSWRC	
	C	9,ZERO	
	BNE	ENDALERT	
	LE	0,XCPAGC	
	SE	0,=E'16'	
	STE	0,XCPAGC	
	STE	0,PREVRC	
ENDALERT	MVC	JSWLC(4),ZERO	
	MVC	JSWRC(4),ZERO	
	LA	8,INBIF	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	SRL	9,31	
	C	9,ZERO	
	BE	NBAND	
	LE	2,RBIAS+16	WIDE BAND TAPE
	STE	2,TRBIAS	
LCPOLAR	L	9,ISWSSP	
	C	9,ONE	
	BNE	CCELTAR	
	LE	2,RBIAS+24	
	AE	2,TRBIAS	ADD IN PSSA-RBIAS(7)
	STE	2,TRBIAS	
	B	CCELTAR	
NBAND	LE	2,RBIAS	NARROW BAND
	STE	2,TRBIAS	
	LA	8,WC273	CENTER OR EDGE TRACK

	A	B,INDEX	
	MVC	TEMP(3),0(8)	
	L	9,TEMP	
	N	9,=X'00C10000'	
	C	9,ZERO	
	BNE	CKNBEDGE	EDGE TRACKING
	B	CDELTAR	
CKNBEDGE	L	8,IRDOT	CHECK SIGN OF R DOT
	C	8,ZERO	
	BH	CKNBLOW	
	LE	2,RBIAS+4	LEADING EDGE BIAS
	AE	2,TRBTAS	
	STE	2,TRBTAS	
	B	CDELTAR	
CKNBLOW	LE	2,RBIAS+8	TRAILING EDGE BIAS
	AE	2,TRBTAS	
	STE	2,TRBTAS	
CDELTAR	RETL		
TEMP	DC	F'0'	
TEMP2	DC	F'0'	
IXC	DC	F'0'	
PRINUM	DC	F'0'	
IPASS	DC	F'0'	
ISWSSO	DC	F'0'	
ISWSSP	DC	F'0'	
JSWLC	DC	F'0'	
JSWRC	DC	F'0'	
PREVLC	DC	E'0.0'	
PREVRC	DC	E'0.0'	
ZERO	DC	F'0'	
CNE	DC	F'1'	
TWO	DC	F'2'	
THREE	DC	F'3'	
FOUR	DC	F'4'	
SEVEN	DC	F'7'	
EIGHT	DC	F'8'	
C10	DC	F'10'	
C100	DC	F'100'	
C1000	DC	F'1000'	
D8UF	DSECT		
INBUF	DS	CL3	
WD1	DS	CL3	PP LOG D.
	DS	CL48	
WD18	DS	CL3	
WD19	DS	CL3	
	DS	CL27	
WD29	DS	CL3	
WD30	DS	CL3	
	DS	CL81	
WD58	DS	CL171	PP PHASE O.
WD115	DS	CL3	
WD116	DS	CL3	
WD117	DS	CL3	
WD118	DS	CL171	CP LOG D.
WD175	DS	CL171	CP PHASE C.
WD232	DS	CL3	
WD233	DS	CL3	

WD234	DS	CL3
	DS	CL3
WD236	DS	CL3
WD237	DS	CL3
	DS	CL3
WD239	DS	CL3
WD240	DS	CL3
WD241	DS	CL3
WD242	DS	CL3
	DS	CL27
WD252	DS	CL3
WD253	DS	CL3
	DS	CL27
WD263	DS	CL3
WD264	DS	CL3
WD265	DS	CL3
WD266	DS	CL3
WD267	DS	CL3
WD268	DS	CL3
WD269	DS	CL3
WD270	DS	CL3
WD271	DS	CL3
WD272	DS	CL3
WD273	DS	CL3
WD274	DS	CL3
WD275	DS	CL3
WD276	DS	CL3
WD277	DS	CL3
WD278	DS	CL3
WD279	DS	CL3
WD280	DS	CL3
	DS	CL6369
IAZ	DS	IF
IEL	DS	IF
INDEX	DS	IF
IPPRCS	DS	IF
IORS	DS	IF
IRANGE	DS	IF
IPKPWR	DS	IF
IRDOT	DS	IF
IALT	DS	IF
INDAZ	DS	IF
JND4Z	DS	IF
INDEL	DS	IF
IRB54	DS	IF
IRB85	DS	IF
IOPRCS	DS	IF
I240B1	DS	IF
I240B2	DS	IF
I240B3	DS	IF
I241B1	DS	IF
I241B2	DS	IF
I241B3	DS	IF
XPPAGC	DS	IF
IBETA	DS	IF
NEWA	DS	IF
BAND	DS	IF

NSW	DS	1F
RBIAS	DS	8F
ISVPRI	DS	1F
IHRS	DS	1F
IMIN	DS	1F
ISEC	DS	1F
IMSEC	DS	1F
STAT	DS	21F
TRBIAS	DS	1F
ISTAT1	DS	1F
ISTAT2	DS	1F
ISTAT3	DS	1F
ISTAT4	DS	1F
IALSW	DS	1F
ISTSW	DS	1F
NBWB	DS	1F
ISIGNO	DS	1F
I11582	DS	1F
JCON	DS	F
NBEG	DS	F
NEND	DS	F
ITST	DS	F
NUMPRI	DS	F
XOPAGC	DS	F
ITBAND	DS	F
ITAPNO	DS	F
IPRF	DS	F
IPCLAR	DS	F
ISSERR	DS	F
PIFA	DS	16F
CIFA	DS	16F
PFSA	DS	1F
CFSA	DS	1F
PSSA	DS	1F
CSSA	DS	1F
PSSL	DS	1F
CSSL	DS	1F
ICODE	DS	F
I273B5	DS	F
I273B6	DS	F
I273B7	DS	F
I273B8	DS	F
IMOVF	DS	F
IMCVC	DS	F
IOFFST	DS	F
	END	

APPENDIX G SUBROUTINE REFC PROGRAM LISTING

```

SUBROUTINE REFC(E,R,DEE,DRR)                                VERSION 6/16/70
DIMENSION CE(16,8),CR(16,8),EO(16),RD(8)
DATA OE/0.0 ,0.0 ,0.0 ,0.0 ,0.0 ,0.0 ,0.0 ,0.0 ,
10.0 ,0.0 ,0.0 ,0.0 ,0.0 ,0.0 ,0.0 ,0.0313,
20.0303,0.0292,0.0287,0.0282,0.0272,0.0262,0.0253,0.0243,0.0223,
30.0214,0.0195,0.0171,0.0135,0.0075,0.0 ,0.0937,0.0848,0.0770,
40.0732,0.0694,0.0627,0.0571,0.0522,0.0480,0.0412,0.0385,0.0337,
50.0278,0.0205,0.0105,0.0 ,0.1850,0.1520,0.1250,0.1140,0.1050,
60.0904,0.0795,0.0708,0.0636,0.0523,0.0478,0.0405,0.0323,0.0229,
70.0114,0.0 ,0.5310,0.3070,0.2120,0.1830,0.1600,0.1280,0.1060,
80.0899,0.0780,0.0612,0.0550,0.0455,0.0354,0.0246,0.0120,0.0 ,
90.7550,0.3720,0.2400,0.2020,0.1750,0.1370,0.1120,0.0942,0.0811,
A0.0631,0.0566,0.0466,0.0361,0.0250,0.0122,0.0 ,0.9120,0.4110,
B0.2560,0.2140,0.1840,0.1420,0.1150,0.0967,0.0830,0.0643,0.0575,
C0.0472,0.0365,0.0252,0.0122,0.0 ,0.9700,0.4200,0.2600,0.2200,
D0.1900,0.1460,0.1170,0.0980,0.0840,0.0653,0.0584,0.0478,0.0369,
EO.0254,0.0123,0.0 /
DATA DR/ 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0,
1 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 22.6, 21.5, 20.4, 19.9,
2 19.4, 18.5, 17.6, 16.8, 16.1, 14.8, 14.2, 13.2, 12.0, 10.4, 8.6,
3 7.7, 67.3, 57.9, 50.2, 47.0, 44.1, 39.3, 35.4, 32.1, 29.3, 24.8,
4 22.9, 19.7, 16.3, 12.7, 9.4, 8.1,137.0, 98.5, 77.4, 69.7, 63.2,
5 52.9, 44.7, 38.4, 33.4, 26.4, 23.9, 20.1, 16.4, 12.7, 9.4, 8.1,
6 340.0,167.0,103.0, 86.1, 73.4, 56.7, 46.2, 38.9, 33.6, 26.4, 24.0,
7 20.2, 16.4, 12.8, 9.5, 8.2,405.0,170.0,104.0, 86.3, 73.6, 56.8,
8 46.3, 38.9, 33.7, 26.5, 24.1, 20.3, 16.5, 12.8, 9.5, 8.2,421.0,
9 171.0,104.0, 86.6, 73.9, 57.1, 46.4, 39.0, 33.8, 26.8, 24.3, 20.5,
A 16.6, 13.0, 9.8, 8.4,446.0,172.0,105.0, 87.4, 74.0, 58.0, 46.6,
B 39.2, 34.0, 27.0, 24.6, 20.7, 16.7, 13.0, 10.0, 8.4/
DATA EC,RTDEC/0.01,2.0,4.0,5.0,6.0,8.0,10.0,12.0,14.0,18.,20.,
124.,30.,40.,60.,90.,57.29578/
DATA RD/0.01,10.,30.,60.,20.,400.,1000.,2000./
IF(R.LE.0.0)GO TO 300
RG=R/1.8520+CO
DO 100 IEO=2,15
I=17-IEO
IF(E.DE.ED(I))GO TO 120
CONTINUE
I=1
100 DO 200 JRO=2,8
J=10-JRO
IF(RG.DE.R0(J))GC TO 220
CONTINUE
J=1
220 IF(J.EC.8)GO TO 340
ZR=ALOG(RC/R0(J))/ALOG(RD(J+1)/RD(J))
IF(E.LE.0.0)GO TO 320
ZE=ALOG(E/EO(I))/ALOG(ED(I+1)/ED(I))
OE1=((CE(I+1,J)-CE(I,J))*(1.-ZR)+(CE(I,J+1)-OE(I,J))*ZR)*ZE
OE2=((CE(I,J+1)-CE(I,J))*(1.-ZE)+(CE(I+1,J+1)-OE(I,J+1))*ZE)*ZR
OE=OE1+OE2+CE(I,J)
DR1=((CR(I+1,J)-CR(I,J))*(1.-ZR)+(CR(I,J+1)-DR(I,J))*ZR)*ZE
DR2=((CR(I,J+1)-CR(I,J))*(1.-ZE)+(CR(I+1,J+1)-DR(I,J+1))*ZE)*ZR
DRR=(DR1+DR2+DR(I,J))
GO TO 400
300 DEE=0.0
DRR=0.0
GO TO 400
320 DEE=DE(I,J)+(OF(I,J+1)-DE(I,J))*ZR
DRR=OR(I,J)+(DR(I,J+1)-OR(I,J))*ZR
GO TO 400
340 DELT=(E-ED(I))/(ED(I+1)-ED(I))
OEE=DELT*(CE(I+1,J)-OE(I,J))+DE(I,J)
ORR=DELT*(CR(I+1,J)-DR(I,J))+DR(I,J)
400 DRR=ORR*.30480-03
RETURN
END

```

APPENDIX H SUBROUTINE STATUS PROGRAM LISTING

* THIS ROUTINE DECODES STATUS INFO AND PACKS IT INTO THE OUTPUT BUFFER
*

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CSECT
ENTRY STATUS
STATUS SAVED
DROP 15
CNOP 0,4
BALR 2,D
USING START,2,3
START L 3,BASA
L 4,DUBUF
L 5,DUBUF
L 6,DUBUF
A 5,=F'4096'
A 6,=F'8192'
USING DBUF,4,5,6
B START1
DUBUF DC V(ICOM)
BASA DC A(START+4C96)
SPACE
START1 LA 8,WORD39
A 8,INDEX
MVC WORD39(3),0(8)
LA 8,WORD64
A 8,INDEX
MVC WORD64(3),0(8)
LA 8,WORD72
A 8,INDEX
MVC WORD72(3),0(8)
MVC WORD73(3),3(8)
SPACE
L 9,WORD39
N 9,=X'00800000' MASK FOR WORD 239
ST 9,WORD39
L 9,WORD64
N 9,=X'FFFFE000' MASK FOR WORD 264
ST 9,WORD64
L 9,WORD72
N 9,=X'A7F3C700' MASK FOR WORD 272
ST 9,WORD72
L 9,WORD73
N 9,=X'CF1FF700'
ST 9,WORD73
SPACE
SR 9,9
ST 9,ISTSW CLEAR STATUS PRINT SWITCH
L 9,WORD39
C 9,OWORD39
BNE XFERW
L 9,WORD64
C 9,OWORD64
BNE XFERW
L 9,WORD72
C 9,OWORD72
BNE XFERW
L 9,WORD73
C 9,OWORD73
BNE XFERW

```

	B	RETUR	
	SPACE		
XFERW	L	9,WCRD39	
	ST	9,OWORD39	
	L	9,WCRD64	
	ST	9,OWORD64	
	L	9,WCRD72	
	ST	9,OWORD72	
	L	9,WCRD73	
	ST	9,OWORD73	
	SPACE		
	L	9,ISTAT2	
	LA	9,1(9)	
	ST	9,ISTAT2	
	C	9,=F'101'	
	BL	SETSW1	
SETSW1	ST	9,ISTAT1	
	L	9,=F'1'	
	ST	9,ISTSW	SET STATUS PRINT SWITCH
	SPACE		
	L	9,WCRD72	
	N	9,=X'00000700'	BIT 22-24
	SRL	9,8	
	A	9,=A(OTAC)	
	MVC	STAT(1),0(9)	
	L	9,WORD72	
	N	9,=X'20000000'	BIT 3
	SRL	9,29	
	A	9,=A(SLW8)	
	MVC	STAT+4(1),0(9)	
	L	9,WCRD72	
	N	9,=X'04000000'	BIT 6
	SRL	9,26	
	A	9,=A(NWN)	
	MVC	STAT+8(1),0(9)	
	L	9,WCRD72	
	N	9,=X'02000000'	BIT 7
	SRL	9,25	
	A	9,=A(GOT)	
	MVC	STAT+12(1),0(9)	
	L	9,WCRD73	
	N	9,=X'00010000'	BIT 16
	SRL	9,16	
	A	9,=A(FEC)	
	MVC	STAT+16(1),0(9)	
	L	9,WCRD73	
	N	9,=X'00000700'	BIT 22-24
	SRL	9,8	
	A	9,=A(OTWC)	
	MVC	STAT+20(1),0(9)	
	L	9,WCRD73	
	N	9,=X'00080000'	BIT 13
	SRL	9,19	
	A	9,=A(N12)	
	MVC	STAT+24(1),0(9)	
	L	9,WCRD73	
	N	9,=X'00040000'	BIT 14

	SRL	9,18	
	A	9,=A(GHL)	
	MVC	STAT+28(1),0(9)	
	L	9,WCRD39	
	N	9,=X'00800000'	
	SRL	9,23	
	A	9,=A(MIC)	
	MVC	STAT+32(1),0(9)	
	L	9,WCRD72	
	N	9,=X'00000000'	
	SRL	9,31	
	A	9,=A(S12)	
	MVC	STAT+36(1),0(9)	
	L	9,WCRD73	
	N	9,=X'00008000'	
	SRL	9,15	
	A	9,=A(CON)	
	MVC	STAT+40(1),0(9)	
	L	9,WCRD73	
	N	9,=X'00100000'	
	SRL	9,20	
	ST	9,STEMP	
	A	9,=A(NBC)	
	MVC	STAT+41(1),0(9)	
	L	9,WCRD64	
	N	9,=X'FFFFFF000'	
	SRL	9,13	
	C	9,=F'0'	
	BNE	NZSTMP	
	L	9,=F'666666'	
	ST	9,STEMP	
	B	ZSTMP	
NZSTMP	ST	9,STEMP	
	L	9,=F'10000000'	
	SR	8,8	
	D	8,STEMP	
	ST	9,STEMP	TRANSMITTED PRF
	SPACE		
	L	9,INBUF	
	SRL	9,31	
	C	9,ZERO	
	BNE	WBAND	
	SPACE		
NBAND	L	9,WCRD73	IN NARROW BAND
	N	9,=X'01000000'	BIT 8
	SRL	9,24	
	C	9,ZERO	
	BE	SLVDUB1	
	SPACE		
XDIV	L	8,FOUR	IN DOUBLET MODE
XDIV1	ST	8,DIVSR	
	B	NEWPRF	
	SPACE		
SLVDUB1	L	9,WCRD73	
	N	9,=X'08000000'	BIT 5
	SRL	9,27	

	C	9,ZERO	
	BE	NBNWBN	
	B	XDIV	IN SLAVED DOUBLET MODE
NBNWBN	L	9,WCRD73	
	N	9,=X'00100000'	BIT 12
	SRL	9,20	
	C	9,ZERO	
	BE	NODIVS	
	L	8,TWO	
	B	XDIV1	NB/WB E.C.P.
NODIVS	L	8,ONE	
	B	XDIV1	NB ONLY
	SPACE		
WBAND	L	9,WCRD73	
	N	9,=X'01000000'	BIT 8
	SRL	9,24	
	C	9,ZERO	
	BNE	SLVDUP2	
	L	8,TWO	IN DOUBLET MODE
	B	XDIV1	
SLVDUB2	L	9,WCRD73	
	N	9,=X'08000000'	BIT 5
	SRL	9,27	
	C	9,ZERO	
	BNE	XDIV	IN SLAVED DOUBLET MODE
	L	8,TWO	
	B	XDIV1	WB ONLY
	SPACE		
NEWPRF	SR	8,8	
	L	9,STEMP	
	D	8,DIVSR	
	ST	9,STEMP	
ZSTMP	MVC	STAT+44(4),STEMP	
	SPACE		
	L	9,WCRD72	
	N	9,=X'00030000'	
	SRA	9,16	
	A	9,=A(DPC)	
	MVC	STAT+48(1),0(9)	
	L	9,WCRD72	
	N	9,=X'01F00000'	BIT 8-12
	SRL	9,19	RIGHT JUSTIFY AND MULTI BY 2
	C	9,=F'40'	
	BL	INRANGE	
	L	9,=F'0'	
INRANGE	A	9,=A(CTN)	
	MVC	STAT+52(2),0(9)	
	L	9,WCRD73	BIT5
	N	9,=X'0BC00000'	
	SRL	9,27	
	ST	9,WBSAVE	
	A	9,=A(SLWB)	
	MVC	STAT+56(1),0(9)	
	L	9,WBSAVE	
	C	9,ZERO	
	BNE	BB6	
	MVI	STAT+60,C'0'	
	MVI	STAT+64,C'0'	

BB6	B	DBLTT	
	L	9,WORD73	BIT 6
	N	9,=X'04000000'	
	SRL	9,26	
	A	9,=A(WBS2)	
	MVC	STAT+60(1),0(9)	
	L	9,WORD73	BIT 7
	N	9,=X'02000000'	
	SRL	9,25	
	A	9,=A(WBS3)	
	MVC	STAT+64(1),0(9)	
DBLTT	L	9,WORD73	BIT 8
	N	9,=X'01000000'	
	SRL	9,24	
	A	9,=A(DBL1)	
	MVC	STAT+68(1),0(9)	
RETUR	RETL		
DTAC	DC	CL8'DTA*C***'	
SLWB	DC	CL2'DS'	
A12	DC	CL4'I122'	
LWN	DC	CL2'NW'	
GOT	DC	CL2'OT'	
EEC	DC	CL2'CF'	
DTWC	DC	CL8'DTW*C***'	
N12	DC	CL2'21'	
GHL	DC	CL2'HI'	
MIC	DC	CL2'***'	
S12	DC	CL2'OP'	
CCN	DC	CL2'NC'	
CPC	DC	CL4'CPC*'	
CTN	DC	CL4C'***T1T2T3T4T5T6N1N2N3N4I1I2I3I4F1F2F3B*P*'	
WBS1	DC	CL2'O1'	
WBS2	DC	CL2'NX'	
WBS3	DC	CL2'MA'	
DBL1	DC	CL2'OD'	
BL	DC	CL1'-'	
NBO	DC	CL2'OW'	
	CNOP	0,4	
WORD39	DC	F'0'	
WORD72	DC	F'0'	
WORD73	DC	F'0'	
WORD64	DC	F'0'	
CWORD39	DC	F'0'	
CWORD64	DC	F'0'	
CWORD72	DC	F'0'	
CWORD73	DC	F'0'	
STEMP	DC	F'0'	
CTEMP	DC	F'0'	
ZERO	DC	F'0'	
CNE	DC	F'1'	
TWC	DC	F'2'	
FOUR	DC	F'4'	
WBSAVE	DC	F'0'	
DIVSR	DC	F'0'	
DBUF	CSECT		
INBUF	DS	CL3	
WD1	DS	CL3	

	DS	CL48
WD18	DS	CL3
WD19	DS	CL3
	DS	CL27
WD29	DS	CL3
WD30	DS	CL3
	DS	CL252
WD115	DS	CL3
WD116	DS	CL3
WD117	DS	CL3
	DS	CL345
WD233	DS	CL3
WD234	DS	CL3
	DS	CL3
WD236	DS	CL3
WD237	DS	CL3
	DS	CL3
WD239	DS	CL3
WD240	DS	CL3
WD241	DS	CL3
WD242	DS	CL3
WD243	DS	CL3
WD244	DS	CL3
WD245	DS	CL3
WD246	DS	CL3
	DS	CL18
WD253	DS	CL3
	DS	CL27
WD263	DS	CL3
WD264	DS	CL3
WD265	DS	CL3
WD266	DS	CL3
WD267	DS	CL3
WD268	DS	CL3
WD269	DS	CL3
WD270	DS	CL3
WD271	DS	CL3
WD272	DS	CL3
WD273	DS	CL3
WD274	DS	CL3
WD275	DS	CL3
WD276	DS	CL3
WD277	DS	CL3
WD278	DS	CL3
WD279	DS	CL3
WD280	DS	CL3
	DS	CL6369
IAZ	DS	IF
IEL	DS	IF
INDEX	DS	IF
IPPRCS	DS	IF
IORS	DS	IF
IRANGE	DS	IF
IPKPWP	DS	IF
IRDOT	DS	IF
IALT	DS	IF
INDAZ	DS	IF

JNDAZ	DS	1F
INCEL	DS	1F
IRB54	DS	1F
IRB85	DS	1F
IOPRCS	DS	1F
I240B1	DS	1F
I240B2	DS	1F
I240B3	DS	1F
I241B	DS	1F
I24	DS	1F
I24	DS	1F
XPPAGL	DS	1F
IBETA	DS	1F
IBETASW	DS	1F
HANC	DS	1F
NSW	DS	1F
RBIAS	DS	8F
ISVPR	DS	1F
IHRS	DS	1F
IMIN	DS	1F
ISEC	DS	1F
IMSEC	DS	1F
STAT	DS	21F
TRBIAS	DS	1F
ISTAT1	DS	1F
ISTAT2	DS	1F
ISTAT3	DS	1F
ISTAT4	DS	1F
IALSW	DS	1F
ISTSW	DS	1F
NBWB	DS	1F
ISIGNO	DS	1F
IL15B2	DS	1F
JCCN	DS	F
NBEG	DS	F
NEND	DS	F
ITST	DS	F
NUMPRI	DS	F
XOPAGC	DS	F
ITBAND	DS	F
ITAPNO	DS	F
IPRF	DS	F
IPOLAR	DS	F
ISSERR	DS	F
PIFA	DS	16F
CIFA	DS	16F
PFSA	DS	1F
CFSA	DS	1F
PSSA	DS	1F
CSSA	DS	1F
PSSL	DS	1F
CSSL	DS	1F
ICODE	DS	F
I273B5	DS	F
I273B6	DS	F
I273B7	DS	F
I273B8	DS	F
IMCVP	DS	F
IMCVC	DS	F
IOFFST	DS	F
	END	