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ESD ltr, 6 Dec 1973
Data Reduction Program Documentation

ALERT

(Effective: April 1971)

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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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 No implication is made that this program will not subsequently be modified, amended, or superseded; on the contrary, the history of radar data processing is one of continuous evolution of techniques, and it is unrealistic to assume that steady-state has been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
Alan A. Grometstein
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</thead>
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</tr>
</tbody>
</table>
COMMON SYMBOLS AND ABBREVIATIONS

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<table>
<thead>
<tr>
<th>Symbol</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADT</td>
<td>ALCOR Data Tape</td>
</tr>
<tr>
<td>ALCOR</td>
<td>ARPA - Lincoln C-band Observables Radar</td>
</tr>
<tr>
<td>ALTAIR</td>
<td>ARPA Long-Range Tracking and Instrumentation Radar</td>
</tr>
<tr>
<td>Alt</td>
<td>Altitude (km)</td>
</tr>
<tr>
<td>APS</td>
<td>Average Pulse Shape</td>
</tr>
<tr>
<td>ARS</td>
<td>ALTAIR Recording System</td>
</tr>
<tr>
<td>Avg</td>
<td>Average, Averaging</td>
</tr>
<tr>
<td>Az</td>
<td>Azimuth (deg)</td>
</tr>
<tr>
<td>c</td>
<td>Speed of Light</td>
</tr>
<tr>
<td>CADJ</td>
<td>Adjusted Calibration Constant (db)</td>
</tr>
<tr>
<td>C-band</td>
<td>ALCOR frequency, 5664 MHz (NB) and 5667 MHz (WB)</td>
</tr>
<tr>
<td>DBLT</td>
<td>Wide Band Pulse Doublet</td>
</tr>
<tr>
<td>DCO</td>
<td>Designations and Communications Operator</td>
</tr>
<tr>
<td>EI</td>
<td>Elevation (deg)</td>
</tr>
<tr>
<td>EOF</td>
<td>End of File</td>
</tr>
<tr>
<td>GMT</td>
<td>Greenwich Mean Time</td>
</tr>
<tr>
<td>h</td>
<td>Hours</td>
</tr>
<tr>
<td>Hz</td>
<td>Hertz</td>
</tr>
<tr>
<td>IF</td>
<td>Intermediate Frequency</td>
</tr>
<tr>
<td>in</td>
<td>Inches</td>
</tr>
<tr>
<td>IRV</td>
<td>Inter-Range Vector</td>
</tr>
<tr>
<td>LC</td>
<td>Left Circular Polarization</td>
</tr>
<tr>
<td>lsb</td>
<td>Least Significant Bit</td>
</tr>
<tr>
<td>min</td>
<td>Minutes</td>
</tr>
<tr>
<td>NB</td>
<td>Narrow Band</td>
</tr>
<tr>
<td>NRTPOD</td>
<td>Non-real Time Precision Orbit Determination Program</td>
</tr>
<tr>
<td>POD</td>
<td>Project PRESS Operation and Data Summary Report</td>
</tr>
<tr>
<td>Phase</td>
<td>Presented in deg</td>
</tr>
<tr>
<td>PRF</td>
<td>Pulse Repetition Frequency (pps)</td>
</tr>
<tr>
<td>PRI</td>
<td>Pulse Repetition Interval (s)</td>
</tr>
<tr>
<td>pps</td>
<td>Pulses per second</td>
</tr>
<tr>
<td>pts</td>
<td>Points</td>
</tr>
<tr>
<td>Symbol</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>R</td>
<td>Range (km)</td>
</tr>
<tr>
<td>R</td>
<td>Range Rate (km/s)</td>
</tr>
<tr>
<td>rad</td>
<td>Radians</td>
</tr>
<tr>
<td>KC</td>
<td>Right Circular Polarization</td>
</tr>
<tr>
<td>RCS</td>
<td>Radar Cross Section (dbsm)</td>
</tr>
<tr>
<td>RF</td>
<td>Radio Frequency</td>
</tr>
<tr>
<td>s</td>
<td>Seconds</td>
</tr>
<tr>
<td>SD</td>
<td>Standard Deviation of Wake Velocity</td>
</tr>
<tr>
<td>SW</td>
<td>Wide Band Slaved Pulse Doublet</td>
</tr>
<tr>
<td>S/N</td>
<td>Signal-to-noise Ratio</td>
</tr>
<tr>
<td>T</td>
<td>Time</td>
</tr>
<tr>
<td>TAL</td>
<td>Time After Launch (s)</td>
</tr>
<tr>
<td>Tr</td>
<td>Traverse Angle (deg)</td>
</tr>
<tr>
<td>UHF</td>
<td>ALTAIR Frequency; 415 MHz</td>
</tr>
<tr>
<td>V</td>
<td>Velocity</td>
</tr>
<tr>
<td>Vd</td>
<td>Doppler Velocity</td>
</tr>
<tr>
<td>Vw</td>
<td>Mean Wake Velocity</td>
</tr>
<tr>
<td>VHF</td>
<td>ALTAIR Frequency; 155.5 MHz</td>
</tr>
<tr>
<td>WB</td>
<td>Wide Band</td>
</tr>
<tr>
<td>WBS</td>
<td>Wide Band Slaved</td>
</tr>
<tr>
<td>WTR</td>
<td>Western Test Range</td>
</tr>
<tr>
<td>θ</td>
<td>Total Off-axis Angle (deg)</td>
</tr>
<tr>
<td>λ</td>
<td>Wavelength</td>
</tr>
<tr>
<td>*</td>
<td>Denotes Multiplication</td>
</tr>
</tbody>
</table>
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

ALCOR

B. Data Input

ALCOR Data Tape (ADT)

C. Description

ALERT is designed to obtain a summary of the data available on an ADT tape. Output is normally requested every 10th pulse. When WRS, 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.
II. DESCRIPTION

ALERT gives a listing of metric and radar status information correlated with pulse 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:

\[ R = \text{IRANGE} + \text{TRBIAS} + \text{TTCOR} + \text{RRCOR} - \text{RCORF} \]
\[ Az = \text{IAZ} + \text{AZBIAS} \]
\[ El = \text{IEL} + \text{ELBIAS} - \text{ECORF} \]

where

- IRANGE is uncorrected R
- TRBIAS is range bias
- TTCOR (transit time correction) = \(\frac{\dot{R}}{c}\)
- 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:

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

where \(R_e = \text{radius of earth (6378.145 km)}\)
RCS is always the NB real time RCS whether the ADT is NB or WB. It is obtained:

\[
\text{LC RCS} = (\text{IPPRCS}) \times (80/255) - 40 \\
\text{RC RCS} = (\text{IOPRCS}) \times (80/255) - 40
\]

where

- IPPRCS is Data Record Byte 802
- IOPRCS is Data Record Byte 803

A/D count is given for Gate 52 unless IW417 = 1 is input. In the latter case, IMOVP is given.

The angle offsets (\(\Delta Tr\) and \(\Delta E1\)) are determined:

\[
\Delta Tr = AZGRAD \times (2 \pi) \times (10^{a/20}) \times (\cos Z1)
\]

\[
\Delta E1 = ELGRAD \times (2 \pi) \times (10^{e/20}) \times (\cos Z2)
\]

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

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

\[
P_e (\text{db}) = \Delta E1 (\text{db}) - \text{REF (db)}
\]

---

# Not an output at present.

### IMOVP 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.

\[ Z_1 = \Delta Tr \text{ phase} - \text{REF phase} + \text{AGAMA} \]
\[ Z_2 = \Delta El \text{ phase} - \text{REF phase} + \text{EGAMA} \]

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:

\[ NB \text{ POWER} = \text{PWRCN} + \text{PWRSN} \log XPKPWR \]
\[ WB \text{ POWER} = \text{PWRSN} + \text{PWRSW} \log XPKPWR \]

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:

<table>
<thead>
<tr>
<th>Code</th>
<th>Pulse Return</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NB</td>
</tr>
<tr>
<td>1</td>
<td>WB</td>
</tr>
<tr>
<td>2</td>
<td>Phantom (not expected on ADT)</td>
</tr>
<tr>
<td>3</td>
<td>WBS</td>
</tr>
<tr>
<td>Code</td>
<td>Pulse Return</td>
</tr>
<tr>
<td>------</td>
<td>--------------</td>
</tr>
<tr>
<td>4</td>
<td>not used</td>
</tr>
<tr>
<td>5</td>
<td>DBLT</td>
</tr>
<tr>
<td>6</td>
<td>not used</td>
</tr>
<tr>
<td>7</td>
<td>SDBLT</td>
</tr>
</tbody>
</table>

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

DBLT waveform status information includes:

<table>
<thead>
<tr>
<th>Calibration Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word No.</td>
</tr>
<tr>
<td>Alt at which DBLT is initiated</td>
</tr>
<tr>
<td>Alt at which DBLT is terminated</td>
</tr>
</tbody>
</table>

The following offset range scan status information is listed:

**Exo-atmospheric**

<table>
<thead>
<tr>
<th>Calibration Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word No.</td>
</tr>
<tr>
<td>Alt at which slaved mode is initiated</td>
</tr>
<tr>
<td>Alt at which slaved mode is terminated</td>
</tr>
<tr>
<td>No. of dwells/scan</td>
</tr>
<tr>
<td>Initial range offset (m)</td>
</tr>
<tr>
<td>Range offset increment (m)</td>
</tr>
<tr>
<td>Total no. of pulses/dwell</td>
</tr>
</tbody>
</table>

**Endo-atmospheric**

<table>
<thead>
<tr>
<th>Calibration Record</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word No.</td>
</tr>
<tr>
<td>Alt at which slaved mode is initiated</td>
</tr>
<tr>
<td>Alt at which slaved mode is terminated</td>
</tr>
<tr>
<td>No. of dwells/scan</td>
</tr>
<tr>
<td>Initial range offset (m)</td>
</tr>
<tr>
<td>Range offset increment (m)</td>
</tr>
<tr>
<td>Total no. of pulses/dwell</td>
</tr>
</tbody>
</table>

PRF is IPRF, determined from the transmitted PRF for the particular waveform on the ADT.*

* See Ref. 2, Appendix F.
Radar status is obtained:

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Column Heading</th>
<th>Code</th>
<th>Status</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range</td>
<td></td>
<td></td>
<td>Designated mode</td>
<td>Data Record Byte 816, Bits 6-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>Track mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>Automatic acquisition mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>Coast mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>NB R not slaved to WB R</td>
<td>Data Record Byte 814, Bit 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>NB R slaved to WB R</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>NB R into target tracker</td>
<td>Data Record Byte 814, Bit 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>WB R into target tracker</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>W</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td>Initially set to O</td>
<td>Data Record Byte 814, Bit 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>Alternates with every track transfer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>Tracking target centroid</td>
<td>Data Record Byte 818, Bit 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>Tracking leading edge of target</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Angle</td>
<td>A</td>
<td>Designated mode</td>
<td>Data Record Byte 819, Bits 6-8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>Track mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>Wait mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>W</td>
<td>Coast mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>Angle servo type 2</td>
<td>Data Record Byte 818, Bit 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>Angle servo type 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>Angle servo type 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>G</td>
<td>Maximum angle servo bandwidth</td>
<td>Data Record Byte 818, Bit 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>H</td>
<td>Minimum angle servo bandwidth</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>L</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Miscellaneous</td>
<td>M</td>
<td>Not used</td>
<td>Data Record Byte 814, Bit 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I</td>
<td>Skin track mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>Beacon track mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Information</td>
<td>Column Heading</td>
<td>Code</td>
<td>Status</td>
<td>Source</td>
</tr>
<tr>
<td>---------------------------</td>
<td>----------------</td>
<td>------</td>
<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>RD Designation Source</td>
<td></td>
<td></td>
<td>Detection normal</td>
<td>Data Record Byte 819, Bit 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>Detection override</td>
<td>Data Record Byte 818, Bit 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>NB transmission only</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>W</td>
<td>NB/WB transmission</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>Designation source selected by DCO</td>
<td>Data Record Byte 815, Bits 7 and 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>P</td>
<td>Current track file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>C</td>
<td>Manual</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*</td>
<td>Not used</td>
<td></td>
</tr>
<tr>
<td>Waveform</td>
<td></td>
<td>T (1-4)</td>
<td>Track files (1-4)</td>
<td>Data Record Byte 815, Bits 1-4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N (1-4)</td>
<td>Nominal track files (1-4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>I (1-4)</td>
<td>Inflight (IRV) messages</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F (1-3)</td>
<td>Fixed point</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B*</td>
<td>Bore sight tower</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>P*</td>
<td>PRESS track file</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>No WBS or SDBLT</td>
<td>Data Record Byte 817, Bit 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>S</td>
<td>WBS or SDBLT</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>Not used</td>
<td>Data Record Byte 817, Bit 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X</td>
<td>Endo offset range scan</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>O</td>
<td>Not used</td>
<td>Data Record Byte 817, Bit 7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>M</td>
<td>Manual offset range scan</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>A</td>
<td>Automatic offset range scan</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>No DBLT or SDBLT</td>
<td>Data Record Byte 817, Bit 8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D</td>
<td>DBLT or SDBLT</td>
<td></td>
</tr>
</tbody>
</table>
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 (H10, 315, 1X, A4)

(Col.)

1-10 ILNCH  Launch time in GMT total ms
11-15 NVALS  No. of processing intervals
16-20 IW147  A/D option: 0 = Gate 52; 1 = MOVP
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 (H110)

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(4), 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. \textsc{readjs}^2

The first call to subroutine \textsc{readjs} opens the file and reads the ADT header record. The second call to \textsc{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 \textsc{readjs} reads an ADT data record consisting of eight \textsc{aCOR} pulses.

E. \textsc{refc} (see Appendix G.)

The tropospheric refraction correction subroutine, \textsc{refc}, is based on tropospheric refraction tables in PPP-36. A modified version of this subroutine is now in use.

The call statement is \textsc{refc} (E, R, DEE, DRR).

\begin{align*}
  E & = \text{Uncorrected El (must be between } 0^\circ \text{ and } 90^\circ \text{)} \\
  R & = \text{Uncorrected R} \\
  \text{DEE} & = \text{El tropospheric correction} \\
  \text{DRR} & = \text{R tropospheric correction}
\end{align*}

The corrected values to be computed after exiting from the \textsc{refc} subroutine are:

\begin{align*}
  \text{El} & = E - \text{DEE} \\
  R & = R - \text{DRR}
\end{align*}

F. \textsc{status} (see Appendix H.)

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

\textbf{STORED IN COMMON}

\begin{tabular}{ll}
  \text{ESTAT} & \text{Array of status mnemonics} \\
  \text{IALSW} & \text{Not used} \\
  \text{ISTSW} & \text{Change of status indicator: } 0 = \text{no change}; 1 = \text{change}
\end{tabular}
REFERENCES


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 B
ALERT OUTPUT

ALERT-ALCDR  BAND = NB  REEL N. = TITLE = LJ25  DATE = 7/3/71
START STOP SKU  START STOP SKU  START STOP SKU  START STOP SKU
24001 24001 9

LAUNCH TIME (TOTAL SECS) = 16930.972  14117 = 0

ENGO-ATMOSPHERIC

UPPER WBS SCAN ALTITUDE (KM) = -0.0
LOWER WBS SCAN ALTITUDE (KM) = -3.0
NUMBER OF OWLLS PER SCAN = 10.
INITIAL RANGE OFFSET (M) = 22.98
RANGE OFFSET INCREMENT (M) = 0.0
NO. OF SLAVED PRIS PER OWELL = 40.
UPPER DOUBLET MODE ALTITUDE (KM) = -3.0
LOWER DOUBLET MODE ALTITUDE (KM) = -0.0

THE CODE I C J 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 (NOT TO BE USED)
3       WB SLAVED WINDOW RETURN
4       NOT USED
5       WB PULSE DOUBLET RETURN
6       NOT USED
7       WB PULSE DOUBLET SLAVED WINDOW RETURN

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

R = O  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 INTO TARGET TRACKER
    = W  WB RANGE INTO TARGET TRACKER

G = O  D ANDT WILL ALTERNATE WITH EVERY TRACK
    = T  TRANSFER (FIRST SET = D)

E = C  CENTER 3R CENTROID TRACK
    = E  EDGE TRACK
THE CODE (TANG) LISTED IN THE STATUS OUTPUT DEFINES THE FOLLOWING:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Designate</td>
</tr>
<tr>
<td>T</td>
<td>Track</td>
</tr>
<tr>
<td>W</td>
<td>Wait</td>
</tr>
<tr>
<td>C</td>
<td>COAST</td>
</tr>
<tr>
<td>N</td>
<td>Angle Type 2 Servo</td>
</tr>
<tr>
<td>L</td>
<td>Angle Type 1 Servo</td>
</tr>
<tr>
<td>M</td>
<td>Maximum Servo Bandwidth</td>
</tr>
<tr>
<td>L</td>
<td>Minimum Angle Servo Bandwidth</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>L</td>
<td>Inut Used</td>
</tr>
<tr>
<td>B</td>
<td>Beacon Tracker Off</td>
</tr>
<tr>
<td>A</td>
<td>Beacon Tracker Active</td>
</tr>
<tr>
<td>S</td>
<td>Detection Normal</td>
</tr>
<tr>
<td>N</td>
<td>Detection Override</td>
</tr>
<tr>
<td>C</td>
<td>NB Transmission Only</td>
</tr>
<tr>
<td>W</td>
<td>NB/WB Transmission</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>DCOS Designation Source</td>
</tr>
<tr>
<td>P</td>
<td>Prime TF (Currently Trackfile)</td>
</tr>
<tr>
<td>C</td>
<td>Console (Joystick, buttons, etc.)</td>
</tr>
<tr>
<td>*</td>
<td>Inut Used</td>
</tr>
</tbody>
</table>

DCO SELECTED DESIGNATION SOURCE

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Trackfile</td>
</tr>
<tr>
<td>U</td>
<td>Nominal</td>
</tr>
<tr>
<td>I</td>
<td>Inflight Messages</td>
</tr>
<tr>
<td>F</td>
<td>Fixed Point</td>
</tr>
<tr>
<td>B</td>
<td>Baresight Tower</td>
</tr>
<tr>
<td>P</td>
<td>Press</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Wide Band Slaved Mode</td>
</tr>
<tr>
<td>X</td>
<td>In Effect</td>
</tr>
<tr>
<td>N</td>
<td>Endo Scan In Progress</td>
</tr>
<tr>
<td>X</td>
<td>Endo Scan In Progress</td>
</tr>
<tr>
<td>S</td>
<td>Endo Not Being Used Yet</td>
</tr>
<tr>
<td>M</td>
<td>Manual WBS Scan</td>
</tr>
<tr>
<td>A</td>
<td>Automatic WBS Scan</td>
</tr>
<tr>
<td>D</td>
<td>Doublet Mode Off</td>
</tr>
<tr>
<td>O</td>
<td>Doublet Mode On</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Manual WBS Scan</td>
</tr>
<tr>
<td>A</td>
<td>Automatic WBS Scan</td>
</tr>
<tr>
<td>O</td>
<td>Doublet Mode Off</td>
</tr>
<tr>
<td>S</td>
<td>Doublet Mode On</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>W</td>
<td>Wide Band Slaved Mode</td>
</tr>
<tr>
<td>S</td>
<td>Slaved Mode</td>
</tr>
<tr>
<td>X</td>
<td>Endo Scan In Progress</td>
</tr>
<tr>
<td>N</td>
<td>Endo Scan In Progress</td>
</tr>
<tr>
<td>S</td>
<td>Endo Not Being Used Yet</td>
</tr>
<tr>
<td>M</td>
<td>Manual WBS Scan</td>
</tr>
<tr>
<td>A</td>
<td>Automatic WBS Scan</td>
</tr>
<tr>
<td>D</td>
<td>Doublet Mode Off</td>
</tr>
<tr>
<td>O</td>
<td>Doublet Mode On</td>
</tr>
</tbody>
</table>
APPENDIX C
ALERT PROGRAM LISTING

DOUBLE PRECISION TLNCH, D1000, TAL, TOTL

COMMON /ICCH/INPUF(1803), IAZ, IEL, INDEX, IPRRCS, IORS, IRANGE, IPKMPW, IRSTA000D10
100T, 1ALT, NDAC2, MDAC2, INDEXL, IREC4, IRCRPS, 124081, 124082, 124083DSTA000D20
1, 124181, 124182, 124183, XPPAGC, IBETA, NEWA, IBAND, INSW, RBAS(8), ISVPRI,
1HR5, IIMN, IMSEC, ISTAT(21), TRBAS, ISTAT1, ISTAT2, ISTAT3, ISTAT4, STA00D4
1ITSLW, IIERTW, NWB, ISIGN10, I115B2, JCON, NBEG, NEND, ITST, NUMP10, XOPAGC,
11TBAND, ITAPNC, IPRF, IPOLAR, IESERR, IPFA(16), IPFA(16), PFSAO, OPFA,
1PSSA, Ossa, PSSL, OSSL, ICODE, 127385, 127386, 127387, 127388, IMOVP, IMCOO,
110FFST

DIMENSION XNBUF(1803), QBIAS(8), XXRCS(5)
DIMENSION XATBL(128), XFZLN(255)
DIMENSION IEQM(9), IT0ESG(3)
DIMENSION NSTAPT(50), NSTOP(50), NSKIP(50)
DIMENSION DW(I118), I0LS1(18)
DIMENSION CBIAS(81), XRCS(5)
EQUIVALENCE (XNPUFC, INBUF(1))
EQUIVALENCE (I11Q5, I11BAN), (IEQM(5), I11TAPEN), (IEQM(5), IMTH)
2(IEQM(5), IMTH, I11TAPEN), (IEQM(5), IMTH)
3(IEQM(5), IMTH, I11TAPEN), (IEQM(5), IMTH)
2C08 FORMAT(1X, 'THE CODE (C) LISTED IN THE OUTPUT HEADING DEFINE
1 IS THE 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 (NOT USED)'
515X,'5 WB PULSE DOUBLET RETURN'//15X,'6 (NOT USED)'//15X,'7
6 WB PULSE DOUBLET SLAVED WINDOW RETURN'//15X,
2004 FORMAT(1X, 'THE CODE (RANGE) LISTED IN THE STATUS OUTPUT DEFINES
1 THE FOLLOWING 0//15X,'R = D DESIGNATION'//21X,'= T TRACK
2 T'/'21X,'= A AUTO-ACQUISITION'//21X,'= C COAST'//15X,'A
3 = O NB RANGE INPUT ESTIMATOR NOT SLAVED TO WB'/'21X,'= S NB I
4S SLAVED TO WB'/'21X,'= N NB RANGE INTO TARGET TRACKER'
515X,'= W WB RANGE INTO TARGET TRACKER'/'15X,'G = O O AND
6T WILL ALTERNATE WITH EVERY TRACK'/'21X,'= T TRANSFER (FIRST SE
7 T = O)'/'15X,'F = C CENTER OR CENTROID TRACK'/'21X,'= E E
8EDGE TRACK'/'/
2005 FORMAT(1X, 'THE CODE (ANG) LISTED IN THE STATUS OUTPUT DEFINES
1 THE FOLLOWING 0//15X,'A = D DESIGNATION'//21X,'= T TRACK'
2 21X,'= W WAIT'/'21X,'= C COAST'/'15X,'N = 2 ANGLE T
3 TYPE 2 SERVO'/'21X,'= 1 ANGLE TYPE I SERVO'/'15X,'G = H M
4AXIMUM SERVO BANDWIDTH'/'21X,'= L MINIMUM ANGLE SERVO BANDWIDTH
571
2006 FORMAT(1X, 'THE CODE (MSC) LISTED IN THE STATUS OUTPUT DEFINE
1 THE FOLLOWING 0//15X,'S = D DESIGNATION'//21X,'= T TRACK'
2 21X,'= W BEACON TRACKER OFF'/'21X,'= B BEACON TRACKER ACTIV
3E'/'15X,'5 = N DETECTION NORMAL'/'21X,'= O DETECTION OVE
4RIDE'/'15X,'C = O NB TRANSMISSION ONLY'/'21X,'= W NB/
FORMAT(0',1C8,'THE CODE (R D) LISTED IN THE STATUS OUTPUT DEFINES
1 THE FOLLOWING 0'//15X,'R = D ODCS-DESIGNATION SOURCE SELECTED BY ODC
2 'I//21x,'=' P PRIME TF (CURRENTLY TRACKFILE)'
3 'I//21x,'=' C CONSOLE (J/CEISTICK, BUTTONS, Etc.)'
4 'I//21x,'='* (NOT USED) 'II1X,'(DC SELECTED DESIGNATION
5 'I//15X,'=' T(I-4) TRACKFILE '
6 'II1X,'=' 'I(I-4) NOMINAL '
7 'II1X,'=' I(I-4) INFLIGHT MESSAGES'
8 'II1X,'=' F(I-3) FIXED POINT '
9 'II1X,'=' * BORESIGHT TOWER '
A 'II1X,'=' P PRESS '
B 'II1X,'=' D DOUBLET MODE C/N
2007 FORMAT(0',1C8,'THE CODE (WBSD) LISTED IN THE STATUS OUTPUT DEFINE
2 IS THE FOLLOWING C'//15X,'R = C WIDE HAND SLAVED MODE NOT IN
3 EFFECT'//15X,'B = C BIT NOT BEING
4 USED YET)'//15X,'D = C AUTOMATIC WBS
5 SCAN'//15X,'O = C DOUBLET MODE OFF 'II1X,'
6 'II1X,'D = C DOUBLET MODE C/N
3100 FORMAT('CBAND = 'A2')
3200 FORMAT('D TIME HGT RANGE RDOT AZIM ELEV LC A/D ACER
1 DI ELMER ACG PWH C GMT R CFFST RANGE AND MISC PRF R D WB
250 PR/)'
3300 FORMAT(' (SECs) (KM) (KM) (SEC) DEG DEG DBM CAT DEG
1 DEG DB DPW PR M SEC (M) 'S5A1,1X,3A1,1X,2A1,2A1,1X,1X,'I13,1X,A1,1X,A2,1X,4A1/)
3400 FORMAT('F9.3,A1,F5.1,F7.1,F8.1,F7.2,F6.2,2I14,2F7.3,F5.1,13,1X,1
1,313,'S5A1,1X,F7.1,1X,5A1,1X,3A1,1X,A2,1X,1X,1X,A1,1X,A2,1X,'I2A1,1X,15)
3600 FORMAT('F9.3,A1,F5.1,F7.1,F8.1,F7.2,F6.2,2I14,2F7.3,F5.1,13,1X,1
1,313,'S5A1,1X,F7.1,1X,29X,1X,15)
C DATA LLC/'LC '/2RC/'RC '/2WNB/'WB '/2ZNB/'NB '/
DATA 'I1FRST2/0/,IFRST4/0/,INTAV/1/,IFRST2/0/,IFRST5/C/
DATA ER /6378.145/,'IFRST1/0/,BLNKK/'*'/2USAGE/'*
DATA 'I1AST2/****1/,I1AST/1*/1/,I1BLNKK'/*
DATA D1000/10000..DO/
C DATA 'ITST = 1 ARE NOT WITHIN THE NSTART-NSTCP INTERVAL
C 'ITST = 2 ARE WITHIN THE NSTART-NSTCP INTERVAL
C 'ITST = 3 AT NSTCP 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)INLCNH,NVALS,IT1117,IAUTO,TITL,(NSTART(1),NSTCP(1),ASKIP(1)
1)//1,NVALS)
1 FORMAT(110,1X,A4//(6110))
C IF(NVALS.LE.0)VALS=1
C IEOF=0
IERRE=0
CALL READS(INPUF,IECF,IERR)
IF(IEOF.EQ.1)GO TO 680
ISIG = 1
CALL HEDACT (ISIG, INBUF(1), IEQMN(1))
NEWA = 0
IF (IYR GT 70) GO TO 282
IF (IYR LT 70) GO TO 283
IF (IMTH GT 11) GO TO 282
IF (IMTH LT 11) GO TO 283
I = (IDAY LT 15) GO TO 283
282 NEWA = 1
283 CONTINUE
IF (NBAN.EQ.0) AUTO = 1
IFRR = 0
CALL READJS (INBUF, IEUF, IERR)
IF (IEUF.EQ.1) GO TO 680

STORE THE DESIRED CALIBRATION VALUES
DO 21 K = 1, 255
21 XFZLN(K) = XNBUF(K)
N = 0
DO 20 K = 256, 381
20 XATBL(N) = XNBUF(K)
N = N + 1
DO 22 K = 512, 527
22 PIFA(N) = XNBUF(K)
N = 0
DO 23 K = 528, 547
23 OIFA(N) = XNBUF(K)
N = N + 1
PFSA = XNBUF(592)
PSSA = XNBUF(593)
OFSA = XNBUF(594)
OSSA = XNBUF(595)
AGAMA = XNBUF(596)
EGAMA = XNBUF(597)
ABIAS = XNBUF(602)
EBIAS = XNBUF(603)
DEGCON = (180. * C479369) / 3141.59
AZBIAS = DEGCON * BIAS
ELBIAS = DEGCON * BIAS
DO 25 K = 604, 611
25 QDIAS(N) = XNBUF(K)
QDIAS(N) = CBIAS(N)
AZGRAD = XNBUF(612)
ELGRAD = XNBUF(613)
PHRCN = XNBUF(620)
PWSN=XNBUF(621)
PWRCw=XNBUF(622)
PWSKh=XNBUF(623)

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

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

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

C
CKC1=14.989625/2046
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 CONTINUE
JCCN=1
INDEX=0
ITST=1
ITDEC=1
IPOLAR=0
ITCNT=0
IPULS=0

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

C
IF(NSTART(1J).LE.0)NSTART(1J)=1
IF(NSTOP(1J).LE.0)NSTOP(1J)=99999
NNSET=NSKPT1(1J)+1
NNSVE=NNSET-1

C
JCCN=JCCN+1
IF(JCCN.EQ.9.0P0,JCCN.EQ.01GO TO 97
INDEX=(JCCN-1)*9CO
GO TO 99

7 JCCN=1
INDEX=0

98 IECF=0
IERR=0
IPAR=1BLNK
CALL READJ5(INBUF,IECF,IERR)
IF(IERR.EQ.1)IPAR=IAST
IF(IEOF.EQ.1)GO TO 680
CALL UNPACK
IF(I1AUTO.EQ.1)GO TO 100
NNSET=NNSV
IF(127385.0.OR.127388.0)NNSSET=1
100 CONTINUE

IF(IFRST2.EQ.1)GO TO 92
PRWRS1=PWRKCN
IF(INWBAN.EQ.1)PRWRS1=PWRKW
PRWRS2=PWRKSN
IF(INWBAN.EQ.1)PRWRS2=PWRKSW
ZINUSE=ZNB
IF(INWBAN.EQ.1)ZBUSE=ZNB
RKUSE=-.CO943
IF(INWBAN.EQ.1)RRUSE=-.00015

WRITE(6,200)ZBUSE,ITAPEN,TITL,(IEQM(I),I=4,6)
200 FORMAT('ALERT-ALCOR',4X,'BANC = ',A2,4X,'REEL NO. = ',L,15X,' TITLE = ',A4,' DATE = ',I2,'/',I2,'/',I2)
WRITE(6,212)IINSTAT(I),NSTUP(I),NSKIP(I),I=1,NVALS

WRITE(6,212)IINSTAT(I),NSTUP(I),NSKIP(I),I=1,NVALS

7431 FORMAT('G1X,'EXO-ATMOSPHERIC',38X,'ENDO-ATMOSPHERIC SCAN'/,
115X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
115X,'LOWER WBS SCAN ALTITUDE (KM) = ',F10.2,'LOWER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'
41X,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2,'UPPER WBS SCAN ALTITUDE (KM) = ',F10.2'

WRITE(6,2149)

8149 FORMAT(/)
WRITE(6,2000)
WRITE(6,2000)
WRITE(6,2000)
WRITE(6,2000)
WRITE(6,2000)
WRITE(6,2000)
WRITE(6,2000)
WRITE(6,3100)ZINUSE
WRITE(6,3200)
WRITE(6,3300)ISTAT(J),J=1,18)

IFKST2=1
92 CONTINUE
   IF(NUMPRI.LT.NSTART(IJ).OR.NUMPRI.GT.NSTOP(IJ))GO TO 3
   CONTINUE
C
   ITOT=(3600*IHR$+60*IMIN+ISEC)*1000+IMSEC
   ITAL=ITOT-ILNCH
   ITAL=DFLOAT(ITAL)/D1000
   DO 710 K=1,18
   710 IOLDS(K)=ISTAT(K)
   CALL STATUS
C
   IF(IFRST4.EQ.0)GO TO 10
   IF(IPULS IPULS+1
   IF(IPULS.GE.NNSET)GO TO 87
   IF(IISTW.EQ.0)GO TO 118
   WRITE(6,90)ITAL,IPAR,(ISTAT(I),I=1,18),NUMPRI
   90 FORMAT(•,F9.3,A1,87X,A1,3A1,1X,2A1,2X,1X,A1,1X,A2,1X,
       14A1,1X,15)
   LCNT=LCNT+1
   GO TO 118
C
   87 IPULS=0
   GO TO 11
   10 IFRST4=1
   11 IADOUT=IRB54-1
   IF(IW117.EQ.0)IADOUT=IMVP
   IF(IFCODE.EQ.5)XOPAC=XPPAC
   IF(IFCODE.EQ.7)XOPAC=XPPAC
   RDOT=(IRDOT/(8192.0))!*14.989625
   RANGE=DFLOAT(IPANGE)/2048000.*14.989625*TRBAS. !4989625
   TCCOR=(RANGE/299776.)*(RDOT/1000.)
   RANGE=RANGE+TCCOR
   RRCOR=RRUSE*RDNT
   RANGE=RANGE*RRCOR/1000.
   APPOP=(IPRCS/255.0)*80.0-40.0
   IOPRCS=APPOR
   RPRCS=APPOR
   AZ=(1AZ**2*314159265358)/(2.0**17)
   XAZ=AZ.957295P
   XAZ=XAZ*A2BIAS
   EL=(1EL**2*314159265358)/(2.0**17)
   XEL=EL.957295P
   XEL=XEL*ELBIAS
   CALL REFCELXEL,PANGE,ECORF,RCORF
   RNGF=RANGE-RCORF
   ELVF=XEL-ECORF
   RADEL=ELVF*0.017453
   CALT=SQR(T(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
   POWERT=PWRUS1+PWRUS2*ALO10(XPKPWR)
   IPKPWR=POWERT
   CONTINUE
39 CONTINUE
   XOFFST=(FLOAT(TOFFST)/2046.)*14.989625
C  IF(1241B1.GT.127)GO TO 6310
   1241B1=1241B1+128
   GO TO 6311
6310 CONTINUE
   IF(1241B1.LT.129)GO TO 6311
   1241B1=256-1241B1
6311 CONTINUE
   IF(1241B2.GT.127)GO TO 6312
   1241B2=1241B2+128
   GO TO 6313
6312 CONTINUE
   IF(1241B2.LT.129)GO TO 6313
   1241B2=256-1241B2
6313 CONTINUE
   IF(1241B3.GT.127)GO TO 6314
   1241B3=1241B3+128
   GO TO 6315
6314 CONTINUE
   IF(1241B3.LT.129)GO TO 6315
   1241B3=256-1241B3
6315 CONTINUE

C
   Z1=XFZLN(I241B2)-XFZLN(I241B1)+AGAMA
   CUSTA=COS(Z1)
   P=XATDL(I240B2)-XATDL(I240B1)
   AZERR=ALGRAC*2.*3.141593*(10.*((P/20.))*COSTA
   AZERR=AZERR*57.2958
   
C
   Z2=XFZLN(I241B3)-XFZLN(I241B1)+EGAMA
   COSTE=COS(Z2)
   P=XATDL(I240B3)-XATDL(I240B1)
   ELERR=ELGRAC*2.*3.141593*(10.*((P/20.))*COSTE
   ELERR=ELERR*57.2958
   
C
   LCNT=LCNT+1
   IF(LCNT.LT.54)GO TO 689
   WRITE(6,3100)PUSSE
   WRITE(6,3200)
   WRITE(6,3300) (10DCS(J),J=1,18)
   LCNT=0
689 CONTINUE
657 CONTINUE
   IF(I=1ST=-EC.C)GO TO 645
   WRITE(6,3400)I,IPAR,CALT,RANGE,RD0T,AZ,EL,IPPRCS,IPACUT,AZERR,
   IEERR,IXPAGC,IXPKWR,ICCODE,IMIN,ISEC,IMSEC,IXFST,
   ISTAT(J),J=1,18,NUMPRI
   GO TO 650
645 WRITE(6,3600)I,IPAR,CALT,RANGE,RD0T,AZ,EL,IPPRCS,IPACUT,AZERR,
   IEERR,IXPAGC,IXPKWR,ICCODE,IMIN,ISEC,IMSEC,IXFST,NUMPRI
650 CONTINUE
C
   118 IF(NUMPRI.LT.NSTCP(IJ))GO TO 3
   IFIRST=0
   IPULS=0
   IFIRST=0
119 IFIRST=0
C
120 CONTINUE
C
   GO TO 125
680 WRITE(6,109)NUMPRI
109 FORMAT(10€, END OF FILE REACHED LAST NUMPRI VALUE = '*,110)
125 RETURN
END
APPENDIX D
ALERT FLOW DIAGRAM

START

READ INPUT CARDS

READ A RECORD

UNPACK HEADER RECORD

READ A RECORD

SET CALIBRATION VALUES INTO LOCATIONS

A
APPENDIX D-3

B

COMPUTE METRIC DATA

LIST METRIC & STATUS DATA

2,10 YES

COUNTER < NSTOP

NO

COMPLETED LAST PROCESSING INTERVAL

NO 2,10

YES

STOP
**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,*  
BALK 12,C  
USING *,BASF  
ST 13,SAVEA+4  
LA 7,SAVEA  
ST 7,810,13)  
LA 13,7  
SPACE
LM XISIG,XICAL,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(/EQU) MREEL  
SPACE
L 8,4(XICAL)  
ST 8,TEMP1  
ST 8,TEMP2  
SRL 8,16  
ST 8,8(XIEQU) M*TR  
L 9,TEMP1  
SLL 8,16  
SRL 8,24  
ST 8,12(XIEQL) MKNTH  
L 8,TEMP2  
SLL 8,24  
SRL 8,24  
ST 8,16(XIEQU) MDAY  
SPACE
SR 8,8  
IC 8,8(XICAL)  
ST 8,2C(XIEQU) MYEAR  
VC 24(9,XIEQU),9(XICAL) MISSION DES.  
SPACE
RETURN L 13,SAVEA+4  
RETURN (14,12),T  
CNOP 0,4  
TEMP1 CC F'O*  
TEMP2 CC F'O*  
SAVEA DC 18A(*)  
END
APPENDIX F
SUBROUTINE UNPACK PROGRAM LISTING

CSECT
ENTRY UNPACK

UNPACK
SAVEL
CROP 15
CROP 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'4036'
A 6,F'192'
USING DUBUF,4,5,6
B START1
CUBUF DC V('ICCM')
BASA DC A('START+4C96')
START1 L 8,'F'1'
ST 8,IALSW
LA 8,INBUF NLMPIR=8*(NPR-1)+JCUN
MVC TEMP(11),0(8)
MVC TEMP2(3),0(8)
L 9,TEMP
SLL 9,0
SRL 9,16
S 9,ONE
SR 8,8
M 8,EIGHT
A 9,JCUN
ST 9,NUMPRI
L 9,NBER
C 9,NUMPRI
BH CCLELTAR
SPACE
LA 8,WC233 COMPUTE GMT
A 8,INDFX
MVC TEMP(7),0(8)
L 9,TEMP
N 9,X'FC00000'
SRL 9,24
ST 9,INRS STORE HRS
L 9,TEMP
N 9,X'03FC0000'
SRA 9,16
ST 9,IMIN STORE MINS
L 9,TEMP
N 9,X'03FC0000'
SRA 9,8
ST 9,ISEC STORE SECS
LA 8,WC234
A 8,INDFX
MVC TEMP(11),0(8)
L 9,TEMP
N 9,X'TEFC0000'
SRL 9,24
ST 9,INFF STORE MSEC
SPACE
GO001
LA 8, WD237
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRL 9, 14
ST 9, 1AL
LA 8, WD236
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRL 9, 14
ST 9, 1EL
LA 8, WD268
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRL 9, 14
ST 9, 1EL
LA 8, WD265
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRL 9, 13
ST 9, TEMP2
LA 8, WD267
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRL 9, 13
ST 9, TEMP2
LA 8, WD266
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRL 9, 16
ST 9, TEMP2
SLL 9, 11
ST 9, TEMP2
LA 8, WD266
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRL 9, 21
A 9, TEMP2
ST 9, RANGE
LA 9, WD115
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
N 9, =X'7FFFFC000'
SRA 9, 16
ST 9, IPKPR
LA 9, WD269
A 8, INDFX
MVC TEMP(3), O(8)
L 9, TEMP
C 9, =F'1

STORE A2
STORE ELEV
STORE PP CBSM
STORE RANGE
STORE PEAK PCWER
BNL DCTG1
N 9,'=X'7FFFFFFC0'
SRA 9,8
LCR 9,9
B DCTG2
SRA 9,8
ST 9,IRDOT
LA 8,WD1R
A 8,INDFX
MVC TEMP(1),0(8)
L 9,TEMP
N 9,'=X'7FC00000'
SRL 9,24
LA 9,1(9)
ST 9,IR854
LA 8,WC268
A 8,INDFX
MVC TEMP(1),0(8)
L 9,TEMP
N 9,'=X'COFFC000'
SRL 9,16
ST 9,ICP0CS
SPACE
LA 8,WC117
A 8,INDFX
MVC TEMP(1),0(8)
L 9,TEMP
N 9,'=X'FFC00000'
SRL 9,24
ST 9,INOVPO
SPACE
L 9,TEMP
N 9,'=X'OC00FO00'
SRL 9,8
ST 9,MOV0
SPACE
LA 8,WC273
A 8,INDFX
MVC TEMP(1),0(8)
L 9,TEMP
N 9,'=X'FFC000C00'
SRL 9,28
ST 9,IC0PE
SPACE
L 9,TEMP
N 9,'=X'OC8C00000'
SRL 9,27
ST 9,1273B5
L 9,TEMP
N 9,'=X'04C00000'
SRL 9,26
ST 9,1273B6
L 9,TEMP
N 9,'=X'20C00000'
SRL 9,25
ST 9,1273B7
L 9,TEMP

STORE R-DCT

A/D COUNT-RB 52

STORE CP C8SM

ARE PRIMARY AND OFFSET MOVING

IS OFFSET WINDCOW MOVING

COMPUTE THE CODE FOR PRI

WBS MODE INDICATOR

ENDO-EXO SCAN INDICATOR

WBS SCAN MODE INDICATOR

31
DCUBLET MODE INDICATOR

RANGE OFFSET FOR SLAVED WINDC

32
ST 9,1241B2
L 9,TEMP
N 9,=X'FCCOFFCO'
SRL 9,8
LA 9,1491
ST 9,1241B3
LA 8,WC2F3
A 8,INDFX
MVC TEMP(1),O(8)
L 9,TEMP
N 9,=X'FCCOC000'
SRL 9,26
LA II,IIFA
LE 0,0(9,11)
STE 0,XPPAGC
L 9,TEMP
N 9,=X'FOCCOC000'
SRL 9,22
LA II,CIFA
LE 0,0(9,11)
STE 0,XPPAGC
L 9,ZERC
ST 9,15SWSP
ST 9,15SSSC
ST 9,15SFRR
LA 8,WC2F9
A 8,INDFX
MVC TEMP(1),O(8)
L 9,TEMP
N 9,=X'FOCC000'
C 9,ZERC
RE CKFSCP
LE 0,PFSB
AF 0,XPPAGC
STE 0,XPPAGC

CKFSCP
L 9,TEMP
N 9,=X'FOCC00100'
C 9,ZERC
BE CKSSSP
LE 0,CFSA
AE 0,XPPAGC
STE 0,XCPAGC

CKSSSP
L 11,TEMP
N 11,=X'CO862600'
C 11,=F'0'
BNE CKSSCP
INDET L 8,ONE
ST 8,15SSFR
B CDELTAR
CKSSCP
L 11,TEMP
N 11,=X'004C0100'
C 11,=F'0'
RE INDET
PPTTEST LA 9,WC2F9
A 9,INDFX
MVC TEMP(1),O(9)
L 10,TEMP
LA 9,WC2F2

GET VALUE FROM PIFA TABLE
GET VALUE FROM GIFA TABLE
CHECK BIT 23 (PFSB)
ACC IN PFSB VALUE
CHECK BIT 24 (CFSA)
ACC IN CFSA VALUE
INDETERMINATE SITUATION
ALX.MICR.MICR WRD INTO REG.10
AUX.MICR.MICR Chronicles INTO REG.11
```assembly
; A9, INDEX
MVC TEMP(3), 0(19)
N 10, =X'00CRC2C00'
C 10, =X'00BC0000'
BNE 574
LE 0, PSSL
AE 0, XPPAGC
STE 0, XPPAGC
L 9, ONE
ST 9, ISWSP

574
C = 8, NEWA
B, ZEHC
BE OPTEST
N 9, =X'00CBC000'
C 9, =F'C'
BE RDBKLC
N 11, =X'080C0000'
C 11, ZERO
HNE SLC
NOATTLC
LE 0, PREVL'C
STE 0, XPPAGC
MVC JSWL'C(14), ONE
MVC ISSERR(41), CNE
B CPTEST

RDBKLC
N 11, =X'040C0000'
C 11, ZERO
BE NCATTLC
B CPTEST

SLC
LE 0, PSSL
AE 0, XPPAGC
STORLC
STE 0, XPPAGC
MVC JSWSP(41), CNE
CP TEST
LA 9, WC279
A 9, INDEX
MVC TEMP(31), 0(19)
L 10, TEMP
LA 9, WC252
A 9, INDEX
MVC TEMP(31), 0(19)
L 11, TEMP
LA 9, WC272
A 9, INDEX
MVC TEMP(31), 0(19)
N 10, =X'0C4C1000'
C 10, =X'004C0000'
BNE 576
LE 0, OSSLL
AE 0, XOPAGC
STE 0, XOPAGC
L 9, ONE
ST 9, ISWSSC

RANGE TR, WCRD INTO REG 0
AUX, MICR, WRD INTO REG 10
ALX, MICROWAVE WORD INTO REG 11

RANGE TR, WCRD INTO TEMP
BIT LC = 0 (COND. A)
ADD IN CSSL (COND. B)

OLD OR NEW ATTEN.
ATTENLATCH REACBACK
S74 ARMED
STATUS REACBACK

S74 NOT ARMED
STATUS REACBACK
ACC IN PSSA (COND. B)
```
S75
L  8,NEWA  OLD OR NEW ATTEN.
C  8,ZERO
BE  CUT1
L  9,TEMP
N  9,'X'00000000'
C  9,'F'0'
BE  RDKRC
N  11,'X'02000000'
C  11,ZERO
BNE  SRC

AGATRC
LE  0,PREVRC
STE  0,XCPAGC
MVC  JSWRC(4),ONE
MVC  ISSER(41),CNE
B  CUT1

RDKRC
N  11,'X'00000000'
C  11,ZERO
BE  NCATTC
B  OUT1

SRC
LE  0,OSSA
AE  0,XCPAGC

STORCC
STE  0,XCPAGC
MVC  ISWSSC(41),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,INBIIF
MVC  TEMP(7),C(8)
L  9,TEMP
SRL  9,31
C  9,ZERO
BE  NBAND
LE  2,RTBIAS+16
STE  2,RTBIAS

LCPOLAR
L  9,TSWSSP
C  9,ONE
BNE  CDELTAR
LE  2,RTBIAS+24
AE  2,RTBIAS
STE  2,RTBIAS
B  CDELTAR

NBAND
LE  2,RTBIAS
STE  2,RTBIAS
LA  8,MC273

WIDE BAND TAPE

ADD IN PSSA-RTBIAS(7)

NARROW BAND

CENTER OR EDGE TRACK
hD234  CS  CL3
hD236  CS  CL3
hD237  CS  CL3
hD239  CS  CL3
hD240  CS  CL3
hD241  CS  CL3
hD242  CS  CL3
hD252  CS  CL3
hD253  CS  CL3
hD263  CS  CL3
hD264  CS  CL3
hD265  CS  CL3
hD266  CS  CL3
hD267  CS  CL3
hD268  CS  CL3
hD269  CS  CL3
hD270  CS  CL3
hD271  CS  CL3
hD272  CS  CL3
hD273  CS  CL3
hD274  CS  CL3
hD275  CS  CL3
hD276  CS  CL3
hD277  CS  CL3
hD278  CS  CL3
hD279  CS  CL3
hD280  CS  CL3
IAZ  CS  IF
IEL  CS  IF
INDEX  CS  IF
IPPRCS  CS  IF
IORS  CS  IF
IRANGE  CS  IF
IPKPHR  CS  IF
IRGOT  CS  IF
IALT  CS  IF
INDAZ  CS  IF
JNDAZ  CS  IF
INDEL  CS  IF
IRB54  CS  IF
IR885  CS  IF
IPPRCS  CS  IF
I24081  CS  IF
I24082  CS  IF
I24083  CS  IF
I24181  CS  IF
I24182  CS  IF
I24183  CS  IF
XPPAGC  CS  IF
IBETA  CS  IF
NEWA  CS  IF
BAND  CS  IF
<table>
<thead>
<tr>
<th>Variable</th>
<th>Type</th>
<th>Size</th>
</tr>
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<tbody>
<tr>
<td>NSW</td>
<td>DS</td>
<td>1F</td>
</tr>
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APPENDIX G
SUBROUTINE REFCE(RE, DCE, ECR) PROGRAM LISTING

SUBROUTINE REFCE(RE, DCE, ECR)  VERSION 6/16/70
DIMENSION CE(16,8), CR(16,8), ED(16,8), RD(18)
DATA 0E/0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
20.0303, 0.0392, 0.0287, 0.0282, 0.0272, 0.0262, 0.0253, 0.0243, 0.0223
30.0214, 0.0195, 0.0171, 0.0135, 0.0075, 0.0093, 0.0084, 0.0070
40.0073, 0.0064, 0.0027, 0.0021, 0.0022, 0.0040, 0.0012, 0.0039, 0.0037
50.0028, 0.0020, 0.0105, 0.0100, 0.1800, 0.1520, 0.1250, 0.1140, 0.1050
60.0904, 0.0995, 0.0708, 0.0636, 0.0523, 0.0478, 0.0405, 0.0332, 0.0229
70.0114, 0.0100, 0.01310, 0.03710, 0.02120, 0.1830, 0.1600, 0.1280, 0.1060
80.0309, 0.0386, 0.0627, 0.0550, 0.0455, 0.0354, 0.0246, 0.0120, 0.0100
90.7590, 0.3720, 0.2400, 0.2200, 0.1750, 0.1370, 0.1120, 0.0940, 0.0811
40.0631, 0.0566, 0.0666, 0.0361, 0.0250, 0.0122, 0.0091, 0.0040, 0.0010
80.2566, 0.2140, 0.1840, 0.1420, 0.1150, 0.0967, 0.0830, 0.0643, 0.0575
CD=0.0472, 0.0365, 0.0252, 0.0122, 0.0090, 0.0042, 0.0020, 0.0010
CD=0.9000, 0.1460, 0.0980, 0.0840, 0.0653, 0.0584, 0.0478, 0.0369
CD=0.0254, 0.0123, 0.0092, 0.0080, 0.0095, 0.0142, 0.0209, 0.0280, 0.0369

DATA 9/ 1.00, 0.0, 0.0, 0.0, 0.0, 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, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
2 19.4, 18.5, 17.6, 16.8, 16.1, 14.8, 14.2, 13.2, 12.0, 10.4, 8.6, 6.8, 5.0, 3.2, 1.4
3 7.1, 67.3, 57.9, 50.2, 47.0, 44.4, 41.0, 35.3, 35.4, 32.1, 27.2, 24.8, 20.0, 14.2, 8.6, 4.8, 2.4, 1.2
4 22.9, 19.7, 16.3, 12.7, 9.4, 8.1, 6.0, 4.8, 3.6, 2.9, 2.2, 1.8, 1.4, 1.0, 0.8, 0.6, 0.4, 0.2
5 52.9, 44.7, 39.4, 33.4, 26.4, 23.9, 20.1, 16.4, 12.7, 9.4, 8.1, 6.8, 5.4, 4.0, 3.0, 2.2, 1.8, 1.4
6 634.0, 167.0, 103.0, 86.1, 73.4, 56.7, 46.2, 38.9, 33.6, 26.4, 24.0, 20.6, 17.1, 14.2, 11.4, 8.6, 6.8, 5.0, 3.2, 1.4
7 20.0, 16.4, 12.8, 9.5, 6.2, 4.5, 0.5, 0.4, 0.3, 0.2, 0.1, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
8 14.6, 10.9, 8.2, 6.5, 4.8, 3.1, 1.4, 0.7, 0.5, 0.3, 0.2, 0.1, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0, 0.0
9 917.0, 104.0, 86.6, 73.9, 57.1, 46.4, 35.0, 33.8, 26.8, 24.3, 20.5, 16.6, 13.0, 9.0, 6.4, 4.0, 2.8, 2.0, 1.2, 0.6
A 16.0, 13.0, 9.0, 6.4, 4.4, 6.0, 17.0, 105.0, 87.4, 74.0, 58.0, 46.6, 34.6, 26.6, 18.6, 12.6, 8.4, 4.6, 2.8, 1.8, 0.8
B 59.2, 34.6, 27.0, 24.6, 20.7, 16.7, 13.0, 10.0, 8.4
DATA 39.2, 59.2, 34.6, 27.0, 24.6, 20.7, 16.7, 13.0, 10.0, 8.4
DATA C.EG, R( , 16) CC TO 120
100 CONTINUE
(=1)
120 DO 200 JR=2,8
J=10-JRD
IF(J.4.RD(J))G0 TO 220
200 CONTINUE
J=1
220 IF(J.4.EG.RD(J))GO TO 340
/R=ALOC(RC/RD(J))/ALOG(RD(J)+RD(J))
IF(J.4.LE.0)GO TO 320
ZE=ALOG(ZE)/ALGEG(ZE(J)+1)/ED(II)
OE1=1(DJ+1,J)+CE(J)+1)-1-GE1,J)+1)ZE)ZE)ZE)
OE2=1(DJ+1,J)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)ZE)
OE3=1(DJ+1,J)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)ZE)
OE4=1(DJ+1,J)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)ZE)
DR5=1(DJ+1,J)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)ZE)
DR6=1(DJ+1,J)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)ZE)
DR7=1(DJ+1,J)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)ZE)
NR=1(DJ+1,J)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)ZE)
CU TO 400
300 DE=0.0
310 DRR=0.0
CD TO 400
320 DEE=DE1,J+1)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)
DRR=DR1,J+1)+1)-1-GE1,J)+1)-1-GE1,J)+1)ZE)
GO TO 400
340 DELT=1(EJ+1)+1)-1-ED(II)
DEE=DE1,J+1)+1)-1-GE1,J)+1)-1-GE1,J)
400 DRR=DRR*3.0480-30
RETURN
END

39
APPENDIX H
SUBROUTINE STATUS PROGRAM LISTING

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

CSECT
ENTRY STATUS

STATUS SAVEL
DROP 15
CNDP 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'R192'
USING DUBUF,4,5,6
R START1

CUBUF DC V("COM")
BASA DC A(START+4096)
SPACE

START1
LA 8,WCD239
A 8,INDFX
MVC WCRD39(3),0(8)
LA 8,WCD64
A 8,INDFX
MVC WCRD64(3),0(8)
LA 8,WCD72
A 8,INDFX
MVC WCRD72(3),0(8)
MVC WCRD72(3),3(8)
SPACE
L 9,WCRD73
N 9,=X'O0000000'
ST 9,WCRD73
L 9,WCRD64
N 9,=X'FFFFEC00'
ST 9,WCRD64
L 9,WCRD72
N 9,=X'A7E3C700'
ST 9,WCRD72
L 9,WCRD73
N 9,=X'0F1FF700'
ST 9,WCRD73
SPACE
SR 9,9
ST 9,1STSW
L 9,WCRD39
C 9,OWORD39
BNE XFERW
L 9,WCRD64
C 9,OWORD64
BNE XFERW
L 9,WCRD72
C 9,OWORD72
BNE XFERW
L 9,WCRD73
C 9,OWORD73
BNE XFERW

MASK FOR WCRD 239
MASK FOR WCRD 264
MASK FOR WCRD 272
CLEAR STATUS PRINT SWITCH
B RETUR
SPACE
XFERw
L 9,WCRR35
ST 9,OWPTD39
L 9,WCRR64
ST 9,OWPTD64
L 9,WCRR72
ST 9,OWPTD72
L 9,WCRR73
ST 9,OWPTD73
SPACE
L 9,ISTAT2
LA 9,1(9)
ST 9,ISTAT2
C 9,F'101'
BL SETSW1
ST 9,ISTAT1
L 9,F'11'
ST 9,ISTSW
SPACE
L 9,WCRR72
N 9,=X'0004007000'
SRL 9,B
A 9,=A(DTAG)
MVC STAT(1),O(9)
L 9,WCRR72
N 9,=X'7000000000'
BIT 3
SRL 9,29
A 9,=A(SLW)
MVC STAT+R(1),O(9)
L 9,WCRR72
N 9,=X'0200000000'
BIT 7
SRL 9,25
A 9,=A(UOT)
MVC STAT+12(1),O(9)
L 9,WCRR73
N 9,=X'0001000000'
BIT 16
SRL 9,16
A 9,=A(FEC)
MVC STAT+16(1),O(9)
L 9,WCRR73
N 9,=X'0000007000'
BIT 22-24
SRL 9,B
A 9,=A(DTWC)
MVC STAT+20(1),O(9)
L 9,WCRR73
N 9,=X'0008000000'
BIT 13
SRL 9,19
A 9,=A(N12)
MVC STAT+24(1),O(9)
L 9,WCRR73
N 9,=X'0004000000'
BIT 14
SRL 9,18
A 9,=A(CHL)
MVC STAT+28(1),0(9)
L 9,WCRD39
N 9,=X'C0B00000'
SRL 9,23
A 9,=A(MIC)
MVC STAT+32(1),0(9)
L 9,WCRD72
N 9,=X'POCO0000'
SRL 9,31
A 9,=A(S12)
MVC STAT+36(1),0(9)
L 9,WCRD73
N 9,=X'C0C00000'
SRL 9,15
A 9,=A(CCN)
MVC STAT+40(1),0(9)
L 9,WCRD64
N 9,=X'FFFFE000'
SRL 9,26
ST 9,=TEMP
A 9,=A(NBC)
MVC STAT+44(1),0(9)
L 9,WCRD64
N 9,=X'FFFFE000'
SRL 9,13
C 9,=FO'
BNE NZSTMP
L 9,=F'66666'
ST 9,=STEP
B 2ZTMP
ST 9,=STEP
L 9,=F'1000000'
SR 8,0
D 8,=STEP
ST 9,=STEP
SPACE
L 9,=INBUF
SRL 9,31
C 9,=ZERO
BNE NBAND
SPACE
NBAND L 9,WCRD73
N 9,=X'C0100000'
SRL 9,24
C 9,=ZERO
BE SLVCUP1
SPACE
XDIV L 8,=CPU
XDIVI ST 8,=DIVSR
B NEWPRF
SPACE
SLVCUP1 L 9,WCRD73
N 9,=X'C8C00000'
SRL 9,27

TRANSMITTED PRF

IN NARROW BAND
BIT 8

IN OCTOLET MODE

BIT 5
IN SLAVED DOUBLET MODE

BIT 12

NB/WB E.C.P.

BIT B

IN DOUBLET MODE

BIT 5

IN SLAVED DOUBLET MODE

WB ONLY

BIT 8-12

RIGHT JUSTIFY AND MULTI BY 2

BITS 5

IN RANGE

MVC STAT+52(1),0(19)
L 9,WCRT73
N 9,*X80BC0000
SRL 9,27
ST 9,WBSAVE
A 9,A(SWB)
MVC STAT+56(1),0(19)
L 9,WBSAVE
C 9,ZERO
BNE BB6
MVI STAT+60,C*C*
MVI STAT+64,C*C*
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