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RAWINPROC

COMPUTER PROGRAM FOR DECOMMUTATING, INTERPRETING, AND INTERPOLATING RAWINSONDE METEOROLOGICAL BALLOON SOUNDING DATA

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ABSTRACT

FORTRAN computer program RAWINPROC accepts output from NASA Wallops computer program METPASS1, and produces input for NASA computer program 3.0.0700 (ECC-PRD). The three parts together form a software system for the completely automatic reduction of standard RAWINSONDE sounding data. RAWINPROC pre-edits the 0.1-second data, including time-of-day, azimuth, elevation, and sonde-modulated tone frequency, condenses the data according to successive dwells of the tone frequency, decommutates the condensed data into the proper channels (temperature, relative humidity, high and low references), determines the running baroswitch contact number and computes the associated pressure altitudes, and interpolates the data appropriate for input to ECC-PRD.

INTRODUCTION

The University of Utah, under sponsorship of the NASA Wallops Flight Center, has developed software for the automatic digital processing of data transmitted from the standard RAWINSONDE meteorological sounder. The following describes the software, RAWINPROC (Appendix A), which interfaces with Wallops routines METPASS1 which reads the magnetic tape from the field to produce the input file of raw data, and ECC-PRD which processes the output file of pressure (altitude), reference frequency, temperature, and relative humidity, all tabulated uniformly at one-minute intervals (Appendix B).

After a brief discussion of the purpose and approach, a subroutine-oriented description is presented which closely relates to the annotated code (Appendix A). The input deck is described in detail under MAIN, and the control card deck is described in Appendix C. Flow diagrams, narrative description, the CALL list, and a complete glossary of variables is included for each subroutine. The variable list includes cross-references, descriptions, units, constant values, range, limits, and effects where appropriate. Files used by RAWINPROC are identified in Appendix D.

Purpose of RAWINPROC

The principal purpose of RAWINPROC is to supplant the routine manual processing of RAWINSONDE data. Given at one-minute intervals from a RAWINSONDE sounding, the time-of-day, the reference tone frequency, temperature and relative humidity ordinates [Ref. 1] from the radiosonde, and the pressure (altitude) and azimuth and

elevation angles of the sounding balloon, existing NASA Computer Program 3.0.0700 (ECC-PRD) computes and presents the corresponding meteorological data in user-ready form. RAWINPROC provides these inputs for ECC-PRD without the usual manual processes of reading and interpreting the AN/TMQ-5 pen recorder chart.

Input data for RAWINPROC is provided by NASA Computer Program METPASS1 which converts field-recorded sonde and tracking data to a convenient format. The field-recorded data includes the time-of-day, sonde-transmitted signal (tone frquency), and tracking angles (azimuth and elevation), all sampled at 0.1-second intervals. The received signal from the sonde is an audio tone whose frquency (5-205 Hz) is determined by the magnitude of the quantity (channel) being measured. A baroswitch selects (commutates) the channels in sequence (see below) as the balloon rises. Additional input constants (calibration data, launch time, etc.) are provided in the input card deck.

Radiosonde Commutator

The four channels transmitted are temperature, relative humidity, reference, and high reference [Ref. 1]. The reference frequency corresponds to a fixed 95 percent of full-scale output frequency of the sonde. The frequencies of the temperature and relative humidity channels in ratio with the reference frequency provide at the receiver the fraction of 95 percent full-scale reading of the temperature and relative humidity sensors, independent of electronic gain changes during flight. Successive switching

from channel to channel is performed by a pressure-actuated commutator (baroswitch) [Ref. 1, p. B2-19]. The leading edge of successive reference, high reference, and relative humidity contacts of the baroswitch correspond to calibrated pressure altitudes. Temperature is transmitted between each of these contacts. At high reference contacts reference frequency is increased a few hertz to distinguish it from other reference contacts so as to eliminate ambiguity in associating switch points in the received signal with their baroswitch contact numbers.

The radiosonde commutator bar is represented in Fig. 1. The

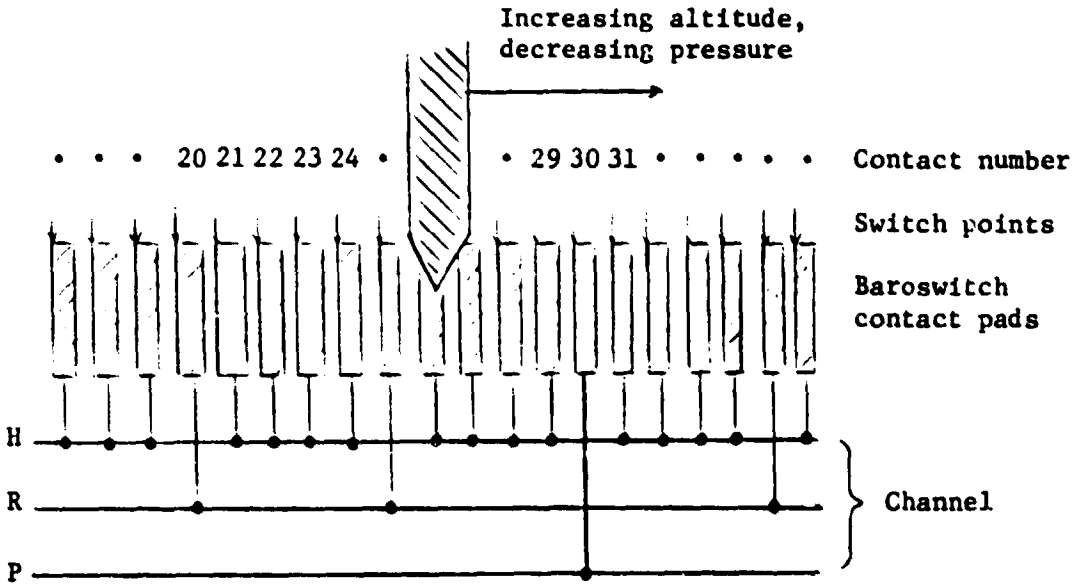


Fig. 1. The baroswitch wiper arm traverses the commutator bar as the atmospheric pressure decreases during balloon ascent. Electric contact with each channel, reference (R), high reference (P), relative humidity (H), is made as the wiper passes over each commutator pad. Temperature (T) is transmitted between pads. "Switch points" in the data occur at the leading edges of the pads.

entire standard baroswitch sequence is displayed in Table 1. As pressure decreases, contact number increases. Baroswitch output dwells on relative humidity, reference, and high reference signals, according to successive contacts as tabulated. Temperature data are transmitted during intervals between contacts. The leading edge of each of the contacts represents a pressure, calibrated for each radiosonde. The contacts are traversed at a rate depending on the balloon rise rate. Spacing between contacts approximately equals contact width, so baroswitch temperature dwells are of length comparable to contact (humidity, reference, and high reference) dwells.

The baroswitch output, then, alternates between temperature and either relative humidity, reference, or high reference, depending on contact number. Contacts below number 135 transmit relative humidity (H), except every fifth contact. The fifth contacts transmit reference frequency (R), except that every third reference beginning with contact number 30 is high reference (P).

Beginning with contact number 135, no humidity is transmitted. Each contact, 135 to 179, transmits reference frequency, with every fifth one a high reference. The pattern is recognizable in the received data so that pressure (sonde altitude) can be assigned to the common time base of the data channels.

Decommutation Approach

The approach taken in DECM is first to track the input frequency function from the sonde and to detect commutator switching

Table 1. BAROSWITCH SEQUENCE.

Contact Number and Channel Transmitted

									1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2
1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
H	H	H	H	R	H	H	H	H	R	H	H	H	H	R	H	H	H	H	R	H	H	H	H	R	H	H	H	H

3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	5	5	5	5	5	5	5	5	5	5
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
P	H	H	H	H	R	H	H	H	H	R	H	H	H	H	P	H	H	H	H	R	H	H	H	H	R	H	H	H	H

6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7	8	8	8	8	8	8	8	8	8	8
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
P	H	H	H	H	R	H	H	H	H	R	H	H	H	H	P	H	H	H	H	R	H	H	H	H	R	H	H	H	H

										1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
9	9	9	9	9	9	9	9	9	9	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
P	H	H	H	H	R	H	H	H	H	R	H	H	H	H	P	H	H	H	H	R	H	H	H	H	R	H	H	H	H

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2	3	3	3	3	3	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
P	H	H	H	H	R	H	H	H	H	R	H	H	H	H	P	R	R	R	R	P	R	R	R	R	P	R	R	R	R

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
5	5	5	5	5	5	5	5	5	5	6	6	6	6	6	6	6	6	6	6	7	7	7	7	7	7	7	7	7	7
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
P	R	R	R	R	P	R	R	R	R	P	R	R	R	R	P	R	R	R	R	P	R	R	R	R	P	R	R	R	R

```
Read:  contact number 13:H, 165:P, etc., represented in the
        1  1
table as 3, 6, , etc.
        H  5
           P
```

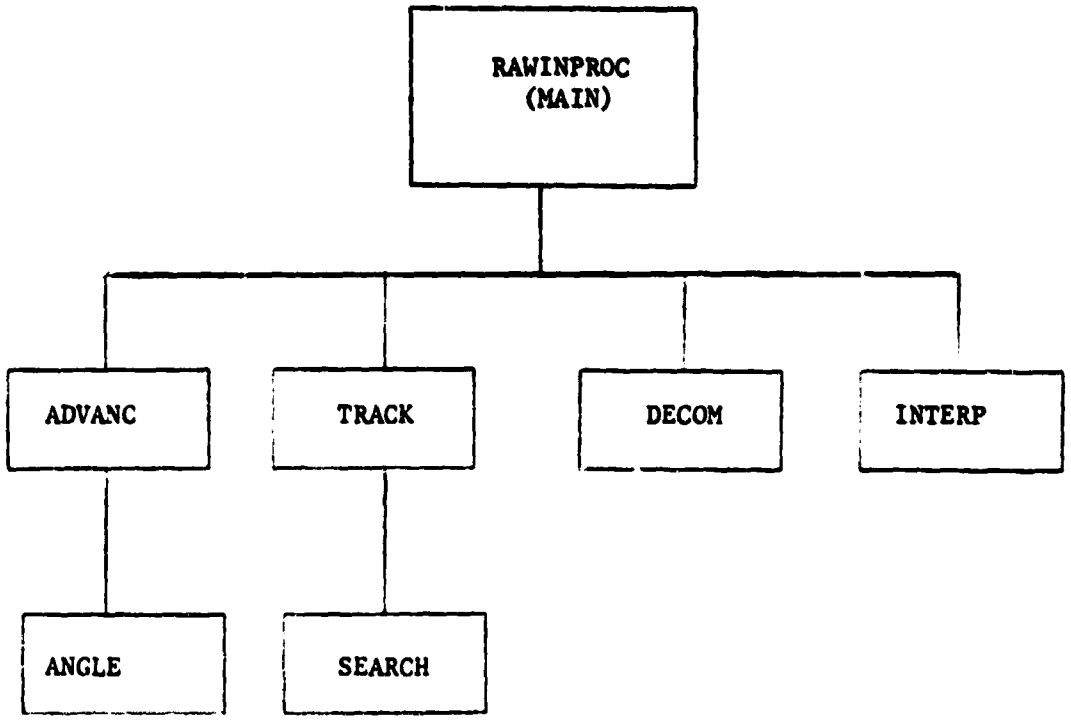
H: relative humidity
R: reference
P: high reference
(T, temperature is transmitted between each contact pad)

events. The data are immediately, then, condensed to the mean frequency and midpoint time (one datum) for each signal dwell. The switching time at the leading edge of each dwell, and the length of dwell are also stored. Tracking frequency gates as well as time gates are used to identify the channels. "Guard zones", first-order extrapolation, and other added logic are used to reduce susceptibility to channel crossovers, sudden changes of signal in a given channel, and to variabilities in sonde design and performance.

Third, the program assigns contact numbers, and therefore pressures, to the appropriate signal switch times according to the baroswitch sequence.

Finally, the desired output table at one-minute intervals is constructed by interpolation from the asynchronous decommutated time functions.

SUBROUTINE DIAGRAM OF RAWINPROC



RAWINPROC(MAIN)

Description, MAIN

MAIN includes the segments of code described as Initializer, Advancer (S.254), Condenser (S.265, Decommutator and Baroswitch Tracker (S.410), and Terminator (S.81) in the block diagram (Fig. 2). The present discussion describes each of these segments and presents a detailed description of the input card deck for RAWINPROC and a glossary of all the variables in MAIN. Separate discussions below describe each of the subroutines ADVANCE, ANGLE, TRACK, SEARCH, DECOM, and INTERP, including the flow through the respective CALL lists. The discussion closely follows the FORTRAN program list (Appendix A). Throughout this document zeroes which might be mistaken as letter "O" are given the slash, Ø. Also, the term Humidity is used in place of the longer Relative Humidity.

Initializer

Input parameters are read from the punched card input deck (see below) and printed.

Launch time (hours, minutes, seconds, GMT) is read in, together with optional limiting elapsed time of processing (TPROC), and optional beginning time of processing (TSTART). When TPROC is unpunched in the input deck, processing terminates on other criteria. When TSTART is unpunched, processing starts two minutes before balloon release (or at the beginning of recorded data, whichever is later).

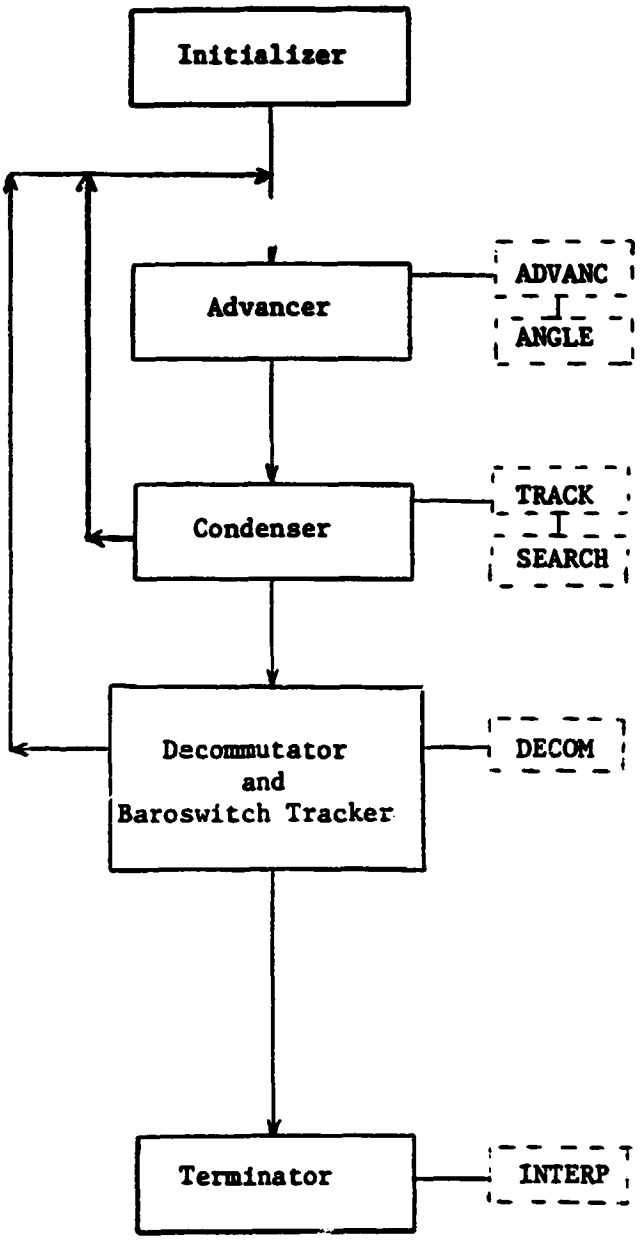


Fig. 2. A block diagram of RAWINPROC(MAIN) indicating the associated subroutines.

Elements of the COND (,) array are printed by MAIN, if desired for diagnostic purposes, along with other information indicative of processing progress. Page headings are printed every LINENO lines. Additional optional printout is available for diagnostic purposes according to input values assigned to TEST(I), where I = 1-3 is used in ADVANC, SEARCH, and TRACK; I = 4, 5 in SEARCH; I = 6 in INTERP; and I = 7-9 in MAIN.

Condenser variables FSUM, NSUM, LOS, and JK are initialized, and constants HGATE = 1.0 (Hz), SIGMIN = 5.0, SIGMAX = 205.0, and IN are assigned or computed. The COND/ICOND array, the raw data counter JJ, and the one-minute table VL are all cleared.

OUTPUT variables TNOH, LIST, and ISTOP are initialized, DLIST, TGMDAQ, and PCAL are read in, and LCNTK defined. Obvious errors in PCAL are automatically corrected and identified. Surface readings FPØ, FTEMPØ, FRHØ, and FRØ are read in, converted where necessary, and stored as initial values of V2. The decimal contact number (AICRØ) equivalent to surface pressure is computed and stored in integer form (ICRØ) for use by DECOM.

Manual burst input CBRST is read in, and TBRST is initialized for DECOM.

The initial frequency TF is computed from the surface ordinate readings according to

$$f = \theta * 2. * FR\emptyset/95.0$$

where f represents the frequency corresponding to ordinate θ, and

FRØ is the ordinate reading of low reference signal (at the time of launch) when the AN/TMQ-5 pen recorder has been adjusted to 30 ordinates for 60 Hz input. Assuming recorder linearity the ratio of frequency to ordinates is the same at reference frequency f_R as at 60 Hz, so

$$\frac{f_R}{FR\emptyset} = \frac{60}{30}\ ,\ f_R = 2*FRO$$

Since, after obtaining FRØ, the recorder is continuously adjusted to maintain 95 ordinates at reference frequency, then

$$\frac{f}{\theta} = \frac{f_R}{95}$$

Thus, for the initial reference frequency f_R = 2*FRØ, the first expression above converts initial ordinate values FTEMPØ and FRHØ to their corresponding sonde frequencies TF and HF. The resulting initial frequency f (i.e., TF) is used by DECOM to initially position frequency gates. (HF has proved not useful in DECOM.)

Subroutine ADVANC is initialized by reading the raw data from the beginning of the file (FILE Ø1), Appendix D) until the forward-most point, TIME(10), of a ten-point sample is past TSTART. To protect against time word errors ("spikes" or constants), the following conditions were imposed before accepting the starting point:

$$-1.0 < TIME(10) - TIME(6) - 0.4 < 1.0 \text{ seconds}$$

$$TIME(10) - TIME(6) > 0.2 \text{ seconds}$$

or, equivalently:

$$|TIME(10) - TIME(6) - 0.8| < 0.6$$

Advancer

The raw data file, TIME, FREQ, AZ, EL, at 0.1-second recorded data rate, is processed by Condenser ten points at a time. The sample of ten points, however, is advanced only five points at a time. Condenser therefore searches for and tracks signal and detects switch times between signal dwells by examining in sequence half-overlapping 1.0-second samples of raw data. At each return for more data, Advancer moves the 1.0-second ten-point sample (TIME, FREQ, AZ, EL) ahead one-half second. Advancer also counts the number (JJ) of raw points read in, for diagnostic purposes, and causes termination if TSTOP is passed.

In addition, at each one minute after launch, except before AN/GMD acquisition time TGMDAQ, Advancer sends the ten-point sample to subroutine ANGLE to compute the output values of AN/GMD angles AZ and EL. The latter two quantities are stored for subroutine INTERP in VL(2,) and VL(3), along with the associated elapsed minutes from launch in VL(1,). Though this processing of angles is a condensing function, it is nevertheless more conveniently located in the code of the Advancer.

Condenser

Condenser (subroutine TRACK) determines whether the ten-point sample lies sufficiently in the signal-tracking gate. If so TRACK

adjusts the gate, accumulates data toward the mean frequency of the current dwell, and returns for the next ten-point sample, repeating this process until the signal does not lie sufficiently in the tracking gate. When the signal changes abruptly, subroutine TRACK calls subroutine SEARCH to reposition the gate on the signal. SEARCH returns via TRACK to MAIN (advancer), (JK = JKMEM) for new data until it finds signal. When signal is found and the tracking gate (SIGLEV) is repositioned, a new condensed point (JK = JK + 1) is stored in COND(, JK), representing the preceding signal dwell. Upon returning to MAIN, control proceeds to the Decommutator and Baroswitch Tracker (subroutine DECOM).

It is noted that the production mode (ITYPE = "P", using no File Ø3) is the principal and normal mode of operation of RAWINPROC. Other modes were used during program development for economical reasons as follows:

ITYPE ="M" includes the writing of File Ø3, Condenser output file

ITYPE ="C" reads File Ø3 (COND, VL), skips Advancer, Condenser

Decommutator and Baroswitch Tracker

Decommutation of a condensed point COND(, JK), i.e., determination of its channel ICOND(1, JK) whether Temperature, Reference, High Reference, or Humidity, is performed by subroutine DECOM. The determination of its contact number, ICOND(2, JK), when it is a Reference or Humidity contact switch point, is also per-

formed by DECOM. Finally, DECOM senses and computes the time of balloon burst, TBRST.

Terminator

RAWINPROC discontinues processing raw data upon one of the following conditions:

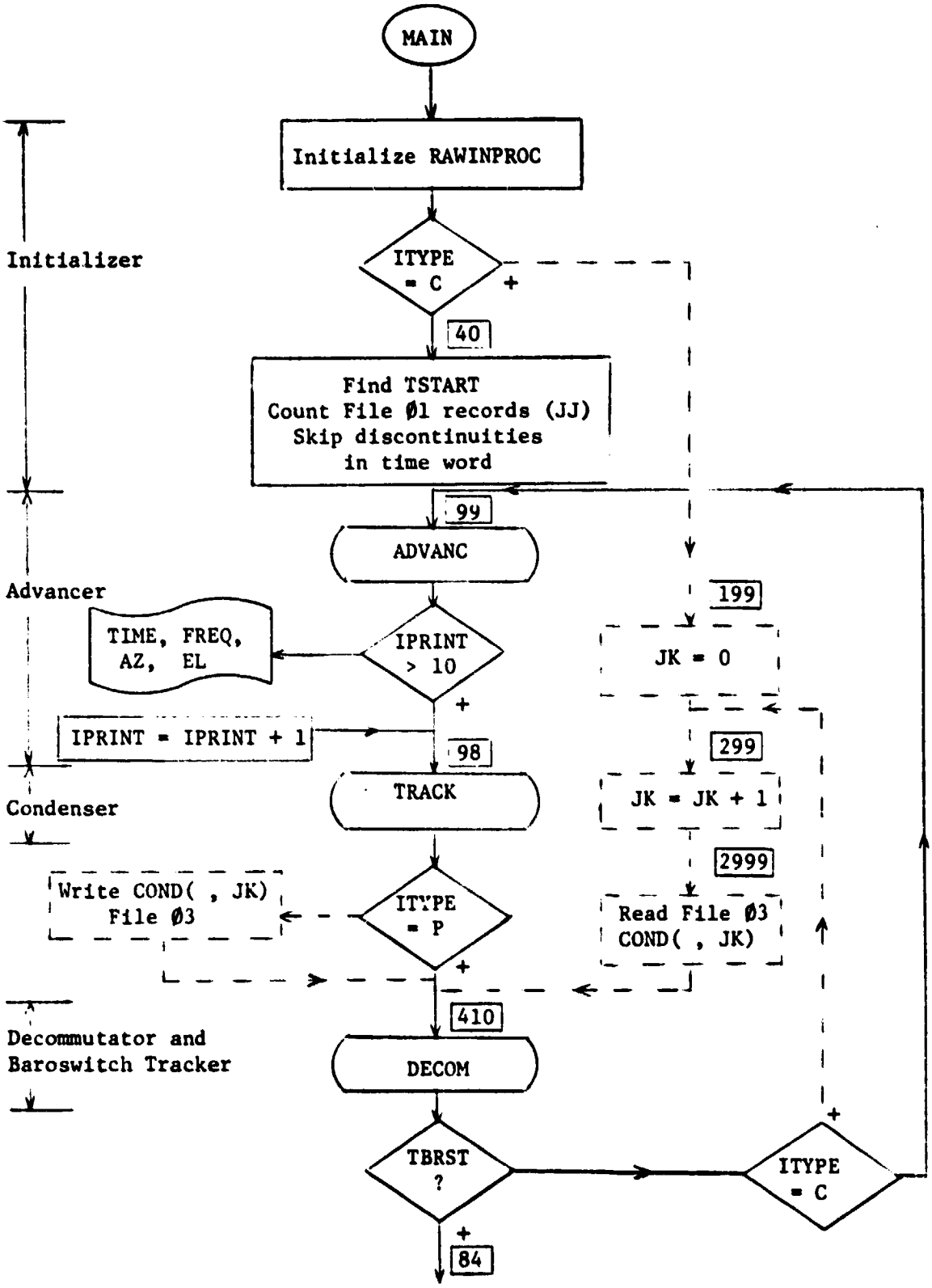
1. TBRST encountered (MAIN S.410, S.84)
   ISTOP = 10 (INTERP S.2003, S.47)
2. End of raw data, File Ø1 EOF (MAIN S.40, S.82)
   ISTOP = 6
3. Reached TSTOP (MAIN S.81, ADVANC S.3)
   ISTOP = 7
4. COND array overflow, JK > 1000 (MAIN S.85, TRACK S.66)
   ISTOP = 8
5. Excessive loss of signal, LOS > 100 (MAIN S.83, TRACK S.83, SEARCH S.10), ISTOP = 5

Upon arriving at the terminal exit, S.90, terminator decodes ICOND(1,) and ICOND(2,) (eliminating diagnostic information coded by DECOM). An auxiliary listing of the asynchronous output of DECOM is printed if requested by input quantity TEST(7). Then subroutine INTERP is called to compute and interpolate VL(I, L), I = 4-7, pressure (mb), reference (Hz), temperature (ordinates), and relative humidity (ordinates), at one-minute intervals corresponding to VL(I, L), I = 1-3, elapsed time and tracking angles (azimuth, elevation) tabulated by ADVANC.

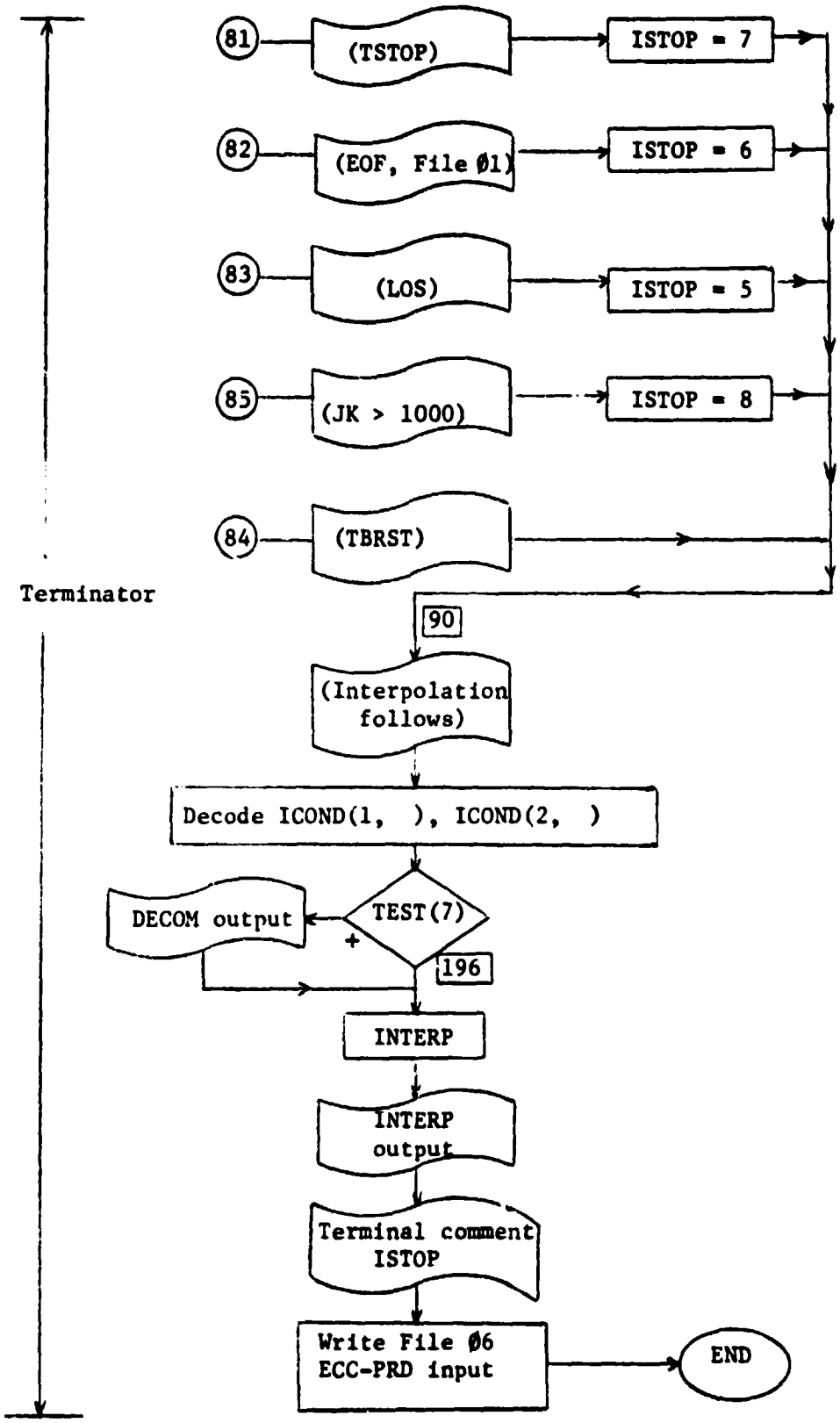
Terminator prints the one-minute table, VL(I, L), L = 1-LIST,

and terminating comments according to ISTOP. Apogee rows of VL having zero pressure are eliminated, as the input "deck" (File Ø2) is prepared for ECC-PRD. This terminates activity No. 2 of the RAWINPROC system.

Flow Diagram, MAIN



Flow Diagram, MAIN (continued)



Input Card Deck

Card	Column	Format	Variable	Value	Units	Comments
1	1-2	I2	IOIN	5		Input deck file number
	3-4	I2	IOUT	6		Print file number
	7	I1	ITYPE	P		Production run
2	1-2	I2	I1	(a)	hour	Launch time, GMT
	3-5	I3	I2	(a)	minute	Launch time, GMT
	7-10	F4.1	TS3	(a)	second	Launch time, GMT
	11-20	F10.2	TPROC		seconds	(d)
	21-30	F10.2	TSTART		seconds	(d)
3	1-5	F5.0	TEST(1)	0.		(b)
	6-10	F5.0	TEST(2)	0.		(b)
	11-15	F5.0	TEST(3)	0.		(b)
	16-20	F5.0	TEST(4)	0.		(b)
	21-25	F5.0	TEST(5)	0.		(b)
	26-30	F5.0	TEST(6)	0.		(b)
	31-35	F5.0	TEST(7)	0.		(b)
	36-40	F5.0	TEST(8)	0.		(b)
	41-45	F5.0	TEST(9)	0.		(b)
	46-50	F5.0	TEST(10)	0.		(b)
4	1-10	F10.1	DLIST	60.	seconds	(c) 60. required
	11-20	F10.1	TGMDAQ	20.	seconds	Recom. 20.
5	1-10	F10.1	FPØ	(a)	mb	"SFC PRESSURE"
	11-20	F10.1	FTEMPØ	(a)	ordinates	"TEMPERATURE"
	21-30	F10.1	FRHØ	(a)	ordinates	"RH"

Input Card Deck (continued)

Card	Column	Format	Variable	Value	Units	Comments
	31-40	F10.1	FRØ	(a)	ordinates	"UNADJUSTED ORDINATE"
6	1-10	F10.2	CBRST	(a)		(f)
7-29		8F10.1	PCAL(i), i = 1, 180	(e)	mb	
30	2-17	A5 [DATE ΔTODAYΔyyddd (yy = year, ddd = day of year)]				
	21	I1	(JOPT)	2		(g)
	25	I1	(KOP)	Ø		(g)
	28-29	I2	(IN)	5		(g)
	30-31	I2	(IO)	6		(g)
	32-33	I2	(IT)	9		(g)
	36-37	I2	(WOPT)	(blank)		(g)
	75-80	A6				I.D., ascent number, e.g., AS607A
31	2-24	A6 [THISΔISΔAΔECCΔΔΔRAWINSONDE]				(g)
	31	I1	(IAZ)	1 or 0		(h), (g)
	33-39	F7.5	(DOBSON)	0.0		(g)
	75-80	A6				I.D., ascent number, e.g., AS607A
32	2-11	2A5	(ISTT1, ISTT2) [WALLOPSΔIS]			(g)
	13-18	I7 (mm = month, dd = day of month, yy = year)	(LDATE) [mmddyy]			(g)
	20-25	I7 (hh = hours, mm = minutes, (GMT), 72 = WALLOPS)	(LANCH) [hhmm72]			(g)
	26-31	F6.1	(HTMSL)	4.0	meters	(g)
	34-37	F6.1	(CALTP)	30.0		(g)

Input Card Deck (continued)

Card	Column	Format	Variable	Value	Units	Comments
	39-43	F6.1	(RECTP)	(a)		Ordinate value corresponding to 30°C (Temperature Calibration)
	45-49	F6.1	(CALRH)	(a)		Ordinate value corresponding to -40° and 46 ord. (RH calibration)
	52-55	F6.1	(RECRH)	46.0		(g)
	56-57	I2	(ICBRN)	02		(g)
	58-62	F5.1	(SURT)	(a)	°C	Surface temperature
	63-67	F5.1	(SURH)	(a)	%	Surface RH
	69-74	F6.1	(PCAL)	(a)	mb	Surface pressure
	75-80	A6	(ID)			I.D., ascent number, e.g., AS607A
33	2-11	A6, A4	(NLBL(2),(3)[WALLOPSAIS]			(g)
	13-18	A6	(DLBL(1) [mmddyy]			(g) Launch data (mm = month, dd = day of month, yy = year)
	20-69					No ozonesonde calibration needed
	75-80	A6				I.D., ascent number, e.g., AS607A
34	2-7	I7	(ILDTE) [mmddyy]			(g) Launch data (mm = month, dd = day of month, yy = year)
	9-12	I7	(ILTME) [hhmm72]			(g) Launch time (hh = hour, mm = minute, ss = station number = 72)
	15		(minus sign) [-]			(g)
	16-19	I5	[9999]			(g)

Input Card Deck

Card	Column	Format	Variable	Value	Units	Comments
	21-26	F7.1	(HGMDT)	4.0	meters	(g) Geopotential height of station
	29-31	F5.0	(VSFC)		meters/s	(g) Surface wind speed
	34-36	F5.0	DSFC		degrees	(g) Surface wind direction
	39-74					
	75-80	A6				I.D., ascent number, e.g., AS607A

Comments:

(a) Derived from field launch records.

(b) Other values used only for internal test purposes.

(c) Obsolete input, value fixed.

(d) Normally unpunched (zero).

(e) Card deck punched from the baroswitch pressure calibration data (chart or punched paper tape) provided with each sonde.

(f) The terminating baroswitch contact number, CBRST, to the nearest one-hundredth the distance between switch points (contact leading edge), is provided by standard manual procedure (Ref. 1, pp. B4-B12, B13, B5-B8). Termination by CBRST is allowed only after 50 minutes (3000 seconds) of flight. Such termination also may be useful for a variety of other reasons, such as battery or other in-flight failure.

(g) For encoding format of cards 30-34, see ECC-PRD documentation, NASA Computer Program 3.0.0700, NASA Wallops Computer Program Abstracts, Vol. XXVII (sonde ID, radiosonde and ozonesonde calibration, and flight-end cards).

(h) Input IAZ is determined by which tracking system is used. IAZ = 0 if azimuth zero is north, = 1 if south.

List of Variables, MAIN

AICRO	Real form of the initial value of ICRØ.
AZ(10)	Ten-point sample of 0.1-second raw data, azimuth angle.
AZK	Azimuth, used in writing VL(2,) into ECC-PRD input file (File Ø6).
CBRST	Contact number, to nearest 0.01, at balloon burst, input card No. 6 (see Input Card Deck, above, and subroutine DECOM).
CNVOF	Conversion factor, ordinates to frequency (Hz).
COND(3, 1000)	Condensed point array, real:
COND(1,)	= Time (seconds) from launch
COND(2,)	= Duration (seconds) of the signal dwell
COND(3,)	= Mean signal frequency (hertz) over the dwell.
DIFF1, DIFF2, DIFFAV, DIFFHI, DIFFLO	Differences used in detecting and correcting gross errors in baroswitch calibration table, PCAL.
DLIST	= 60 seconds, data rate of ECC-PRD input cards, used in computing output array VL(7, LIST), input card No. 4.
DM1 DM2 DUM(18)	Dummy variables, used in reading raw data file, (File Ø1).
EL(10)	Ten-point sample of 0.1-second raw data, elevation

	angle.
ELPT	Time (seconds) from launch of condensed points, used in auxiliary listing of DECOM output.
ELV	Elevation angle, used in writing VL(3,) into ECC-PRD input file (File Ø6).
FPØ	Surface atmospheric pressure (mb) at balloon release, input card No. 5.
FRØ	Stripchart reading (ordinates) of Reference channel when recorder gain is adjusted to 30 ordinates for 60 Hz test input. Input card No. 5. Used in computing CNVOF.
FREQ(10)	Sample of ten 0.1-second raw data points (Hz).
FRHØ	Stripchart reading (ordinates) of Humidity channel at balloon release, input card No. 5.
FSUM	Running sum (Hz) of signal means in signal tracking gates for computation of the signal dwell mean COND(3,) = FSUM/NSUM.
FTEMPØ	Stripchart reading (ordinates) of Temperature channel at balloon release, input card No. 5.
HF	Signal frequency equivalent to FRHØ (not used).
HGATE	Half-width (Hz) of signal tracking gate, constant 1.0 Hz.
I	DO-loop index.
I1	Hours integer of launch GMT, input card No. 2
I2	Minutes integer of launch GMT, input card No. 2.
IBC	Intermediate variable used in decoding ICOND(2,)

	after termination (MAIN S.90) of DECOM.
IBT	ECC-PRD ozone input datum (OZN4), DNA, IBT = 0.
ICOND(2, 1000)	Condensed point array, integer:
ICOND(1,)	= channel (1 = temperature, 2 = reference, 3 = high reference, 4 = relative humidity)
ICOND(2,)	= baroswitch contact number
ICRØ	Effective baroswitch contact number at launch (to nearest two decimal places multiplied by 100) computed from surface pressure and PCAL table.
ID	ECC-PRD input, quantity (ID), identification, input card No. 32.
IN	The number of subdivisions of the sonde frequency range used in searching for signal.
INDAX	Working channel number, ICOND(1,) before decoding, used in auxiliary printout of DECOM output.
IO	ECC-PRD input file number, File Ø2, IO = Ø2.
IOØ	ECC-PRD ozone input datum (OZN2), DNA, IOØ = 0.
IO3	ECC-PRD ozone input datum (DJP), DNA, IO3 = 0.
IOC	ECC-PRD ozone input datum (OZN3), DNA, IOC = 0.
IOIN	Input card deck file number (File Ø5), IOIN = 5.
IOUT	Output print file number (File Ø6), IOUT = 6.
IPRINT	Count of printed input raw data samples, TIME(J), FREQ(J), J = 1, 10, in auxiliary printout; IPRINT = 1-10.
IRH	ECC-PRD Humidity input datum (OF), IRH = VL(76,) *10.0.

IST	Additive term which increases with altitude the percentage limit within which PCAL values are tested in sequence by contact. Used in the process of detecting gross errors in the PCAL table.
ISTOP	Variable indicating termination status (see MAIN, Description, Terminator).
ISTT1, ISTT2	ECC-PRD input (ISTT1, ISTT2), station name, input card No. 32.
IT	ECC-PRD input datum (TIM), IT = VL(1,)/60.0.
IT1, IT2	Time of day, hours, minutes; used in auxiliary printout of DECOM output.
IT3	Time from launch, minutes; used in auxiliary printout of DECOM output.
ITP	ECC-PRD Temperature input datum (DT), ITP = VL(6,)*10.0.
ITY	First character, V, of a "VL" record in COND/VL file.
ITYPE	Input character (input card No. 1). ITYPE = P. (See MAIN, Description, Condenser.)
IX, IY	DO-loop indices, used in reading and printout of baroswitch pressure calibration, PCAL, table.
J	DO-loop index, used in initializing VL, indexing raw data, and testing for zero pressures in VL.
JC	DO-loop index used in auxiliary printout of DECOM output.
JJ	Count of raw data records read.

JK	Count, or current index, of condensed point COND.
JKMEM	Value of JK upon each entering of the condensing process, used to detect whether subroutine TRACK requires a new raw data point or has concluded a new dwell.
JKT	Minute from launch, integer stored in File Ø3 with associated VL. DNA in production (ITYPE = P) runs.
JP	DO-loop index, used in computing ICRØ.
KNTCT	Last contact processed by INTERP, used only in terminal printout if INTERP encountered LCNTK.
LCNTK	The highest number contact pressure-calibrated. (See PCAL.)
LDATE	ECC-PRD input (LDATE), input card No. 32.
LINE	ECC-PRD input character string, used in reading input cards No. 30-34.
LINENO	Lines printed per page, used in labeling auxiliary printout of DECOM output (File Ø6).
LIST	Count, or current index, of rows of VL array, i.e., number of one-minute "cards" input to ECC-PRD.
LL	DO-loop index, used in auxiliary printout of VL array and in eliminating zero-pressures at apogee in VL.
LOS	Loss of signal count from Condenser (see subroutine SEARCH), used in terminal printout when processing terminated due to signal noise (ISTOP = 5).
LTIME	ECC-PRD input (LANCH), input card No. 32.

NSUM	Quantity initialized for Condenser (see subroutine TRACK).
PCAL(180)	Calibrated pressure values, in order corresponding to baroswitch contact number, input cards No. 7-29.
PERC	Limiting percent change, used in automatic checking successive PCAL values for gross errors.
PR	ECC-PRD input (PR), PR = VL(4,).
RT1	Seconds part of time of day (IT1, IT2, RT1), used in auxiliary printout of DECOM output.
RT2	Time of day (hours), used in auxiliary printout of DECOM output.
RT3	Seconds part of elapsed time from launch, used in auxiliary printout of DECOM output.
RT4	Same as COND(2,), dwell (seconds), used in auxiliary printout of DECOM output.
SIGLEV	Center frequency (Hz) of signal tracking gate in Condenser (see subroutine TRACK).
SIGMAX, SIGMIN	Upper and lower limits of sonde frequency range (Hz). SIGMIN = 5, SIGMAX = 205.
TBRST	Computed time (seconds from launch) of balloon burst (see subroutines DECOM, INTERP).
TEST(10)	Input constants which control diagnostic printout (see MAIN, Description, Initializer).
TF	Initial signal frequency of Temperature channel, computed from initial temperature ordinate FTEMPØ and sonde frequency calibration FRØ. Passed in

first call to subroutine DECOM.

TGMDAQ — Time delay (seconds) after balloon release of expected AN/GMD antenna acquisition of the sonde. Input card No. 4.

TIME(10) — Time of day (seconds) in the ten-point sample of raw data processed by Condenser.

TLANCH — Time of day (seconds) of balloon release (launch). Computed from data on input card No. 2.

TNOH — Time (seconds from launch) of the occurrence of contact 135, when transmission of humidity data ceases.

TPROC — Maximum time interval (seconds) of flight data to be processed, automatically made large if unpunched on input card No. 2.

TS3 — Seconds part of time of day at launch, input card No. 2.

TSTART — Time from launch (seconds) to begin processing flight data. Made -120 seconds (two minutes before launch) if left unpunched on input card No. 2.

TSTOP — Time (seconds from launch) at which processing is terminated if requested via input TPROC. TSTOP = TPROC - TSTART.

V2(7) — Initial values for interpolation in subroutine INTERP (see). Computed from surface input quantities FPØ, FTEMPØ, FRMØ, FRØ.

VL(7, 150) — One-minute array, output of INTERP, input data for

ECC-PRD.

VL(1,) = Time (seconds from launch) at one-minute intervals.

VL(2,) = Azimuth (degrees)

VL(3,) = Elevation (degrees)

VL(4,) = Pressure (mb)

VL(5,) = Reference frequency (Hz)

VL(6,) = Temperature (ordinates)

VL(7,) = Relative humidity (ordinates)

XM ECC-PRD ozone input quantity (XM), DNA, XM = 0.0.

SUBROUTINE ADVANC

Description

The ten-point sample of 0.1-second raw data, TIME(J), FREQ(J), AZ(J), EL(J), J = 1, 10, is advanced five points at each call of subroutine ADVANC. A running sum, JJ, of raw data points read in is kept by ADVANC for diagnostic purposes only.

The raw data word TIME is converted from time of day (hours) to elapsed time from launch (seconds). The raw data word FREQ is converted from period (milliseconds) to frequency (hertz). Those with periods outside the range 4.8 to 200 ms (5 to 208 Hz) are made zero hertz, to prevent dividing by possible extreme values. If the TIME word does not increase by 0.1 ± 0.05 seconds, its value is replaced by the preceding value increased by 0.1 second. This "corrects" possible "spikes" and other temporary time word errors, relying on the fact that the data were recorded in the field at real-time 0.1-second intervals. Gross faultiness in the time word is usually detected in MAIN when searching for TSTART.

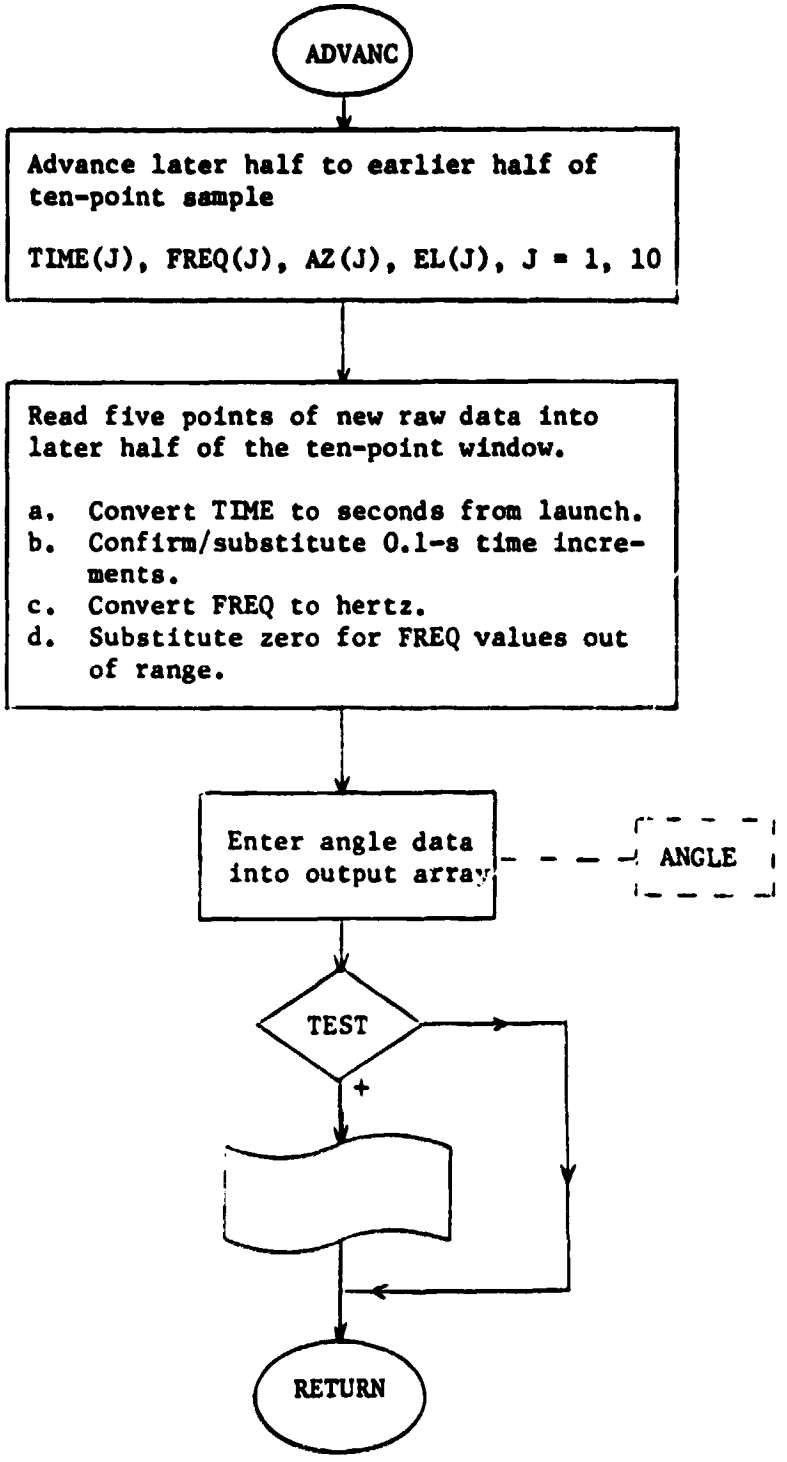
When the accepted time reaches TSTOP, ADVANC causes termination via RETURN1 (MAIN S.82).

At each minute after field tracker target acquisition time TGMDAQ, ADVANC calls subroutine ANGLE to compute from the ten-point sample AZ(J), EL(J), J = 1, 10, a value each for azimuth and elevation to place in the RAWINPROC output table VL(2,) and VL(3,), respectively.

If input TEST(1) is greater than zero, and TIME(1) lies be-

tween input values TEST(1) and TEST(2), the angle raw data AZ(J), EL(J), J = 1, 10 are printed out.

Block Diagram, ADVANC



CALL List, ADVANC (Ref.: List of Variables, below)

Variable	Flow	Comments
TIME(10	Initial 5 points from MAIN (Initializer) to MAIN (Condenser)	ADVANC moves this sample forward 5 points each call.
FREQ(10)	Initial 5 points from MAIN (Initializer) to MAIN (Condenser)	ADVANC moves this sample forward 5 points each call.
AZ(10)	Initial 5 points from MAIN (Initializer to MAIN (Condenser)	ADVANC moves this sample forward 5 points each call.
EL(10)	Initial 5 points from MAIN (Initializer to MAIN (Condenser)	ADVANC moves this sample forward 5 points each call.
JJ	From MAIN to MAIN	ADVANC increments at each READ.
TSTOP	From MAIN	Used to terminate processing.
TLANCH	From Main	Used in converting to elapsed time.
TGMDAQ	From Main	Used to prohibit processing meaningless angle data.
TEST(1), TEST(2), TEST(3)	From Main	Control diagnostic printout.

List of Variables, ADVANC

AZ(10)	Azimuth angle (degrees), ten-point sample of 0.1-second raw data.
DLIST	Time interval (60 seconds) of uniform output table VL (see input deck, MAIN).
DM1, DM2, DUM	Dummy variables used in reading raw data file.
EL(10)	Elevation angle (degrees), ten-point sample of 0.1-second raw data.
FREQ(10)	Signal frequency (Hz), ten-point sample of 0.1-second raw data.
ITYPE	Program development input to permit rerunning from Condenser output file (File 3). Options: "M" writes File 3 (COND/VL array) "C" reads File 3 "P" Production (File 3 omitted).
J, J5, JI	Raw data variable indices.
JJ	Total number of raw data points read from File 1.
LIST	Total number of entries stored in one-minute table VL.
TEST(10)	Input variable controlling diagnostic printout.
TGMDAQ	Input constant, number of initial seconds angle data are presumed invalid due to target acquisition time required by the AN/GMD balloon tracker.
TIME(10)	Time (seconds from launch) of the ten-point sample of 0.1-second raw data.
TLANCH	Time of day (seconds) of balloon release.

TSTOP	Time (seconds from launch less TSTART) preset by card input to stop processing data.
VL(7, 150)	RAWINPROC output array. The first three columns VL(1,) = (minute), VL(2,) = AZ, VL(3,) = EL, are computed and loaded by ADVANC, the remainder by INTERP.

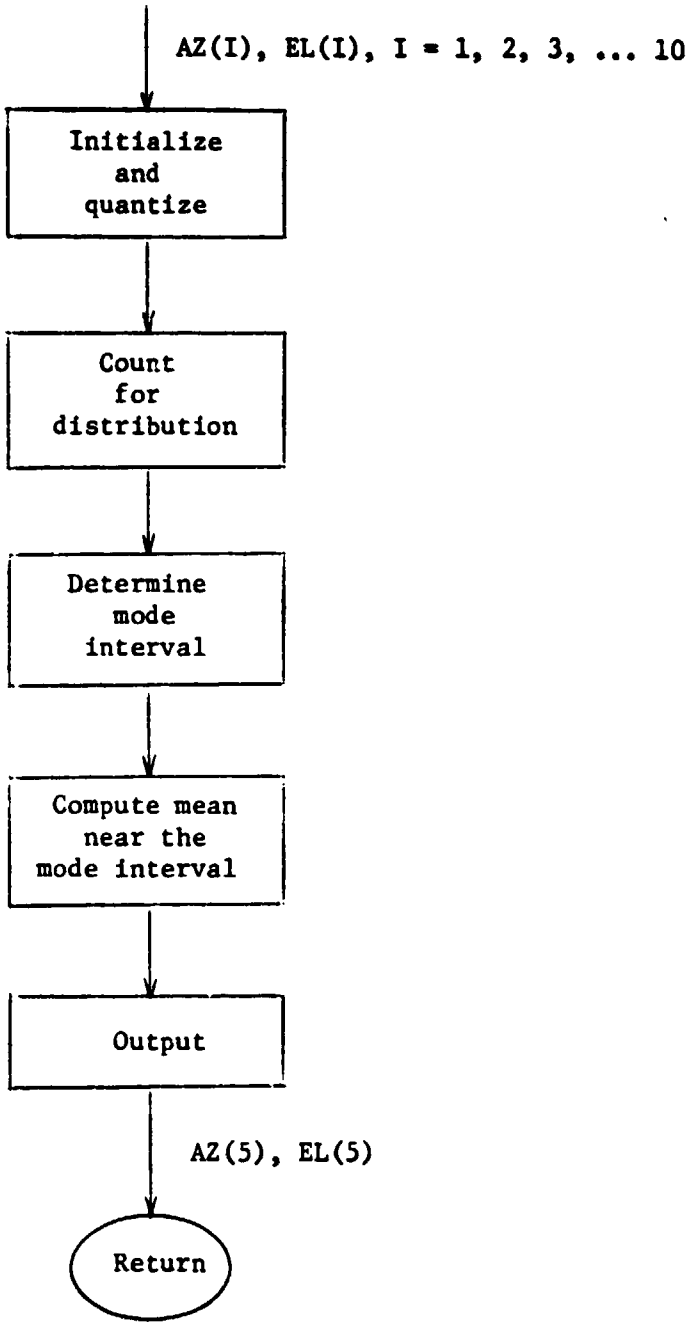
SUBROUTINE ANGLE

Description

Subroutine ANGLE edits, condenses, and smooths input AN/GMD angle data AZ(I), EL(I), I = 1, 2, 3, ..., 10 (azimuth, elevation). It computes (when called every DLIST seconds) from the ten local consecutive (0.1-second) values, one value assigned at the midpoint, AZ(5), EL(5). The computed value is the mean of those points lying in the five-degree interval centered on the unit degrees mode of the ten input points. Other points, including extreme values, are therefore rejected.

The unit degrees mode is the most populated one-degree interval over the ten input points. It is found by rounding to units place the input values and counting equal rounded values. When the distribution is such that more than one unit degree interval has the highest population, the one occurring earliest in time within the 1.0-second sample is used.

Block Diagram, ANGLE



CALL List, ANGLE (Ref.: List of Variables, below)

	Flow	Comments
AZ(10)	From ADVANC	Ten 0.1-second points, raw data, input.
[AZ(5)]	To ADVANC	One 1.0-second condensed point, output.
EL(10)	From ADVANC	Ten 0.10-second points, raw data, input.
[EL(5)]	To ADVANC	One 1.0-second condensed point, output.

List of Variables, ANGLE

AZ(10)	Azimuth (degrees) input data. Output value placed in AZ(5).
EL(10)	Elevation (degrees) input data. Output value placed in EL(5).
IAZ(10)	AZ rounded to nearest degree.
IEL(10)	EL rounded to nearest degree.
K	DO-loop index.
KMA	Index value of the mode (highest population) interval, azimuth.
KME	Index value of the mode (highest population) interval, elevation.
L	DO-loop index.
LL	DO-loop index.
NIAZ(10)	"Distribution" of IAZ, number of AZ values rounding to the correspondingly indexed IAZ (includes harmless extraneous values).
NIEL(10)	"Distribution" of IEL, number of EL values rounding to the correspondingly indexed IEL (includes harmless extraneous values).
NSUMA	Population of the five-degree azimuth averaging interval centered on the mode IAZ(KMA).
NSUME	Population of the five-degree elevation averaging interval centered on the mode IAZ(KME).
SUMA	Sum of the AZ lying in the averaging interval for azimuth.

SUME	Sum of the EL lying in the averaging interval for elevation.

SUBROUTINE TRACK

Description

The purpose of Condenser (MAIN) is to discern from the 0.1-second raw data, first, the switch points, i.e., the points at which the baroswitch changes contacts (channels), and second, a condensed representation of the signal transmitted while on each contact. The representation consists of the three quantities for a given signal dwell:

COND(1, JK) = switch, or beginning, time (seconds from launch)

COND(2, JK) = duration (seconds)

COND(3, JK) = mean frequency

If the signal changes suddenly for a given contact position, more than one signal dwell may result for that contact position. Thus, a rapidly varying or noisy signal may be represented by several condensed points, COND, over its baroswitch interval.

Subroutine TRACK examines the ten-point sample, FREQ(i), i = 1, 10, to determine whether the signal is in the frequency tracking gate; i.e., whether at least two of the FREQ(i) lie within HGATE (Hz) of SIGLEV (Hz). If so, SIGLEV is adjusted half-way toward the mean value of the points within the gate. This mean value includes SIGLEV for further stabilization. Some computing time is saved by requiring no more than the first seven points in the gate for computation of the mean. TRACK continues by returning to ADVANC via MAIN (without changing JK, i.e., JK = JKMEM) for more data and repeating the process, summing the mean values:

FSUM = FSUM + SUMGTE/NGATE

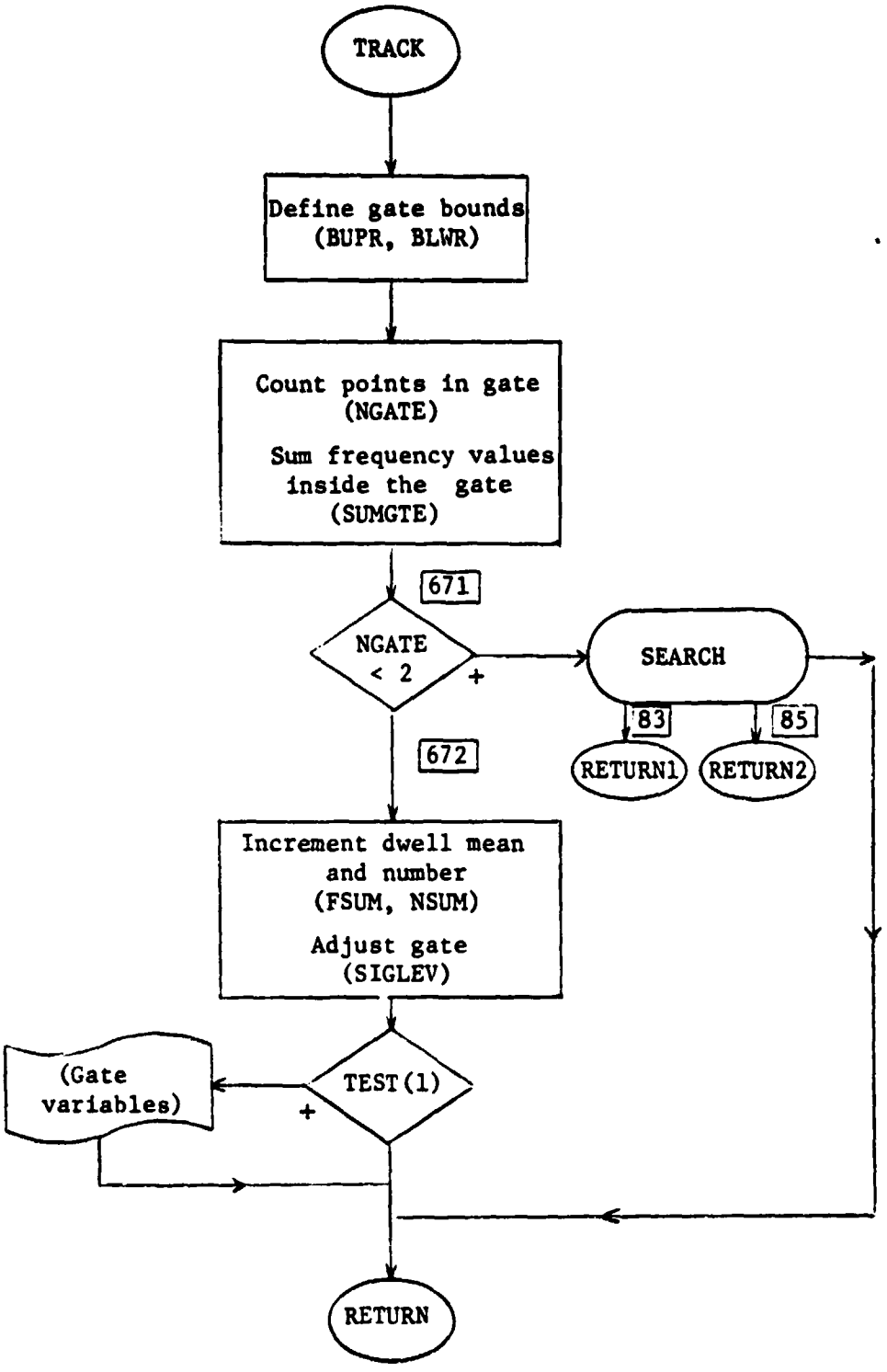
NSUM =NSUM + 1

until the signal is not found in the gate.

If less than two of the ten-point raw data samples lie in the frequency tracking gate, TRACK calls subroutine SEARCH. SEARCH obtains successive ten-point samples, FREQ(i), by returning to ADVANC via TRACK and MAIN, without changing JK (JK = JKMEM). If SEARCH cannot find signal or exceeds COND dimension, JK > 1000, it returns to TRACK (S.83, S.85, respectively), and TRACK returns to Terminator (MAIN S.83, S.85, respectively).

When SEARCH finds signal, it returns to MAIN via TRACK, having incremented JK (JK ≠ JKMEM), where control therefore proceeds to subroutine DECOM to process the new condensed point, COND(, JK).

Flow Diagram, TRACK



CALL List, TRACK (Ref.: List of Variables, below)

Variable	Flow	Comments
TIME(10)	From ADVANC via MAIN	Ten-point raw data sample, TIME sent to SEARCH, FREQ, used to track signal.
FREQ(10)	From ADVANC via MAIN	
TEST(10)	From MAIN (Initializer)	Diagnostic printout control, input TEST(i), i = 1-3 used.
LOS	To MAIN (Terminator) from SEARCH	Counts continuous half-seconds of no signal.
COND(3, 1000)	To DECOM via MAIN from SEARCH	Condensed points generated.
JK	To MAIN	Index of last computed COND.
Variables in COMMON/SIGNAL/:		
SIGMAX, SIGMIN, HGATE, IN	From MAIN (Initializer)	For SEARCH
SIGLEV	From SEARCH, initially from MAIN (Initializer)	Frequency gate position
NSUM, FSUM	From/To SEARCH	For mean frequency computation.

List of Variables, TRACK

BLWR, BUPR	Lower and upper bounds (Hz), respectively, of the signal tracking gate.
COND(3, 1000)	Array (real) of condensed points defined in SEARCH.
FREQ(10)	Ten-point sample of the 0.1-second raw data (Hz), used to determine whether the signal is in the gate, and, if so, to center the gate and to compute SUMGTE and FSUM.
FSUM	Running sum over a dwell of the mean frequency in the signal tracking gate, used by SEARCH in computing COND(3,).
HGATE	Half-width (Hz) of the signal tracking gate.
IN	The number of subdivisions of the sonde signal frequency range, used by SEARCH.
J	DO-loop index.
JK	Count, index of the last condensed point computed, incremented by SEARCH, used by MAIN, etc.
LOS	Counter of consecutive half-second steps for which no signal is detected by SEARCH.
NGATE	The number of the ten raw data FREQ which fall within the signal tracking gate, SIGLEV ± HGATE, augmented by one to include SIGLEV in the computed mean.
NSUM	The number of half-second samples in a signal dwell which were found in the gate, used in computing the mean frequency COND(3,) = FSUM/NSUM.

SIGLEV	Center, position (Hz), of the signal tracking gate, successively adjusted with lag to the signal mean; i.e., SIGLEV = (SIGLEV + SUMGTE/NSUM)/2.
SIGMAX, SIGMIN	Upper and lower limit (Hz), respectively, of the sonde signal frequency range, used in excluding noise. (SIGMAX = 205, SIGMIN =5)
SUMGTE	Sum of the frequencies FREQ which lie within the signal tracking gate, plus the preceding value of SIGLEV, used to compute local means SUMGTE/NGATE which are again averaged over the dwell, which are used to adjust the gate position SIGLEV at each step.
TEST(10)	Diagnostic printout control, input, TRACK uses TEST(i), i = 1-3.
TIME(10)	Times (seconds from launch) corresponding to the ten-point raw data sample FREQ, used by SEARCH.

SUBROUTINE SEARCH

Description

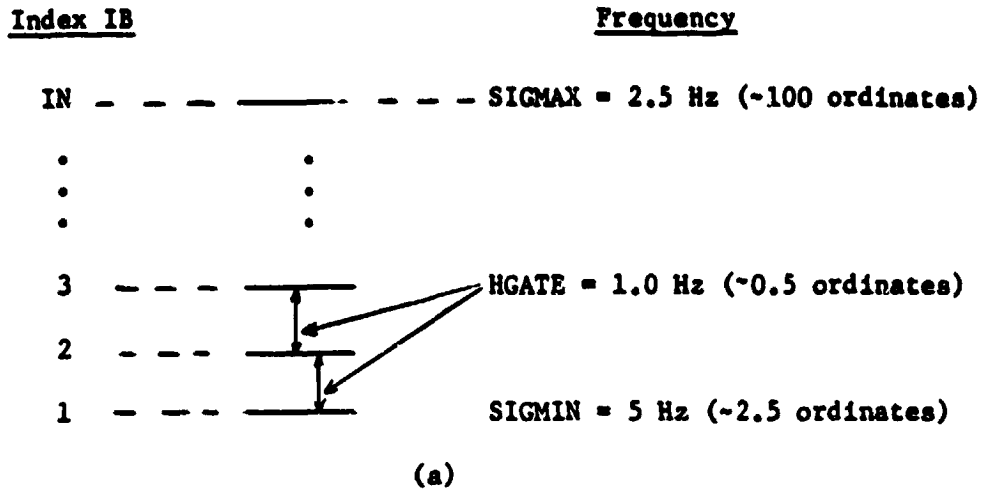
When a sudden change in signal level occurs, i.e., when a ten-point raw data sample falls outside of the signal tracking gate SIGLEV ± HGATE, subroutine TRACK calls subroutine SEARCH to find the new signal level, and to "wrap up" the condensed data point just passed. SEARCH searches the signal range from SIGMIN to SIGMAX to find the frequency band of half-width HGATE which contains most but at least three of the ten points (Fig. 3). If more than one of the bands contain the largest number of points, the one at highest frequency is chosen.

If no band contains at least three points, LOS is incremented, and SEARCH continues by returning to ADVANC via TRACK and MAIN for more data. This process is repeated, except:

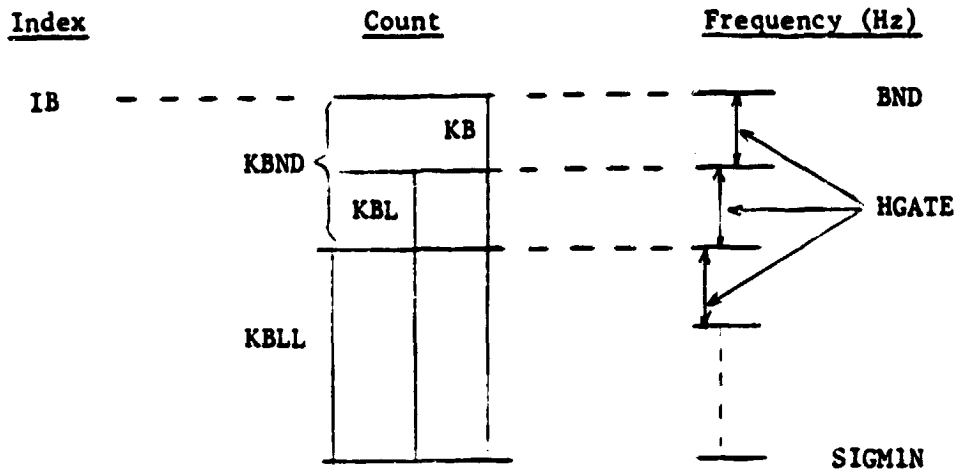
a. At LOS = 1, TSWCH2 (the beginning time of the present noise or LOS interval) is assigned (this quantity is used as the ending time of the preceding signal dwell, thus excluding the noisy interval from that signal dwell), and

b. At LOS > 100 (50 seconds), indicating excessive noise or no signal, at which time SEARCH terminates processing by returning to TRACK and MAIN (S.83).

If, as in the normal case, a frequency band is found sufficiently populated, the center (SIGLEV) of the signal frequency gate is placed at the midpoint of the band, the beginning time of the new signal dwell is assigned, LOS is stored in LOSN (for use in



(a)



(b)

Fig. 3. "Met" signal acquisition. (a) To find signal, the entire sonde frequency range is divided into IN one-hertz levels. (b) Beginning at SIGMIN + 2 * HGATE, the number KB of the ten raw data points FREQ falling below each level BND, less that KBLL of two levels below, is computed. KBND = KB - KBLL. The index IBND and count KBNDG of the most populated such 2-Hz band is obtained. If KBNDG is at least three points, the signal-tracking gate SIGLEV is centered at the level corresponding to index IBND - 1; i.e.,

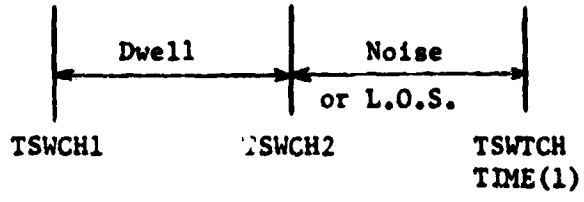
$$SIGLEV = SIGMIN + (IBND - 2) * HGATE$$

computing DWELL) before being reset to zero, COND index JK is incremented, and a new condensed point is defined over the preceding signal dwell.

$$COND(1, JK) = TSWCH1$$

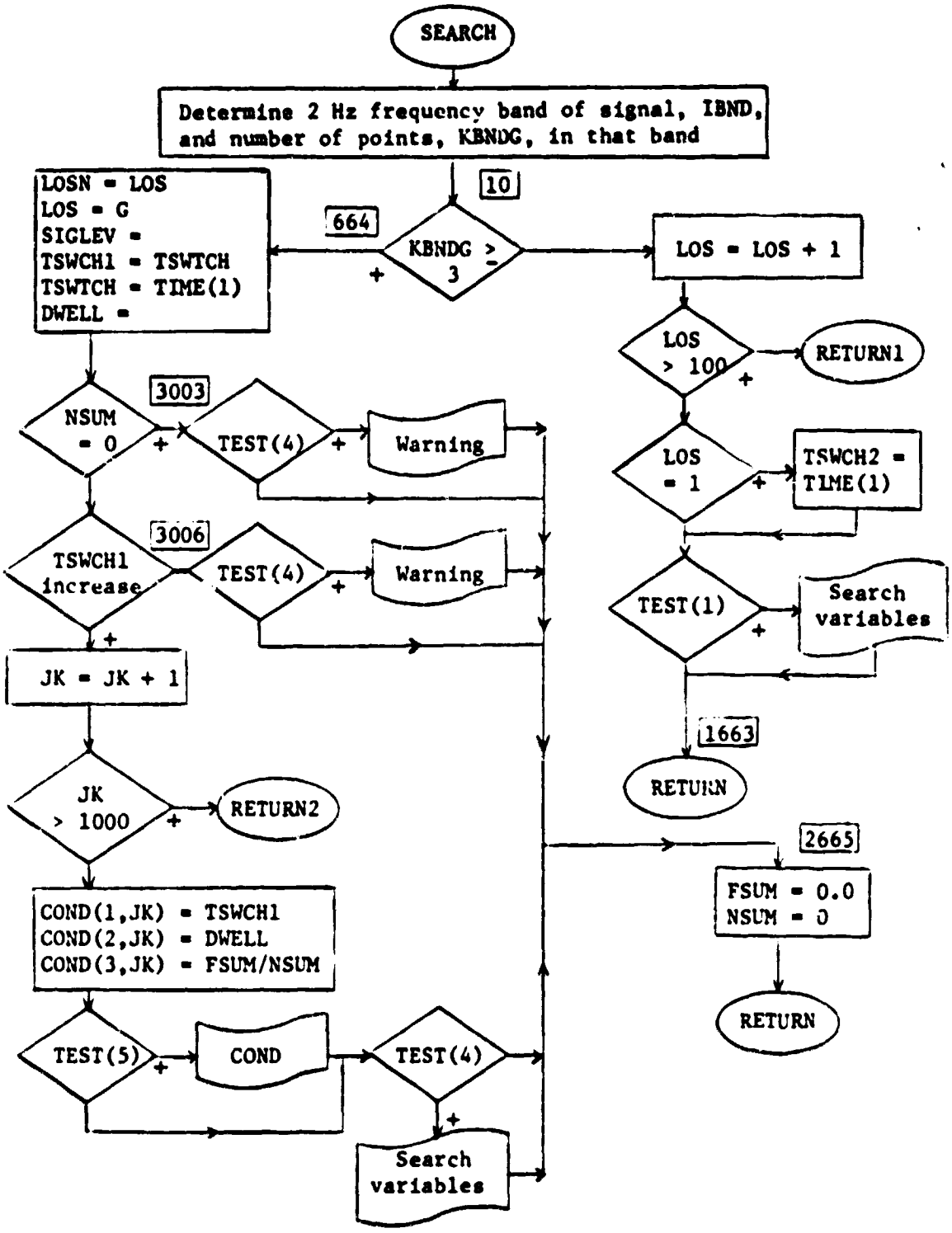
$$COND(2, JK) = DWELL$$

$$COND(3, JK) = FSUM/NSUM$$



The signal frequency over the dwell is taken as the mean of the "ten-point" means FSUM computed in TRACK.

Flow Diagram, SEARCH



CALL List, SEARCH (Ref.: List of Variables, below)

Variable	Flow	Comments
TIME(10)	From ADVANC via MAIN, TRACK	Ten-point raw data sample
FREQ(10)	From ADVANC via MAIN, TRACK	Ten-point raw data sample
LOS	To MAIN via TRACK	Count of continuous half-seconds of no signal
COND(3, 1000)	To DECOM via TRACK, MAIN	Condensed points generated
JK	To MAIN (Terminator) via TRACK	Index of last COND computed
TEST(10)	From MAIN (Initializer) via TRACK	Diagnostic printout control, input
In COMMON/SIGNAL/		
SIGMAX, SIGMIN, HGATE, IN	From MAIN (Initializer) via TRACK	Signal range and increments for search
SIGLEV	To TRACK (initially from MAIN via TRACK)	For TRACK
NSUM, FSUM	To/From TRACK	Accumulators for mean frequency computation

List of Variables, SEARCH

BND — Momentary upper bound (Hz) of a signal search region.

COND(3, 1000) — Array (real) of condensed points defined by Condenser (TRACK and SEARCH), each being the dwell or interval between sudden changes in the signal:

- COND(1,) = beginning time (seconds from launch) of the signal dwell.
- COND(2,) = duration (seconds) of the signal dwell.
- COND(3,) = mean signal frequency (Hz) over the dwell.

DWELL — Duration (seconds) of the current signal dwell.

FREQ(10) — Ten-point raw data sample, used to locate the signal in the search process.

FSUM — Sum over the dwell of the mean frequency values within the tracking gate computed by TRACK, used to compute the mean frequency COND(3,).

HGATE — Step size (Hz) used in the search for signal over the sonde signal range.

IB — DO-loop index, used in the stepping search process.

IBND — Index of the most populated frequency band when searching for signal, each bandwidth is two steps HGATE.

IN — The number of subdivisions (steps) of the sonde frequency range used in searching for signal, IN = ((SIGMAX - SIGMIN)/HGATE) + 1, defined in MAIN (Initializer).

ITYPE	Program mode (see Input Card Deck).
J	DO-loop index.
JK	COND index, array counter.
KB, KBL, KBLL	Counter of raw data FREQ below level BND in the signal search process (see SEARCH, Description).
KBND	The number, 1-10, of raw data FREQ falling within the 2*HGATE interval below BND (Hz).
KBNDG	Largest KBND over the 5-205 Hz range of the sonde.
LOS	Counter of consecutive half-second steps for which no signal is detected by SEARCH.
LOSN	Stored value of LOS, used to recall LOS > 0 to exclude noise interval from DWELL.
NSUM	Accumulated number of half-second raw data samples, in the signal dwell, found in the tracking gate by TRACK.
SIGLEV	Tracking gate center (Hz), repositioned on the signal by SEARCH.
SIGMAX, SIGMIN	Upper, lower limits (Hz), respectively, of the sonde signal frequency range.
TEST(10)	Diagnostic printout control, input, SEARCH uses TEST(i), i =1-5.
TIME(10)	Time (seconds from launch) corresponding to the ten-point raw data sample FREQ, used to identify sudden signal changes; i.e., dwell boundaries.
TSWCH1	Beginning time (seconds from launch) of the current dwell.

TSWCH2	Beginning time (seconds from launch) of a noise (no signal) interval, used as the ending time of the dwell when succeeded by noise.
TSWTCH	Ending time (seconds from launch) of the current dwell.

SUBROUTINE DECOM

Description

Subroutine DECOM determines for each condensed point, COND, its proper channel (Temperature, Reference, High Reference or Humidity) and for each Reference and Humidity switch point, its baroswitch contact number. Channel and contact numbers are stored in ICOND.

ICOND(1,) = 1 Temperature

= 2 Reference

= 3 High Reference

= 4 Humidity

> 5 Undecommutated, rejected

ICOND(2,) = 1-180 Baroswitch contact number

Decom may be considered in two major parts, Process "A" in which Temperature and Humidity channel and contact numbers are assigned as each occurs ("forward-assigned") (S.178, S.200), and Process "B" in which, after assigning each Reference its channel and contact number (S.600), the preceding Temperature and Humidity channel and contact numbers are corrected ("back-assigned") where necessary (S.180). Process "B" also discriminates High Reference dwells and verifies their contact numbers (S.130), and detects balloon burst (S.50). These parts are indicated in Fig. 4. More detailed discussion follows.

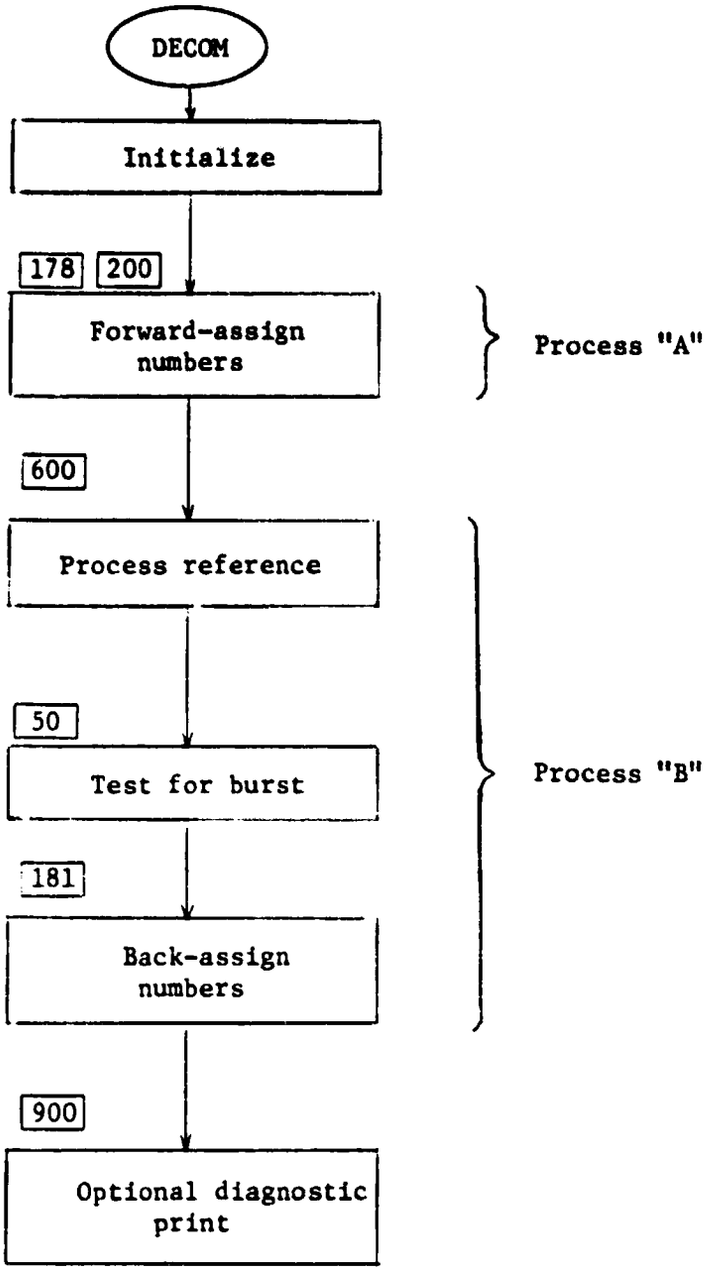


Fig. 4. Overall block diagram of subroutine DECOM.

Initialize

Initial values for TNOH, DSL, FHUM, ICR1 in the CALL List are set in MAIN. TNOH = 10000.0 is set large so that it is ineffective as a burst indicator in INTERP unless TNOH is computed in DECOM. Starting frequencies DSL and FHUM for the Temperature and Humidity tracking gates are computed in MAIN according to input ordinate values at launch. The effective intercontact value ICR1 of the baroswitch at launch is computed in MAIN according to the input surface pressure FPØ.

Initial values of RFL and DRPFL, e.g., 170. and 2. Hz, have proved acceptable. PFL is set initially somewhat large to prevent its premature interference, and low enough that it reaches a proper value by the time it is needed at contact 30. Accumulators RFSUM and RTSUM and reference marker TR are initialized zero. Contact number multiplier MLT and its real form AMLT are set at the constant 100. NXTP is initially made 30, the contact number of the first high reference.

Temperature tracking gate half-width, GTEMP, is initially 4.0 Hz (GTEMP is subsequently increased to 6.0 above contact 135 where Humidity data ceases, allowing greater changes in lapse rate between the larger Reference intervals later in flight). M1 is made unity as if under normal conditions. Quantities TSL, ESL, TR1, INCH, JKR, NOH, JKP, ICM, JKR1, ICR, and KROSS are initialized zero.

Upon each call of DECOM, the variables T, D, DWELL, D, and TB are defined from the condensed point COND to be processed.

Forward-Assign

Channel Decommutation.

Contiguous condensed points or dwells whose frequencies exceed the reference threshold RFL are accumulated (S.220) for a mean frequency and are assigned channel number 2. The channel number for each condensed point is also remembered in INCH, for use in processing the next condensed point. The index of the first dwell of a Reference group is retained in JKR (S.200). Upon arrival of a reference DWELL, COND(3,) = D > RFL, the value INCH = 2 indicates that the arriving dwell is a continuation of the preceding dwell, whereas INCH = Ø signifies that the arriving dwell is the first dwell after launch. If INCH is neither Ø nor 2, the arriving dwell is taken as the beginning of a new Reference group of dwells; i.e., a baroswitch contact switch point. The group may consist of more than one dwell (COND element), depending on the variation of the signal over the group.

Signal dwells which are not Reference points, COND(3, = D < RFL, which immediately follow a Reference, INCH = 2, if not after the first Reference of the flight, JKØ ≠ 0, send control to Process "B" (S.600) discussed below. If after the first Reference, JKØ = 0, the point is taken as a Temperature dwell. Points assigned to the Temperature channel are used to adjust the temperature tracker variables ESL (S.782), DSL (S.781), and TSL. The temperature tracking gate position at a subsequent time TB is computed (S.78):

$$TF = DSL + ESL*(TB - TSL)$$

Dwell frequencies D falling within GTEMP of TF are accepted as Temperature data. Dwells falling outside this gate but immediately following a Reference, i.e., when

$$NOH = \emptyset, \quad JK\emptyset \neq 0, \quad T < TR + 0.8*SLOPE$$

or when

$$NOH = 1, \quad INCH = 2$$

are accepted as Temperatures and are used to correct or "recapture" the temperature gate (S.7831). NOH = 0, 1 signifies the humidity-no humidity regions of flight defined by contact number 135. Dwells not accepted under the above conditions are processed as Humidity data (S.785) if NOH = 0, or are rejected (S.784) if NOH = 1.

Inter-Reference Contact Number Determination

Dwells to be processed as Humidity (S.785) which are not "switch points", INCH ≠ 1, are accepted as "data points" of Humidity groups (S.788). If, however, the dwell follows a Temperature, INCH = 1, it is treated also as a baroswitch contact switch point. If it is the first such point, ICM = 0, the contact number is computed as the next integer greater than the decimal contact number, ICR1 (ICRØ in MAIN), associated with the surface pressure at balloon launch. The contact time rate SLOP2 is also computed for use in computing subsequent contact numbers. Subsequent contact numbers are computed according to elapsed time, (T-T2), from

the preceding contact number ICM ≠ 0 and according to the contact time rate SLOP2. After two Reference switch points have occurred, SLOP2 is computed from the preceding inter-Reference time interval. When a computed Humidity contact number exceeds the next expected Reference contact number, the switch point is rejected, ICOND(1,) = 6, and "back-assigning" is requested, KROSS = 1, over the entire inter-Reference interval. Such a condition is caused by erroneous decommutation (channel crossovers), by momentary balloon descents ("dip"), or by baroswitch or signal irregularities.

Process Reference

When a non-Reference dwell is encountered immediately following a complete (JKØ ≠ 0) Reference group (INCH = 2), then control is sent to Process "B" (S.600) where, first, the Reference group is processed. The mean frequency and cumulative dwell time over the Reference group are assigned to the leading dwell COND(, JKR).

If it is the first Reference group (ICR = 0), its contact number is computed as the next multiple of five integer greater than the decimal contact number at launch (ICR1), plus an additional multiple of five for each whole multiple of 90 seconds contained in the time interval from launch to TR seconds.

$$ICR = (ICRB1 + ICRB) * 5 * ML$$

where

$$ICRB1 = ICR1/(5*MLT)$$

$$ICRB = TR/90. + 0.5$$

$$\geq 1$$

Ninety seconds is a sufficiently valid estimate for the inter-Reference time interval. The resulting contact number ICR accommodates missing first References.

Succeeding Reference contact numbers are incremented by 5*M for contact numbers less than or equal to 135 and by M for contact numbers greater than 135. The intercontact time interval SLOPE is computed assuming no Reference switch points were missed (M = 1) and compared to the previous value (SLOP1) to verify or determine the correct value for M.

$$M = SLOPE/SLOP1 + 0.5$$

When $M \neq 1$ and recomputation of ICR is required, the fact is remembered, $M1 = M \neq 1$, to inhibit later "back-assigning" over such inter-Reference intervals. $M-1$ is the number of References missing.

When $M < 1$, signifying too early a Reference contact, baroswitch reversal is assumed (by setting $M1 = -1$) and the switch point is ignored. Such cases can be due to balloon "dip" (temporary descent).

After accepting a Reference switch point (S.645), GTSW is computed for use in back-assigning, described below. At contact

number 135 (ICR = 13500) the NOH flag is set to unity, the corresponding time TNOH is set, and the temperature gate half-width GTEMP is increased to 6 Hz.

If the mean frequency of the Reference group, COND(3, JKR) (S.120), is less than the High Reference threshold, PFL, both PFL and RFL are adjusted to follow:

$$RFL = 0.6*RFL + 0.4*(COND(3, JKR) - 10.0)$$

$$PFL = 0.6*PFL + 0.4*(RFL + DRPFL + 10.0)$$

Otherwise the Reference is taken as a High Reference (S.130) and the Reference-High Reference difference is adjusted:

$$DRPFL = 0.6*DRPFL + 0.4*(COND(3, JKR) - RFL - 10.0)/2$$

If the High Reference is not the first one, tests are made to determine whether a High Reference was missed, and the next expected High Reference contact number NXTP is defined.

Finally, in processing Reference points, the dwell, COND(, JKR-1), immediately preceding the Reference is again defined a temperature datum. If this requires a change in ICOND(1, JKR-1), then the temperature frequency gate is "recaptured" and back-assigning is requested (KROSS = 1).

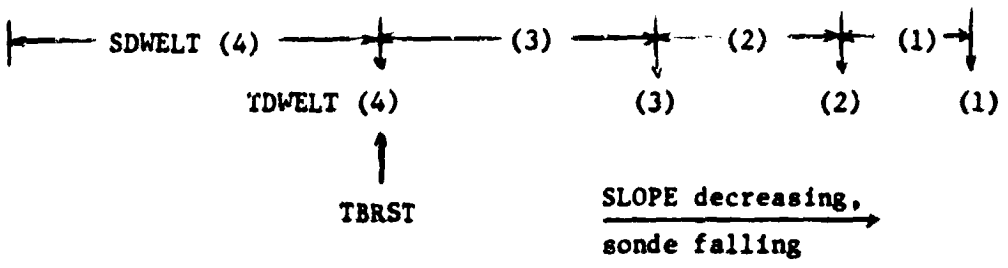
Test for Burst

When Reference switch time TR exceeds 3000 seconds (50 min-

utes from launch), two tests for balloon burst are performed. The principal test (S.951 + 1) simply computes the time (TBRST) corresponding to the manually input decimal contact number at burst (CBRST). That is, when ICR reaches the contact number just preceding burst, TBRST is computed according to the fraction of the contact interval remaining before burst.

$$TBRST = TR + (CBRST - AINT(CBRST))*SLOPE$$

The alternate test automatically determines the time of burst by detecting the sudden decrease in intercontact time SLOPE. A running mean (SDWELT) over the preceding four contact periods (SLOPE), excluding SLOPE < 15 seconds (interpreted as baroswitch noise), is examined at each reference switch time to detect a sudden decrease. When three successive decreases (IBRST = 3) in this smoothed SLOPE occur, burst time is assigned to the third preceding contact switch point. TBRST = TDWELT(4)



Manual burst input CBRST routinely should be supplied to terminate data processing before burst to avoid spurious data conditions at apogee.

Back-Assign

When indications of error occur in the forward-assigning process above, back-assigning is automatically requested (KROSS = 1) for the respective inter-Reference interval. Back-assigning incorporates the additional advantages of using the value of contact time rate, SLOPE, computed over the inter-Reference interval to which it is being applied (instead of using SLOPE computed from the preceding interval), and of using time gates as well as frequency gates for discriminating Temperature and Humidity points. Back-assigning is ineffective, however, if the contact rate is irregular as in the cases of balloon dip or missed reference switch points. In such cases back-assigning is prevented (M1 ≠ 1).

The nearest contact number, NCT, to a given dwell is computed, along with its estimated time, TØ.

$$TS = (TN - TR1)/SLOPE$$

$$NCT = TS + 0.5$$

$$T\emptyset = FLOAT(NCT)*SLOPE + TR1$$

The expected frequency, TFN, of the temperature signal is computed from the temperature tracking parameters DSLN and ESLN computed previously at TSLN,

$$TFN = DSLN + ESLN*(TBN - TSLN)$$

A dwell which falls in the frequency gate,

$$TFN \pm GTEMP$$

or lies on either side of a Reference (NCT = 0, 1, 5), and whose midtime TBN falls GTSW seconds before its nearest expected contact switch time TØ, is accepted as a temperature point. Before proceeding to the next older dwell, the temperature tracking parameters are updated according to the frequency DN and time TBN of the accepted temperature point.

$$ESLN = 0.8*ESLN + 0.2*(DN - DSLN)/(TBN - TSLN)$$

$$DSLN = 0.8*DSLN + 0.2*DN$$

$$TSLN = TBN$$

except if ESLN changes too suddenly, more than 0.2 Hz/s, it is left unchanged. This protects against gate-stealing by noise.

A dwell not accepted as a temperature point is next considered as a contact switch point. If:

a. Its leading edge time TN falls within GTSW seconds of its nearest expected contact switch time TØ, and

b. Its frequency is not within the temperature frequency gate, and

c. Its nearest expected contact switch time is between (not including) the References ($0 < NCT < 5$), and

d. It is the leading dwell satisfying these conditions for a

given contact number NCT,

then it is accepted as a contact switch point. It is assigned contact number

$$ICOND(2, \ ) = ICOND(2, JKR1) + NCT$$

and channel number 4 (Humidity) datum.

A dwell not accepted as a temperature nor a switch point under the conditions above, but was accepted as a temperature in the forward-assigning process, is accepted as a temperature point. All other dwells treated in back-assigning are rejected.

Before resuming the forward-assigning process (S.78), the quantities JKR1, TR1, and JNSTRT are advanced in case back-assigning is requested for the next inter-Reference interval, ICR1, SLOP1, T2, SLOP2 are advanced for use in forward-assigning, and M1, KROSS are reinitialized (S.188).

Optional Diagnostic Print

Printout during execution of subroutine DECOM includes optional as well as warning messages. When input TEST(9) is unity (greater than 0.01), internal back-assign quantities are printed. Until dwell time T exceeds input TEST(8), forward-assign quantities are printed at each exit of DECOM.

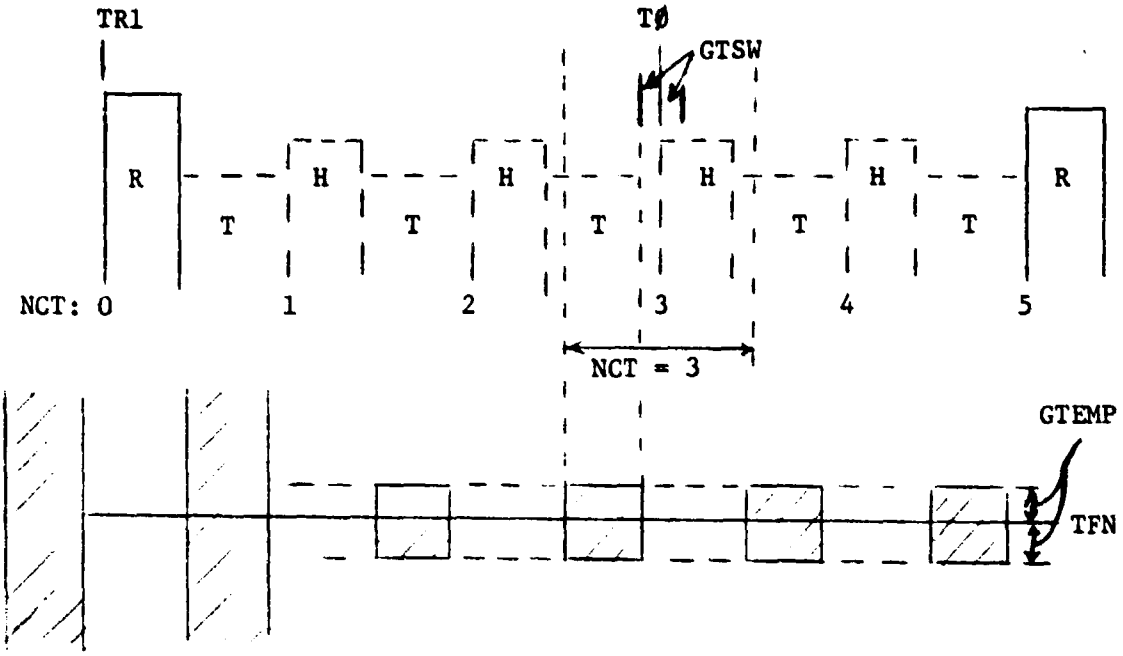
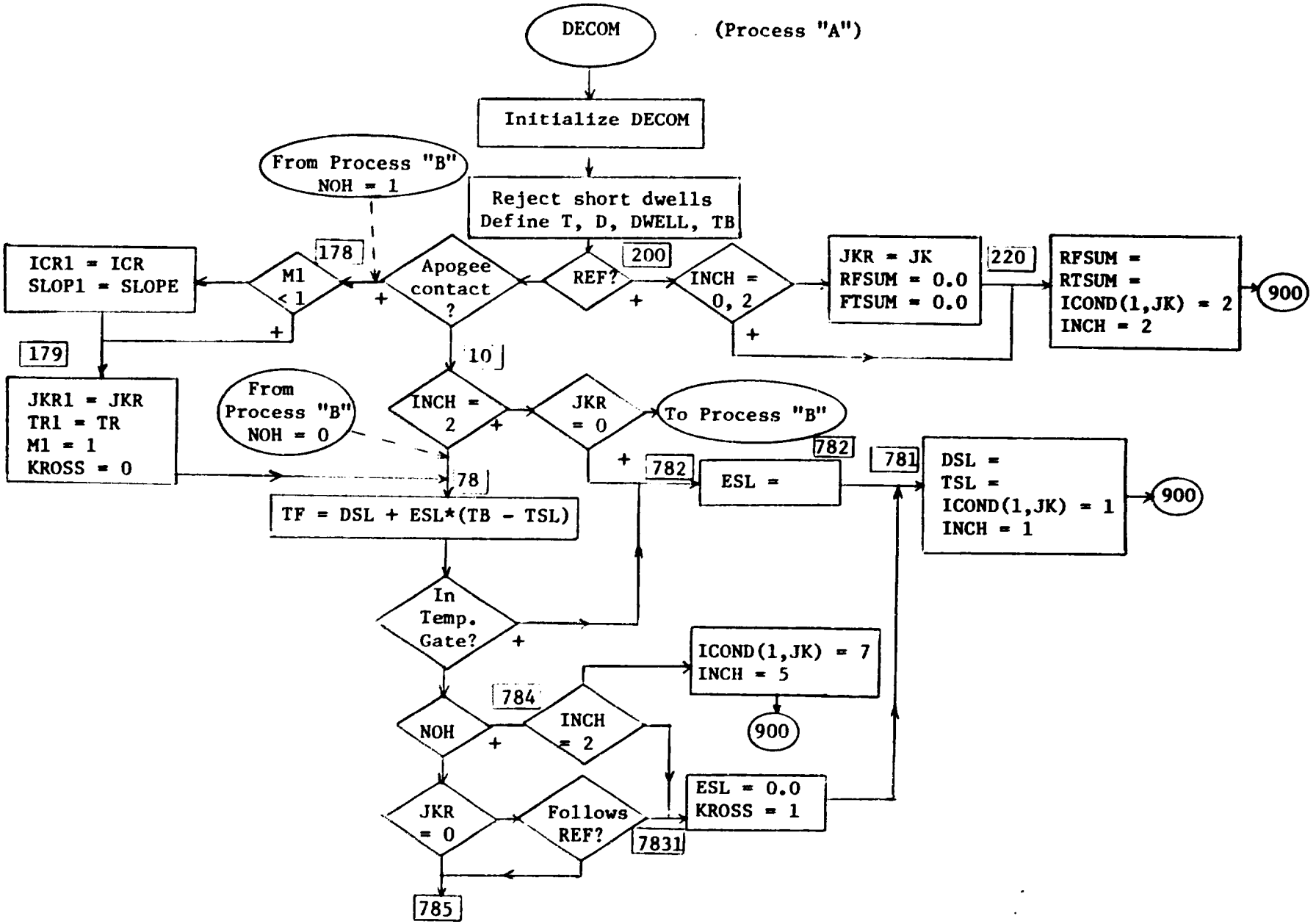
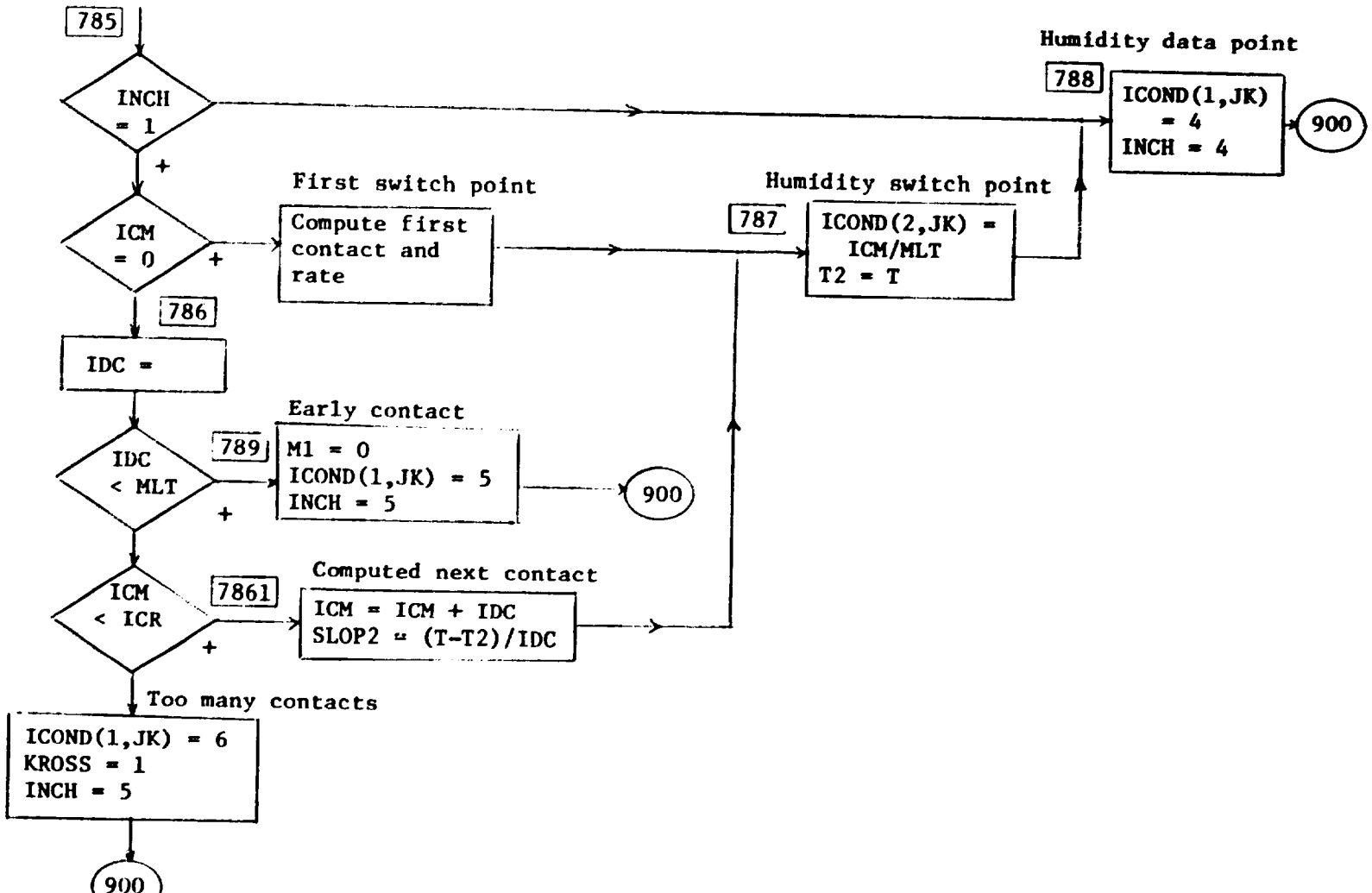


Fig. 5. In back assigning, a dwell whose midtime TBN and whose frequency DN fall within the shaded region is accepted as a Temperature point.

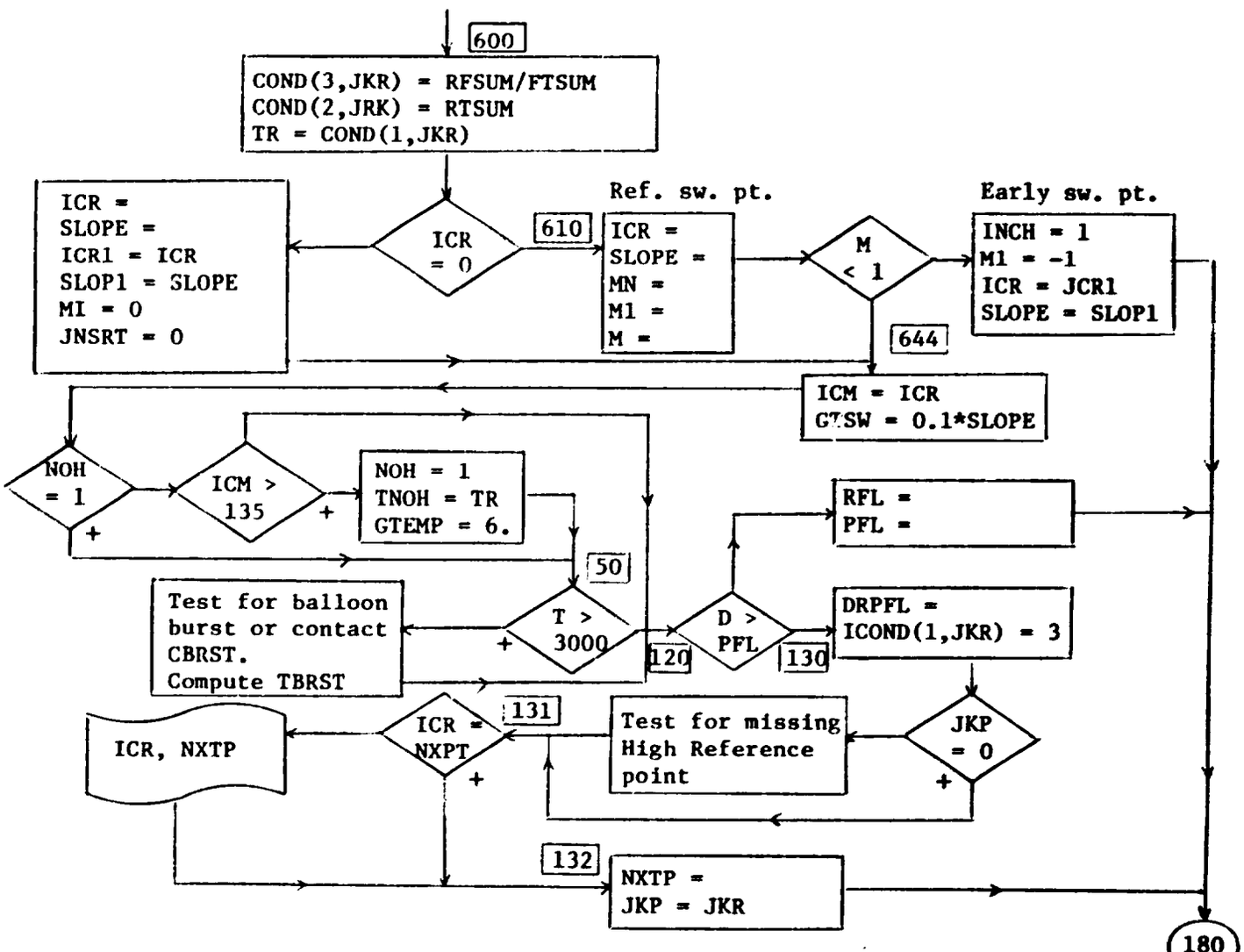
Flow Diagram



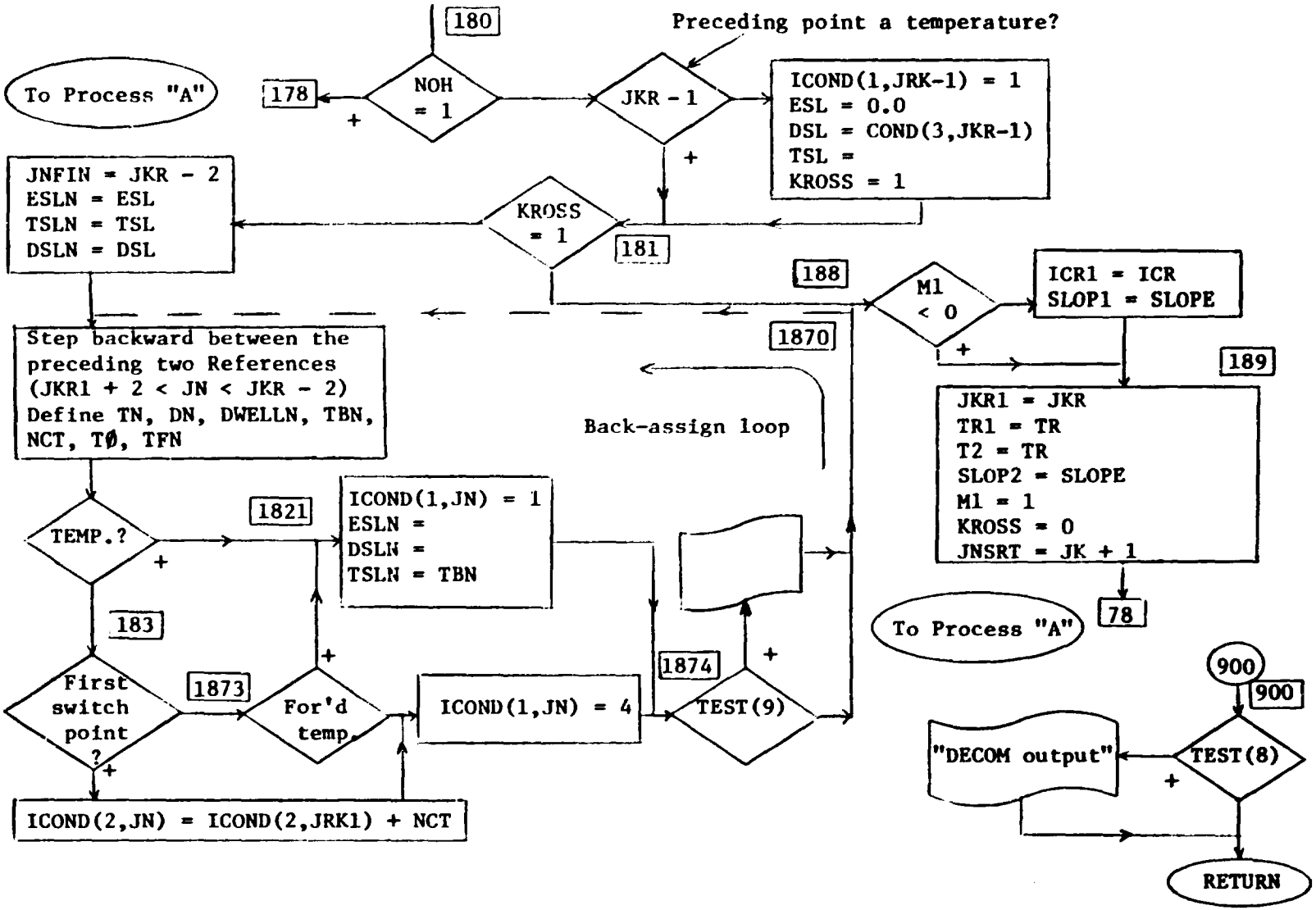
DECOM (Process "A") (continued)



DECOM (Process "B")



DECOM (Process "B") (continued)



CALL List, DECOM (Ref.: List of Variables, below)

Variable	Flow	Comments
COND(3, 1000)	From TRACK via MAIN	Condensed data points
JK	From SEARCH via MAIN and TRACK	Index of COND(, JK)
ICOND(2, 1000)	To INTERP via MAIN	Channel and contact numbers of COND, computed by DECOM
TNOH	To MAIN for INTERP (large initial value from MAIN)	Time at baroswitch contact number 135
DSL	Initial value from MAIN	Temperature gate position at launch
TEST(10)	From MAIN (card input)	Controls for diagnostic printout
ICR1	From MAIN (initial value)	Effective contact number at launch

List of Variables, DECOM

AMLT — Multiplier, real form (AMLT = 100.), used in the computation of baroswitch contact numbers for more precision.

CBRST — Effective baroswitch contact number at balloon burst, real form (XXX.XX).

COND(3, 1000) — Real array, condensed data:

COND(1,) = elapsed time from launch (seconds) to the leading edge of the dwell.

COND(2,) = duration (seconds) of the dwell.

COND(3,) = mean signal frequency (hertz) of the dwell.

D, DN — Same as COND(3,), used in forward- or back-assigning processes, respectively.

DRPFL — Running difference (Hz) between High Reference and previous low Reference. Initial value set equal 2.

DSL, DSLN — Temperature gate position (Hz) computed and used in forward- or back-assigning processes, respectively.

DWELL, DWELLN — Same as COND(2,), used in forward- or back-assigning processes, respectively.

DWELT — Baroswitch period (seconds/contact), used in automatic detection of balloon burst.

ESL, ESLN — Slope (Hz/second) of Temperature signal frequency, used in first-order extrapolation of Temperature gate, in forward- or back-assigning processes, respectively.

ESL1, ESLN1 — Previous value of ESL, used if computed value ex-

ceeds a maximum change, in forward- or back-assigning process.

GTEMP — Half-width (Hz) of the Temperature gate.

GTSW — Half-width (seconds) of the contact switch gate, used in back-assigning process.

I — Index (arbitrary), used in printing statement.

IBRST — Counter used in automatic detection of burst.

ICM — Integer indicating baroswitch contact number, multiplied by MLT = 100, $0 \leq ICM \leq 18000$.

ICOND(2, 1000) — Integer array, condensed data:

ICOND(1,) = channel number:

1 Temperature

2 Reference

3 High Reference

4 Humidity

≥ 5 Undecommutated

ICOND(2,) = baroswitch contact number, 1-180.

ICR — Computed contact number of the current Reference point, multiplied by MLT = 100.

ICR1 — Stored value of preceding ICR.

ICRB — Number of Reference contacts from ICRB1 to the first one detected.

ICRB1 — Contact number of the Reference contact "lower" than that at launch.

IDC — Change in contact number since the last detected contact switch time. Usually unity.

INCH	Channel of preceding dwell.
IS, ISS	Indices used in automatic detection of balloon burst.
ITCNT	Counter used for labeling diagnostic printout, TEST(8).
JK	Index of condensed point, or dwell, COND(, JK), being processed by DECOM (in forward-assigning).
JKP	Index of the previous High Reference switch point.
JKR	Index of the current Reference switch point.
JKR1	Index of the previous Reference switch point.
JN	Index of condensed point, or dwell, COND(, JN), being processed in back-assigning process.
JN1	JN-decrementing variable in back-assigning DO-loop.
JNF1N	First, largest, index JN in back-assigning process.
JNLCT	Value of index JN at preceding humidity point.
JNSTRT	Last, smallest, index JN in back-assigning process.
KROSS	Flag requesting (KROSS = 1) back-assigning. Set under conditions which indicate errors in forward-assigning process, e.g., T-H crossover, etc.
LCT	Value of contact number ICOND(2, JNLCT) assigned to the preceding humidity point.
M	Integer used in computing contact number, represents increment of contacts according to elapsed time.
M1	Flag indicating irregular contact progression (M1 ≠ 1) which contraindicates back-assigning.

MLT	Multiplier constant (MLT = 100) which serves to increase precision in contact number computation.
MM	Inert tag used for diagnostic purposes in back-assigning process.
NCT	Integer used in back-assigning process. Represents contact number increment from the earlier Reference contact number ICOND(2, JKR1).
NOH	Integer indicating state below (NOH = 0) or above (NOH = 1) contact number 135.
NXTP	Number of next expected High Reference.
PFL	High Reference threshold (Hz), used to discriminate High and low Reference.
RFL	Reference threshold (Hz), used to discriminate Reference dwells from Temperature and Humidity dwells.
RFSUM	Summation variable (Hz) for computing the mean frequency over a Reference group.
RTSUM	Summation variable (seconds) for computing the mean frequency over a Reference group.
SDWELT	Running mean over four DWELT.
SLOP1	Stored SLOPE from preceding inter-Reference interval, used in computing (forward-assigning) Reference switch point contact number.
SLOP2	Stored SLOPE from preceding contact interval, used in computing (forward-assigning) Humidity switch point contact number.

SLOPE	Mean contact time rate (seconds/contact) between the preceding two Reference switch points.
T, TN	Switch time, time (seconds from launch) of leading edge of the current dwell for condensed point. Same as COND(1,), in forward- or back-assigning processes, respectively.
TØ	Switch time of nearest expected contact, in back-assigning.
T2	Switch time of preceding contact, in forward-assigning, used to compute contact number from elapsed time.
TB, TBN	Midpoint time ("T-bar") of the current dwell (seconds from launch).
TBM	Time of burst (minutes from launch) from automatic detection of balloon burst, for auxiliary printout only.
TBRST	Time of balloon burst (seconds from launch) computed from CBRST or from automatic detection of burst.
TDWELT	Time (seconds from launch) corresponding to DWELT and SDWELT.
TEST(10)	Input control of diagnostic printout, TEST(8) and TEST(9) only, used in DECOM.
TF, TFN	Expected frequency (Hz) of the next Temperature dwell, center frequency of Temperature gate in forward- or back-assigning processes, respectively.

TNOH	Time (seconds from launch) of contact 135, at which humidity data terminates.
TP1	Time (seconds from launch) of the preceding High Reference switch point, used in detecting and correcting for missed High Reference points.
TP12	Expected time (seconds) between High References, used in detecting and correcting for missed High References.
TR	Switch time (seconds from launch) of the current Reference point.
TR1	Switch time (seconds from launch) of the preceding Reference point.
TS	Estimated number (real) of contact numbers from TR1 to TN, used in computing the nearest contact number in back-assigning.
TSL, TSLN	Time (seconds from launch) of the previously-computed Temperature dwell from which the Temperature gate is extrapolated, used in forward- or back-assigning, respectively.

SUBROUTINE INTERP

Description

The primary purpose of INTERP is to construct a table of Pressure (mb), Reference frequency (Hz), Temperature (ordinates), and Relative Humidity (ordinates) values at one-minute intervals from the surface to balloon apogee (burst), to be used as input data to ECC-PRD. NASA computer program ECC-PRD, used without ozonesonde inputs, produces the final output of the RAWINSONDE data processing system.

INTERP receives decommutated sonde data as asynchronous samples COND(, i), ICOND(, i), i = 1 to JK, the one-minute table to be completed VL(i, j), i = 4 to 7, j = 1 to LIST, surface values V2(i), i = 4 to 7, the baroswitch pressure calibration function PCAL(i), i = 1 to LCNTK, the time of flight at the end of humidity data, TNOH, and at the end of all data, TBRST, and the diagnostic printout control input, TEST(6). INTERP computes the values which complete the table VL and defines ISTOP = 10 when it reaches the time of balloon burst (TBRST) in the data, or ISTOP = 2 if it reaches the last baroswitch contact calibrated (LCNTK). The last contact number used by INTERP is sent back to MAIN for printout in case ISTOP = 2.

Interpolation

Linear interpolation is performed in each of the four variables: contact number, Reference (Hz), Temperature (ordinates), and Humidity (ordinates). Bracketing values T1(IV), V1(IV),

T2(IV), V2(IV),in the condensed data (COND, ICOND) for a given one-minute level, L, are accepted for each variable according to the following tests.

For contact number (IV = 4) only the first-occurring time of a given contact number is used, and no contact number is used if the condensed point was finally determined undecommutated, ICOND(1,) ≥ 5, or if the contact number exceeds the highest contact number calibrated, LCNTK.

For Reference frequency (IV = 5), only the frequency of Reference switch points (those whose frequencies were computed by DECOM over the entire group of reference dwells) are accepted.

For Temperature (IV = 6), only dwells which have nonzero mean frequency are accepted. The frequency value is converted to ordinates with the use of the local Reference frequency VL(5, L) according to

$$V2(6) = 95.*COND(3, I)/VL(5, L)$$

The time is taken as that at the midpoint of the dwell.

$$T2(6) = COND(1, I) + COND(2, I)/2$$

For levels beyond the last temperature dwell, e.g., during a Reference dwell just before balloon burst, the extrapolating quantities are chosen to be the one-minute values at the two preceding levels. This is done to avoid possible large errors resulting from

extrapolation from short-time-base variable temperatures which may occur in the data.

For Humidity, frequencies less than 5 Hz are excluded. The time T2(7) and ordinate V2(7) are computed in the same way as for Temperature. No values are computed beyond contact 135, i.e., beyond time TNOH.

For all four variables, no condensed data (COND, ICOND) is used which exceeds JK in index or TBRST in time.

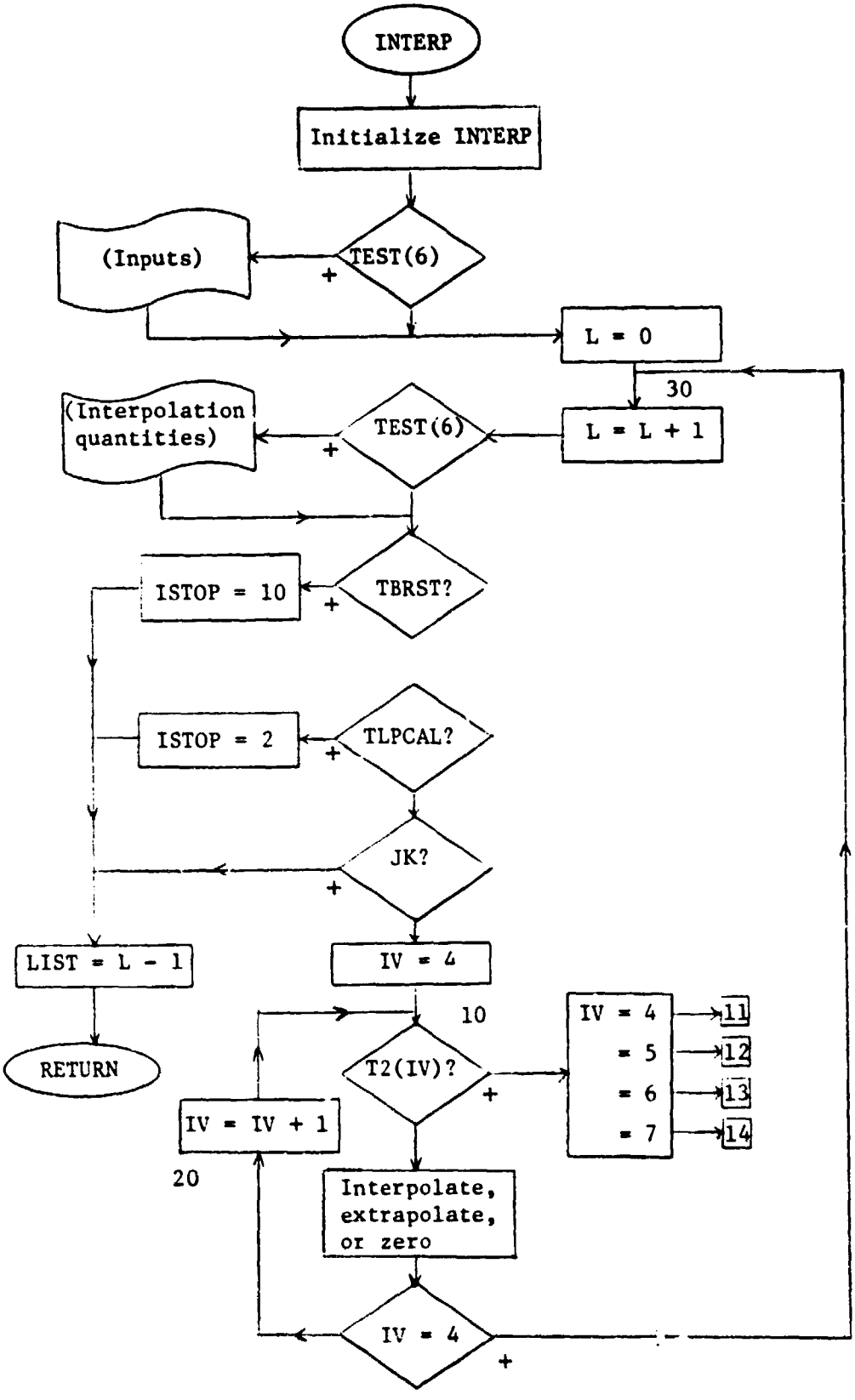
Diagnostic Printout

Interpolation quantities during the first and last 30 minutes of the flight are printed for diagnostic purposes if input value TEST(6) is greater than 0.01 (e.g., TEST(6) = 1). Included in this printout are the input quantities JK, LIST, TNOH, V2, and TBRST.

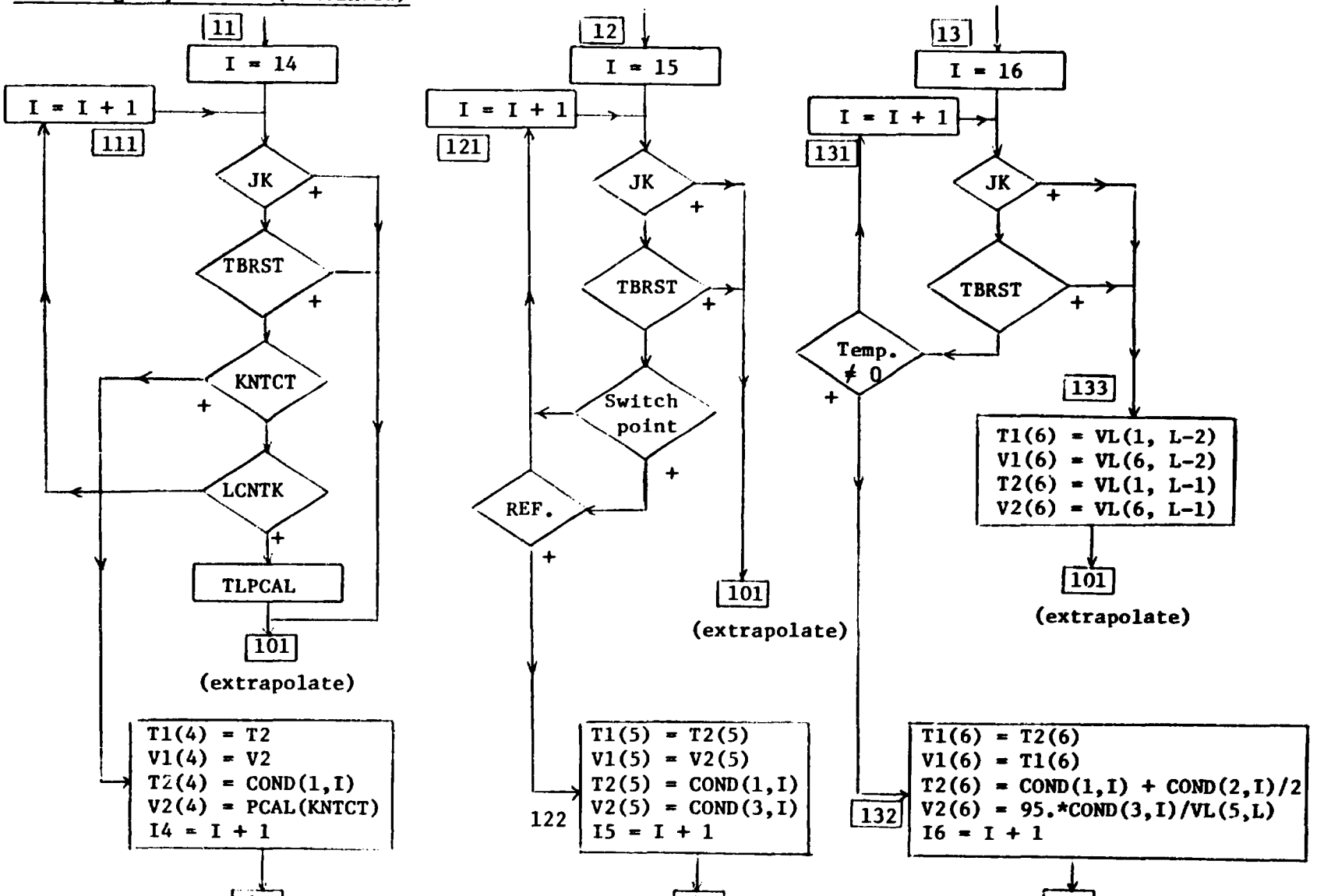
Signal Dropout

Zeroes are entered in the one-minute table (VL) at levels where no measurement data, COND(,), are within ALOSS seconds of the one-minute level. ALOSS is 200., 600., 100., and 100. seconds for pressure, Reference frequency, Temperature, and Humidity, respectively.

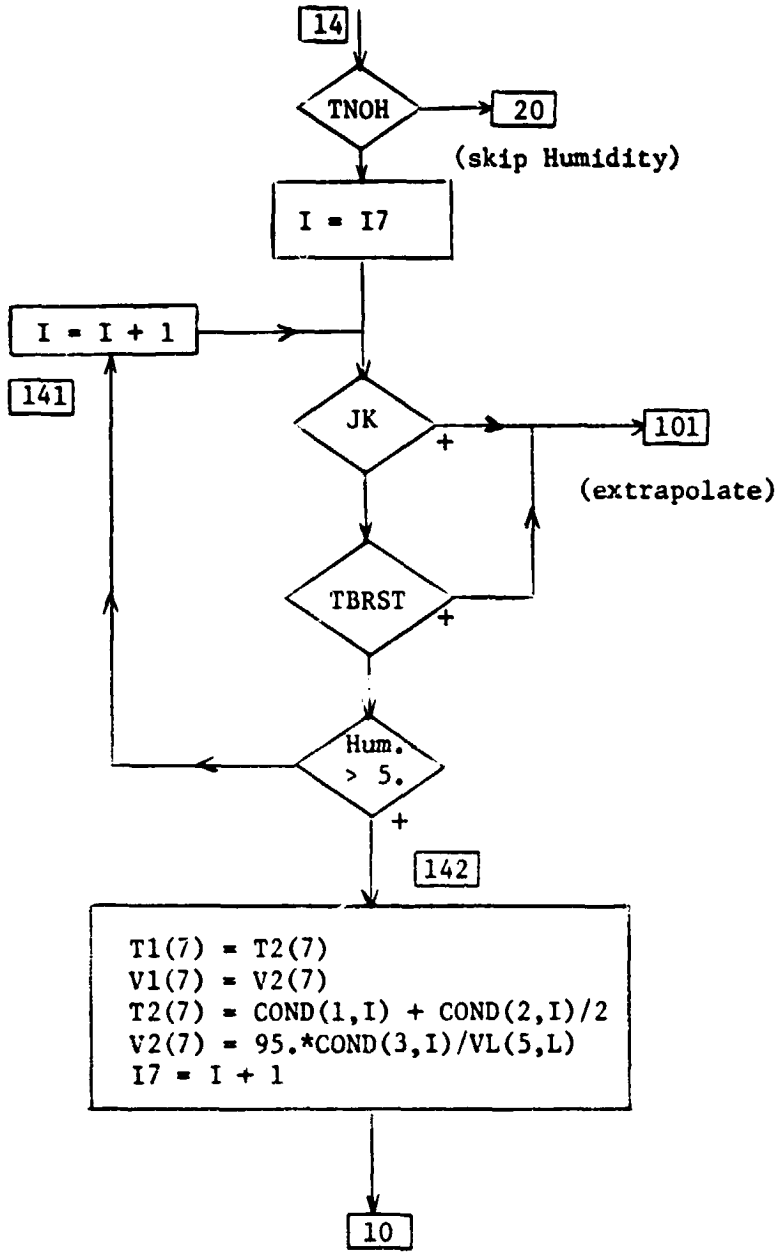
Flow Diagram, INTERP



Flow Diagram, INTERP (continued)



Flow Diagram, INTERP (continued)



CALL List, INTERP (Ref., List of Variables, below)

Variable	Flow	Comments
ICOND(2, 1000)	From DECOM via MAIN	Channel, contact number, asynchronous data
COND(3, 1000)	From Condenser, SEARCH via TRACK and MAIN	Time, dwell, frequency, asynchronous data
JK	From condenser, SEARCH via TRACK and MAIN	Count, of COND, ICOND, condensed points
PCAL(180)	From Initializer MAIN	Baroswitch contact calibrated pressures
TNOH	From DECOM via MAIN	Time at contact 135, when humidity data stops
TBRST	From DECOM via MAIN	Time of burst, apogee
ISTOP	To Terminator MAIN	Terminal condition indicator
LCNTK	From Initializer MAIN	Highest contact number calibrated
KNTCT	To Terminator MAIN	Last contact number used by INTERP
V2(7)	From Initializer MAIN	Upper bracketing quantities, become initial (surface) values of VL
TEST(10)	From Initializer MAIN	Diagnostic printout control, input

List of Variables, INTERP

ALOSS(7)	Maximum time (seconds) away from the nearest datum that a value VL is interpolated. Zeroes are substituted in regions remote from measured data.
COND(3, 1000)	Condensed data from Condenser (see MAIN).
DLIST	Time interval (60 seconds) between interpolated levels VL.
I	DO-loop index, used in initializing V1 and T2, also used in searching for bracketing COND for one-minute interpolation.
I4, I5, I6, I7	"Place markers" which permit starting the search for the next bracketing COND(i,) from the previous one.
ICOND(2, 1000)	Channel and contact number corresponding COND. (See DECOM.)
IJ	Pointer (IV-3) for conditional GO TO statement in time-bracketing process for interpolation.
IOUT	Print file number (File Ø6), IOUT = 6.
ISTOP	Terminating condition indicator, ISTOP = 2, or = 5 if contact number LCNTK, or time TBRST is encountered, respectively.
IV	Index indicating variable: contact (pressure), 4; Reference, 5; Temperature, 6; or Humidity, 7.
JK	Length of the filled COND, ICOND array, JK rows.
KNTCT	The last contact number used by INTERP.
L	The row index of the one-minute table VL.

LCNTK	The last contact number calibrated in the PCAL table.
LIST	The used length of the VL table.
PCAL(180)	The calibrated pressure values at the baroswitch contacts.
T1(7), T2(7)	Time (seconds from launch) of the bracketing COND, ICOND at a given one-minute level L.
TBRST	Time (seconds from launch) of balloon burst.
TEST(10)	Diagnostic print control inputs (see MAIN). INTERP prints interpolator quantities if TEST(6) > 0.01, e.g., if TEST(6) = 1.
TLPCAL	Time (seconds from launch) that contact LCNTK is encountered. It causes termination of data processing.
TNOH	Time (seconds from launch) that contact 135 was encounterd in DECOM. No Humidity data is processed thereafter.
V1(7), V2(7)	Bracketing quantities from COND, ICOND array for a given one-minute level L.
VL(7, 150)	One-minute table produced by INTERP (and by ADVANC).

VL(1,) = Time (seconds from launch)

VL(2,) = Azimuth (degrees)

VL(3,) = Elevation (degrees)

VL(4,) = Pressure (mb)

VL(5,) = Reference frequency (Hz)

VL(6,) = Temperature (ordinates)

VL(7,) = Humidity (ordinates)

REFERENCES

1. Radiosonde Observations, Federal Meteorological Handbook No. 3, January 1, 1969, U. S. Department of Commerce and U. S. Department of Defense, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C.

2. ECC-PRD, NASA Computer Program 3.0.0700, NASA Wallops Computer Program Abstracts, Vol. XXVII.

APPENDIX A

PROGRAM LIST

(RAWINPROC)

The FORTRAN program list of RAWINPROC given below is included for reference. The few handwritten annotations indicate certain details assumed in the main body of the document which, in fact, differ from the program version existing and "frozen" at delivery of this document. They are at most minor improvements in that they do not affect program performance greatly. Those which may have noticeable effect are:

a. MAIN line No. 55, which extends applicability to negative input values of TSTART.

b. MAIN line No. 155, which corrects a minor error in the ultimate values of the temperature and humidity near the surface.

c. ANGLE line No. 39, which would provide smoother angles for wind computation.

d. SEARCH line No. 65, which would more accurately exclude short dwells from DECOM.

e. DECOM lines No. 168-169, which eliminate erroneous assignment of contact number in certain cases.

f. DECOM lines No. 326-327, which skip short dwells (as intended).

g. DECOM line No. 336, which retains, in some cases, the Temperature dwell adjacent to a Reference dwell.

The annotation at DECOM lines No. 356 and 358, though valid, is not

necessary since INTERP ignores repeated contact numbers. Other annotations delete some of the obsolete (inert) code and update some of the comments.

```
      *                    RAWINPROC PROGRAM - UNIV. OF UTAH
      *
            COMMON /TABLES/ VL,LIST,DLIST
            COMMON /SIGNAL/ SIGMAX,SIGMIN,HGATE,IN,SIGLEV,NSUM,FSUM
             COMMON /MANUAL/ TBRST,CBRST
            COMMON /IO/ICIN,IOUT,ITYPE
             DIMENSION AZ(10),EL(10),TIME(10),FREQ(10)
             DIMENSION VL(7,150),V2(7)
            DIMENSION ICOND(2,1000), COND(3,1000)
            DIMENSION  PCAL(180),TEST(10)
             DIMENSION DUM(18)

            CHARACTER*80 LINE
            CHARACTER*1 ITYPE,ITY
            CHARACTER*6  LDATE,LTIME,ID
            CHARACTER*5  ISTT1,ISTT2
      C
      C
      C     ASSIGNMENTS:    #01 = METPASS#.
      C                     #02 = CONDOUT.
      C                     #03 = CONDPASS#.
      C                     #05 = INPUT (CAN CHANGE)
      C                     #06 = OUTPUT (CAN CHANGE)
      C
      C
      *
            READ(5,11)IOIN,IOUT,ITYPE
       11   FORMAT(2I2,2X,A1)
            IF(IOIN .EQ. 0)IOIN = 5
            IF(IOUT .EQ. 0)IOUT = 6
      C
      C
            WRITE(IOUT,9998)
       9998 FORMAT(1H1,131('*')/1X,10('*'),111X,10('*'),
           *  /1X,10('*'),38X,'     CONDENSER',
           *  '/DECOMMUTATOR PROGRAM ',37X,10('*')/1X,10('*'),
           *  111X,10('*')/1X,131('*'))
             WRITE(IOUT,9997)
```

```
      9997 FORMAT(//107X,'UNIV. OF UTAH   JAN. 1981',///)
           WRITE(IOUT,9999)
      9999 FORMAT (1X,45X,'********** INPUT  DATA **********'//)
C          RUNNING TIME, T, IS SECONDS ELAPSED AFTER LAUNCH.
C           *** TPROC IS THE TIME INTERVAL (SEC)TO BE PROCESSED,
C           *** BEGINNING AT TSTART SECONDS AFTER LAUNCH.
C               TLANCH = BALLOON RELEASE TIME OF DAY
*
           READ(IOIN,10002) I1,I2,TS3,TPROC,TSTART
10002       FORMAT(I2,I3,1X,F4.1,2F10.2)
           WRITE(IOUT,10004)I1,I2,TS3
10004       FORMAT(' BALLOON RELEASED AT ',2(I2,1H:),F4.1)
C
C          CONVERT I1(HOURS),I2(MIN),TS3(SEC) TO SECONDS
C
           TLANCH = I1*3600. + I2*60. + TS3
            IF (TSTART .LT. .01) TSTART = - 120.
           IF (TPROC .LT. .01) TPROC = 10000.
           TSTOP = TPROC - TSTART
            WRITE(IOUT,10003) TSTART,TPROC,TSTOP
10003 FORMAT(//1X,'TSTART =',F10.2,15X,'TPROC = ',F10.2,15X,
     +  'TSTOP =',F10.2//)
*
C           *** LINENO IS THE NUMBER OF LINES PER PAGE TO BE PRINTED
*
            LINENO=40
C
*
C           *** OPTIONAL DIAGNOSTIC PRINTS
C          FOR TEST1, SET TIME INTERVAL, TEST2 TO TEST3  (ADVANCE S.53,
C                SEARCH S.10, TRACK S.672 )
C          TEST4  USED IN SEARCH S.3002, S.3003, S.3006)
C          TEST(5)     NON ZERO CAUSES WRITE OF COND MATRIX TO UNIT IOUT
C                           (SEARCH S.3001)
C          TEST(6)    NON ZERO VAL CAUSES WRITE IN 'INTERP' ( S.1 )
C          TEST(7)   POSITIVE VAL. CAUSES UNINTERPOLATED COND/ICOND MATRIX WRITE
C                     ( MAIN S.95 )
C          TEST(8)    USE IN DECOM ( S.900 )
```

ABS(TSTART)

C-2

```
C     TEST(9)  POSITIVE VALUE IN DECOM LOOP ( DECOM S.187D )
C     TEST(10)  UNUSED
*
      READ(IOIN,10006)TEST
10006 FORMAT(10F5.0)
      WRITE (IOUT,10007)TEST
10007  FORMAT(//5X,'TEST1    TEST2    TEST3    TEST4'
     +  '    TEST5    TEST6    TEST7    TEST8',
     +  '    TEST9   TEST10',
     +  /,1X,10F9.1/////)
*
*
C          INITIALIZE CONDENSER
*
      FSUM = 0.0
      NSUM = 0
*
C          LOSS OF SIGNAL FLAG LOS
*
      LOS = 0
*
C                              FOR SEARCH
C          MODE INTERVAL ( OVERLAPPING BANDS) HALF-WIDTH ( 0.5 HZ)
*
      HGATE = 1.0
*
C          SIGNAL RANGE ( SIGMIN TO SIGMAX HZ )
*
      SIGMIN = 5.
      SIGMAX = 205.
      IN = (( SIGMAX - SIGMIN )/ HGATE ) + 1
*
C          CONDENSED DATA INDEX JK, FOR ONE DECOMMUTATION CYCLE
*
      JK=0
C
```

```
      DO 1 I=1,1000
      COND(1,I) = 0.0
      COND(2,I) = 0.0
      COND(3,I) = 0.0
      ICOND(1,I) = 0
      ICOND(2,I) = 0
    1 CONTINUE
C
*
C          INITIAL EXPECTED SIGNAL LEVELS
*
*
*
*
*
*
*
*
      JJ=0
*
*               INITIALIZE TABLE
*
      DO 13 J=1,150
      DO 14 I=1,7
       VL(I,J) = 0.0
   14  CONTINUE
   13  CONTINUE
C
       TNOM = 10000.0
       ~~VL(1,1) = 0.0~~   redundant
       READ(IOIN,10017) DLIST,TGMDAQ
10017  FORMAT(2F10.1)
       WRITE(IOUT,10018) DLIST,TGMDAQ
10018  FORMAT(1X,'DLIST = ',F10.2,' SEC',10X,'TGMDAQ = ',F10.2,' SEC')
       LIST=1
      READ(IOIN,10013) FPO, FTEMPO, FRHO, FRO
10013  FORMAT(4F10.1)
       IF (FRO .LT. .01) FRO = 95.
      WRITE(IOUT,10019)FPO, FTEMPO, FRHO, FRO
```

```
      1DC19 FORMAT(' FPO =',F10.1,'  FTEMPO =',F10.1,'  FRHO =',F10.1,
     *'  FRO =',F10.1)
            V2( 4) = FPO
            V2( 5) = FRO*2.*FRO/95.
            V2( 6) = FTEMPO
            V2( 7) = FRHO
      C
      C                 SET INITIAL FREQUENCY GATES FROM SURFACE ORDINATE INPUTS
      C
             CNVOF = 2.*FRO/95.
             IF (CNVOF .LT. .01) GO TO 5
             TF = FTEMPO*CNVOF
             HF=FRHO*CNVOF
          5  CONTINUE
      *
      *                 MANUAL BURST INPUTS
      *
            TBRST = 1.E22

            READ(IOIN,1027)CBRST
       1027  FORMAT(F10.2)
            IF(CBRST .LT. .01)CBRST = 1.E22
            WRITE(IOUT,1028)CBRST
       1028  FORMAT(' EFFECTIVE CONTACT NUMBER AT BURST = 'F10.2)

             ISTOP = 0
      *
      C                 PRESSURE CALIBRATION INPUT
      *
             READ(IOIN,1C020) (PCAL(IX),IX=1,180)
             IF(PCAL(1) .LT. .01)STOP
             DIFF1=PCAL(1)-PCAL(2)
             DO 8 I=2,179
                IST=I/20
                PERC=.11+IST/100.
                DIFF2=PCAL(I)-PCAL(I+1)
                IF(PCAL(I) .GT. 0.0)GO TO 2
                IF(PCAL(I+1) .LT. 0.01)GO TO 9
          2     DIFFAV=(DIFF1+DIFF2)/2.
```

delete

```
191.                DIFFHI=DIFFAV*(1.+PERC)
192.                DIFFLO=DIFFAV*(1.-PERC)
193.                IF(DIFF2 .GT. DIFFHI .OR. DIFF2 .LT. DIFFLO)GO TO 6
194.          9     DIFF1=DIFF2
195.                GO TO 8
196.          6   IF(PCAL(I)-DIFF1 .LT. 0)GO TO 8
197.                WRITE(IOUT,100)(I+1),PCAL(I+1),PCAL(I)-DIFF1
198.          100   FORMAT(7X,' PCAL(',I3,') WAS',F10.1,' AND IS NOW',F10.1)
199.                PCAL(I+1)=PCAL(I)-DIFF1
200.          8     CONTINUE
201.               WRITE(IOUT,10024)
202.         10024 FORMAT(1H1,'BAROSWITCH PRESSURE CALIBRATION TABLE')
203.         10020 FORMAT(8F10.1)
204.               DO 30 IY = 8,176,8
205.               WRITE(IOUT,10023) IY-7,(PCAL(IX+IY-8),IX=1,8)
206.         10023 FORMAT(1X,I3,':  ',8F10.1)
207.          30   CONTINUE
208.               WRITE(IOUT,10026) (PCAL(IX),IX=177,180)
209.         10026 FORMAT(1X,'177:  ',4F10.1)
210.
211.              DO 15 JP = 1,180
212.          15   IF(PCAL(JP) .LT. FPO)GO TO 16
213.          16   ICRO = ((FPO - PCAL(JP-1))/(PCAL(JP)-PCAL(JP-1)))*100.
214.              ICRO = ICRO + (JP-1)*100
215.
216.               DO 3 LCNTK = 1,180
217.            3  IF(PCAL(LCNTK) .LT. 0.1) GO TO 4
218.            4  LCNTK = LCNTK - 1
219.
220.              AICRO = FLOAT(ICRO)/100.
221.              WRITE(IOUT,10016)AICRO,LCNTK
222.         10016 FORMAT(' EFFECTIVE CONTACT NUMBER AT LAUNCH = ',F6.2,/
223.              + ' HIGHEST CONTACT NUMBER CALIBRATED = ',I3)
224.
225.         *
226.         *
```

```
227.      *              ONLY IF USING CONDPASS1. NOT METPASS1.
228.      *
229.           IF(ITYPE.EQ.'C')GO TO 199
230.      *
231.      C
232.      C           FIND TSTART IN RAW DATA
233.      *
234.        40    CONTINUE
235.      *
236.      *                 METPASS1  (RAW DATA READ)
237.      *
238.           DO 41 J=6,10
239.            READ (01,END = 82) DUM, FREQ(J), AZ(J), EL(J), DM1, TIME(J), DM2
240.           TIME(J) = TIME(J) * 3600. - TLANCH
241.           FREQ(J) = 1000./FREQ(J)
242.         41    CONTINUE
243.           JJ = JJ+ 5
244.      C
245.            IF(TIME(10) .LT. TSTART) GO TO 40
246.            IPRINT = 0
247.            IF(ABS( TIME(10) - TIME(6) - 0.8 ) .LT. 0.6 ) GO TO  99
248.            IF(ABS( TIME(10) - TIME(1) - 1.3 ) .LT. 0.6 ) GO TO  99
249.            GO TO 40
250.      C
251.      C
252.      C*****************************************************************
253.      C
254.         99     CALL ADVANC (TIME,FREQ,AZ,EL,JJ,TSTOP,TLANCH,TGMDAQ,
255.           +  TEST,$81,$82)
256.      C
257.      *
258.            IF (IPRINT .GT. 10 )  GO TO 98
259.            WRITE(IOUT,1098)(TIME(J),J=1,10)
260.            WRITE(IOUT,1098)(FREQ(J),J=1,10)
261.            IPRINT = IPRINT + 1
262.         1098  FORMAT(1X,10F12.5 )
263.           98  CONTINUE
264.            JKMEM = JK
265.            CALL TRACK(TIME,FREQ,TEST,LOS,COND,JK,$83,$85)
```

```
266.              IF (JKMEM .EQ. JK)GO TO 99
267.              IF(  ITYPE .EQ. 'P' ) GO TO 410
268.        C
269.        C     USE WRITE TO SAVE COND MATRIX, READING METPASS#.
270.        C     USE READ  TO READ COND MATRIX, READING CONDPASS#.
271.        C
272.                 WRITE(3,198)JK,(COND(I,JK),I=1,3)
273.         198  FORMAT(' COND(',I3,'): ',3F15.8)
274.              GO TO 410
275.        C
276.         199         JK=0
277.         299       JK = JK+1
278.         2999        READ(3,399,END=82)ITY,JKT,(COND(I,JK),I=1,3)
279.         399       FORMAT(1X,A1,4X,I3,3X,3F15.8)
280.              IF(ITY .NE. 'V')GO TO 400
281.              LIST = JKT
282.              VL(1,LIST) = COND(1,JK)
283.              VL(2,LIST-1) = COND(2,JK)
284.              VL(3,LIST-1) = COND(3,JK)
285.              GO TO 2999
286.           400  WRITE(IOUT,10400)
287.        10400  FORMAT('ERROR IN CONDPASS1. READ')
288.        C
289.        C
290.        C
291.         410    CALL DECOM(COND,JK,ICOND,INOH,TF,HF,TEST,ICRD)
292.        C
293.              IF ( COND(1,JK) .GT. TORST) GO TO 84
294.        *
295.        C               ONLY IF USING CONDPASS1. NOT METPASS1.
296.        *
297.              IF(ITYPE.EQ.'C')GO TO 299
298.        *
299.        C                  @299 MEANS CONDPASS#.,, 99 MEANS METPASS#.
300.        *
301.              GO TO 99
302.        C*****************************************************************
303.        C
304.        C
```

```
 81    WRITE(IOUT,1810) TSTOP,TIME(10),JJ
       ISTOP = 7
      GO TO 90
 82    WRITE(IOUT,1820) TIME(10), JJ
       ISTOP = 6
      GO TO 90
  83 WRITE(IOUT,1830) LOS
       ISTOP = 5
      GO TO 90
 85   WRITE(IOUT,1850)
       ISTOP = 8
      GO TO 90
 84    WRITE(IOUT,1840)JK,COND(1,JK),TBRST
 1810 FORMAT(2X, '      TSTOP,TIME(10),JJ =',     2F10.1, 1110)
 1820 FORMAT(2X, 'END OF FILE,TIME(10),JJ =', 10X, F10.1, 1110)
 1830 FORMAT (2X, ' LOS = ',10X,I6)
 1840  FORMAT(/,' TIME EXCEEDS TBRST....COND(1,',I3,') =',F10.2,
     +   ' > TBRST =',F10.2)
 1850 FORMAT(' EXCEEDED COND ARRAY DIMENSION')
*
C
C
C     LIST UNINTERPOLATED COND/ICOND MATRIX
C
 90    WRITE(IOUT,1900)
 1900  FORMAT(//,' CONDENSER DONE.'/' DECOMMUTATOR DONE.'/,
     +  ' INTERPOLATION FOLLOWS.......')

      DO 196 JC = 1,JK

      IBC = ICOND(2,JC)
      IF(IBC .GT. 999)ICOND(2,JC) = IBC/1000
      IF(ICOND(2,JC) .GT. 200)ICOND(2,JC) = 0
       INDAX = ICOND(1,JC)
      IF(ICOND(1,JC).GE.10.AND.ICOND(1,JC).LE.19)ICOND(1,JC) = 1
      IF(ICOND(1,JC).GE.40.AND.ICOND(1,JC).LE.49)ICOND(1,JC) = 4
```

```
      IF (ICOND(1,JC).EQ.0.OR.ICOND(1,JC).GT.5)ICOND(1,JC) = 5

      IF (TEST(7) .LT. 0.01)GO TO 196

   95 FORMAT(1H1,' JK',6X,'TIME: OF DAY;    ELAPSED',
     +'  DWELL     TEMP.       REF. HIGH REF.  REL.HUM.   UNDECOM',
     +'   BAROSWITCH   WORKING   WORKING',
     +  /6X,' HH:MM:SS.S    HOURS MM:SS.S  (SEC)',21('-'),
     +  '--(HZ)--',21('-'),'  CONTACT #   CONTACT   CHANNEL',/)
      RT2 = (COND(1,JC)+TLANCH)/3600.
      RT4 = COND(2,JC)
      ELPT = COND(1,JC)
      IT3 = ELPT/60
      RT3 = AMOD(ELPT,60.)
      IT1 = INT(RT2)
      IT2 = (RT2-IT1)*60
      RT1 = ((RT2-IT1)*60-IT2)*60.
      IF(MOD(JC-1,LINENO) .EQ.0)WRITE(IOUT,95)
       GO TO (1910,1920,1930,1940,1950) ,ICOND(1,JC)
 1910 WRITE(IOUT,191)JC,IT1,IT2,RT1,RT2,IT3,RT3,RT4,COND(3,JC),
     +   ICOND(2,JC),IBC,INDAX
      GO TO 196
 1920 WRITE(IOUT,192)JC,IT1,IT2,RT1,RT2,IT3,RT3,RT4,COND(3,JC),
     +   ICOND(2,JC),IBC,INDAX
      GO TO 196
 1930 WRITE(IOUT,193)JC,IT1,IT2,RT1,RT2,IT3,RT3,RT4,COND(3,JC),
     +   ICOND(2,JC),IBC,INDAX
      GO TO 196
 1940 WRITE(IOUT,194)JC,IT1,IT2,RT1,RT2,IT3,RT3,RT4,COND(3,JC),
     +   ICOND(2,JC),IBC,INDAX
      GO TO 196
 1950 WRITE(IOUT,195)JC,IT1,IT2,RT1,RT2,IT3,RT3,RT4,COND(3,JC),
     +   ICOND(2,JC),IBC,INDAX
  196 CONTINUE
  191  FORMAT(1X,I3,3X,I2,1H:,I2,1H:,F4.1,F9.4,1X,I2,1H:,F4.1,F7.1,
     +     F10.2,40X,5X,I6,2I10)
  192  FORMAT(1X,I3,3X,I2,1H:,I2,1H:,F4.1,F9.4,1X,I2,1H:,F4.1,F7.1,
     + 10X,F10.2,30X,5X,I6,2I10)
  193  FORMAT(1X,I3,3X,I2,1H:,I2,1H:,F4.1,F9.4,1X,I2,1H:,F4.1,F7.1,
```

```
380.          * 20X,F10.2,2CX,5X,I6,2I10)
381.       194   FORMAT(1X,I3,3X,I2,1H:,I2,1H:,F4.1,F9.4,1X,I2,1H:,F4.1,F7.1,
382.          * 30X,F10.2,1CX,5X,I6,2I10)
383.       195   FORMAT(1X,I3,3X,I2,1H:,I2,1H:,F4.1,F9.4,1X,I2,1H:,F4.1,F7.1,
384.          * 40X,F10.2,5X,I6,2I10)
385.
386.      C*****************************************************************
387.      *
388.            CALL INTERP(ICOND,COND,JK,PCAL,
389.          *          TNOP,TBRST,ISTOP,LCNTK,KNTCT,V2,TEST)
390.      *
391.      C
392.      C*****************************************************************
393.      *
394.      *
395.      *               PRINT TABLE
396.      *
397.            WRITE(IOUT,1030)
398.       1030 FORMAT (1H1,  13X,'DECOMPUTATED OUTPUT AT UNIFORM TIME INTERVALS')
399.      C
400.            WRITE(IOUT,1131)
401.       1131 FORMAT(5X,'INDEX     TIME AZIMUTH ELEVATION PRESSURE REF FREQ',
402.          *   5X,'TEMP  REL HUM')
403.            WRITE (IOUT,1230)
404.       1230 FORMAT(14X,'(SEC)    (DEG)    (DEG)     (MB)', 5X,
405.          *  '(HZ)----(ORDINATES)---')
406.            WRITE(IOUT,1330) (LL-1,(VL(I,LL),I=1,7),LL=1,LIST)
407.       1330 FORMAT(1X, I9,7F9.1)
408.      C
409.      C
410.      C     FINISH EXPLAINING AND END
411.      C
412.            WRITE(IOUT,1043)ISTOP
413.       1043   FORMAT('1*** EXCECUTION COMPLETE ***  COMMENT FOLLOWS',
414.          *   ' (ISTOP = ',I2,')')
415.      C
416.            IF(ISTOP .EC. 2) WRITE(IOUT,1042) KNTCT,LCNTK
417.       1042  FORMAT(1X,'STOPPED AT CONTACT NR',I5,5X,'LAST NON ZERO PCAL NR',
418.          *          I5)
```

```
      IF(ISTOP .EQ. 5) WRITE(IOUT,1045)
 1045 FORMAT(1X,'STOPPED, CONDENSER UNABLE TO FIND SIGNAL. TOO NOISY')
      IF(ISTOP .EQ. 6) WRITE(IOUT,1046)
 1046 FORMAT(1X,'STOPPED, END OF INPUT DATA (EOF)')
      IF(ISTOP .EQ. 7) WRITE(IOUT,1047)
 1047 FORMAT(1X,'STOPPED, REACH TSTOP (TSTART+TPROC)')
      IF(ISTOP .EQ. 8) WRITE(IOUT,1048)
 1048 FORMAT(1X,'STOPPED, COND OVERFLOW')
      IF(ISTOP .EQ. 10) WRITE(IOUT,1050)
 1050 FORMAT(1X,'COMPLETED TO BURST')
*
*
*             WRITE PRD COMPATIBLE TAPE
*
*
      IO=02
*
     WRITE(IOUT,500)IO
 500  FORMAT(/////' ECCPRD TAPE(FILE) WRITE FOLLOWS',///)
*
*              ECC-PRD INPUT CARD NR.1
*
      READ (IOIN,2000) LINE
      WRITE (IO,2000) LINE
*
*             SONDE ID CARD
*
      READ(IOIN,2000) LINE
      WRITE(IO,2000) LINE
*
*             RADIOSONDE CALIBRATION CARD
*
      READ(IOIN,2000) LINE
      DECODE(LINE,2100) ISTT1,ISTT2,LDATE,LTIME,ID
      WRITE(IO,2000) LINE
*
```

```
*               OZONESONDE CALIBRATION CARD
*
      READ(IOIN,2000) LINE
      WRITE(IO,2000) LINE
*
*               DOUBLE CHECK FOR ZERO PRESSURE VALUES AT TOP OF FLIGHT
*
      DO 501 LL=1,LIST
      J = LIST - LL + 1
      IF(VL(4,J) .GT. 0.0) GO TO 502
 501  CONTINUE
      WRITE(IOUT,6000)
      GO TO 503
 502  CONTINUE
      LIST = J
 503  CONTINUE
*
*               HEADER CARD
*
      WRITE(IO,4000) LIST, 0, LIST-1, LIST-1
*
*               ONE MINUTE DATA CARDS
*
      DO 50 LL=1,LIST
      IT=VL(1,LL)/60.0
      PR=VL(4,LL)
      I00=0
      I0C=0
      I03=0
      IBT=0
      ITP=VL(6,LL)*10.0
      IRH=VL(7,LL)*10.0
      XM=0.0
        AZM =VL(2,LL)
       ELV = VL(3,LL)
 50   WRITE(IO,5000) LDATE,LTIME,IT,PR,I00,I0C,I03,IBT,ITP,IRH,XM,AZM,
     *         ELV,ID
*
*               FLIGHT END CARD
```

```
C
      READ(IOIN,2000) LINE
      WRITE(IO,2000) LINE
C
      REWIND IO
C
 2000 FORMAT(A80)
 2100 FORMAT(1X,2A5,1X,A6,1X,A6,49X,A6)
 4000 FORMAT(1X,I9,2X,I3,1X,I3,1X,I4,62X)
 5000 FORMAT(1X,A6,1X,A6,I5,F7.1,3F6.3,3I4,F6.3,F7.2,F6.2,2X,A6)
 6000 FORMAT(1X,'UNABLE TO FIND NON ZERO PRESSURE - EXPECT ERROR IN '
     *          'ECC-PRD PROGRAM')
C
C
C
C
      STOP
      END
```

```
      SUBROUTINE ADVANC (TIME,FREQ,AZ,EL,JJ,TSTOP,TLANCH,TGMDAQ,
     *  TEST,*,*)
C
      COMMON /TABLES/ VL,LIST,DLIST
      COMMON /IC/IUIN,IOUT,ITYPE
C
C         ADVANCE, 5 NEW RAW DATA POINTS. JJ=RUNNING
C         INDEX IN RAW DATA FILE.
*
      DIMENSION TIME(10),FREQ(10),AZ(10),EL(10)
      DIMENSION TEST(10),VL(7,150)
      DIMENSION DUM(18)
      CHARACTER*1 ITYPE

C
      DO  2 JI=1,5
      J5= JI+5
       TIME(JI)=TIME(J5)
       FREQ(JI)=FREQ(J5)
       AZ(JI)=AZ(J5).
       EL(JI)=EL(J5)
    2 CONTINUE
      JJ=JJ+5

      DO 3 J=6,10
       READ (01,END = 82) DUM, FREQ(J), AZ(J), EL(J), DM1, TIME(J), DM2
      TIME(J) = TIME(J)*3600. - TLANCH
      IF(FREQ(J) .LT. 4.8 .OR. FREQ(J) .GT. 200.)GO TO 5
       FREQ(J) = 1000./FREQ(J)
      GO TO 6
    5  FREQ(J)=0.0
    6  IF(INT((TIME(J)-TIME(J-1)+.05)*10.) .EQ. 1)GO TO 3
       TIME(J)=TIME(J-1)+.1
    3  CONTINUE
       IF(TIME( 9) .GT. TSTOP) RETURN 1
*
*               INCREMENT TABLE AND ENTER GMD ANGLES
*
```

```
   51    IF(TIME(4) .LT. VL(1,LIST)) GO TO 53

         IF(TIME(4) .LT. TGMDAC) GO TO 52
         CALL ANGLE(AZ,EL)
         VL(2,LIST)=AZ(5)
         VL(3,LIST)=EL(5)
   52    LIST=LIST+1
         VL(1,LIST)=VL(1,LIST-1)+DLIST
*
C     SAVE VL(I,LIST),I=1,3 AND LIST
C          ONLY IF SAVING COND*ATRIX
*
      IF(ITYPE .EQ. 'M')WRITE(3,521)LIST,VL(1,LIST),
     +   VL(2,LIST-1),VL(3,LIST-1)
  521 FORMAT(' VL',3X,I3,3X,3F15.8)
*


         GO TO 51
   53    CONTINUE
C
      IF(TEST(1).LE. 0.) RETURN
         IF(TIME(1) .LT. TEST(2) .OR. TIME(1) .GT. TEST(3)) RETURN
         WRITE(IOUT,1059)(TIME(J),J=1,10)
         WRITE(IOUT,1059)(FREQ(J),J=1,10)
 1059 FORMAT(10F10.5)
      RETURN
C
   82    CONTINUE
C
C     END OF DATA
C
         RETURN 2
C
      END
```

```
*ANGLE   SUBROUTINE ANGLE
*
      SUBROUTINE ANGLE (AZ,EL)
      DIMENSION AZ(10),EL(10),
     *          NIAZ(10),NIEL(10),IAZ(10),IEL(10)
*
*               INITIALIZE AND QUANTIZE
*
      DO 11 K=1,10
      NIAZ(K)=0
      NIEL(K)=0
      IAZ(K)=AZ(K)+0.5
      IEL(K)=EL(K)+0.5
 11   CONTINUE
*
*               COUNT FOR DISTRIBUTION
*
      DO 10 K=1,9
      DO 12 L=1,11-K
      LL=11-K
      IF(IAZ(LL) .EQ. IAZ(L)) NIAZ(LL)=NIAZ(LL)+1
      IF(IEL(LL) .EQ. IEL(L)) NIEL(LL)=NIEL(LL)+1
 12   CONTINUE
 10   CONTINUE
*
*               DETERMINE MODE INTERVAL
*
      KMA=1
      KME=1
      DO 13 K=2,10
      IF(NIAZ(K) .GT. NIAZ(KMA)) KMA=K
      IF(NIEL(K) .GT. NIEL(KME)) KME=K
 13   CONTINUE
*
*               COMPUTE MEAN IN MODE INTERVAL
*
      SUMA=0.
      NSUMA=0
```

```
      DO 14 K=1,10
      IF(IAZ(K) .NE. IAZ(KMA)) GO TO 14
      SUMA=SUMA+AZ(K)
      NSUMA=NSUMA+1
   14 CONTINUE
      SUME=0.
      NSUME=0
      DO 15 K=1,10
      IF(IEL(K) .NE. IEL(KME)) GO TO 15
      SUME=SUME+EL(K)
      NSUME=NSUME+1
   15 CONTINUE
*
*              OUTPUT
*
      AZ(5)=SUMA/FLOAT(NSUMA)
      EL(5)=SUME/FLOAT(NSUME)
      RETURN
      END
```

(ABS(IAZ(K)-IAZ(KMA)).GT.2)

```
      C       TRACK SUBROUTINE
      C
      C
            SUBROUTINE TRACK(TIME,FREQ,TEST,LOS,COND,JK,*,*)

            COMMON/IO/IOIN,IOUT,ITYPE
            COMMON /SIGNAL/ SIGMAX,SIGMIN,HGATE,IN,SIGLEV,NSUM,FSUM

            DIMENSION TIPE(10),FREQ(10)
             DIMENSION TEST(10),COND(3,1000)
            CHARACTER*1 ITYPE
      C
      C           SET GATE BOUNDS
      C           COUNT SIGNAL POINTS IN GATE
      *
            BUPR = SIGLEV + HGATE
            IF(BUPR.GT.SIGMAX ) BUPR = SIGMAX
            BLWR = SIGLEV - HGATE
            IF(BLWR.LT.SIGMIN ) BLWR = SIGMIN
      *
      C           MEMORY TO STABILIZE CONDENSED SIGNAL
      *
            NGATE = 1
            SUMGTE = SIGLEV
      *
      C           COUNT POINTS  IN GATE
      *
            DO 671  J= 1,10
            IF (FREQ(J) .GT. BUPR .OR. FREQ(J) .LT. BLWR) GO TO 671
            SUMGTE = SUMGTE + FREQ(J)
            NGATE = NGATE +1
            IF ( NGATE . GT. 6) GO TO 672
        671 CONTINUE
      *
      C           IF LESS THAN TWO (EXCLUDING SIGLEV) IN GATE,  LOST SIGNAL
      *
            IF ( NGATE . GT. 2 ) GO TO 672
             CALL SEARCH(TIME,FREQ,LOS,COND,JK,TEST,$83,$85)
```

```
      RETURN
*
C          HAVE SIGNAL # INCREMENT FOR MEAN AND ADJUST GATE
*
  672 FSUM = FSUM + SUMGTE/NGATE
      NSUM = NSUM +1
      SIGLEV = (SIGLEV + SUMGTE / NGATE) * 0.5
*
C             ADVANCE GATE AND CONTINUE TRACKING
*
      IF(TEST(1).LE.0.) RETURN
       IF(TIME(1) .LT. TEST(2) .OR. TIME(1) .GT. TEST(3)) RETURN
      WRITE(IOUT,1672) BUPR,BLWR,SUMGTE,NGATE,FSUM,NSUM,SIGLEV
 1672 FORMAT(1X,'AT 672, BUPR,BLWR,SUMGTE, NGATE,FSUM,NSUM,SIGLEV',
     1 3F9.3,I5,F9.3,I5,F9.3 )
       RETURN
C
  83   CONTINUE
C
C     LOST SIGNAL --- NEVER FOUND IT IN SEARCH
C
       RETURN 1
C
  85      CONTINUE
*
C                  JK > 1000  (COND DIMENSION)
*
       RETURN 2

      END
```

```
      SUBROUTINE SEARCH (TIME,FREQ,LOS,COND,JK,TEST,*,*)

      COMMON /SIGNAL/ SIGMAX,SIGMIN,HGATE,IN,SIGLEV,NSUM,FSUM
      COMMON /IO/ICIN,IOUT,ITYPE
      DIMENSION TIME(10),FREQ(10),COND(3,1000),TEST(10)
      CHARACTER*1 ITYPE

C           SEARCH FROM LOW TO HIGH FREQ. (SIGNAL MORE OFTEN LOW)
*
      BND = SIGMIN
*
C           COUNTS ( KB,KBL,KBLL) BELOW MOVING BOUNDS,
C           GREATEST BAND COUNT ( KBNDG) AND INDEX ( IBND)
*
      KBL= 0
      KBLL = 0
      KBNDG = 0
      IBND = 3
      DO 662   IB = 1,   IN
      KB = 0
      DO 661 J= 1,10
  661 IF (FREQ(J). LT . BND ) KB = KB+1
      KBND = KB - KBLL
      BND = BND + HGATE
       IF (KBLL .EQ. 10) GO TO 10
      KBLL = KBL
      KBL = KB
      IF( IB .LT. 3 ) GO TO  662
      IF ( KBND . LT . KBNDG ) GO TO 662
      IBND = IB
      KBNDG = KBND
  662 CONTINUE
   10 IF(KBNDG .GE. 3) GO TO 664
*
C           SIGNAL NOT FOUND # INCREMENT NOISE COUNT
*
      LOS = LOS +1
      IF (LOS. GT. 100 ) RETURN 1
```

```
      IF(LOS .EQ. 1) TSWCH2= TIME(1)
C
      IF(TEST(1).LE.0.) GO TO 1663
       IF(TIME(1) .LT. TEST(2) .OR. TIME(1) .GT. TEST(3)) GO TO 1663
      WRITE(IOUT,2663) SIGLEV,IBND,KBNDG,LOS,TSWTCH,TSWCH2
 2663 FORMAT(5X,'IN SEARCH,SIGLEV,IBND,KBNDG,LOS,TSWTCH,TSWCH2 = ',
     * F10.3,3I10,2F10.2)
 1663 CONTINUE
C
C          GET NEXT FIVE RAW DATA POINTS
C
      RETURN
C
C
C          FOUND SIGNAL # SET GATE , NOTE LEADING
C          EDGE SWITCH TIME AND DWELL.
C          CONDENSE THE DATA POINT , AND PROCEED TO DECOMMUTATE.
C
  664 CONTINUE
      LOSN = LOS
      LOS = 0
      SIGLEV  =      SIGMIN  +  (IBND-2)*HGATE
C
C
      TSWCH1 = TSWTCH
      TSWTCH= TIME(1)
      DWELL =  TSWTCH - TSWCH1
C
C          CONDENSER OUTPUT
C
       IF(NSUM .EQ. 0) GO TO 3003
      IF(TSWCH1 .LE. COND(1,JK))GO TO 3006
       JK = JK + 1
      IF(JK .GT. 1000)RETURN 2
      COND(1,JK) = TSWCH1
      COND(2,JK) = DWELL
      COND(3,JK) = FSUM/NSUM
```

IF(LOSN.GT.1) DWELL = TSWCH2 - TSWCH1

```
C
C           DECOMPUTATE
*
      IF (TEST(5) .EQ. 0.) GO TO 3002
      IF (JK .GT. 1)GO TO 3001
      WRITE(IOUT,3005)
 3005 FORMAT('1****** COND. MATRIX ******',/)
 3001 CONTINUE
      WRITE(IOUT,3000)JK,(COND(J,JK),J=1,3)
 3000 FORMAT(' COND(',I3,')= ',F12.1,F8.1,F10.4,5X)

C
 3002 IF(TSWTCH .GT. TEST(4)) GO TO 2665
      WRITE(IOUT,1669)(COND(J,JK),J=1,3),IBND,KBND6,LGSN,SIGLEV,
     *TSWTCH , FSUM, NSUM,TSWCH2
 1669 FORMAT(F10.2,F10.3,F10.2,3I10 ,2F10.2,F10.3,I10,F10.2)
      GO TO 2665
 3003 IF(TEST(4) .GT. 0.01)WRITE(IOUT,3004)JK
 3004 FORMAT(' *** WARNING *** NSUM = 0.0 BETWEEN JK, JK+1 @ JK=',I3)
      GO TO 2665
 3006 IF(TEST(4) .GT. 0.01)WRITE(IOUT,3007)JK
 3007 FORMAT(' *** WARNING ***  SWITCH TIME DID NOT INCREASE AT',
     *  ' JK = ',I3)
 2665 FSUM = 0.
      NSUM = 0
C
      RETURN
      END
```

```
      C                SUBROUTINE     DECOM     DECOM     DECOM     DECOM
      C
      SUBROUTINE DECOM(COND,JK,ICOND,TNOM,DSL,FNOM,TEST,ICR1)
      C
      COMMON /IO/ICIN,IOUT,ITYPE
       COMMON /MANUAL/ IBRST,CBRST
       DIMENSION DWELT(10), TDWELT(10), SDWELT(10)
       DIMENSION ICOND(2,1000), TEST(10), COND(3,1000)
      CHARACTER*1 ITYPE
      *
      C
      C
      C                  INITIALIZE DECOM
      C
       DATA RFL,PFL,DRPFL,RFSUM,RTSUM,TR,AMLT,MLT
     * /170.,190.,2.,0.,0.,0.,100.,100/
       DATA GTEMP,TSL,ESL,TR1,INCH,JKR,NOM,JKP,ICM,JKR1,M1,ICR,KROSS
     * /4.,0.,0.,0.,0,0,0,0,0,0,1,0,0/
      DATA NXTP /0/
      C
      *
      C                CONTACT NRS., ICR, ETC., ARE ALL MULTIPLIED BY MLT
      C                IN SUBROUTINE DECOM ONLY.
      C                ICOND(2, ) IS NOT MULTIPLIED BY MLT.
      *
      IF(NXTP .EQ. 0)NXTP = 30*MLT
      *
      C                REJECT SHORT DWELLS
      *
      IF(COND(2,JK) .GE. 3.0) GO TO 8
      ICOND(1,JK) = 8
      GO TO 900
      C
      *
      *          ELAPSED TIME TO LEADING EDGE
      *
    8  T = COND(1,JK)
```

```
*
*              DWELL TIME OF  THIS CONDENSED POINT
*
      DWELL = COND(2,JK)
*
*               MEAN FREQUENCY OVER THIS CONDENSED POINT
*
      D = COND(3,JK)
     TB = T + DWELL/2.

     IF(D .GT. RFL)GO TO 200
*
*
C                        PROCESS  -A-
*
*
     IF(TBRST .GT. 1.E20)GO TO 10
*
 178 IF(M1 .LT. 0)GO TO 179
     ICR1 = ICR
     SLOP1 = SLOPE

 179 JKR1 = JKR
     TR1 = TR
     M1 = 1
     KROSS = 0
     GO TO 78

 10  IF(INCH .NE. 2)GO TO 78
     IF(JKR .EQ. 0)GO TO 782
     GO TO 600
*
C                  FORWARD-ASSIGN BETWEEN REFERENCES
*
*
C                  TEMPERATURE GATE
*
 78  CONTINUE
     TF = DSL + ESL *(TB - TSL)
```

```
      IF(APS(D-TF) .GT. GTEMP)GO TO 783

C                  A TEMPERATURE DATUM

 782  ESL1 = ESL
      ESL = .8*ESL + .2*(D-DSL)/(TB-TSL)
      IF(ABS(ESL-ESL1) .GT. .2)ESL = ESL1
 781  DSL = .8*DSL + .2*D
      TSL = TB
      ICOND(1,JK) = 1
      INCH = 1
      GO TO 900

 783  IF(NOM .EQ. 1)GO TO 784
      IF(JKR .EQ. 0)GO TO 785
*
C                     ASSURE DWELL SUCCEEDING THE PEFERENCE IS A TEMPERATURE.
*
      IF(T .GT. TR + .8*SLOPE)GO TO 785

C                  RESTORE TEMPEPATURE FREQUENCY GATE

 7831 ESL = 0.0
      KROSS = 1
      GO TO 781

 784  IF(INCH .EQ. 2)GO TO 7831
      ICOND(1,JK) = 7
      INCH = 5
      GO TO 900

C                  PROCESS THIS NON-REFERENCE, NON-TEMPERATURE
*
 785  CONTINUE
      IF(INCH .NE. 1) GO TO 780
```

```
      *
      C                  A CONTACT SWITCH POINT
      *
            IF(ICM .NE. 0) GO TO 786
      *
      C                  FIRST CONTACT SWITCH POINT
      *
            ICM = (INT(ICR1/MLT)+1)*MLT
            SLOP2 = AMLT*T/FLOAT(ICM-ICR1)
             GO TO 787

       786  IDC = (T-T2)/SLOP2 + .5
            IDC = IDC*MLT
            IF(IDC .LT. MLT)GO TO 789
            IF(ICM+IDC .LT.(INT(ICR1/(5*MLT)))*5+5)*MLT)GO TO 7861
            ICOND(1,JK) = 6
            KROSS = 1
            INCH = 5
            GO TO 900

       7861 CONTINUE
            ICM = ICM + IDC
            SLOP2 = AMLT*(T-T2)/IDC

       787  ICOND(2,JK) = ICM/MLT
            T2 = T

      C                  AN HUMIDITY DATUM

       788  ICOND(1,JK) = 0
            INCH = 4
            KNUM = 0
            GO TO 900

      C                  EARLY CONTACT, POSSIBLE BALLOON DIP

       789  M1 = 0
            ICOND(1,JK) = 5
            INCH = 5
```

```
      GO TO 900
*
C                          PROCESS -b-
*
C                    PROCESS THE PRECEDING REFERENCE
C                          CHECK FOR BURST AND BACK-ASSIGN AS APPROPRIATE.
*
 600   COND(3,JKR) = RTSUM/RTSUM
      COND(2,JKR) = RTSUM
      TR = COND(1,JKR)
      IF(ICR .NE. 0)GO TO 610
*
C                    FIRST REFERENCE
*
       ICRB = TR/90. + .5
       ICRB1 = ICR1/(5*MLT)
       ICRB = ICRB - ICRB1   < IF (ICRB.EQ.0) ICRB = 1
      ICR = ((ICRB1*5 + 5*((1+ICRB)))*MLT   ie, ICR = (ICRB1 + ICRB) AS * MLT
      SLOPE = AMLT*TR/FLOAT(ICR-ICR1)
      ICR1 = ICR
      SLOP1 = SLOPE
      M1 = 0
      JNSTRT = 0
      GO TO 644

 610   M = 1
      MN = 0
 620  IF(M .GT. 1) M1 = M
      MN = MN + 1
       ICR = ICR1 + M*MLT
      IF (ICR1 .LT. (135 - (M - 1)*5)*MLT) ICR = ICR1 + 5*MLT*M
      SLOPE = AMLT*(TR-TR1)/FLOAT(ICR-ICR1)
      M = SLOPE/SLOP1 + 0.5
      IF(M .GT. 1)GO TO 620
      IF(M .EQ. 1)GO TO 644

C                    M = 0  INTERPRETED AS BALLOON DIP, BAROSWITCH REVERSAL.
C                    SUCH AN EARLY REFERENCE IS IGNORED FOR PRESSURE
```

```
191.            WRITE(IOUT,944)ICR/MLT,TR/60.
192.      944    FORMAT(1X,'CHECK FOR BALLOON DIP AFTER CONTACT ',I3,
193.           +   ' NEAR',F5.1,' MINUTES.')
194.            INCH = 1
195.            M1 = -1
196.            ICR = ICR1
197.            SLOPE = SLOP1
198.            GO TO 180
199.
200.      644    CONTINUE
201.            IF(MN .EQ. 1 .AND. ABS(SLOPE/SLOP1-1) .LT. .3)MN=-1
202.            IF(MN .NE. -1 .OR. M1 .NE. 0)GO TO 645
203.            M1 = 1
204.            WRITE(IOUT,6450) TR1/60.,TR/60.
205.      6450 FORMAT(' EARLY CONTACT FOUND IS FALSE BECAUSE NO',
206.           +   ' BALLOON DIP BETWEEN ',F6.2,' AND ',F6.2,' MINUTES.'
207.           +  ,'  WILL BACK-ASSIGN!')
208.      645   ICOND(2,JKR) = ICR/MLT
209.            ICM = ICR
210.
211.            GTSW = 0.1 * SLOPE
212.            HUMGT = 0.25 * SLOPE
213.      C
214.      C                          SET 'NO HUMIDITY' FLAG ABOVE CONTACT NUMBER 135
215.      *
216.            IF(NOH .EQ. 1)GO TO 50
217.             IF (ICR .LT. 135*MLT) GO TO 120
218.             NOH=1
219.             TNOH = TR
220.            GTEMP = 6.
221.      *
222.      C                    ADVANCE DWELT ARRAY,AND TEST FOR BURST
223.      *
224.         50  IF (TR .LT. 3000.) GO TO 55
225.            DO 52  IS = 1,9
226.             DWELT( 11-IS) =  DWELT( 10-IS)
```

delete

delete

```
227.              SDWELT(11-IS) = SDWELT(10-IS)
228.           52 TDWELT( 11-IS) = TDWELT( 10-IS)
229.              DWELT(1) = SLOPE
230.              SDWELT(1) = 0.0
231.              DO 51 ISS = 1,4
232.           51   SDWELT(1) = SDWELT(1) + DWELT(ISS)
233.              SDWELT(1) = SDWELT(1) / 4.0
234.              TDWELT(1) = TR
235.        C     WRITE(IOUT,951) TDWELT
236.        C     WRITE(IOUT,951)  DWELT
237.        C     WRITE(IOUT,951) SDWELT
238.        C 951 FORMAT( 1X,10F12.1)
239.              IF (ICR .LT. INT(CBRST)*MLT)GO TO 54
240.              TBRST = TR + (CBRST-AINT(CBRST))*SLOPE
241.              GO TO 56
242.           54   CONTINUE
243.              IBRST = 0
244.              DO 53  IS = 1,3
245.           53  IF(DWELT(IS) .GT. 15.0 .AND. SDWELT(IS) .LT. SDWELT(IS+1) .AND.
246.             +          SDWELT(IS+3) .GT. 70.0) IBRST = IBRST + 1
247.              IF(IBRST .LT. 3 .OR. TR .LT. 400.) GO TO 55
248.        *
249.        C                       BURST CONDITIONS ENCOUNTERED
250.        *
251.              TBRST = TDWELT(4)
252.           56 TBM = TBRST / 60.
253.              WRITE(IOUT,950) TBM,IBRST
254.           950 FORMAT(1X,'BURST AT', F6.1, ' MINUTES.  IBRST =', I3)
255.           55 CONTINUE
256.
257.           120  IF(COND(3,JKR) .GT. PFL)GO TO 130
258.        *
259.        C                  ----- ADJUST REFERENCE THRESHHOLDS
260.        *
261.              RFL = 0.6 * RFL + 0.4 * (COND(3,JKR)-10.0)
262.              PFL = 0.6 * PFL + 0.4 * (RFL+DRPFL+10.0)
263.              GO TO 180
264.
265.        C                  PROCESS THIS HIGH REFERENCE
```

```
      130   DRPFL = 0.6 * DRPFL + 0.4 * (COND(3,JKR)-RFL-10.0)*.5
            ICOND(1,JKR) = 3

            IF(JKP .EQ. 0)GO TO 131
      C
      C           CORRECT NXTP WHEN APPARENT THAT A HIGH REF. (P) PT. WAS MISSED
      C
            TP12 = 15.*SLOPE
              IF (NXTP .GT. 135*MLT) TP12 = 5.*SLOPE
            IF(NXTP.LT.135*MLT.AND.(T-TP1).GT.(1.5*TP12).AND.
           $MOD(ICR,15*MLT).EQ.0..AND.ICR.LE.135*MLT)NXTP
           $ = ICR
              IF (NXTP .LT. 135*MLT .AND. ABS(T-TP1-2.*TP12) .LT. .5*TP12 .AND.
           $ICR .NE. NXTP) NXTP = NXTP + 15*MLT
              IF (NXTP .GT. 135*MLT .AND. (T-TP1) .GT. (1.8*TP12) .AND. MOD(
           $ICR,5*MLT) .EQ. 0. .AND. ICR .GT. NXTP) NXTP = ICR
              IF (NXTP .GT. 135*MLT .AND. ABS(T-TP1-2.*TP12) .LT. .5*TP12
           $.AND. ICR .NE. NXTP) NXTP = NXTP + 5*MLT
      *
       131  IF(ICR .EQ. NXTP)GO TO 132
            WRITE(IOUT,1131)ICR,NXTP
       1131 FORMAT(' CONTACT NUMBER ',I8,' NOT EQUAL TO NXTP ',I8)

       132  NXTP = NXTP + 5*MLT
            IF  (ICR.LT.135*MLT)  NXTP = NXTP + 10*MLT
            TP1 = TR
            JKP = JKR


      C              BACK-ASSIGN
      C         DECOMMUTATE TEMPERATURE AND HUMIDITY UP TO THE CURRENT REFERENCE.
      C
      C             ASSURE DWELL PRECEDING THIS REFERENCE IS A TEMPERATURE
      *
       180  CONTINUE
            IF(NOH .EQ. 1)GO TO 178
            IF(COND(1,JKR-1) .LT. TR - .8*SLOPE)GO TO 181
            IF(ICOND(1,JKR-1) .EQ. 1)GO TO 181
```

```
305.            ICOND(1,JKR-1) = 10 * ICOND(1,JKR-1)
306.            ESL = 0.
307.            TSL = COND(1,JKR-1) * COND(2,JKR-1)/2.
308.            DSL = COND(3,JKR-1)
309.            KROSS = 1
310.      181   IF(KROSS .NE. 1)GO TO 188
311.            JNFIN = JKR-2
312.            ~~INCHN = 2~~   LCT=0, JNLCT=0   proper but not necessary
313.            ESLN = ESL
314.            TSLN = TSL
315.            DSLN = DSL
316.
317.            DO 1870  JN1 = 1, JNFIN - JNSTRT + 1
318.            JN = JNFIN + 1 -  JN1
319.      *
320.      C               SKIP REFERENCE AND REJECT POINTS
321.      *
322.            MM = 90
323.            IF(M1 .EQ. 1) GO TO 182
324.            MM = 80
325.            GO TO 186
326.      ~~182~~   TN = COND(1,JN)   cosmetic
327.       182  IF( COND(2,JN) .LT. 3.0 ) GO TO 1870
328.            DWELLN = COND(2,JN)
329.            DN = COND(3,JN)
330.            TBN = TN + DWELLN/2.
331.
332.            TS = (TN-TR1)/SLOPE
333.            NCT = TS + .5
334.            TO = FLOAT(NCT)*SLOPE + TR1
335.            TFN = DSLN + ESLN * (TBN-TSLN)
336.            IF(NCT.NE.0.AND.NCT.NE.1.AND.ABS(DN-TFN).GT.GTEPP)
337.           + GO TO 183          (.AND.NCT.NE.5)  minor improvement
338.            IF(TBN .GE. (TO-GTSW))GO TO 183
339.      *
340.      C                     A TEMPERATURE DATUM
```

```
      *
 1821 ICOND(1,JN) = 10 * ICOND(1,JN)
      ESLN1 = ESLN
      ESLN = 0.8*ESLN + 0.2*(DN - DSLN)/(TBN - TSLN)
      IF(ABS(ESLN - ESLN1) .GT. .2) ESLN = ESLN1
      DSLN = .8*DSLN + .2*DN
      TSLN = TBN
      INCHN = 1
      GO TO 1874

C              BACK-ASSIGN CHANNEL AND CONTACT NUMBERS
      *

 183  IF(ABS(TN-TO).GE.GTSW.OR.ABS(DN-TFN).LE.GTEMP)GOTO 1873
      IF(NCT .GE. 5 .OR. NCT .LE. 0)GO TO 1873
      IF(ICOND(2,JN)+1)/1000.EQ.ICOND(2,JKR)+NCT)GO TO 1873
      ICOND(2,JN) = (ICOND(2,JKR)) + NCT)*1000 + ICOND(2,JN)
      *  LCT = NCT ; JNLCT = JN
C                    AN HUMIDITY DATUM
      *
      ICOND(1,JN) = 40 + ICOND(1,JN)
      INCHN = 4
      GO TO 1874

 1873 IF(ICOND(1,JN) .EQ. 1)GO TO 1821
 186  ICOND(1,JN) = MM + ICOND(1,JN)
 1874 IF(ICOND(2,JN)/1000 .EQ. 0)ICOND(2,JN) = ICOND(2,JN)+MM*10000

      IF(TEST(9) .LT. .01)GO TO 1870
      WRITE(IOUT,187)JN,TBN,TS,NCT,TO,GTSW,HUMG1,TFN,
     +   ESLN,INCHA,(ICOND(I,JN),I=1,2)
 187  FORMAT(1X,I5,2F9.1,I3,2F9.1,2I5)
 1870 CONTINUE
      *
C                    WRAP-UP PROCESS -B-
      *
 188  IF(M1 .LT. 0) GO TO 189
      ICR1 = ICR
      SLOP1 = SLOPE

 189  JKR1 = JKR
```

IF(NCT. EQ. LCT) ICOND (2, JNLCT) = ICOND (2, JNLCT) + 1000000

proper but not necessary

```
      TR1 = TR
      T2 = TR
      SLOP2 = SLOPE
      M1 = 1
      KROSS = 0
      JNSTRT = JK + 1
      GO TO 78
*
C                          STORE REFERENCE DATA
*
  200 CONTINUE
      IF(INCH .EQ. 0) GO TO 220
       IF(INCH .EQ. 2)GO TO 220
*
C                  A CONTACT SWITCH POINT
*
       JKR = JK
      RFSUM = 0.C
      RTSUM = 0.0
*
C                   CUMULATION OF REFERENCE MEAN FREQUENCY
*
  220  RFSUM = RFSUM + D * DWELL
       RTSUM = RTSUM + DWELL
      ICOND(1,JK) = 2
       INCH = 2

  900  IF(T .GE. TEST(8)) RETURN
       IF(MOD(ITCNT,50).EQ.0)WRITE(IOUT,9001)
       ITCNT = ITCNT + 1
       WRITE(IOUT,9000)(COND(I,JK),I=1,3),(ICOND(I,JK),I=1,2),JK,
     & INCH, NOH, RFL, DRPFL, TF, TMUM, ESL, SLOPE,KROSS,M1
 9001 FORMAT('1DECCM OUTPUT: -----COND(1,JK),I=1,3',
     + '-----ICOND   JK INCH  NOH    RFL',
     + '  DRPFL     TF   TMUM    ESL  SLOPE KROSS    M1')
 9000 FORMAT(' DECCM OUTPUT: ',3F7.1,5I5,4F7.1,F7.4,F7.2,2I6)


      RETURN
      END
```

```
      *INTERP  SUBROUTINE INTERP
      *
            SUBROUTINE INTERP(ICOND,COND,JK,PCAL,
           *          TNOM,TBRST,ISTOP,LCNTK,KNTCT,V2,TEST)
      C
            COMMON /TABLES/ VL,LIST,DLIST
            COMMON /IO/ICIN,IOUT,ITYPE
      C
            DIMENSION  VL(7,150),  T1(7),  T2(7) ,V1(7),V2(7),
           *ICOND(2,1000),  COND(3,1000),
           *ALOSS(7), PCAL(180), TEST(10)
      X     CHARACTER*1 ITYPE
      *
      C           TOLERABLE TIME INTERVALS BETWEEN SIGNAL DATA
      C                    ( P, R, T, H )
      *
            DATA ALOSS   / 0.,0.,0.,200.,600.,100.,100./
      *
            KNTCT = 0
            I4 = 1
            I5 = 1
            I6 = 1
            I7 = 1
            DO 1   I = 4,7
            V1(I) = 0.
          1 T2(I) =-0.1
            TLPCAL = 1.0E10
      *                          DIAGNOSTIC PRINTOUT
      X     *              OPTIONAL MANUAL BURST OVERRIDES COMPUTED BURST
      *
            IF(TEST(6).GT..01)WRITE(IOUT,2001) I4,I5,I6,I7,JK,LIST,
           *          TNOM, V2, TBRST
       2001  FORMAT(1X,6I7,/,9F9.1)
      C
      C                DO EACH ROW (TIME) OF OUTPUT TABLE
      C
            DO 30 L = 1,LIST
             IF (TEST(6) .LT. .01) GO TO 2003
```

```
            IF(L .GT. 30 .AND. L .LT. LIST-30) GO TO 2003
           WRITE(IOUT,2002)I4,I5,I6,I7,KNTCT,L,VL(1,L),
          *          T1,T2,V1,V2
 2002  FORMAT(1X,6I10,F10.1,4(/,7F10.1),///)
 2003  CONTINUE
            IF(VL(1,L) .GT. TBRST) GO TO 47
            IF(VL(1,L) .GT. TLPCAL) GO TO 42
            IF(VL(1,L) .GT. COND(1,JK)) GO TO 48
C
C                 DO EACH COLUMN ENTRY (VARIABLE) OF THE OUTPUT TABLE
C
C                 IF TL IS BRACKETED, INTERPOLATE
         DO 20 IV = 4,7
      10 IF( VL(1,L) .LE. T2(IV) ) GO TO 101
C
C           ADVANCE BRACKET BEFORE INTERPOLATING
         IJ = IV - 3
```

```
      GO TO ( 11, 12, 13, 14 ) , IJ
*
*                NEXT PRESSURE PAIRS
*
   11 DO 111     I = I4,1000
       IF(I .GT. JK .OR. COND(1,I) .GT. TBRST) GO TO 101
      IF (ICOND(2,I) .GT. KNTCT .AND. ICOND(1,I) .LT. 5) GO TO 112
       IF(ICOND(2,I) .GE. LCNTK) GO TO 100
  111   CONTINUE
   112  CONTINUE
       KNTCT = ICOND(2,I)
      T1( 4)= T2( 4)
      V1( 4)= V2( 4)
      V2( 4) = PCAL(KNTCT)
      T2(4) = COND(1,I)
      I4 = I + 1
      GO TO 10
*
*                NEXT REFERENCE FREQUENCY PAIRS
*
   12 DO 121    I = I5,1000
       IF(I .GT. JK .OR. COND(1,I) .GT. TBRST) GO TO 101
      IF(ICOND(2,I) .EQ. 0)GO TO 121
      IF( ICOND(1,I)  .EQ.  2) GO TO 122
  121   CONTINUE
   122  CONTINUE
       T1(5) = T2(5)
      V1( 5)= V2( 5)
      V2(5) = COND(3,I)
      T2( 5)= COND(1,I)
      I5 = I + 1
      GO TO 10
*
*                NEXT TEMPERATURE PAIRS
*
   13 DO 131    I = I6,1000
       IF(I .GT. JK .OR. COND(1,I) .GT. TBRST) GO TO 133
       IF(ICOND(1,I) .EQ. 1 .AND. COND(3,I) .GT. C.001) GO TO 132
  131   CONTINUE
```

```
      132 T1( 6)= T2( 6)
          V1( 6)= V2( 6)
          V2(6) = 95. * COND(3,I)/ VL(5,L)
          T2( 6)= COND(1,I) * COND(2,I)*0.5
          I6 = I * 1
           GO TO 10
      133  CONTINUE
           V1(6) = VL(6,L-2)
           T1(6) = VL(1,L-2)
           V2(6) = VL(6,L-1)
           T2(6) = VL(1,L-1)
           GO TO 101
*
*                NEXT RELATIVE HUMIDITY PAIR
*
   14 IF(VL(1,L)  .GT.  TNOH) GO TO 20
      DO 141    I = I7,1000                                    redundant
X      IF(I .GT. JK ~~.OR. COND(1,I) .GT. TNOH~~ .OR. COND(1,I) .GT. TBRST)
     *          GO TO 101
        IF( ICOND(1,I) .EQ. 4 .AND. COND(3,I) .GT. 5.0  ) GO TO 142
  141   CONTINUE
  142 T1( 7)= T2( 7)
      V1( 7)= V2( 7)
      V2(7) = 95. * COND(3,I)/ VL(5,L)
      T2( 7)= COND(1,I) * COND(2,I)*0.5
      I7 = I * 1
      GO TO 10
*
  100  TLPCAL = COND(1,I)
*
*                INTERPOLATE / EXTRAPOLATE
*
  101  IF(IV .EQ. 7 .AND. VL(1,L) .GT. TNOH) GO TO 20
      IF( V1(IV).GT. .0001 .AND. (T2(IV) - T1(IV)) .GT. .0001) GO TO 190
      VL(IV,L)= V2(IV)
      GO TO 20
  190 VL(IV,L)=V1(IV)+((V2(IV)-V1(IV))/(T2(IV)-T1(IV)))*(VL(1,L)-T1(
     *IV))
```

```
133.      *
134.      C           OUTPUT ZEROS FOR NO LOCAL SIGNAL
135.      *
136.            IF(ABS(VL(1,L)-T1(IV)) .GT. ALOSS(IV) .AND.
137.           *    ABS(VL(1,L)-T2(IV)) .GT. ALOSS(IV) )  VL(IV,L) = 0.
138.      *
139.         20 CONTINUE
140.         30 CONTINUE
141.      C
142.            GO TO 49
143.         42 ISTOP = 2
144.            GO TO 48
145.         47 CONTINUE
146.            ISTOP = 10
147.         48 CONTINUE
148.            LIST = L - 1
149.         49 CONTINUE
150.      *
151.      *
152.      *
153.      *
154.      *
155.            RETURN
156.            END
```

APPENDIX B

SAMPLE OUTPUT

(RAWINPROC and ECC-PRD)

The primary output of RAWINPROC is the "input card deck" (File IO, IO = 6) for the concluding Activity No. 3, ECC-PRD. The content of the "one-minute data cards" in this "deck" is listed with the label "DECOMMUTATED OUTPUT AT UNIFORM TIME INTERVALS" found near the end of Activity No. 2, below. Detailed output of DECOM is listed by time and channel if desired (TEST(7) > 0.01). The first eleven ten-point samples of raw data (TIME, FREQ) after TSTART are printed to verify proper input. All input card deck quantities and computed initializing quantities are routinely listed. Certain other output messages indicate status and progress of the computation.

The consequent listed output of ECC-PRD is also included. Note that ECC-PRD, used in this "no-ozone" mode, lists zeroes for ozone quantities.

The erroneous Humidity dwell at 23.5 minutes (JK = 187) was due to the reversed order of source deck cards (DECOM line No. 326, 327).

The large Temperature frequency at 24.1 minutes (JK = 195) appears real. Examination of the raw data (output of METPASS1) will verify the presence of this irregularity in the input data. Annotation d), Appendix A, would eliminate this irregular point if, in fact, it is composed of a short extreme value followed by a few seconds of noise. The irregularity did not occur when run at the

University using File #1 prepared by the University's counterpart to METPASS1. The output shown here is one of three test flights run at NASA Wallops Flight Center on February 27, 1981, using METPASS1 which was then under development.

CONDENSER/DECOMMUTATOR PROGRAM

UNIV. OF UTAH JAN. 198

********** INPUT DATA **********

BALLOON RELEASED AT 15022027.0

TSTART = -120.00 TPROG = 10000.00 TSTOP = 10120.00

TEST1	TEST2	TEST3	TEST4	TEST5	TEST6	TEST7	TEST8	TEST9	TEST10
0.	0.	200.0	0.	0.	0.	1.0	3.0	0.	0.

DLIST = 60.00 SEC TGNDAW = 20.00 SEC
FP0 = 1026.0 FTEMP0 = 63.0 FRH0 = 16.5 FRC = 92.6
EFFECTIVE CONTACT NUMBER AT BURST = 141.07

PAYOSWITCH PRESSURE CALIBRATION TABLE

1#	1064.0	1051.8	1041.4	1030.2	1019.0	1007.8	997.0	985.8
9#	974.8	964.0	953.6	942.8	932.4	921.6	911.4	901.2
17#	890.6	880.4	870.2	859.8	849.6	839.4	829.4	819.4
25#	809.6	799.6	789.6	779.8	770.2	760.4	750.6	740.8
33#	731.2	722.0	712.6	703.2	693.8	684.8	675.6	666.6
41#	657.4	648.4	639.8	630.8	622.2	613.4	605.5	596.4
49#	587.8	579.4	570.9	562.6	554.2	546.8	538.2	530.0
57#	522.0	513.8	505.2	497.4	489.6	481.8	474.4	466.8
65#	459.2	451.6	444.4	437.0	429.8	422.6	415.4	408.4
73#	401.4	394.4	387.6	380.8	374.0	367.4	360.6	354.4
81#	347.8	341.4	335.2	328.8	322.6	316.4	310.4	304.4
89#	299.4	292.6	286.6	281.0	275.4	269.6	264.2	258.6
97#	253.2	248.0	242.4	237.4	232.2	227.6	222.0	217.2
105#	212.0	207.2	201.9	197.0	192.4	187.8	183.4	179.0
113#	174.6	170.2	166.0	161.6	157.6	153.4	149.4	145.6
121#	141.6	137.8	133.9	130.0	126.4	122.8	119.2	115.8
129#	112.2	108.8	105.6	102.2	98.8	95.6	92.4	89.4
137#	86.0	83.0	79.9	76.8	73.8	71.6	68.2	65.0
145#	62.2	59.4	56.4	53.6	50.8	48.0	45.2	42.4
153#	39.6	36.8	34.0	31.2	28.4	25.6	22.8	20.0
161#	17.2	14.2	11.0	7.6	4.4	0.	0.	0.
169#	0.	0.	0.	0.	0.	0.	0.	0.
177#	0.	0.	0.	0.				

EFFECTIVE CONTACT NUMBER AT LAUNCH = 4.30

HIGHEST CONTACT NUMBER CALIBRATED = 105

-107.10017	-107.00018	-106.90019	-106.80020	-106.70020	-106.60021	-106.50022	-106.40022	-106.30023	-106.20024
132.73162	132.80213	132.78449	132.85505	132.90803	132.78449	132.87271	132.85505	132.90803	132.85505
-106.60021	-106.50022	-106.40022	-106.30023	-106.20024	-106.10025	-106.00025	-105.90026	-105.80027	-105.70028
132.78449	132.87271	132.85505	132.90803	132.85505	138.81976	132.87271	107.45755	133.01410	133.17352
-106.10025	-106.00025	-105.90025	-105.80027	-105.70028	-105.60028	-105.50029	-105.40030	-105.30030	-105.20031
132.81976	132.87271	107.45755	133.01410	133.17352	132.73162	88.37826	83.15317	132.69639	132.83741
-105.60025	-105.50029	-105.40030	-105.30030	-105.20031	-105.10032	-105.00033	-104.90033	-104.80034	-104.70035
132.73162	88.37826	83.15317	132.69639	132.83741	84.88964	132.76686	132.78449	132.62599	132.80213
-105.10032	-105.00033	-104.90033	-104.80034	-104.70035	-104.60036	-104.50036	-104.40037	-104.30038	-104.20038
84.88964	132.76686	132.78449	132.62599	132.80213	138.67879	132.83741	132.59082	132.78449	98.14506
-104.60036	-104.50036	-104.40037	-104.30038	-104.20038	-104.10039	-104.00040	-103.90041	-103.80041	-103.70042
132.67879	132.83741	132.59082	132.78449	98.14506	138.71400	84.53085	132.73162	132.57325	132.64359
-104.10039	-104.00040	-103.90041	-103.80041	-103.70042	-103.60043	-103.50001	-103.40001	-103.30002	-103.20003
132.71400	84.53085	132.73162	132.57325	132.64359	138.43279	132.80213	96.58103	132.69639	86.91118
-103.60043	-103.50001	-103.40001	-103.30002	-103.20003	-103.10003	-103.00004	-102.90005	-102.80006	-102.70006
132.43279	132.80213	96.58103	132.69639	86.91118	138.74924	132.66118	132.62599	132.71400	85.72653
-103.10003	-103.00004	-102.90005	-102.80006	-102.70006	-102.60007	-102.50008	-102.40009	-102.30009	-102.20010
132.74924	132.66118	132.62599	132.71400	85.72653	100.01000	132.71400	66.33499	132.60841	132.76686
-102.60007	-102.50008	-102.40009	-102.30009	-102.20010	-102.10011	-102.00011	-101.90012	-101.80013	-101.70014

```
DECOM OUTPUT# -----COND(I,JK),I=1,3-------ICOND   JK INCM  NOW     RFL  DRPFL     TF    FRUN     ESL  SLOPE KROSS     M1
DECOM OUTPUT#      0.9    1.5   95.7     0    0    1    0    0  170.0    2.0     0.    32.2 0.        0.       0      1
DECOM OUTPUT#      2.4   11.5  123.5     1    0    2    1    0  170.0    2.0   122.8   32.2 0.0172    0.       0      1
BURST AT  96.9 MINUTES.  IBRST =  0

TIME EXCEEDS TBRST....COND(1,513) =   4626.95 > TBRST =   4611.59


CONDENSER DONE;
DECOMMUTATOR DONE.
INTERPOLATION FOLLOWS.....
```

JK	TIME# OF DAY: HH#MM#SS.S	DAY: HOURS	ELAPSED HH#SS.S	DWELL (SEC)	TEMP.	REF. HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
1	15#22#27.9	15.3744	0# 0.9	1.5				95.70	0	0	0
2	15#22#29.4	15.3748	0# 2.4	11.5	123.52				0	0	1
3	15#22#40.9	15.3780	0#13.9	9.0		185.79			5	5	2
4	15#22#49.9	15.3805	0#22.9	9.0	122.86				0	0	1
5	15#22#55.9	15.3830	0#31.9	5.5			53.66		6	6	4
6	15#23# 4.4	15.3846	0#37.4	12.5	122.47				0	0	1
7	15#23#17.4	15.3882	0#50.4	1.0				58.34	0	0	0
8	15#23#18.4	15.3884	0#51.4	3.5			55.83		7	7	4
9	15#23#22.4	15.3896	0#55.4	12.0	121.68				0	0	1
10	15#23#34.4	15.3929	1# 7.4	1.0				101.96	0	0	0
11	15#23#35.4	15.3932	1# 8.4	1.0				105.17	0	0	0
12	15#23#36.4	15.3934	1# 9.4	1.5				107.71	0	0	0
13	15#23#37.9	15.3939	1#10.9	2.5				110.59	0	0	0
14	13#23#40.4	15.3946	1#13.4	11.0	121.15				0	0	1
15	15#23#51.4	15.3976	1#24.4	6.5			115.07		9	9	4
16	15#23#57.9	15.3994	1#30.9	12.5	120.36				0	0	1
17	15#24#10.4	15.4029	1#43.4	9.5		185.16			10	10	2
18	15#24#19.9	15.4055	1#52.9	8.5	119.29				0	0	1
19	13#24#28.4	15.4079	2# 1.4	6.5			103.09		11	11	4
20	15#24#34.9	15.4097	2# 7.9	11.0	118.43				0	0	1
21	15#24#45.9	15.4127	2#18.9	5.5			99.93		12	12	4
22	15#24#51.4	15.4143	2#24.4	12.0	117.68				0	0	1
23	15#25# 3.4	15.4176	2#36.4	4.0			98.83		13	13	4
24	15#25# 7.4	15.4187	2#40.4	1.5				101.06	0	0	0
25	15#25# 8.9	15.4191	2#41.9	12.5	117.54				0	0	1
26	15#25#21.4	15.4226	2#54.4	4.5			108.74		14	14	4
27	15#25#25.9	15.4239	2#58.9	1.0				112.50	0	0	0
28	15#25#26.9	15.4241	2#59.9	11.5	117.40				0	0	1
29	15#25#39.4	15.4273	3#11.4	11.0		184.71			15	15	2
30	15#25#49.4	15.4304	3#22.4	7.5	117.60				0	0	1
31	13#25#56.9	15.4325	3#29.9	3.5			63.03		16	16	4
32	13#26# 0.4	15.4334	3#33.4	1.5				111.06	0	0	0
33	15#26# 1.9	15.4339	3#34.9	11.5	118.08				0	0	1
34	13#26#13.4	15.4371	3#46.4	3.5			124.41		17	17	4
35	15#26#16.9	15.4380	3#49.9	2.0				126.83	0	0	0
36	15#26#19.4	15.4387	3#52.4	13.0	119.04				0	0	1
37	13#26#32.4	15.4423	4# 5.4	2.0				145.57	0	0	0
38	15#26#34.4	15.4429	4# 7.4	4.5			149.12		18	18	4
39	15#26#39.9	15.4441	4#11.9	10.0	120.75				0	0	1
40	15#26#54.9	15.4486	4#27.9	5.5			154.74		19	19	4

JK	TIME OF DAY HH:MM:SS.S	DAYS HOURS	ELAPSED HH:SS.S	DBELL (SEC)	TEMP.	REF. HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT	WORKING CONTACT	WORKING CHANNEL
41	15:27: 0.4	15.4501	4:33.4	13.0	121.04				0	0	1
42	15:27:13.4	15.4537	4:46.4	10.5		184.28			20	20	2
43	15:27:23.9	15.4566	4:56.9	9.5	120.76				0	0	1
44	15:27:33.4	15.4593	5: 6.4	1.5				115.61	0	0	8
45	15:27:34.9	15.4597	5: 7.9	1.0				108.00	0	0	8
46	15:27:36.4	15.4601	5: 9.4	1.5				99.38	0	0	8
47	15:27:38.4	15.4607	5:11.4	12.5	120.15				0	0	1
48	15:27:50.9	15.4641	5:23.9	4.0			35.77		22	22	4
49	15:27:54.9	15.4652	5:27.9	1.5				32.90	0	0	8
50	15:27:56.4	15.4657	5:29.4	1.0				30.83	0	0	8
51	15:27:57.4	15.4659	5:30.4	13.0	119.37				0	0	1
52	15:28:10.4	15.4696	5:43.4	1.0				15.34	0	0	8
53	15:28:11.4	15.4698	5:44.4	1.5				12.59	0	0	8
54	15:28:12.9	15.4702	5:45.9	5.5			10.61		23	23	4
55	15:28:16.4	15.4712	5:49.4	12.5	118.83				0	0	1
56	15:28:28.9	15.4747	6: 1.9	6.0			10.63		24	24	4
57	15:28:34.9	15.4764	6: 7.9	12.5	118.13				0	0	1
58	15:28:47.4	15.4798	6:20.4	9.0		184.35			25	25	2
59	15:28:56.4	15.4823	6:29.4	8.0	117.57				0	0	1
60	15:29: 4.4	15.4846	6:37.4	1.0				147.98	0	0	8
61	15:29: 5.4	15.4848	6:38.4	1.0				150.44	0	0	8
62	15:29: 6.4	15.4851	6:39.4	5.0			153.05		26	26	4
63	15:29:11.4	15.4865	6:44.4	12.5	117.52				0	0	1
64	15:29:23.9	15.4900	6:56.9	2.0				151.52	0	0	8
65	15:29:25.9	15.4905	6:58.9	1.5				148.84	0	0	8
66	15:29:27.4	15.4909	7: 0.4	2.0				145.49	0	0	8
67	15:29:29.4	15.4915	7: 2.4	11.0	116.62				0	0	1
68	15:29:40.4	15.4946	7:13.4	1.0				99.41	0	0	8
69	15:29:41.4	15.4948	7:14.4	3.5			96.54		28	28	4
70	15:29:44.9	15.4958	7:17.9	1.0				93.55	0	0	8
71	15:29:45.9	15.4961	7:18.9	12.5	115.48				0	0	1
72	15:29:58.4	15.4996	7:31.4	2.5				93.51	0	0	8
73	15:30: 0.9	15.5002	7:33.9	4.0			91.11		29	29	4
74	15:30: 4.9	15.5014	7:37.9	15.0	114.40				0	0	1
75	15:30:19.9	15.5055	7:52.9	6.0		188.54			30	30	3
76	15:30:25.9	15.5072	7:58.9	14.0	113.51				0	0	1
77	15:30:39.9	15.5111	8:12.9	2.5				78.26	0	0	8
78	15:30:42.4	15.5118	8:15.4	6.5			75.74		31	31	4
79	15:30:49.9	15.5136	8:21.9	10.0	112.27				0	0	1
80	15:31: 3.9	15.5177	8:36.9	7.5			21.09		32	32	4

JK	TIME# OF DAY: HH#MM#SS.S	DAYS HOURS	ELAPSED HH#SS.S	DWELL (SEC)	TEMP.	REF. HIGH (HZ)	REF.	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
81	15#31#11.4	15.5198	8#44.4	13.5	111.81					0	0	1
82	15#31#24.9	15.5236	8#57.9	3.0					44.47	0	0	8
83	15#31#27.9	15.5244	9# 0.9	4.5				49.52		33	33	4
84	15#31#32.4	15.5257	9# 5.4	12.0	111.97					0	0	1
85	15#31#44.4	15.5290	9#17.4	10.0				56.79		34	34	4
86	15#31#54.4	15.5318	9#27.4	10.0	112.52					0	0	1
87	15#32#12.4	15.5368	9#45.4	15.0		183.99				35	35	2
88	15#32#27.4	15.5409	10# 0.4	13.5	114.13					0	0	1
89	15#32#37.9	15.5439	10#10.9	1.0					46.78	0	0	8
90	15#32#39.4	15.5443	10#12.4	5.5				46.41		36	36	4
91	15#32#44.9	15.5458	10#17.9	13.5	113.14					0	0	1
92	15#32#58.4	15.5496	10#31.4	4.5				48.52		37	37	4
93	15#33# 2.9	15.5508	10#35.9	11.5	111.98					0	0	1
94	15#33#14.4	15.5543	10#47.4	5.5				27.89		38	38	4
95	15#33#19.9	15.5555	10#52.9	1.5					24.22	0	0	8
96	15#33#21.4	15.5559	10#54.4	12.0	110.65					0	0	1
97	15#33#33.4	15.5593	11# 6.4	3.5				17.55		39	39	4
98	15#33#36.9	15.5602	11# 9.9	1.5					15.57	0	0	8
99	15#33#38.4	15.5607	11#11.4	13.0	109.38					0	0	1
100	15#33#51.4	15.5643	11#24.4	9.5		183.87				40	40	2
101	15#34# 0.9	15.5669	11#33.9	7.0	109.06					0	0	1
102	15#34# 7.9	15.5689	11#40.9	7.0				8.54		41	41	4
103	15#34#14.9	15.5708	11#47.9	15.5	108.30					0	0	1
104	15#34#30.4	15.5751	12# 3.4	7.5				7.72		42	42	4
105	15#34#37.9	15.5772	12#10.9	17.5	109.11					0	0	1
106	15#34#55.4	15.5821	12#28.4	6.0				7.93		43	43	4
107	15#35# 1.4	15.5837	12#34.4	17.5	109.15					0	0	1
108	15#35#18.9	15.5886	12#51.9	6.5				7.93		44	44	4
109	15#35#25.4	15.5904	12#58.4	14.0	108.36					0	0	1
110	15#35#39.4	15.5943	13#12.4	7.5			188.14			45	45	3
111	15#35#46.9	15.5964	13#19.9	16.0	107.39					0	0	1
112	15#36# 2.9	15.6008	13#35.9	5.0				7.81		46	46	4
113	15#36# 7.9	15.6022	13#40.9	17.5	106.52					0	0	1
114	15#36#25.4	15.6071	13#58.4	7.0				7.84		47	47	4
115	15#36#32.4	15.6090	14# 5.4	15.5	105.69					0	0	1
116	15#36#47.9	15.6133	14#20.9	7.5				7.85		48	48	4
117	15#36#55.4	15.6154	14#28.4	17.0	104.77					0	0	1
118	15#37#12.4	15.6201	14#45.4	6.5				7.80		49	49	4
119	15#37#19.9	15.6219	14#51.9	16.0	104.00					0	0	1
120	15#37#34.9	15.6264	15# 7.9	16.0		183.76				50	50	2

JK	TIME# OF DAY# MM#HH#SS,S	DAY# HOURS	ELAPSED MM#SS,S	DWELL (SEC)	TEMP.	REF. HIGH REF. REL.HUM. (HZ)	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
121	15#37#44,9	15.6291	15#17,9	9,0	103.35			0	0	1
122	15#37#53,9	15.6316	15#26,9	8,0		7.63		51	51	4
123	15#38# 1,9	15.6339	15#34,9	12,5	102.63			0	0	1
124	15#38#14,4	15.6373	15#47,4	6,0		7.62		52	52	4
125	15#38#20,4	15.6390	15#53,4	14,5	101.59			0	0	1
126	15#38#34,9	15.6430	16# 7,9	7,0		7.62		53	53	4
127	15#38#41,9	15.6450	16#14,9	13,5	100.67			0	0	1
128	15#38#55,4	15.6487	16#28,4	7,0		7.66		54	54	4
129	15#39# 2,4	15.6507	16#35,4	15,0	99.55			0	0	1
130	15#39#17,4	15.6548	16#50,4	10,5		183.63		55	55	2
131	15#39#27,9	15.6577	17# 0,9	10,0	98.27			0	0	1
132	15#39#37,9	15.6605	17#10,9	8,5		8.02		56	56	4
133	15#39#46,4	15.6629	17#19,4	14,0	97.39			0	0	1
134	15#40# 0,4	15.6668	17#33,4	6,5		7.93		57	57	4
135	15#40# 6,9	15.6686	17#39,9	17,0	97.01			0	0	1
136	15#40#23,9	15.6733	17#56,9	7,0		7.91		58	58	4
137	15#40#30,9	15.6752	18# 3,9	15,5	97.29			0	0	1
138	15#40#46,4	15.6796	18#19,4	8,5		8.01		59	59	4
139	15#40#54,9	15.6819	18#27,9	17,0	96.37			0	0	1
140	15#41#11,9	15.6866	18#44,9	9,5		187.88		60	60	3
141	15#41#21,4	15.6893	18#54,4	15,5	96.29			0	0	1
142	15#41#36,9	15.6936	19# 9,9	9,5		8.12		61	61061	44
143	15#41#46,4	15.6962	19#19,4	10,0	96.52			0	900001	11
144	15#42# 4,4	15.7012	19#37,4	7,0			8.16	0	900062	94
145	15#42#11,4	15.7032	19#44,4	15,5	96.31			0	900000	11
146	15#42#26,9	15.7075	19#59,9	6,5			8.24	0	900063	94
147	15#42#33,4	15.7093	20# 6,4	16,5	95.78			0	900000	11
148	15#42#49,9	15.7139	20#22,9	6,5			8.40	0	900064	94
149	15#42#56,4	15.7157	20#29,4	5,0	95.43			0	900000	11
150	15#43# 1,4	15.7171	20#34,4	1,0	99.11			0	900001	18
151	15#43# 2,4	15.7173	20#35,4	1,0			95.36	0	900002	98
152	15#43# 3,4	15.7176	20#36,4	1,0			91.98	0	900000	98
153	15#43# 4,4	15.7179	20#37,4	1,0			95.33	0	900000	98
154	15#43# 5,4	15.7182	20#38,4	1,0	99.63			0	900000	18
155	15#43# 6,4	15.7184	20#39,4	1,5			95.25	0	900000	98
156	15#43# 7,9	15.7189	20#40,9	1,0	99.85			0	0	18
157	15#43# 8,9	15.7191	20#41,9	11,5		183.42		65	65	2
158	15#43#20,4	15.7223	20#53,4	9,5	94.58			0	0	1
159	15#43#29,9	15.7250	21# 2,9	6,0			8.62	66	66066	44
160	15#43#35,9	15.7266	21# 8,9	14,0			93.71	0	900000	94

JK	TIME# OF DAY: HH#MM#SS.S	ELAPSED HOURS	ELAPSED HH#SS.S	DWELL (SEC)	TEMP.	REF. HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
161	15#43#49.9	15.7305	21#22.9	7.5			9.23		67	67000	44
162	15#43#57.4	15.7326	21#30.4	13.5				92.56	0	900009	94
163	15#44#10.9	15.7364	21#43.9	7.0			9.35		68	68000	44
164	15#44#17.9	15.7383	21#50.9	13.5				91.36	0	900000	94
165	15#44#31.4	15.7421	22# 4.4	7.5			9.58		69	69000	44
166	15#44#38.9	15.7441	22#11.9	1.0				90.63	0	900009	98
167	15#44#40.4	15.7446	22#13.4	2.5				90.44	0	900000	98
168	15#44#42.9	15.7453	22#15.9	1.0				83.29	0	900009	98
169	15#44#43.9	15.7455	22#16.9	1.0	87.65				0	900000	18
170	15#44#44.9	15.7458	22#17.9	5.5	89.93				0	900000	14
171	15#44#50.9	15.7475	22#23.9	1.5				81.43	0	900009	98
172	15#44#52.4	15.7479	22#25.4	1.0	89.60				0	9	18
173	15#44#53.4	15.7482	22#26.4	11.5		183.50			70	70	2
174	15#45# 4.9	15.7514	22#37.9	4.5	88.69				0	0	1
175	15#45# 9.4	15.7526	22#42.4	2.0	89.12				0	900000	18
176	15#45#11.4	15.7532	22#44.4	2.5				81.13	0	900009	98
177	15#45#13.9	15.7539	22#46.9	8.5			10.11		71	71071	44
178	15#45#22.9	15.7564	22#55.9	2.0				80.96	0	900009	98
179	15#45#24.9	15.7569	22#57.9	1.0				86.40	0	900009	98
180	15#45#25.9	15.7572	22#58.9	1.0				80.64	0	900000	98
181	15#45#26.9	15.7575	22#59.9	3.5				80.13	0	900009	94
182	15#45#30.4	15.7584	23# 3.4	4.0				78.62	0	900000	94
183	15#45#34.4	15.7596	23# 7.4	7.5			10.35		72	72009	44
184	15#45#41.9	15.7616	23#14.9	1.5				80.07	0	900009	98
185	15#45#43.4	15.7621	23#16.4	5.5				78.84	0	900009	94
186	15#45#49.9	15.7639	23#22.9	6.5				78.94	0	900000	94
187	15#45#56.4	15.7657	23#29.4	1.0			81.52		73	73000	48
188	15#45#57.4	15.7659	23#30.4	6.0				11.08	0	900009	94
189	15#46# 3.4	15.7676	23#36.4	9.0				77.81	0	900000	94
190	15#46#12.4	15.7701	23#45.4	1.0				88.17	0	900000	98
191	15#46#13.4	15.7704	23#46.4	1.0				78.41	0	900000	98
192	15#46#14.4	15.7707	23#47.4	2.0				108.17	0	900009	98
193	15#46#16.4	15.7712	23#49.4	6.0			12.83		74	74009	44
194	15#46#24.4	15.7734	23#57.4	7.0				77.08	0	900009	94
195	15#46#31.4	15.7754	24# 4.4	5.0	100.53				0	9	14
196	15#46#36.4	15.7768	24# 9.4	8.0		187.53			75	75	3
197	15#46#44.4	15.7790	24#17.4	2.5				92.13	0	9	8
198	15#46#46.9	15.7797	24#19.9	1.0				76.67	0	9	8
199	15#46#47.9	15.7800	24#20.9	3.5	81.25				9	9	1
200	15#46#51.4	15.7809	24#24.4	7.5	76.30				0	900009	11

JK	TIME OF DAY HH#MM#SS.S	ELAPSED HOURS	ELAPSED MM#SS.S	DWELL (SEC)	TEMP.	REF. HIGH (HZ)	REF.	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
201	15#46#58.9	15.7830	24#31.9	14.5				18.18		76	76076	44
202	15#47#13.4	15.7871	24#46.4	3.5	74.57					0	900000	14
203	15#47#16.9	15.7880	24#49.9	1.5					75.66	0	900000	98
204	15#47#18.9	15.7886	24#51.9	1.0					74.02	0	900000	98
205	15#47#19.9	15.7889	24#52.9	8.0				20.50		77	77000	44
206	15#47#29.4	15.7912	25# 1.4	1.0					89.13	0	900006	98
207	15#47#29.4	15.7915	25# 2.4	1.0					74.95	0	900000	98
208	15#47#30.4	15.7918	25# 3.4	1.0					89.93	0	900000	98
209	15#47#31.4	15.7921	25# 4.4	1.0	74.09					0	900000	18
210	15#47#32.4	15.7923	25# 5.4	1.0					100.11	0	900000	98
211	15#47#33.9	15.7928	25# 6.9	1.5	72.30					0	900000	18
212	15#47#35.4	15.7932	25# 8.4	1.0	75.93					0	900000	18
213	15#47#36.4	15.7934	25# 9.4	2.0					78.54	0	900000	98
214	15#47#38.9	15.7941	25#11.9	2.5					73.12	0	900000	98
215	15#47#41.4	15.7948	25#14.4	1.0					100.76	0	900000	98
216	15#47#42.4	15.7951	25#15.4	8.0				20.55		78	78000	44
217	15#47#50.4	15.7973	25#23.4	13.5					73.41	0	900000	94
218	15#48# 3.9	15.8011	25#36.9	7.0				20.45		79	79000	44
219	15#48#10.9	15.8030	25#43.9	14.0	72.29					0	0	14
220	15#48#24.9	15.8069	25#57.9	11.5		183.10				80	80	2
221	15#48#36.4	15.8101	26# 9.4	5.5	71.27					0	0	1
222	15#48#41.9	15.8116	26#14.9	2.0	68.74					0	900000	18
223	15#48#44.4	15.8123	26#17.4	1.5					71.29	0	900000	98
224	15#48#45.9	15.8128	26#18.9	7.5				21.00		81	81081	44
225	15#48#53.4	15.8148	26#26.4	13.5	70.16					0	900000	11
226	15#49# 6.9	15.8186	26#39.9	8.0				21.57		82	82082	44
227	15#49#14.9	15.8208	26#47.9	2.0					70.06	0	900000	98
228	15#49#16.9	15.8214	26#49.9	12.0	69.15					0	900000	11
229	15#49#29.9	15.8247	27# 1.9	6.5				22.24		83	83083	44
230	15#49#37.4	15.8271	27#10.4	3.5	68.17					0	900000	11
231	15#49#41.4	15.8282	27#14.4	1.0					67.91	0	900000	98
232	15#49#43.4	15.8287	27#16.4	1.0					67.96	0	900000	98
233	15#49#45.4	15.8293	27#18.4	1.5					67.92	0	900000	98
234	15#49#46.9	15.8297	27#19.9	1.0	63.12					0	900000	18
235	15#49#47.9	15.8300	27#20.9	1.5					76.66	0	900000	98
236	15#49#49.4	15.8304	27#22.4	2.5					68.63	0	900000	98
237	15#49#51.9	15.8311	27#24.9	6.5				22.39		84	84084	44
238	15#49#58.4	15.8329	27#31.4	1.0					62.73	0	900000	98
239	15#49#59.9	15.8333	27#32.9	1.0					63.19	0	900000	98
240	15#50# 1.4	15.8337	27#34.4	11.5	63.02					0	0	14

JK	TIME OF DAY HH:MM:SS.S	ELAPSED HOURS	ELAPSED HH:SS.S	DWELL (SEC)	TEMP.	REF. (HZ)	HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT	WORKING CONTACT	WORKING CHANNEL
241	15:50:12.9	15.8369	27:49.9	12.5		182.75				85	85	2
242	15:50:29.4	15.8404	27:58.4	0.0	65.87					0	0	1
243	15:50:33.4	15.8426	28: 0.4	1.5					63.36	0	0	0
244	15:50:34.9	15.8433	28: 7.9	0.0				22.11		86	86	4
245	15:50:42.9	15.8453	28:15.9	13.0	65.45					0	0	1
246	15:50:55.9	15.8489	28:28.9	0.5				22.31		87	87	4
247	15:51: 2.4	15.8507	28:35.4	14.0	64.43					0	0	1
248	15:51:16.4	15.8546	28:49.4	0.5				23.83		88	88	4
249	15:51:22.9	15.8564	28:55.9	14.5	63.33					0	0	1
250	15:51:37.4	15.8604	29:10.4	0.5				27.48		89	89	4
251	15:51:43.9	15.8622	29:16.9	15.0	62.31					0	0	1
252	15:51:58.9	15.8664	29:31.9	0.0			184.81			90	90	3
253	15:52: 4.9	15.8680	29:37.9	14.5	60.97					0	0	1
254	15:52:19.4	15.8721	29:52.4	1.0					38.06	0	0	0
255	15:52:20.4	15.8723	29:53.4	2.0					42.49	0	0	0
256	15:52:22.4	15.8729	29:55.4	4.0				40.97		91	91	4
257	15:52:26.4	15.8740	29:59.4	14.5	59.72					0	0	1
258	15:52:40.9	15.8780	30:13.9	0.0				46.74		92	92	4
259	15:52:48.9	15.8803	30:21.9	17.5	58.42					0	0	1
260	15:53: 6.4	15.8851	30:39.4	0.5				47.80		93	93	4
261	15:53:12.9	15.8869	30:45.9	15.0	57.07					0	0	1
262	15:53:27.9	15.8911	31: 0.9	9.5				47.26		94	94	4
263	15:53:37.4	15.8937	31:10.4	14.5	56.54					0	0	1
264	15:53:51.9	15.8978	31:24.9	12.0		182.29				95	95	2
265	15:54: 3.9	15.9011	31:36.9	0.0	56.30					0	0	1
266	15:54:11.9	15.9033	31:44.9	1.0					54.83	0	0	0
267	15:54:12.9	15.9036	31:45.9	9.0				49.06		96	96	4
268	15:54:21.9	15.9061	31:54.9	1.0					55.88	0	0	0
269	15:54:22.9	15.9064	31:55.9	11.0	53.66					0	0	1
270	15:54:33.9	15.9094	32: 6.9	5.5				49.56		97	97	4
271	15:54:39.4	15.9110	32:12.4	1.5					46.05	0	0	0
272	15:54:40.9	15.9114	32:13.9	15.0	52.61					0	0	1
273	15:54:55.9	15.9155	32:28.9	7.5				49.63		98	98	4
274	15:55: 3.4	15.9176	32:36.4	2.0					48.39	0	0	0
275	15:55: 5.4	15.9182	32:38.4	7.0	51.25					0	0	1
276	15:55:12.4	15.9201	32:45.4	2.0					47.78	0	0	0
277	15:55:14.4	15.9207	32:47.4	1.0					52.71	0	0	0
278	15:55:15.4	15.9210	32:48.4	1.0					50.99	0	0	0
279	15:55:16.4	15.9212	32:49.4	1.0					47.67	0	0	0
280	15:55:17.4	15.9215	32:50.4	1.0					53.06	0	0	0

JK	TIME# OF DAY HH#MM#SS.S	DAY# HOURS	ELAPSED MM#SS.S	DWELL (SEC)	TEMP.	REF. HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
281	15#55#18.4	15.9218	32#51.4	1.5				50.70	0	?	8
282	15#55#20.4	15.9223	32#53.4	1.0				50.84	0	?	8
283	15#55#21.9	15.9228	32#54.9	1.0				50.91	0	?	8
284	15#55#22.9	15.9230	32#55.9	1.0				46.84	0	?	8
285	15#55#23.9	15.9233	32#56.9	1.0				50.96	0	?	8
286	15#55#24.9	15.9236	32#57.9	1.5				46.89	0	?	8
287	15#55#26.4	15.9240	32#59.4	1.0				52.56	0	?	8
288	15#55#27.4	15.9243	33# 0.4	1.0				50.66	0	?	8
289	15#55#28.4	15.9246	33# 1.4	8.0			46.90		99	99	4
290	15#55#36.4	15.9268	33# 9.4	5.0	49.62				0	?	1
291	15#55#41.4	15.9282	33#14.4	13.5		181.93			109	109	2
292	15#55#54.9	15.9319	33#27.9	10.0	48.89				0	0	1
293	15#55# 4.9	15.9347	33#37.9	7.5			58.73		101	101101	44
294	15#56#12.4	15.9368	33#45.4	15.0	47.54				0	900809	11
295	15#56#27.4	15.9410	34# 0.4	8.5			61.64		102	102102	44
296	15#56#35.9	15.9433	34# 8.9	4.0				42.42	0	900800	94
297	15#56#40.0	15.9444	34#13.0	2.5				46.00	0	900800	98
298	15#56#42.5	15.9451	34#15.5	1.0	43.29				0	900809	18
299	15#56#43.5	15.9454	34#16.5	4.0	46.41				0	900800	11
300	15#56#47.5	15.9465	34#20.5	1.0				44.65	0	900809	98
301	15#56#48.5	15.9468	34#21.5	1.5				40.00	0	900809	98
302	15#56#50.0	15.9472	34#23.0	9.0			63.55		103	103103	44
303	15#56#59.0	15.9497	34#32.0	3.5				41.89	0	900800	94
304	15#57# 2.5	15.9507	34#35.5	6.5	38.83				0	900809	14
305	15#57# 9.0	15.9525	34#42.0	4.0	41.47				0	900800	11
306	15#57#13.0	15.9536	34#46.0	6.0			63.99		104	104104	44
307	15#57#19.0	15.9553	34#52.0	1.0				61.98	0	900800	98
308	15#57#20.0	15.9555	34#53.0	5.0				40.82	0	900800	94
309	15#57#25.0	15.9569	34#58.0	1.0	37.54				0	900809	18
310	15#57#26.0	15.9572	34#59.0	3.5	42.64				0	900800	11
311	15#57#29.5	15.9582	35# 2.5	5.0	39.16				0	?	16
312	15#57#34.5	15.9596	35# 7.5	7.0		185.89			105	105	3
313	15#57#41.5	15.9615	35#14.5	10.0	38.53				0	?	1
314	15#57#57.5	15.9660	35#30.5	7.0			63.34		106	106	4
315	15#58# 4.5	15.9679	35#37.5	6.0	38.27				0	?	1
316	15#58#12.5	15.9701	35#45.5	1.0				39.08	0	?	8
317	15#58#13.5	15.9704	35#46.5	4.5	37.40				0	?	1
318	15#58#19.5	15.9719	35#51.5	6.5			61.97		107	107	4
319	15#58#25.0	15.9736	35#58.0	9.0	34.28				0	?	1
320	15#58#34.0	15.9761	36# 7.0	5.0	35.66				0	?	1

JK	TIME OF DAY HH:MM:SS.S	DAY: HOURS	ELAPSED HH:SS.S	DWELL (SEC)	TEMP.	REF. HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
321	15:58:37.0	15.9769	36:10.0	4.0	33.81				0	0	1
322	15:58:41.0	15.9780	36:14.0	1.0				68.87	0	0	0
323	15:58:42.0	15.9783	36:15.0	6.0			64.21		109	108	4
324	15:58:48.0	15.9800	36:21.0	10.5	33.07				0	0	1
325	15:59: 4.5	15.9846	36:37.5	7.0			64.82		109	109	4
326	15:59:11.5	15.9865	36:44.5	14.0	32.75				0	0	1
327	15:59:25.5	15.9904	36:58.5	10.0		181.05			110	110	2
328	15:59:35.5	15.9932	37: 8.5	11.0	31.57				0	0	1
329	15:59:46.5	15.9962	37:19.5	1.0				63.81	0	0	0
330	15:59:47.5	15.9965	37:20.5	2.0				67.38	0	0	0
331	15:59:51.0	15.9975	37:24.0	1.0				68.22	0	0	0
332	15:59:52.0	15.9978	37:25.0	1.0				64.73	0	0	0
333	15:59:53.5	15.9982	37:26.5	15.5	31.07				0	0	1
334	16: 0: 9.5	16.0026	37:42.5	5.0			73.20		112	112	4
335	16: 0:14.5	16.0040	37:47.5	17.5	29.97				0	0	1
336	16: 0:32.0	16.0089	38: 5.0	6.5			76.78		113	113	4
337	16: 0:38.5	16.0107	38:11.5	15.5	29.30				0	0	1
338	16: 0:55.0	16.0153	38:28.0	1.0				17.44	0	0	0
339	16: 0:56.0	16.0155	38:29.0	2.0				86.98	0	0	0
340	16: 0:58.5	16.0162	38:31.5	2.5				86.63	0	0	0
341	16: 1: 1.0	16.0169	38:34.0	15.5	28.63				0	0	1
342	16: 1:16.5	16.0212	38:49.5	12.0		180.95			115	115	2
343	16: 1:28.5	16.0246	39: 1.5	9.0	27.76				0	0	1
344	16: 1:38.0	16.0272	39:11.0	1.0				83.67	0	0	0
345	16: 1:39.0	16.0275	39:12.0	1.0				82.56	0	0	0
346	16: 1:40.0	16.0278	39:13.0	4.5			89.93		116	116	4
347	16: 1:44.5	16.0290	39:17.5	15.5	27.31				0	0	1
348	16: 1:60.0	16.0333	39:33.0	1.0				90.36	0	0	0
349	16: 2: 1.0	16.0336	39:34.0	1.0				84.94	0	0	0
350	16: 2: 2.0	16.0339	39:35.0	4.5			90.52		117	117	4
351	16: 2: 6.5	16.0351	39:39.5	10.0	26.34				0	0	1
352	16: 2:24.5	16.0401	39:57.5	4.0			85.12		118	118	4
353	16: 2:29.0	16.0414	40: 2.0	2.5				91.61	0	0	0
354	16: 2:31.5	16.0421	40: 4.5	17.5	26.37				0	0	1
355	16: 2:49.0	16.0469	40:22.0	4.5			99.11		119	119	4
356	16: 2:53.5	16.0482	40:26.5	2.0				92.18	0	0	0
357	16: 2:55.5	16.0487	40:28.5	10.5	25.49				0	0	1
358	16: 3:12.0	16.0533	40:45.0	7.5		184.76			120	120	3
359	16: 3:19.5	16.0554	40:52.5	10.0	24.84				0	0	1
360	16: 3:35.5	16.0599	41: 8.5	0.0			92.71		121	121	4

JR	TIME OF DAY HHMMSS.S	DAYS HOURS	ELAPSED HHMMSS.S	DRILL (SEC)	TEMP.	REF. HIGH (HZ)	REF.	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
361	140 3043.5	16.0621	41M16.5	10.5	24.25					0	0	1
362	140 3060.0	16.0667	41M33.0	16.5				93.08		122	122	4
363	140 4010.5	16.0694	41M43.5	10.0	24.71					0	0	1
364	140 4028.5	16.0746	42M 1.5	7.5				93.57		123	123	4
365	140 4034.0	16.0767	42M 9.0	14.5	24.85					0	0	1
366	140 4055.5	16.0821	42M28.5	8.0				94.15		124	124	4
367	140 4103.5	16.0843	42M36.5	10.5	24.81					0	0	1
368	140 4122.0	16.0894	42M55.0	17.5		180.30				125	125	2
369	140 4139.5	16.0943	43M12.5	19.0	25.50					0	0	1
370	140 4154.5	16.0985	43M27.5	16.5				96.17		126	126	4
371	140 5010.0	16.1014	43M38.0	17.5	24.64					0	0	1
372	140 5022.5	16.1062	43M55.5	11.5				96.91		127	127	4
373	140 5034.0	16.1094	44M 7.0	21.0	24.92					0	0	1
374	140 5055.0	16.1153	44M28.0	11.0				97.61		128	128	4
375	140 5106.0	16.1183	44M39.0	22.5	24.14					0	0	1
376	140 5129.5	16.1246	45M 1.5	11.0				98.30		129	129	4
377	140 5139.5	16.1276	45M12.5	24.0	23.45					0	0	1
378	140 5159.5	16.1332	45M32.5	14.0		180.40				130	130	2
379	140 5213.5	16.1371	45M46.5	19.5	23.59					0	0	1
380	140 5229.0	16.1414	46M 2.0	11.0				98.94		131	131	4
381	140 5240.0	16.1444	46M13.0	19.5	23.13					0	0	1
382	140 5259.5	16.1499	46M32.5	12.5				99.29		132	132	4
383	140 5312.0	16.1533	46M45.0	23.0	23.96					0	0	1
384	140 5335.0	16.1597	47M 8.0	11.0				99.70		133	133	4
385	140 5346.0	16.1628	47M19.0	19.0	24.01					0	0	1
386	140100 5.0	16.1681	47M38.0	11.0				100.19		134	134	4
387	140100 16.0	16.1711	47M49.0	20.5	24.59					0	0	1
388	140100 42.5	16.1785	48M15.5	12.0			184.54			135	135	3
389	140100 54.5	16.1818	48M27.5	26.5	26.56					0	0	1
390	140110 21.0	16.1892	48M54.0	13.5		190.42				136	136	2
391	140110 34.5	16.1929	49M 7.5	27.0	27.21					0	0	1
392	140120 1.5	16.2004	49M34.5	13.5		180.33				137	137	2
393	140120 15.0	16.2042	49M48.0	28.5	27.27					0	0	1
394	140120 43.5	16.2121	50M16.5	12.5		180.33				138	138	2
395	140120 54.0	16.2150	50M29.0	29.5	27.27					0	0	1
396	140130 25.5	16.2238	50M58.5	12.0		180.46				139	139	2
397	140130 37.5	16.2271	51M10.5	29.5	27.35					0	0	1
398	140140 6.0	16.2350	51M39.0	14.5			184.56			140	140	3
399	140140 20.5	16.2390	51M53.5	29.0	26.81					0	0	1
400	140140 47.5	16.2471	52M22.5	11.0		180.43				141	141	2

JK	TIME OF DAY HHMMSS.S	DAYS HOURS	ELAPSED HH:SS.S	DWELL (SEC)	TEMP.	REF. (HZ)	HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
401	160150 0.5	16.2501	52:33.5	20.5	27.72					0	0	1
402	160150 29.0	16.2501	53: 2.0	14.5		180.33				142	142	2
403	160150 43.5	16.2621	53:16.5	20.0	27.62					0	0	1
404	160160 11.5	16.2699	53:44.5	17.0		180.42				143	143	2
405	160160 23.5	16.2746	54: 1.5	33.0	28.75					0	0	1
406	160170 1.5	16.2838	54:34.5	17.5		180.52				144	144	2
407	160170 19.0	16.2886	54:52.0	33.0	28.99					0	0	1
408	160170 52.0	16.2978	55:25.0	15.0			184.61			145	145	3
409	160180 7.0	16.3020	55:40.0	35.0	30.10					0	0	1
410	160180 42.0	16.3117	56:15.0	14.5		180.59				146	146	2
411	160180 56.5	16.3157	56:29.5	34.5	30.19					0	0	1
412	160190 31.0	16.3253	57: 4.0	18.0		180.51				147	147	2
413	160190 49.0	16.3303	57:22.0	34.5	30.56					0	0	1
414	160200 27.5	16.3410	58: 0.5	21.0		180.50				148	148	2
415	160200 48.5	16.3468	58:21.5	30.5	32.31					0	0	1
416	160210 27.0	16.3575	59: 0.0	17.5		180.56				149	149	2
417	160210 44.5	16.3624	59:17.5	34.5	32.67					0	0	1
418	160220 19.5	16.3721	59:52.5	3.0	33.67					0	0	1
419	160220 22.5	16.3729	59:55.5	16.0			184.75			150	150	3
420	160220 38.5	16.3774	60:11.5	6.5	34.78					0	0	1
421	160220 45.0	16.3792	60:18.0	30.5	32.54					0	0	1
422	160230 21.5	16.3893	60:54.5	21.5		180.56				151	151	2
423	160230 43.0	16.3953	61:16.0	1.0					33.98	0	0	0
424	160230 44.5	16.3957	61:17.5	41.5	33.45					0	0	1
425	160240 26.1	16.4072	61:59.1	1.0					35.06	0	0	0
426	160240 27.1	16.4075	62: 0.1	22.5		180.41				152	152	2
427	160240 45.1	16.4125	62:18.1	5.0		180.38				0	0	2
428	160240 50.1	16.4139	62:23.1	6.5	34.11					0	0	1
429	160240 56.6	16.4157	62:29.6	21.0	34.28					0	0	1
430	160250 17.6	16.4215	62:50.6	1.5					36.50	0	0	0
431	160250 19.1	16.4220	62:52.1	1.5					33.82	0	0	0
432	160250 20.6	16.4224	62:53.6	2.0					36.53	0	0	0
433	160250 22.6	16.4229	62:55.6	4.5	33.72					0	0	1
434	160250 27.1	16.4242	63: 0.1	3.0	36.42					0	0	1
435	160250 30.1	16.4250	63: 3.1	2.5	33.96					0	0	1
436	160250 35.6	16.4265	63: 8.6	2.5					36.17	0	0	0
437	160250 38.1	16.4272	63:11.1	24.0		180.48				153	153	2
438	160260 2.1	16.4339	63:35.1	2.5					33.72	0	0	0
439	160260 4.6	16.4346	63:37.6	14.5	36.64					0	0	1
440	160260 15.1	16.4375	63:46.1	1.5					34.41	0	0	0

JK	TIME# OF DAY: HHHMMSS.S	ELAPSED HOURS	ELAPSED MM#SS.S	DWELL (SEC)	TEMP.	REF. (MΩ)	HIGH REF. (MΩ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
441	16026015.6	16.4379	63#49.6	1.5					37.01	0	0	0
442	16026018.1	16.4383	63#51.1	35.5	34.65					0	0	1
443	16026053.6	16.4482	64#26.6	31.0		190.41				154	154	2
444	16027024.6	16.4568	64#57.6	0.0	34.81					0	0	1
445	16027030.6	16.4585	65# 3.6	2.6					36.57	0	0	0
446	16027032.6	16.4591	65# 5.6	1.5					34.10	0	0	0
447	16027034.1	16.4595	65# 7.1	2.0					35.85	0	0	0
448	16027036.1	16.4600	65# 9.1	1.0					34.88	0	0	0
449	16027037.1	16.4603	65#10.1	1.5					36.12	0	0	0
450	16027038.6	16.4607	65#11.6	1.5					33.93	0	0	0
451	16027040.1	16.4611	65#13.1	1.0					36.14	0	0	0
452	16027041.1	16.4614	65#14.1	3.5	33.76					0	0	1
453	16027045.6	16.4629	65#19.6	1.0					36.03	0	0	0
454	16027047.6	16.4632	65#20.6	3.5	33.82					0	0	1
455	16027051.1	16.4642	65#24.1	1.5					36.12	0	0	0
456	16027052.6	16.4646	65#25.6	1.5					34.03	0	0	0
457	16027054.1	16.4650	65#27.1	2.0					36.01	0	0	0
458	16027056.1	16.4656	65#29.1	3.0	34.03					0	0	1
459	16027059.1	16.4664	65#32.1	12.0	36.40					0	0	1
460	16028011.1	16.4697	65#44.1	1.5					33.76	0	0	0
461	16028012.6	16.4702	65#45.6	20.0			184.50			155	155	3
462	16028033.6	16.4774	66#11.6	1.5					33.94	0	0	0
463	16028040.1	16.4778	66#13.1	2.5					36.63	0	0	0
464	16028042.6	16.4785	66#15.6	0.0	34.95					0	0	1
465	16028045.6	16.4802	66#21.6	35.0	36.35					0	0	1
466	16029023.6	16.4899	66#56.6	12.5	34.80					0	0	1
467	16029035.1	16.4934	67# 8.1	20.0		190.29				156	156	2
468	16030 4.1	16.5011	67#37.1	43.0	34.87					0	0	1
469	16030047.1	16.5131	68#20.1	5.5	36.06					0	0	1
470	16030052.6	16.5146	68#25.6	12.5	34.60					0	0	1
471	16031# 5.1	16.5189	68#41.1	35.5		190.29				157	157	2
472	16031041.6	16.5282	69#14.6	37.5	34.77					0	0	1
473	16032019.1	16.5386	69#52.1	1.5					36.98	0	0	0
474	16032020.6	16.5390	69#53.6	27.0	37.83					0	0	1
475	16032047.5	16.5465	70#29.5	31.0		190.28				158	158	2
476	16033019.5	16.5551	70#51.5	12.5	36.97					0	0	1
477	16033031.0	16.5586	71# 4.0	1.0					42.89	0	0	0
478	16033032.0	16.5589	71# 5.0	3.0					37.25	0	0	0
479	16033035.0	16.5597	71# 8.0	3.0					40.18	0	0	0
480	16033039.0	16.5606	71#11.0	4.5	37.53					0	0	1

JK	TIME# OF DAY# HH#MM#SS.S	DAY# HOURS	ELAPSED MM#SS.S	DWELL (SEC)	TEMP.	REF. (HZ)	HIGH REF. (HZ)	REL.HUM.	UNDECOM	BAROSWITCH CONTACT \	WORKING CONTACT	WORKING CHANNEL
481	16#33#42.5	16.5618	71#15.5	35.5	40.55					0	0	1
482	16#34#18.5	16.5718	71#51.5	1.0					43.44	0	0	0
483	16#34#19.5	16.5721	71#52.9	5.5	40.58					0	0	1
484	16#34#25.0	16.5736	71#58.0	3.0					42.89	0	0	0
485	16#34#28.0	16.5745	72# 1.0	2.0					40.64	0	0	0
486	16#34#30.0	16.5750	72# 3.0	30.0		180.11				159	159	2
487	16#35# 0.0	16.5856	72#41.0	1.5					177.65	0	0	0
488	16#35# 9.5	16.5860	72#42.5	30.0	44.45					0	0	1
489	16#35#39.5	16.5943	73#12.5	16.0	44.92					0	0	1
490	16#35#55.5	16.5987	73#28.5	5.0	42.84					0	0	1
491	16#36# 0.5	16.6001	73#33.5	6.5	45.14					0	0	1
492	16#36# 7.0	16.6019	73#40.0	22.0					38.75	0	0	7
493	16#36#29.0	16.6081	74# 2.0	7.0					41.89	0	0	7
494	16#36#36.0	16.6100	74# 9.0	46.5			184.19			160	160	3
495	16#37#25.0	16.6236	74#58.0	1.0					37.86	0	0	0
496	16#37#26.0	16.6239	74#59.0	25.5	40.67					0	0	1
497	16#37#51.5	16.6310	75#24.5	4.0	43.90					0	0	1
498	16#37#56.0	16.6322	75#29.0	3.5	40.61					0	0	1
499	16#37#59.5	16.6332	75#32.5	9.5	44.35					0	0	1
500	16#38# 9.0	16.6358	75#42.0	1.0					39.94	0	0	0
501	16#38#10.0	16.6361	75#43.0	8.0	41.22					0	0	1
502	16#38#19.0	16.6383	75#51.0	6.0	41.71					0	0	1
503	16#38#24.0	16.6400	75#57.0	1.5					21.25	0	0	0
504	16#38#25.5	16.6404	75#58.5	2.0					43.95	0	0	0
505	16#38#27.5	16.6410	76# 0.5	3.5	38.63					0	0	1
506	16#38#31.0	16.6419	76# 4.0	1.5					43.35	0	0	0
507	16#38#32.5	16.6423	76# 5.5	6.5	41.39					0	0	1
508	16#38#41.0	16.6447	76#14.0	4.0	40.04					0	0	1
509	16#38#45.0	16.6458	76#18.0	8.0	41.35					0	0	1
510	16#38#53.0	16.6480	76#26.0	1.0					39.82	0	0	0
511	16#38#54.5	16.6485	76#27.5	13.5	41.71					0	0	1
512	16#39# 9.0	16.6522	76#41.0	26.0		179.89				161	161	2
513	16#39#33.9	16.6594	77# 6.9	24.0	45.22					0	0	1

DECOMMUTATED OUTPUT AT UNIFORM TIME INTERVALS

INDEX	TIME (SEC)	AZIMUTH (DEG)	ELEVATION (DEG)	PRESSURE (MB)	REF FREQ (HZ)	TEMP (ORDINATES)	REL HUM
0	0.	0.	0	1026.7	180.6	63.0	16.5
1	60.0	17.1	43.9	991.2	185.5	62.4	34.6
2	120.0	19.7	39.8	954.4	185.1	61.2	53.7
3	180.0	12.7	38.8	918.2	184.8	60.4	53.7
4	240.0	3.7	37.2	884.0	184.5	61.3	71.1
5	300.0	349.3	39.6	652.4	184.3	62.3	47.2
6	360.0	329.9	40.7	820.6	184.3	61.2	5.5
7	420.0	316.3	40.7	787.9	184.3	60.3	63.5
8	480.0	306.6	39.2	757.3	184.2	58.7	42.5
9	540.0	303.4	36.5	731.6	184.1	57.7	23.5
10	600.0	302.0	32.5	707.5	184.0	58.8	25.5
11	660.0	297.7	28.6	678.7	183.9	57.2	11.5
12	720.0	292.9	25.3	649.8	183.9	56.0	4.1
13	780.0	287.3	22.1	627.4	183.8	56.1	4.1
14	840.0	283.9	20.0	604.9	183.8	54.9	4.0
15	900.0	280.6	18.4	582.3	183.8	53.8	4.0
16	960.0	277.2	17.6	557.4	183.7	52.6	3.9
17	1020.0	275.7	16.5	534.4	183.6	51.9	4.1
18	1080.0	274.2	15.9	512.6	183.6	50.5	4.1
19	1140.0	272.9	14.9	492.7	183.5	49.9	4.2
20	1200.0	271.3	14.0	473.0	183.5	49.8	4.3
21	1260.0	269.1	13.2	452.7	183.4	48.9	4.4
22	1320.0	267.2	12.5	431.3	183.5	45.9	4.9
23	1380.0	265.8	12.0	410.9	183.4	47.3	5.3
24	1440.0	264.5	11.7	390.8	183.3	51.6	7.0
25	1500.0	263.0	11.1	371.9	183.2	38.5	10.6
26	1560.0	262.0	10.5	353.7	183.1	37.3	10.7
27	1620.0	261.3	10.5	335.7	182.9	35.8	11.5
28	1680.0	261.0	10.2	318.6	182.7	34.1	11.5
29	1740.0	260.5	10.0	301.4	182.6	33.0	13.1
30	1800.0	260.0	9.4	285.2	182.5	31.3	21.7
31	1860.0	259.8	9.0	269.9	182.3	29.7	24.7
32	1920.0	259.8	8.9	255.0	182.2	28.1	25.7
33	1980.0	259.5	8.5	242.6	182.0	26.2	24.3
34	2040.0	259.5	8.2	227.1	181.8	24.2	31.9
35	2100.0	259.5	8.2	213.8	181.5	21.5	33.4
36	2160.0	259.7	8.0	200.1	181.3	18.3	32.7
37	2220.0	259.7	7.9	187.5	181.0	16.9	35.3
38	2280.0	259.9	7.7	175.6	181.0	15.7	39.6
39	2340.0	259.9	7.5	164.0	180.9	14.7	45.6
40	2400.0	260.2	7.4	153.0	180.8	13.8	44.9
41	2460.0	260.4	7.4	143.0	180.6	13.1	49.6

42	2520.0	260.4	7.4	134.0	180.4	13.0	49.2
43	2580.0	260.6	7.4	125.8	180.3	13.0	50.1
44	2640.0	260.6	7.4	118.7	180.3	12.8	51.0
45	2700.0	260.7	7.3	112.4	180.4	12.6	51.7
46	2760.0	260.8	7.2	105.8	180.4	12.4	52.1
47	2820.0	261.0	7.2	99.6	180.4	12.6	52.4
48	2880.0	261.3	7.2	93.7	180.4	12.9	52.9
49	2940.0	261.5	7.2	88.9	180.4	14.2	0.
50	3000.0	261.7	7.2	84.2	180.3	14.4	0.
51	3060.0	261.6	7.2	79.7	180.5	14.4	0.
52	3120.0	261.6	7.2	75.4	180.4	14.2	0.
53	3180.0	261.5	7.2	71.1	180.3	14.6	0.
54	3240.0	261.5	7.2	67.2	180.4	14.9	0.
55	3300.0	261.6	7.2	63.6	180.5	15.2	0.
56	3360.0	261.8	7.2	60.2	180.6	15.5	0.
57	3420.0	261.8	7.3	56.8	180.5	15.9	0.
58	3480.0	261.4	7.4	53.6	180.5	16.4	0.
59	3540.0	261.8	7.4	50.8	180.6	17.1	0.
60	3600.0	261.9	7.5	47.8	180.6	17.9	0.
61	3660.0	262.0	7.5	45.0	180.5	17.3	0.
62	3720.0	262.0	7.5	42.4	180.4	18.2	0.
63	3780.0	262.0	7.5	40.0	180.5	18.6	0.
64	3840.0	262.0	7.6	37.8	180.4	18.6	0.
65	3900.0	262.0	7.6	35.6	180.4	17.9	0.
66	3960.0	262.0	7.5	33.5	180.3	18.8	0.
67	4020.0	262.1	7.7	31.5	180.3	18.4	0.
68	4080.0	262.1	7.8	29.6	180.3	18.4	0.
69	4140.0	262.1	7.9	27.9	180.3	18.3	0.
70	4200.0	262.1	8.0	26.2	180.3	19.6	0.
71	4260.0	262.1	8.0	24.5	180.2	19.5	0.
72	4320.0	262.1	8.1	22.9	180.1	21.6	0.
73	4380.0	262.1	8.2	21.5	180.1	23.5	0.
74	4440.0	262.1	8.2	20.2	180.0	23.2	0.
75	4500.0	262.1	8.2	19.1	180.0	21.8	0.
76	4560.0	262.1	8.3	18.0	179.9	20.8	0.

```
*** EXCECUTION COMPLETE ***  COMMENT FOLLOWS (ISTOP = 1C)
COMPLETED TO BURST


ECCPRD TAPE(FILE) WRITE FOLLOWS



ECCPRD TAPE(FILE) WRITE FOLLOWS
```

```
                              *** INPUT CARD LISTING ***
          ECC                   1 0.
WALLOPS IS 103080 152272   4.0  30?0  73.7  57.8  46.0 2  7.3 83.( 1026.8AS607A
WALLOPS IS 103080 1522     0.    0?    0.    0.   0.   0.   0.  0.        AS607A
      DIV CHECK     AT LOCATION      062245
     EXP OVERFLO    AT LOCATION      062246
     EXP OVERFLO    AT LOCATION      062255
     EXP OVERFLO    AT LOCATION      062262
     EXP OVERFLO    AT LOCATION      062263
     EXP OVERFLO    AT LOCATION      062270
     EXP OVERFLO    AT LOCATION      062271
     EXP OVERFLO    AT LOCATION      062272
     EXP OVERFLO    AT LOCATION      062277
     EXP OVERFLO    AT LOCATION      062300
     EXP OVERFLO    AT LOCATION      062301
     EXP OVERFLO    AT LOCATION      062302
      DIV CHECK     AT LOCATION      062315
  77    0  76  76
103080 152272.9999    4.0   4. 360?   0.  0.
```

STATION WALLOPS IS LAUNCH DATE 193080 LAUNCH TIME 1522 GMT GCC SONDE AS607AX

SURFACE CONDITIONS
PRESS 1026.8 MB
TEMP 280.5 K
HUMY 83.0 %

003 = 0.
OIZ = 0.
OZC = 0.
IO =34E 37
PS = 0.

TBOX CAL = 0. C AT 0. ORD
BASE CAL = 30.6 C AT 73.7 ORD
HUMIDITY = 57.8 % AT 46.0 ORD

PROFILE	DOBSON
INTEGRATED OZONE	0.
RESIDUAL OZONE	
TOTAL OZONE	0.

TIME MIN	ALT GP MT	OZONE MICMB	TOTOZ ATMCM	OZDEV GAMMA	OZMXR MICGG	PRESS MB	LOG PRESS	TEMP DEG K	PTEMP DEG K	VTEMP DEG K	HUMTY PRCNT	DEWPT DEG K	SPECIF HUMTY	SPD MPS	DIR DEG	NS MPS	EW MPS
0.	4	0.				1026.7	3.0114	280.4	278.3	281.29	79.7	277.2	0.0049	4.0	360.0	-4.0	-0.0
0.7	320					1000.0	3.0000	279.5	279.5	280.24	70.3	274.5	0.0040	5.4	16.1	-5.2	-1.5
1.0	295					991.2	2.9962	279.2	279.9	279.89	67.2	273.6	0.0040	6.0	19.7	-5.6	-2.0
2.0	601					954.4	2.9797	277.1	280.9	277.66	56.7	269.3	0.0030	6.9	11.1	-6.8	-1.3
3.0	914					918.2	2.9629	275.8	282.6	276.28	56.6	268.1	0.0028	7.8	351.4	-7.7	1.2
3.5	1076					900.0	2.9542	276.7	285.2	277.14	49.4	267.0	0.0026	7.4	334.9	-6.7	3.1
4.0	1222					884.0	2.9465	277.5	287.4	277.91	43.0	266.0	0.0025	7.6	319.8	-5.8	4.9
5.0	1519					852.4	2.9306	279.0	292.1	279.71	57.7	271.4	0.0039	9.9	281.3	-1.9	9.7
5.1	1541					850.0	2.9294	278.9	292.2	279.59	60.8	271.8	0.0042	10.0	280.4	-1.8	9.9
6.0	1829					820.6	2.9141	277.1	293.3	278.18	98.8	277.0	0.0061	11.6	270.5	-0.1	11.6
6.6	2035					800.0	2.9031	276.3	294.5	277.02	70.3	270.9	0.0035	11.5	269.4	0.1	11.5
7.0	2159					787.9	2.8965	275.8	295.2	276.32	53.3	267.3	0.0031	11.4	268.8	0.2	11.4
8.0	2477					757.3	2.8793	273.8	295.6	273.56	64.8	267.2	0.0032	11.5	279.3	-1.9	11.3
9.0	2752					731.6	2.8643	271.6	297.9	272.14	72.5	267.3	0.0034	14.3	293.9	-5.8	13.1
10.0	3019					707.5	2.8497	273.2	301.6	273.82	71.2	268.6	0.0038	20.6	289.1	-6.8	19.5
10.3	3103					700.0	2.8451	272.5	301.8	273.17	75.1	268.6	0.0039	22.2	286.1	-6.1	21.3
11.0	3350					678.7	2.8317	270.6	302.3	271.31	86.5	268.7	0.0040	26.8	279.2	-4.3	26.5
12.0	3694					649.8	2.8128	268.9	304.2	269.64	100.0	268.9	0.0043	32.5	270.7	-0.4	32.5
13.0	3971					627.4	2.7975	269.1	307.4	269.83	100.0	269.1	0.0045	34.5	267.0	1.8	34.5
14.0	4258					604.9	2.7817	267.1	308.4	267.77	100.0	267.1	0.0040	34.2	264.7	3.2	34.0
14.2	4321					600.0	2.7782	266.8	308.7	267.41	100.0	266.8	0.0039	33.9	263.1	4.1	33.7

STATION WALLOPS IS LAUNCH DATE 103080 LAUNCH TIME 1522 GMT ECC SONDE AS607AX

15.0	4555	582.3	2.7651	265.5	389.8	266.38	100.0	265.5	0.0037	33.1	257.2	7.3	32.3
16.0	4894	557.4	2.7462	263.7	341.7	264.26	100.0	263.7	0.0033	33.2	258.4	6.6	32.5
17.0	5218	534.4	2.7279	261.6	312.9	262.04	100.8	261.6	0.0029	34.0	262.9	4.2	33.8
18.0	5537	512.6	2.7098	260.7	315.6	261.17	100.0	260.7	0.0028	37.0	262.8	5.1	36.7
18.6	5726	500.0	2.6990	260.2	317.2	260.63	100.0	260.2	0.0028	41.8	261.2	6.4	41.3
19.0	5839	492.7	2.6926	259.9	318.1	260.31	100.8	259.9	0.0028	44.6	260.7	7.2	44.8
20.0	6150	473.0	2.6749	259.7	321.7	260.19	100.0	259.7	0.0028	48.8	254.7	12.9	47.1
21.0	6483	452.7	2.6558	258.5	324.2	258.90	100.0	258.5	0.0027	49.6	250.4	16.7	46.7
22.0	6847	431.3	2.6348	254.9	323.6	254.81	99.5	254.4	0.0020	52.3	251.2	16.9	49.5
23.0	7210	410.9	2.6137	256.4	330.6	256.79	98.8	256.2	0.0025	52.0	250.9	17.0	49.1
23.5	7414	400.0	2.6021	259.6	337.3	260.08	96.6	259.1	0.0037	54.2	250.1	18.5	50.9
24.0	7591	390.8	2.5920	262.3	343.0	262.93	94.7	261.6	0.0040	56.1	249.4	19.8	52.5
25.0	7959	371.9	2.5704	244.5	324.4	244.65	86.4	243.0	0.0008	62.7	250.2	21.3	59.0
26.0	8317	353.7	2.5486	243.0	326.9	243.06	86.1	241.4	0.0007	49.9	251.0	16.2	47.1
26.2	8391	350.0	2.5441	242.6	327.4	242.66	85.8	241.0	0.0007	49.2	251.4	15.7	46.7
27.0	8687	335.7	2.5260	241.0	329.2	241.07	84.7	239.3	0.0006	46.8	252.8	13.8	44.7
28.0	9054	318.6	2.5032	236.7	331.0	238.81	84.2	237.0	0.0005	53.4	253.7	15.8	51.3
29.0	9441	301.4	2.4791	237.4	334.4	237.47	81.6	235.4	0.0005	73.8	254.6	19.6	71.1
29.1	9473	300.0	2.4771	237.2	334.6	237.27	80.6	235.1	0.0005	73.5	254.8	19.3	70.9
30.0	9823	285.2	2.4551	235.0	336.3	235.04	70.3	231.6	0.0003	70.8	256.5	16.6	68.8
31.0	10200	269.9	2.4312	232.8	338.5	232.83				76.6	256.8	17.5	74.5
32.0	10585	255.0	2.4065	230.6	340.8	230.63				72.5	258.1	15.0	70.9
32.4	10717	250.0	2.3979	229.6	341.2	229.63				70.2	258.3	14.3	68.7
33.0	10919	242.6	2.3849	228.1	341.9	228.11				66.6	258.6	13.1	65.3
34.0	11857	227.1	2.3562	225.1	343.8	225.10				67.2	259.0	12.8	65.9
35.0	11751	213.8	2.3300	221.1	343.5	221.05				66.7	260.1	11.4	65.7
36.0	12174	200.1	2.3012	215.9	342.0	215.94				67.1	260.9	10.7	66.2
36.0	12177	200.0	2.3010	215.9	342.0	215.92				67.1	260.9	10.7	66.2
37.0	12583	187.5	2.2730	213.7	344.8	213.73				67.6	261.8	9.6	66.9
38.0	12991	175.6	2.2445	211.4	347.5	211.42				76.4	262.7	9.7	75.8
39.0	13412	164.0	2.2148	209.6	351.3	209.56				70.1	264.3	7.0	69.8
40.0	13836	153.0	2.1847	207.8	355.3	207.83				60.9	264.6	5.8	60.6
40.3	13958	150.0	2.1761	207.4	356.7	207.42				60.2	264.7	5.6	59.9
41.0	14246	143.0	2.1553	206.4	359.8	206.43				58.6	265.0	5.1	58.3
42.0	14639	134.0	2.1271	206.4	366.6	206.43				44.8	264.6	4.2	44.6
43.0	15020	125.8	2.0997	206.2	372.9	206.23				43.4	263.5	4.9	43.2
43.1	15058	125.0	2.0969	206.2	373.5	206.20				44.5	263.5	5.0	44.2
44.0	15378	118.7	2.0745	206.0	378.8	206.02				52.7	264.0	5.5	52.4
45.0	15698	112.4	2.0508	205.6	383.9	205.61				52.9	264.5	5.1	52.7
46.0	16061	105.8	2.0245	205.0	389.4	204.98				52.7	267.5	2.3	52.6

STATION WALLOPS IS LAUNCH DATE 103080 LAUNCH TIME 1522 GMT BCC SONDE AS607AX

46.9	16399	100.0	2.0000	205.6	396.9	205.57	51.6	268.9	1.0	51.6
47.8	16424	99.6	1.9983	205.6	397.4	205.61	51.5	269.0	0.9	51.5
48.8	16792	93.7	1.9717	206.2	405.6	206.23	40.8	272.8	-1.4	40.8
49.8	17111	88.9	1.9489	206.6	456.5	206.61	39.1	269.9	0.0	39.1
50.8	17443	84.2	1.9253	209.0	413.8	208.99	37.1	264.6	3.5	36.9
50.9	17756	80.0	1.9031	209.0	430.1	208.99	38.0	262.8	5.3	37.6
51.8	17779	79.7	1.9015	209.0	430.5	208.99	38.1	261.8	5.4	37.7
52.8	18118	75.4	1.8774	208.6	436.6	208.61	38.4	259.9	6.7	37.8
53.8	18471	71.1	1.8519	209.4	445.6	209.37	36.9	261.3	5.6	36.5
53.3	18572	70.0	1.8451	209.6	448.1	209.58	36.9	262.3	4.9	36.6
54.8	18823	67.2	1.8274	210.1	454.5	210.13	36.8	264.9	3.3	36.7
55.8	19162	63.6	1.8035	210.7	462.9	210.68	33.9	267.8	1.8	33.8
56.8	19501	60.2	1.7796	211.8	472.7	211.78	25.7	268.3	0.8	25.7
56.1	19521	60.0	1.7782	211.8	473.2	211.79	25.5	268.3	0.8	25.5
57.8	19883	56.6	1.7528	212.0	481.5	211.96	22.4	267.5	1.8	22.4
58.8	20221	53.6	1.7292	212.7	490.7	212.67	20.4	267.1	1.8	20.4
59.8	20556	50.8	1.7059	213.9	501.1	213.90	21.4	266.7	1.2	21.3
59.3	20655	50.0	1.6990	214.3	504.3	214.26	23.2	266.3	1.5	23.2
60.8	20938	47.8	1.6794	215.3	513.2	215.27	28.4	265.4	2.3	28.3
61.8	21317	45.0	1.6532	214.4	520.1	214.42	31.1	265.1	2.7	31.0
62.8	21692	42.4	1.6274	215.9	532.7	215.94	31.5	263.0	3.9	31.3
63.8	22060	40.0	1.6021	216.4	542.9	216.44	27.8	262.4	3.9	29.5
64.8	22418	37.8	1.5775	216.4	551.8	216.44	30.5	263.1	3.7	30.3
65.8	22797	35.6	1.5515	215.4	558.7	215.44	27.1	263.9	2.9	27.0
65.3	22904	35.0	1.5441	215.8	562.4	215.81	26.7	264.3	2.7	26.6
66.8	23181	33.5	1.5250	216.8	572.0	216.77	25.6	265.1	2.2	25.5
67.8	23571	31.5	1.4983	216.3	580.8	216.27	26.6	264.8	2.4	26.5
67.8	23879	30.0	1.4771	216.3	589.0	216.27	18.8	265.3	1.5	18.8
68.8	23965	29.6	1.4713	216.3	591.3	216.27	15.7	265.5	1.2	15.6
69.8	24339	27.9	1.4456	215.9	600.4	215.94	17.8	264.8	1.9	17.7
70.8	24738	26.2	1.4183	218.1	617.3	218.07	19.1	262.5	2.5	19.0
70.7	25037	25.0	1.3979	218.1	625.7	218.07	17.0	262.2	2.3	16.8
71.8	25168	24.5	1.3892	218.1	629.3	218.07	16.1	262.1	2.2	15.9
72.8	25600	22.9	1.3598	221.2	650.8	221.21	25.5	262.1	3.5	25.2
73.8	26011	21.5	1.3324	224.1	671.2	224.07	25.0	262.1	3.4	24.8
74.8	26420	20.2	1.3054	223.8	682.3	223.77	21.3	262.1	2.9	21.1
74.2	26484	20.0	1.3010	223.4	683.0	223.37	20.8	262.1	2.8	20.6
75.8	26785	19.1	1.2810	221.5	686.3	221.91	18.5	262.1	2.5	18.4
76.8	27168	18.0	1.2553	220.1	693.7	220.13	999.9	999.9	999.9	999.9

```
 $NUMB = 49720, ACTIVITY # = 03, REPORT CODE = 10, RECORD COUNT = 000021

*** LAYER BELOW  431.3 MB HAS SUPER ADIABATIC LAPSE RATE OF  18.9 DEG/KM
*** LEVEL BELOW  431.3 MB   ***   POTENTIAL TEMPERATURE =  323.6 DEG K   ***   NOT INCREASING
*** LAYER BELOW  371.9 MB HAS SUPER ADIABATIC LAPSE RATE OF  48.2 DEG/KM
*** LEVEL BELOW  371.9 MB   ***   POTENTIAL TEMPERATURE =  324.4 DEG K   ***   NOT INCREASING
*** LAYER BELOW  213.8 MB HAS SUPER ADIABATIC LAPSE RATE OF  18.3 DEG/KM
*** LEVEL BELOW  213.8 MB   ***   POTENTIAL TEMPERATURE =  343.5 DEG K   ***   NOT INCREASING
*** LAYER BELOW  200.1 MB HAS SUPER ADIABATIC LAPSE RATE OF  12.1 DEG/KM
*** LEVEL BELOW  200.1 MB   ***   POTENTIAL TEMPERATURE =  342.0 DEG K   ***   NOT INCREASING
******   FOR THE ABOVE LAYERS OR LEVELS, CHECK TEMP ORDINATE AND PRESSURE ENTRIES.   ******
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        WMO/ONM                VERTICAL DISTRIBUTION OF OZONE              MSC/SMO
   STATION: WALLOPS IS      DISTRIBUTION VERTICALE D'OZONE          EQUIPMENT: ECC
ISMMNYYMMJJGG    LSXXXPPPxxQCCCC SIGNIFICANT COMMENTS
107 130108015              99      ECC    607A   TROP 143.0MB
ISMMNYYMMJJGG    PPPP P3TTTDDDFFFPPPP P3TTTDDDFFFPPPP P3TTTDDDFFFPPP P3TTTDDDFFF
107 230108015    1026      7360  41000      6 16  5 900     4335  7 850     6280 10
107 330108015     800      3269 12 700    -1286 22 600    -6263 34 800   -13261 42
107 430108015     400   -14250 54 350   -31251 49 300   -36255 74 850   -44258 70
107 530108015     200   -57261 67 150   -66265 60 143   -67265 59 125   -67264 45
107 630108015     100   -60269 5280.0   -64262 3870.0   -64262 3768.0   -61268 26
107 730108015    50.0   -59266 2340.0   -57262 3035.0   -57264 2738.0   -57265 18
107 830108015    25.0   -55262 1720.0   -50262 2118.0   -53
```


NORMAL PROGRAM TERMINATION

APPENDIX C

JOB CONTROL DECK

(RAWINPROC)

```
$     IDENT   300700,RAWINPROC
$     OPTION  FORTRAN
  (object decks--MAIN, ADVANC, ANGLE, TRACK, SEARCH, DECOM, INTERP)
$     EXECUTE
$     LIMITS  05,23K,0,3K
$     FILE    02,A1S
$     FILE    01,NSTDLB,MLTFIL
$     TAPE    01,X1D,8592
$     ICODE   IBMF
  (input deck for RAWINPROC)
$     IDENT   300700,ECC-PRDØ9
      OPTION  FORTRAN
  (object decks--OZONE, ECC, WODC, OZGRID, RL, TEMPCE, WINDS, ADIR)
$     EXECUTE
$     LIMITS  05,28K,3K
$     SYSOUT  Ø8
$     FILE    Ø5,A1R
$     FILE    Ø9,A2R
$     TAPE    Ø7,X1R,,,,SCRATCH
$     ENDJOB
***EOF
```

The job control deck above is for the second and third of the three-part RAWINPROC system. Documentation for the first part, METPASS1, is presently under way at NASA Wallops Flight Center (W. J. Speidel). The middle portion, RAWINPROC, is described in this document. The final portion, ECC-PRD, is operational and documented as NASA Computer Program 3.0.0700, NASA Wallops Computer Program Abstracts, Vol. XXVII.

APPENDIX D

FILE DESCRIPTION

(RAWINPROC)

File 01 -- Input tape file containing successive (0.1-second) values, TIME, FREQ, AZ, EL, written by the preceding computer routine METPASS1 (see Appendix C).

File 02 -- Output disc file to the succeeding computer routine ECC-PRD (see Appendix C, Appendix A (INTERP), and Input Card Deck.

File 03 -- Vestigial file used in program development, not used in production runs.

File 05 -- Input file for card input (see Input Card Deck).

File 06 -- Print file for auxiliary and diagnostic printout (Appendix B).